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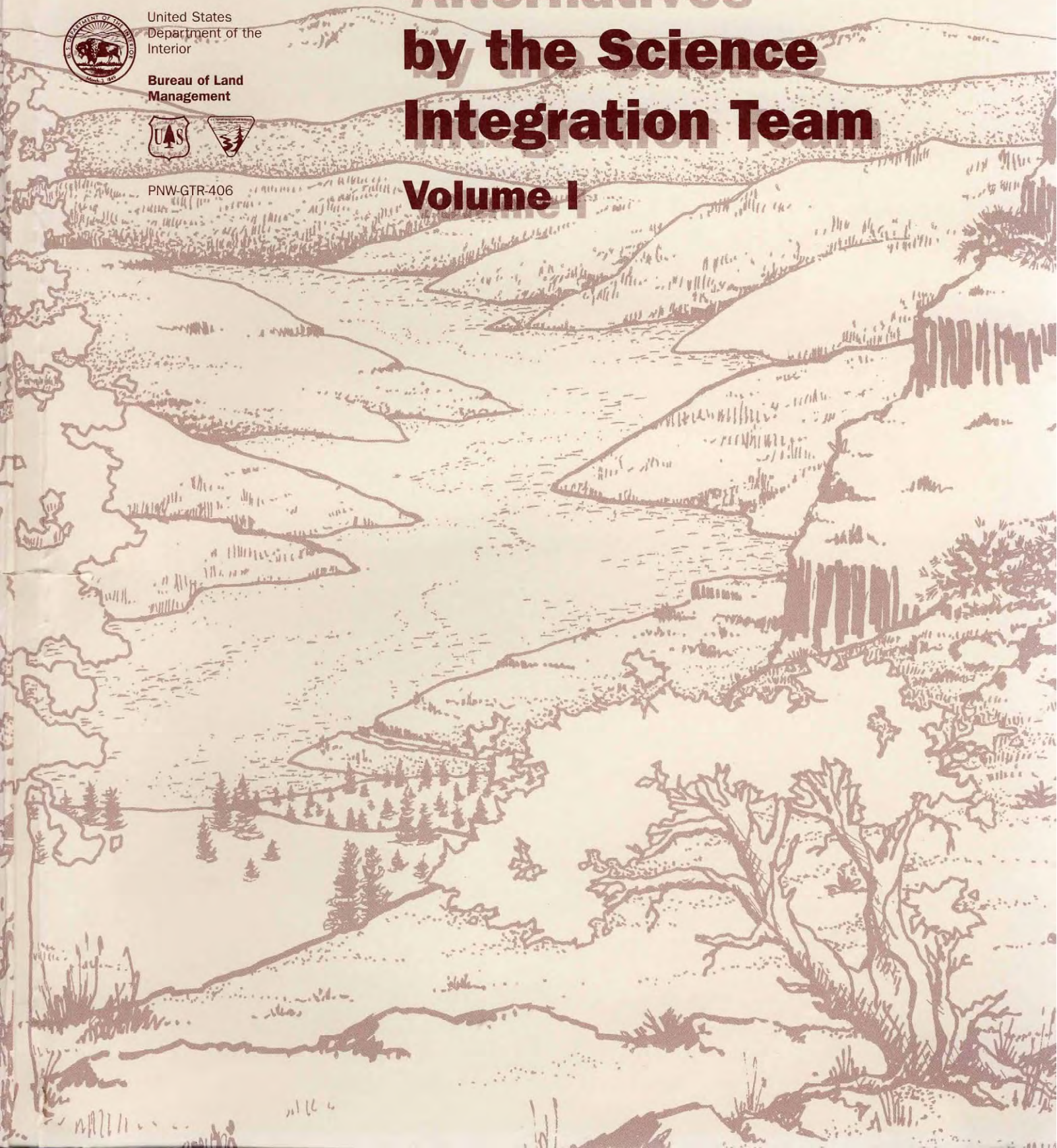
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PNW-GTR-406

Evaluation of EIS Alternatives by the Science Integration Team

Volume I



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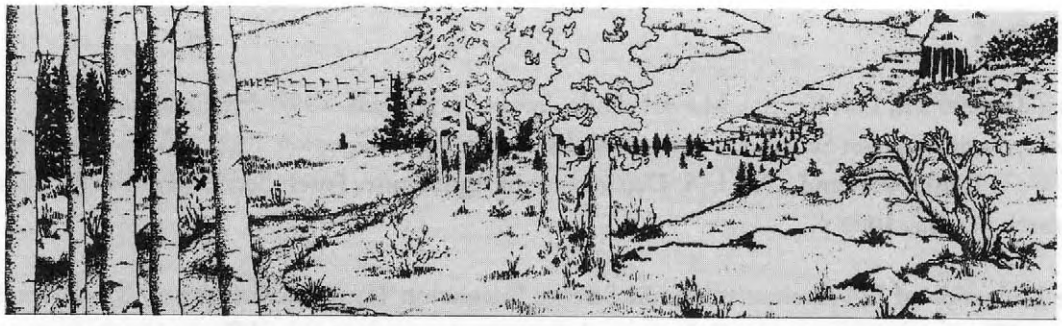
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Interior Columbia Basin Ecosystem Management Project

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Evaluation of EIS Alternatives by the Science Integration Team Volume I

This volume contains pages 1-536

Thomas M. Quigley, Kristine M. Lee,
and Sylvia J. Arbelbide
Technical Editors

Thomas M. Quigley is a range scientist/economist with the USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA 99362

Kristine M. Lee is a biologist with the USDA Forest Service, Intermountain Region, Ogden, UT 84401

Sylvia J. Arbelbide is a geologist with the USDA Forest Service, Pacific Southwest Region, San Francisco, CA 94111

May 1997
United States Department of Agriculture
Forest Service
Pacific Northwest Research Station
Portland, Oregon

Abstract

Quigley, Thomas M.; Lee, Kristine M.; Arbelbide, Sylvia J., tech. eds. 1997. Evaluation of the Environmental Impact Statement Alternatives by the Science Integration Team. 2 Vols. Gen. Tech. Rep. PNW-GTR-406. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 1094 p.

The Evaluation of EIS Alternatives by the Science Integration Team describes the outcomes, interactions, effects, and consequences likely to result from implementing seven different management strategies on Forest Service (FS) and Bureau of Land Management (BLM) administered lands within the Interior Columbia Basin and portions of the Klamath and Great Basins. Two environmental impact statement teams developed seven alternative approaches to the management of forest, rangeland, aquatic, and watershed systems of FS- and BLM- administered lands. The alternatives varied from continuation of current management, to managing biodiversity within a network of large reserves, to actively managing to restore ecosystem health and integrity. Continuing with current management direction, in the absence of interim protection measures, results in continued declining trends in ecological integrity and increasing risk to species. No single alternative was found to result in improved outcomes for all species, reduced risk to ecological integrity, and improved resiliency for social and economic systems. Alternatives that prioritize activities to restore and/or maintain ecological integrity and simultaneously provide desired goods and services within the capability of the ecosystem appear to have favorable trends in most species outcomes, landscape functions, and resiliency in social and economic systems. The Draft and Final Environmental Impact Statements are expected to differ to some extent from the preliminary Draft Environmental Impact Statement analyzed for this evaluation.

Keywords: Ecosystem management; ecological integrity; socioeconomic resiliency; management and goals; risk management

Preface

This document is one of three primary products from the Science Integration Team (SIT) of the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The first is a *Framework for Ecosystem Management* (Haynes and others 1996); the second is the compilation of detailed reports from each science team staff, referred to as the *Assessment of Ecosystem Components* (Quigley and Arbelbide, in press). In addition to the products from the SIT, the Upper Columbia River Basin Environmental Impact Statement and the Eastside Environmental Impact Statement comprise the other primary products of the ICBEMP. Jointly they represent the information gathered for the purpose of adopting a scientifically sound, ecosystem-based management strategy for Forest Service and Bureau of Land Management lands within the interior Columbia River Basin and portions of the Klamath and Great Basins.

The Environmental Impact Statements (EISs) were developed under the leadership of Jeff Blackwood, Steve Mealey, Pat Geehan, Linda Colville, Jim May, Jeff Walter, Cathy Humphrey and George Pozzuto. A complete listing of all EIS team members would include several dozen individuals. Critical to the content of the alternatives was the involvement of the Executive Steering Committee and other Regional Executives including: Elaine Zielinski, Martha Hahn, Larry Hamilton, Robert Williams, Hal Salwasser, Dale Bosworth, Thomas Mills, Denver Burns, William Stelle, Michael Spear and Chuck Clarke.

All members of the Science Integration Team participated in discussions and contributed to analysis or writing early versions of this report. This document has evolved from a rough draft in late 1995. Charles Philpot and Thomas Mills have been particularly influential in helping define and protect the role of science within this science and management partnership. Integral to this work was the development of concepts related to and estimates of integrity, resiliency, and risk. James Sedell, Danny Lee, Paul Hessburg, Bruce Rieman, Mark Jensen, Brad Smith, Jeff Jones, and Wendel Hann developed the ecological integrity elements and the forest and range clusters. The material related to composite ecological integrity was developed by James Sedell, Danny Lee, Richard Holthausen, Bruce Marcot, Wendel Hann, Jeff Jones, and Thomas Quigley. Richard Haynes, Amy Horne, and Jim Burchfield developed measures of socioeconomic resiliency. Richard Haynes, Wendel Hann and Thomas Quigley developed the risk ratings for ecological integrity and risk to human assets from wildlands.

The chapters include individual acknowledgments of contributions to the completion of this document. Literally hundreds of individuals have made specific contributions. We are certain to have failed in recognizing everyone's contribution. We apologize for any oversights.



SCIENCE TEAM MEMBERS

Team Leaders

Thomas M. Quigley, Range Scientist, Science Integration Team Leader.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Sylvia J. Arbelbide, Geologist, Deputy Science Integration Team Leader.
USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

Russell T. Graham, Research Forester, Deputy Science Team Leader.
USDA Forest Service, Intermountain Research Station, Moscow, ID.

Aquatics

James Clayton, Soil Scientist.
USDA Forest Service, Intermountain Research Station, Boise, ID.

Lynn Decker, Biologist, Aquatic Team Co-Leader.
USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

Robert Gresswell, Fisheries Biologist.
USDI Fish and Wildlife Service, detailed to Pacific Northwest Research Station, Corvallis, OR.

Robert House, Fisheries Biologist.
USDI Bureau of Land Management, Idaho State Office, Boise, ID.

Danny C. Lee, Research Biologist, Aquatic Team Co-Leader.
USDA Forest Service, Intermountain Research Station, Boise, ID.

Kristine M. Lee, Biologist, Aquatic Team Co-Leader.
USDA Forest Service, Intermountain Region, Ogden, UT.

Shaun McKinney, Fisheries Biologist.
USDA Forest Service, Umatilla National Forest, Pendleton, OR.

Tracy Noel, Biological Technician.
USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR.

C. Kerry Overton, Technology Transfer Specialist.
USDA Forest Service, Intermountain Research Station, Boise, ID.

Bruce E. Rieman, Research Fisheries Biologist.
USDA Forest Service, Intermountain Research Station, Boise, ID.

James R. Sedell, Research Biologist, Aquatic Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR.

Russell F. Thurow, Fisheries Research Scientist.
USDA Forest Service, Intermountain Research Station, Boise, ID.

Ken Tu, Forester.
USDA Forest Service, Umatilla National Forest, Walla Walla, WA.

Jack E. Williams, Aquatic Scientist, Aquatic Team Co-Leader.
USDI Bureau of Land Management, Idaho State Office, Boise, ID.

Economics

Richard W. Haynes, Research Forester, Economics Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Amy L. Horne, Research Forester, Economics Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Wendy McGinnis, Economist.
USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Nicholas Reyna, Forest Economist.
USDA Forest Service, Pacific Northwest Research Station,Walla Walla, WA.

Landscape Ecology

Ann L. Acheson, Air Program Manager.
USDA Forest Service, Northern Region, Missoula, MT.

Carl Almquist, Geologist.
USDI Bureau of Mines, Western Field Operations Center, Spokane, WA.

Kenneth Brewer, Landscape Ecologist.
USDA Forest Service, Flathead National Forest, Kalispell, MT.

Sue Ferguson, Research Climatologist.
USDA Forest Service, Pacific Northwest Research Station, Seattle, WA.

Gary L. Ford, Soil Scientist.
USDA Forest Service, Idaho Panhandle National Forest, Coeur d'Alene, ID.

Thomas P. Frost, Research Geologist.
USDI Geological Survey, Western Mineral Resources Branch, Spokane, WA.

Iris Goodman, Research/Landscape Hydrologist.
Environmental Protection Agency, Office of Landscape Characterization Research and Development, Las Vegas, NV.

Wendel J. Hann, Landscape Ecologist, Landscape Ecology Team Co-Leader.
USDA Forest Service, Northern Region, Missoula, MT.

Colin Hardy, Supervisory Research Forester.
USDA Forest Service, Intermountain Research Station, Missoula, MT.

Paul F. Hessburg, Research Plant Pathologist/Entomologist, Landscape Ecology Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Wenatchee, WA.

Mark E. Jensen, Landscape Ecologist/ Landscape Ecology Team Co-Leader.
USDA Forest Service, Northern Region, Missoula, MT.

Jeffrey L. Jones, Wildlife Biologist.
USDA Forest Service, Beaverhead National Forest, Dillon, MT.

Lynn Kaney, Silviculturist.
USDA Forest Service, Colville National Forest, Newport, WA.

Michael G. (Sherm) Karl, Rangeland Management Specialist/Ecologist.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Robert E. Keane, System Dynamics/Research Ecologist.
USDA Forest Service, Intermountain Research Station, Missoula, MT.

Steve Leonard, Range Conservationist.
USDI Bureau of Land Management, Nevada State Office, Reno, NV.

Don Long, Forester.
USDA Forest Service, Intermountain Research Station, Missoula, MT.

Mary E. Manning, Ecologist.
USDA Forest Service, Northern Region, Missoula, MT.

Cecilia McNicoll, Ecological Analyst/Inventory.
USDA Forest Service, Intermountain Research Station, Missoula, MT.

James P. Menakis, Forester.
USDA Forest Service, Intermountain Research Station, Missoula, MT.

John Nesser, Soil Scientist.
USDA Forest Service, Northern Region, Missoula, MT.

Roger Ottmar, Research Forester.
USDA Forest Service, Pacific Northwest Research Station, Seattle, WA.

David Powell, Forest Silviculturist.
USDA Forest Service, Umatilla National Forest, Pendleton, OR.

Bradley G. Smith, Quantitative Community Ecologist.
USDA Forest Service, Pacific Northwest Research Station, Bend, OR.

Mike Stimak, Forester.
USDI Bureau of Land Management, Upper Columbia-Salmon and Clearwater Districts,
Coeur d'Alene, ID.

Social

Stewart D. Allen, Sociologist.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Jon S. Bumstead, Social Scientist, Social Science Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

James A. Burchfield, Sociologist, Social Science Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Steven J. Galliano, Landscape Architect.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Richard C. Hanes, Anthropologist/Native American Topics Specialist.
USDI Bureau of Land Management, Oregon/Washington State, Eugene, OR.

Gary Loeffler, Landscape Architect.
USDA Forest Service, Mt. Hood National Forest, Zigzag, OR.

Steven F. McCool, Social Scientist, Social Science Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA.

Joan Trent, Attitudes/Values/Beliefs Specialist.
USDI Bureau of Land Management, Montana State Office, Billings, MT.

Spatial

Becky Gravenmier, Natural Resource Specialist/GIS, Spatial Team Leader.
USDI Bureau of Land Management, Oregon/Washington State Office, Portland, OR.

John Steffenson, GIS Specialist.
USDA Forest Service, Pacific Northwest Region, Portland, OR.

Andrew Wilson, GIS Specialist.
USDA Forest Service, Pacific Northwest Region, Portland, OR.

Terrestrial

Katie Boula, Wildlife Biologist.
USDA Forest Service, Umatilla National Forest, Pendleton, OR.

Michael A. Castellano, Research Forester.
USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR.

Lisa Croft, Botanist, Vascular and Non-Vascular Plants Group Leader.
USDA Forest Service, Ochoco National Forest, Prineville, OR.

Michelle Eames, Wildlife Biologist.
USDI Fish and Wildlife Service, Spokane, WA.

Christina Hargis, Wildlife Ecologist.
USDA Forest Service, Intermountain Research Station, Logan, UT.

Randal J. Hickenbottom, Wildlife Biologist, Terrestrial Team Co-Leader.
USDA Forest Service, Pacific Northwest Region, Portland, OR.

Richard S. Holthausen, Wildlife Ecologist, Terrestrial Team Co-Leader.
USDA Forest Service, Washington Office, Corvallis, OR.

John F. Lehmkuhl, Wildlife Ecologist, Terrestrial Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Wenatchee, WA.

Bruce G. Marcot, Wildlife Ecologist, Terrestrial Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Wally Murphy, Wildlife Biologist.
USDA Forest Service, Umatilla National Forest, Pendleton, OR.

Robert H. Naney, Wildlife Biologist, Vertebrates Group Leader.
USDA Forest Service, Okanogan National Forest, Okanogan, WA.

Kurt Nelson, Wildlife Biologist, Terrestrial Team Co-Leader.
USDA Forest Service, Payette National Forest, McCall, ID.

Dave Newhouse, Wildlife Biologist.
USDA Forest Service, Intermountain Region, Ogden, UT.

Christine G. Niwa, Research Entomologist, Invertebrates Group Leader.
USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR.

Wayne Owen, Botanist.
USDA Forest Service, Boise National Forest, Boise, ID.

Mike Pellant, Ecologist.
USDI Bureau of Land Management, Idaho State Office, Boise, ID.

Martin G. Raphael, Research Wildlife Biologist, Terrestrial Team Co-Leader.
USDA Forest Service, Pacific Northwest Research Station, Olympia, WA.

Terry Rich, Wildlife Biologist.
USDI Bureau of Land Management, Idaho State Office, Boise, ID.

Roger Rosentreter, Botanist.
USDI Bureau of Land Management, Idaho State Office, Boise, ID.

Vicki Saab, Wildlife Research Biologist.
USDA Forest Service, Intermountain Research Station, Boise, ID.

Fred Samson, Wildlife Biologist.
USDA Forest Service, Northern Region, Missoula, MT.

Roger E. Sandquist, Forester.
USDA Forest Service, Pacific Northwest Region, Portland, OR.

J. Stephen Shelly, Regional Botanist.
USDA Forest Service, Northern Region, Missoula, MT.

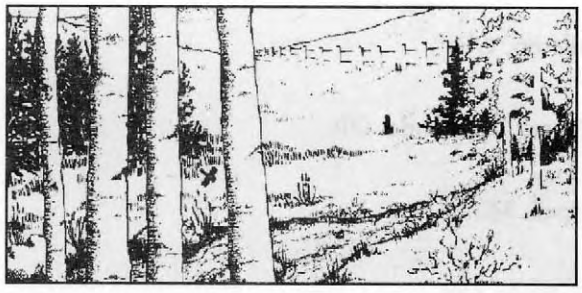
Karl Urban, Forest Botanist.
USDA Forest Service, Umatilla National Forest, Pendleton, OR.

Barbara Wales, Wildlife Biologist/Data Base Manager.
USDA Forest Service, Wallowa-Whitman National Forest, La Grande, OR.

Nancy Warren, Wildlife Biologist.
USDA Forest Service, Flathead National Forest, Kalispell, MT.

Michael Wisdom, Wildlife Biologist.
USDA Forest Service, Pacific Northwest Region, La Grande, OR.

Elaine Zieroth, Wildlife Biologist, Terrestrial Team Co-Leader.
USDA Forest Service, Okanogan National Forest, Tonasket, WA.



ENVIRONMENTAL IMPACT STATEMENT TEAM MEMBERS

Jeff Blackwood, Project Manager.
USDA Forest Service, Walla Walla, WA.

Linda Colville, Project Manager.
USDI Bureau of Land Management, Boise, ID.

James May, Acting Project Manager.
USDI Bureau of Land Management, Boise, ID.

Andy Brunelle, Intergovernmental Coordination Team Leader/Public Affairs Team Leader.
USDA Forest Service, Boise, ID.

Mary Carr, Technical Writer-Editor.
USDA Forest Service, Olympia, WA.

Patricia Carroll, Hydrologist and Soil Scientist.
USDA Forest Service, Boise, ID.

Cathy Humphrey, Deputy EIS Team Leader (Geologist).
USDI Bureau of Land Management, Walla Walla, WA.

Michael (Sherm) Karl, Rangeland Management Ecologist.
USDA Forest Service, Walla Walla, WA.

Steven Kozel, Fish Ecologist.
USDA Forest Service, Boise, ID.

Thomas Miles, Rangeland Management Specialist.
USDI Bureau of Land Management, Boise, ID.

Melanie Miller, Fire Ecologist.
USDI Bureau of Land Management, Boise, ID.

Ralph Perkins, Forester, Tribal Liaison Team Leader.
USDA Forest Service, Walla Walla, WA.

Nick Reyna, Economist.
USDA Forest Service, Walla Walla, WA.

John Sloan, Forest Ecologist.
USDI Bureau of Land Management, Boise, ID.

Joan Suther, Wildlife Biologist.
USDI Bureau of Land Management, Boise, ID.

Jeffrey Walter, EIS Team Leader (Forest Ecologist).
USDA Forest Service, Boise, ID.

Shari Whitwell, Technical Editor/Computer Specialist.
USDI Bureau of Land Management, Walla Walla, WA.

Gary Wyke, UCRB EIS Team Co-Leader.
USDI Bureau of Land Management, Boise, ID.

Former EIS Team Members

Stewart Allen, Social Scientist.
USDA Forest Service.

Keith Bennett, Economic Geographer.
USDI Bureau of Land Management.

Paul Boehne, Fish Biologist, National Marine Fisheries Service Representative.
USDA Forest Service.

James Burchfield, Social Scientist.
USDA Forest Service.

Ismael Caballero, Forester, Tribal Liaison group.
USDA Forest Service.

Kathleen Cushman, Ecologist.
USDI Bureau of Land Management.

Cindy Deacon-Williams, UCRB EIS Team Co-Leader (Biologist).
USDA Forest Service.

Marty Dumpis, Natural Resource Specialist.
USDA Forest Service.

Leslie Frewing-Runyon, Economist.
USDI Bureau of Land Management.

Patrick Geehan, Deputy Project Manager.
USDI Bureau of Land Management.

Ralph Heft, BLM Field Management Representative.
USDI Bureau of Land Management.

Les Holsapple, Fire Ecologist.
USDA Forest Service.

Howard Hudak, Wildlife Biologist.
USDA Forest Service.

Lyle Jensen, Forest Planner.
USDA Forest Service.

Lynn Kaney, Silviculturist.
USDA Forest Service.

Mary Keith, Archeologist, Tribal Liaison group.
USDA Forest Service.

Don Lyon, Deputy Eastside EIS Team Leader (Forester).
USDA Forest Service.

Kenneth MacDonald, Fisheries Biologist.
USDA Forest Service.

Greg Macheack, Writer-Editor.
USDA Forest Service.

Stephen Mealey, Project Manager.
USDA Forest Service.

Ed McHugh, Geologist.
USDI Bureau of Mines.

Wally Murphy, Wildlife Biologist.
USDA Forest Service.

Jim O'Connor, Hydrologist.
USDA Forest Service.

William Peterson, Operations Research Analyst.
USDA Forest Service.

George Pozzuto, Eastside EIS Team Leader (Forester).
USDA Forest Service.

Dan Robison, Environmental Protection Agency Representative.
Environmental Protection Agency.

Heidi Sandeno, Writer-Editor.
USDA Forest Service.

Leslie Sekavec, Silviculturist.
USDA Forest Service.

Ayn Shlisky, Ecologist.
USDA Forest Service.

Karen (Kaz) Thea, Wildlife Biologist.
USDI Fish and Wildlife Service.

Richard Thompson, Economic Geologist.
USDI Bureau of Mines.

Elaine Zieroth, Wildlife Biologist.
USDA Forest Service.

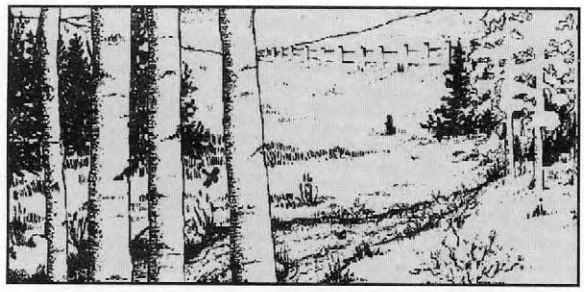


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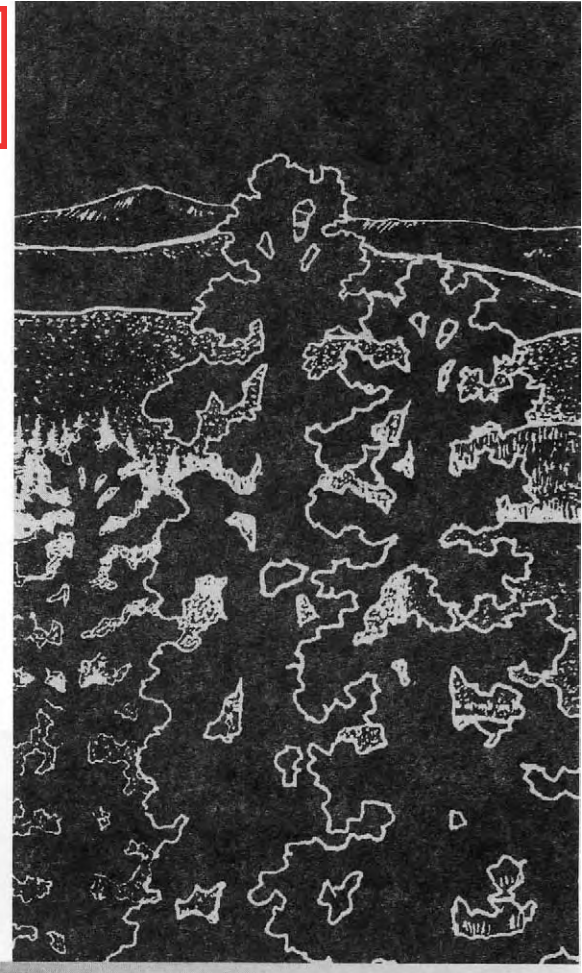
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CHAPTER 1

Introduction

Thomas M. Quigley
Kristine M. Lee
Sylvia J. Arbelbide



Quigley, Thomas M., Range Scientist/Economist, Forest Service, Pacific Northwest Research Station, Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA

Lee, Kristine M., Fisheries/Aquatics Ecology Program Leader, Forest Service, Intermountain Region, Ogden, UT

Arbelbide, Sylvia J., Geologist, Forest Service, Pacific Southwest Region, Minerals Area Management Director, San Francisco, CA



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Introduction

In July 1993, as part of his plan for ecosystem management in the Pacific Northwest, President Clinton directed the Forest Service (FS) to "develop a scientifically sound and ecosystem-based strategy for management of Eastside forests." To accomplish this, in January 1994, the Chief of the Forest Service and the Director of the Bureau of Land Management jointly established the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The area covered by the ICBEMP includes lands within the interior Columbia Basin east of the Cascade crest and those portions of the Klamath and Great Basins within Oregon (the Basin) (map 1.1). This area includes over 58.4 million hectares (144.6 million ac), 30.9 million hectares (76.3 million ac) of which are lands administered by the U.S. Department of Agriculture, Forest Service and the U.S. Department of Interior, Bureau of Land Management (BLM).

Three teams were established to accomplish the project's objectives, a Science Integration Team (SIT) and two Environmental Impact Statement (EIS) Teams. The EIS teams were established to prepare Environmental Impact Statements, one covering the Upper Columbia River basin (UCRB), those portions of the interior Columbia River basin in Idaho, Montana, Wyoming, Nevada, and Utah, and one covering Oregon and Washington east of the crest of the Cascade Range (Eastside). These areas are displayed in maps 1.2 and 1.3. Tables 1.1 and 1.2 show the amount of agency-administered land in each area.[1] Drawing on information developed for the assessment, the EISs were to examine management options for FS- and BLM-administered lands in the Basin.

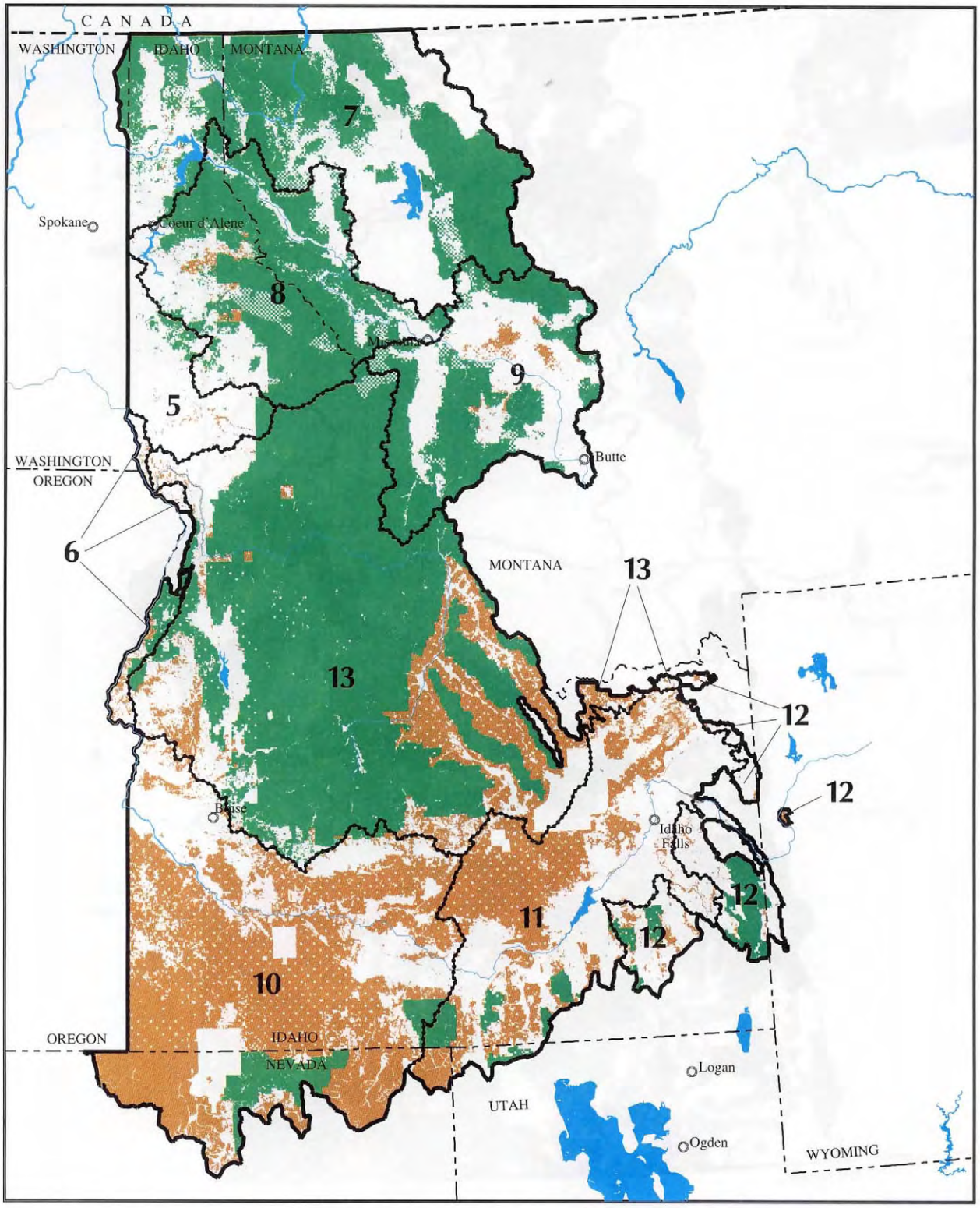
Both EISs were developed with a common set of alternatives. Decisions resulting from the EISs will not completely replace existing land and resource management plans but place the focus on those broad-scale issues that have been challenging to address on a unit-by-unit basis. Many conditions and decisions, most appropriately addressed at the local level, are not addressed in the EISs.

The Science Integration Team was charged with developing a scientific framework for ecosystem management and conducting a scientific assessment of the Basin and an evaluation of EIS alternatives. The document, *A Framework for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Framework) (Haynes and others 1996), describes the principles, and planning and analysis processes, applicable for managing ecosystems in the Basin at multiple geographic extents and resolutions of data. *An Assessment of Ecosystem Components in the Interior Columbia Basin* (Component Assessment) (Quigley and Arbelbide, in press), and other documents including *An Integrated Scientific Assessment of the Interior Columbia Basin* (Integrated Assessment) (Quigley and others 1996), summarize the assessment process and examine the historical trends, current status and trends, and projections about the future outcomes and conditions of ecosystems within the Basin. This document, the *Evaluation of EIS Alternatives by the Science Integration Team,* looks at the alternatives developed by the EIS teams in light of the scientific information brought forward in the assessment process. Figure 1.1 provides a flow diagram for the relationship of the science assessment and the evaluation of the alternatives to the EISs.

An attempt was made to evaluate a version of the EIS alternatives in October, 1995. The evaluation was not totally possible, however, due to the rough and changing nature of the alternatives, their internal inconsistencies, a lack of specificity and spatial definition, and the consequent inability to project viability outcomes for terrestrial and aquatic species.

[1]The Targhee and Bridger-Teton National Forests and portions of the Caribou National Forest that lie within the boundaries of both the UCRB and Greater Yellowstone Ecosystem will be excluded from the analysis of effects in the EIS and from decisions made in the Record(s) of Decision (ROD). All BLM lands within the boundaries of the UCRB, whether or not they overlap with boundaries of the Greater Yellowstone Ecosystem, will be covered by the ROD(s).

Map 1.1 – Topography of the Interior Columbia Basin Ecosystem Management Project assessment area. The assessment area consists of the planning areas for both the Eastside and UCRB Environmental Impact Statements.



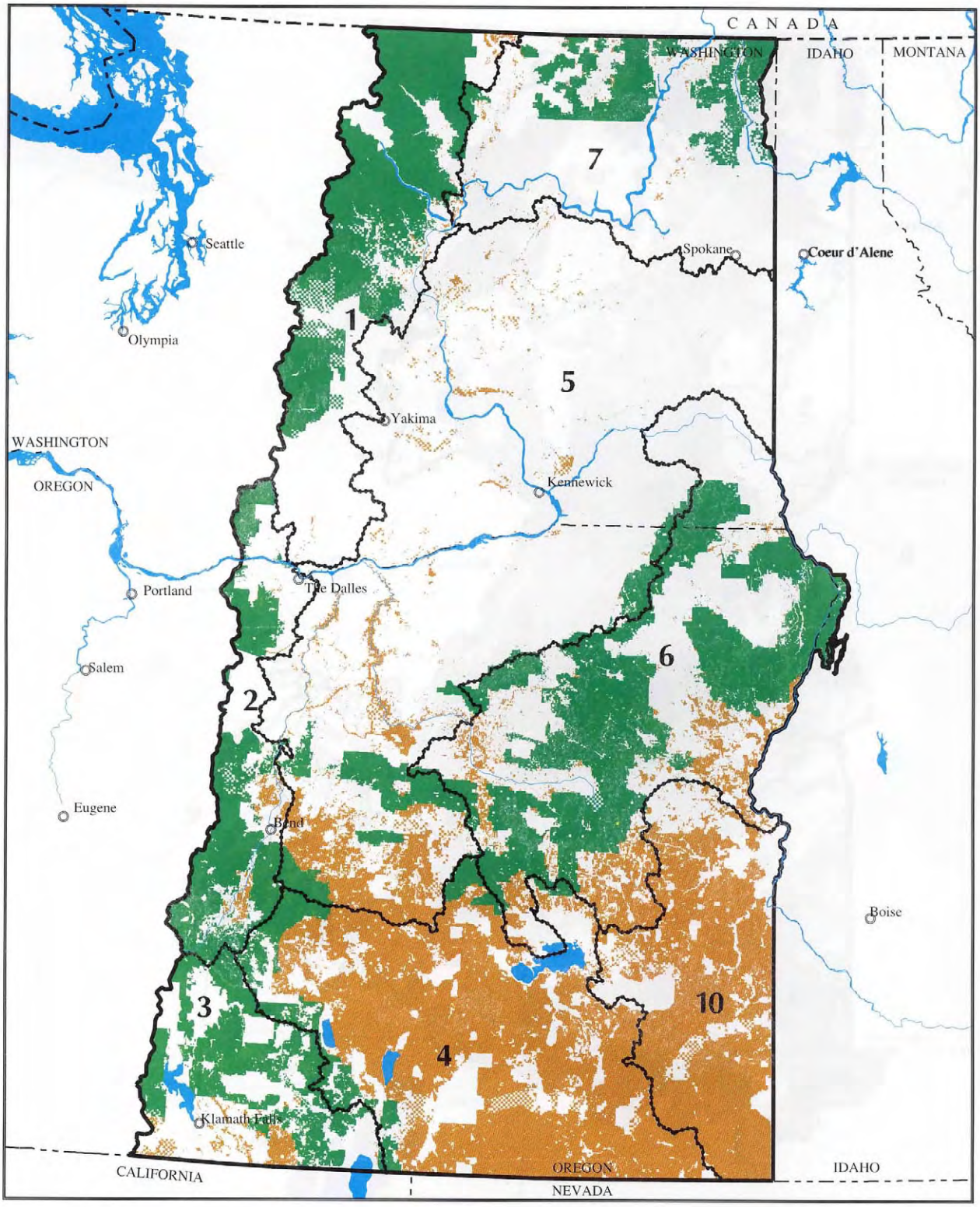
Map 1.2 – BLM- and FS-administered lands in the Upper Columbia River Basin EIS area.

BLM & Forest Service Administered Lands

INTERIOR COLUMBIA
BASIN ECOSYSTEM
MANAGEMENT PROJECT

Draft UCRB EIS
1996

- *Forest Service Administered Lands*
- *BLM Administered Lands*
- *Water*
- *EIS Area Border*
- *Ecological Reporting Unit Border:*
- 5 *Columbia Plateau*
- 6 *Blue Mountains*
- 7 *Northern Glaciated Mountains*
- 8 *Lower Clark Fork*
- 9 *Upper Clark Fork*
- 10 *Owyhee Uplands*
- 11 *Upper Snake*
- 12 *Snake Headwaters*
- 13 *Central Idaho Mountains*



Map 1.3 – BLM- and FS-administered lands in the Eastside EIS area.

BLM & Forest Service Administered Lands

INTERIOR COLUMBIA
BASIN ECOSYSTEM
MANAGEMENT PROJECT

Draft EASTSIDE EIS
1996

- *Forest Service Administered Lands*
- *BLM Administered Lands*
- *Water*
- *EIS Area Border*
- *Ecological Reporting Unit Border:*
  - 1 *Northern Cascades*
  - 2 *Southern Cascades*
  - 3 *Upper Klamath*
  - 4 *Northern Great Basin*
  - 5 *Columbia Plateau*
  - 6 *Blue Mountains*
  - 7 *Northern Glaciated Mountains*
  - 10 *Owyhee Uplands*
- *Cities and Towns*

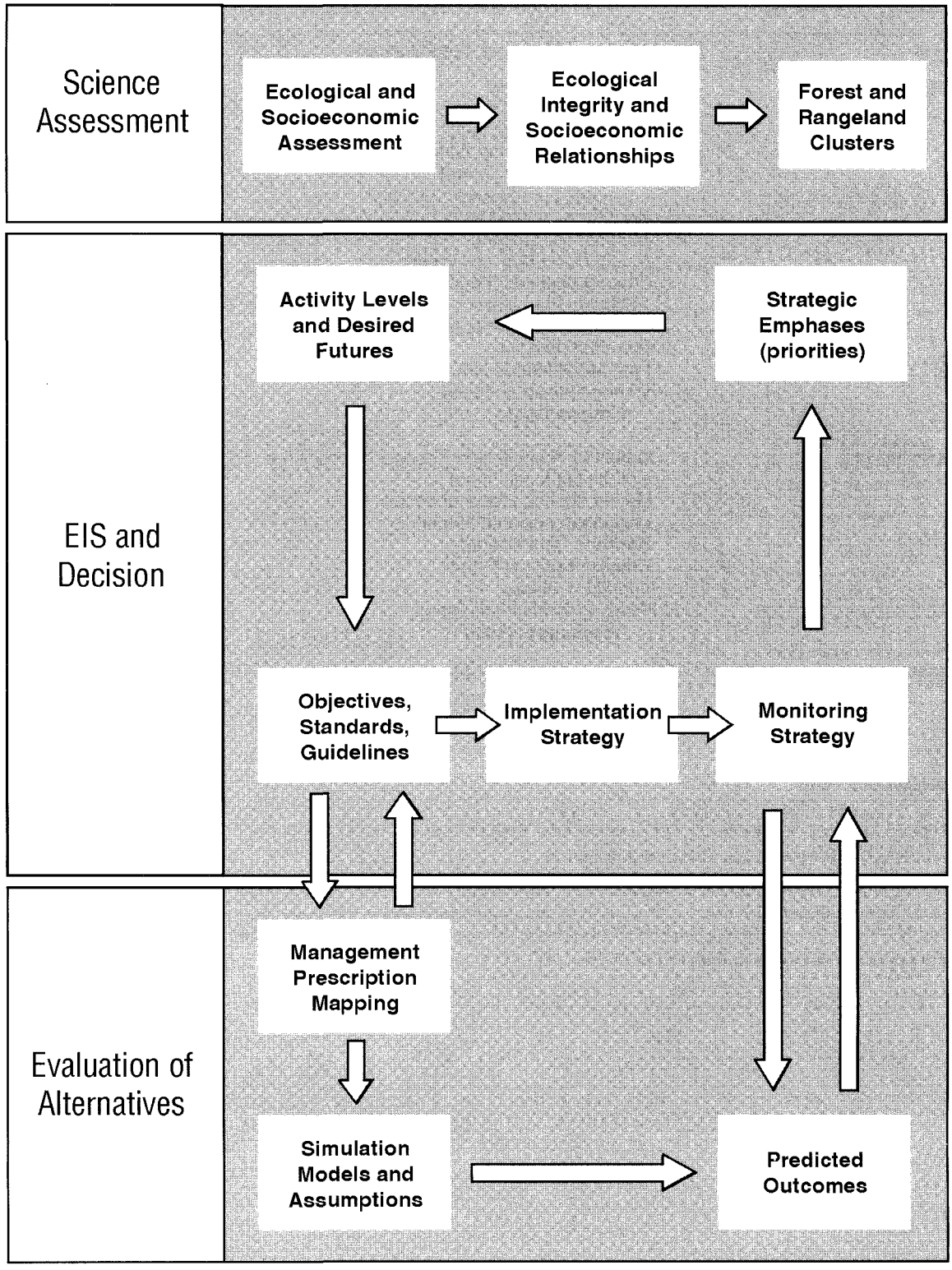


Figure 1.1 – Relationship of the Evaluation of Alternatives to the Scientific Assessment and Environmental Impact Statements.

Table 1.1 — National Forest and BLM Districts affected by the Eastside EIS.

State	National Forest or BLM District	Acres Affected[1]
Oregon	Burns BLM District	3,417,000
	Columbia River Gorge National Scenic Area (FS)	6,000
	Crooked River National Grassland	117,000
	Deschutes National Forest[2]	1,584,500
	Fremont National Forest	1,140,000
	Lakeview BLM District	3,382,000
	Malheur National Forest	1,459,500
	Medford BLM District	500
	Mount Hood National Forest	330,500
	Ochoco National Forest	847,000
	Prineville BLM District	1,648,000
	Umatilla National Forest	1,068,500
	Vale BLM District	5,043,000
	Wallowa-Whitman National Forest[3]	2,249,000
	Winema National Forest	1,037,500
	Oregon Total	**23,330,000**
Washington	Columbia River Gorge National Scenic Area (FS)	8,000
	Colville National Forest	1,088,000
	Gifford Pinchot National Forest	187,500
	Okanogan National Forest	1,497,500
	Spokane BLM District	347,000
	Umatilla National Forest	311,000
	Vale BLM District	10,500
	Wenatchee National Forest	2,192,000
	Washington Total	**5,641,500**
Idaho	Nez Perce National Forest	4,500
	Payette National Forest	4,000
	Wallowa-Whitman National Forest	131,000
	Idaho Total	**139,500**
Eastside EIS Total		**29,111,000**

[1]Acres listed are only those administered by the Bureau of Land Management or the Forest Service.

[2]Newberry Crater National Volcanic Monument acres included.

[3]Hells Canyon National Recreation acres included.

Source: ICBEMP GIS data (converted to a 100 x 100 meter grid and rounded to nearest 500 acres). These totals will not match official government land office totals or those shown elsewhere in this document that were calculated from a 1000 x 1000 meter grid (1 km^2).

This table was adapted from the Eastside Preliminary Draft EIS.

Table 1.2 — National Forests and BLM Districts addressed by the Upper Columbia River Basin EIS.

State	National Forest or BLM District	Acres Affected[1]
Idaho	Bitterroot National Forest	470,500
	Boise National Forest	2,573,500
	Caribou National Forest[2]	580,000
	Challis National Forest	2,463,000
	Clearwater National Forest	1,814,500
	Curlew National Forest	4,000
	Idaho Panhandle National Forest[3]	2,456,000
	Kootenai National Forest	45,000
	Nez Perce National Forest[4]	2,111,500
	Payette National Forest[4]	2,354,000
	Salmon National Forest	1,687,500
	Sawtooth National Forest	1,691,000
	Lower Snake River BLM District	5,169,000
	Upper Snake River BLM District	5,017,000
	Upper Columbia-Salmon Clearwater BLM Districts	1,550,500
	Idaho Total	**29,987,000**
Montana	Bitterroot National Forest	1,115,000
	Deerlodge National Forest	695,000
	Flathead National Forest	2,369,500
	Helena National Forest	385,000
	Idaho Panhandle National Forests	27,500
	Kootenai National Forest	2,207,000
	Lolo National Forest	2,075,000
	Butte BLM District	150,000
	Montana Total	**9,024,000**
Nevada	Humboldt National Forest	632,000
	Elko and Winnemucca BLM Districts	1,953,000
	Lower Snake River BLM District	49,500
	Nevada Total	**2,634,500**
Utah	Sawtooth National Forest	59,000
	Salt Lake BLM District	52,500
	Utah Total	**111,500**
Wyoming	Caribou National Forest	7,000
	Rock Springs BLM District	23,000
	Wyoming Total	**30,000**
UCRB EIS Total		**41,787,000**

[1]Acres listed are only those administered by the Bureau of Land Management or the Forest Service.

[2]Excludes portion within the Greater Yellowstone Ecosystem.

[3]Includes 119,000 acres in Washington.

[4]Includes portion assigned to Eastside EIS.

Source: ICBEMP GIS data (converted to 100 x 100 meter grid and rounded to nearest 500 acres). These totals will not match official government land office totals or those shown elsewhere in this document that were calculated from a 1000 x 1000 meter grid (1 km^2).

Adapted from the Upper Columbia River Basin Preliminary Draft EIS.

While the SIT was attempting to evaluate the October 1995 version of the alternatives, it was also completing a classification of river subbasins (4th-field hydrologic units) for assessment of integrated forest, range, and aquatic integrity (Quigley and others 1996). This information contributed to the development of forest and range clusters, or groups of subbasins with similar broad biophysical environments, ecological integrity, amounts of wilderness-like allocations, amounts of roads, and risks to ecological integrity. The clusters provided the spatial resolution needed to develop a more specific set of alternatives and a more comprehensive analysis of effects. The clusters became the basic unit for management emphasis and the logic behind the prioritization and allocation of management activities described in the alternatives. Revised alternatives were developed based on the new approach.

The version of the EIS alternatives under evaluation here was presented to the SIT on February 26, 1996 in a package titled "Alternatives Package for SIT Evaluation for Eastside and UCRB EISs," containing seven alternatives. Referred to as the February 1996 Preliminary Draft EIS in this document, it is on file as part of the project record.[2] Pertinent information from this document relating to the evaluation is also included, for reference, in appendix I. (Appendix I is located at the back of Volume II this document.)

During this SIT evaluation process a number of additional questions arose about the specifics of the alternatives. An interactive process between the SIT and EIS teams resulted in substantial clarification. Where there was insufficient detail in the alternatives to conclude an evaluation, the SIT made assumptions in order to provide clarification and allow the evaluation to proceed. Those assumptions were screened to eliminate internal conflict and immediately passed on to the EIS teams. The assumptions used for the evaluation by each SIT staff area are described in the individual staff area chapters which follow.

Because of the lack of specificity necessary for evaluation of the earlier draft, as well as the development of the cluster approach and the staff area assumptions, the EIS teams adopted an iterative approach to refining the objectives, standards, guidelines, and other strategies described in the EIS alternatives. The concurrent nature of the EIS development and scientific assessment resulted in additional information becoming available during the evaluation of the February 1996 Preliminary Draft EIS alternatives. The EIS Teams used the SIT information as a basis to further refine alternatives in later drafts.

Description of Alternatives

Alternative development begins with a statement of purpose and need for the proposed action. For the Upper Columbia River Basin (UCRB) and Eastside (EEIS) EISs, the purpose is to provide a coordinated approach to a scientifically sound, ecosystem-based management strategy for lands

The purpose of the proposed action — to provide a scientifically sound, ecosystem-based management strategy: 1) restore and maintain long-term ecosystem health and integrity; 2) support economic and/or social needs of people, cultures and communities, and provide predictable levels of products and services; 3) update current land management plans based on ecosystem management principles; 4) provide consistent direction at a landscape level; 5) restore and maintain habitat needs of plant and animal species; 6) provide opportunities for cultural, recreational and aesthetic experiences; 7) provide long-term management direction to replace interim strategies; and 8) identify barriers to implementing the strategy or achieving desired conditions.

The need for the proposed action — 1) restore and maintain long-term ecosystem health and integrity, and 2) support economic and/or social needs of people, cultures and communities, and provide predictable levels of products and services.

[2]On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, Washington, 99362.

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administered by the Forest Service (FS) or Bureau of Land Management (BLM) in the Basin. The stated need for this action is to restore and maintain long-term ecosystem health and integrity, to support the economic and/or social needs of people, cultures, and communities, and to provide predictable levels of goods and services from National Forest System and Bureau of Land Management lands.

Currently, there are 74 existing land and resource management plans administered by the BLM or FS within the Basin. Because these plans were not developed and approved at the same time, or in concert with one another, they do not necessarily reflect consistent approaches in land management. There are several important conceptual differences between the current plans and the alternatives developed by the EIS teams.

Alternatives represent potentially different approaches to meet the purpose and need for action. Broad goals are defined that remain consistent across the alternatives and outline a common set of outcomes sought from FS- and BLM-administered lands within the Basin. Each alternative has a broad theme that describes the basic strategy underlying the alternative. A desired range of future conditions describes primary vegetation futures for major vegetation categories. Management emphasis, activity levels, objectives, standards and guidelines are provided for specific areas in an effort to achieve the goals and desired future conditions. To fully understand any given alternative and its effects requires integrating all these pieces, as well as interpreting how implementation and monitoring will occur (see figure 1.1).

Alternative 1 is the "no action" alternative which would continue management strategies under existing approved plans with the addition of direction from the Northwest Forest Plan. Current direction, which includes existing plans plus PACFISH, INFISH, and Eastside Screens is reflected in Alternative 2. The direction described in Alternative 1 applies to those areas not covered by such interim direction. The EIS teams designed Alternatives 3 through 7 to meet the purpose and need statement in the EISs. Each of these alternatives examines different ways of responding to the issue questions identified through the public scoping process. Alternatives 1 and 2 were not designed fully to satisfy the purpose and need but to provide the benchmarks required by the National Environmental Policy Act (NEPA)[1] against which to evaluate the "action" alternatives.

There are several differences between existing plans and the alternatives developed by the EIS teams. Existing plans were designed primarily on the assumption that healthy ecosystem conditions existed. Alternatives 3 through 7 recognize that the FS and BLM administer some systems that, for a variety of reasons, no longer exhibit healthy, functioning conditions. Past timber and livestock management, past roading practices, and exclusion of fire are examples of activities that have altered systems. Some of this is desired by society; some creates long-term challenges. Other events, such as climate cycles, exotic weed expansion, and the way in which other lands are managed, influence how FS and BLM lands are administered. The reverse is also true. These conditions are more fully considered in Alternatives 3 through 7 than they are under existing plans.

Alternatives 3 through 7 attempt to portray consistent interagency approaches to broad-ranging issues, such as the decline in cold water fish and riparian habitat, concerns about late-seral forest, and the expansion of exotic weed species, as well as to incorporate the use of ecosystem management principles as they evolve. These alternatives also incorporate more meaningful participation at all levels, and recognize the unique needs and contributions of tribes and local governments.

Existing forest plans are heavily based on even-aged forest management. These plans emphasize commodity production and mitigate for other

[1]National Environmental Policy Act of 1969. 42 U.S.C. 4321(note).

resource values. Alternatives 3 through 7 rely less on even-aged forest management and focus on reversing the decline in large trees and late-seral forest structure. Timber harvest volume from existing plans comes from all size classes; most volume from Alternatives 3 through 7 comes from smaller size and age classes from either thinnings or removal of smaller trees to enhance development of residual overstory trees. In addition, these alternatives rely more heavily on the use of prescribed fire to restore patterns and structures that are consistent with those in which these elements evolved.

Under existing plans and current direction, there is no overall cold water fish and riparian management strategy. Parts of the planning area are covered by direction in existing plans; some parts are covered by direction in the Northwest Forest Plan, PACFISH, INFISH, or Eastside Screens. This has been confusing, and makes consistent approaches to management, inventory, monitoring, and adaptive management difficult. Alternatives 3 through 7 describe common and consistent approaches to managing aquatic and riparian resources on lands administered by the BLM or FS. In addition, the primary management goals and objectives for activities in these areas would be to maintain or improve aquatic/riparian functions and processes. Strategies in these alternatives also address the links between riparian areas and uplands, relating these to overall watershed function.

Vegetation management emphasis on forest lands would be different from existing plans and current direction in the "action" alternatives. Whether considering salvage or working with healthy forests, these alternatives emphasize appropriate ecosystem analysis in order to determine desirable patterns, structure, and composition of vegetation that consider natural disturbance events and regimes closely. They emphasize those patterns, structures, and compositions that are, consistent with the theme of the alternative, desirable to carry into the future. Resources in excess of these needs are available for social and economic benefits to society. A similar approach for vegetation management on rangelands is also described.

A description of each EIS alternative as it was presented to the SIT in the February 1996 UCRB and Eastside Preliminary Draft EISs follows.

Alternative 1 (No Action) — Alternative 1 continues management specified under existing FS and BLM plans. Implementation of this alternative would occur assuming recent budgets. An analysis of the alternative is a requirement of NEPA, as well as of BLM and FS planning procedures. This alternative displays the federal agencies' use of existing plans to manage lands and resources into the future. Existing FS and BLM plans include Regional Guides, Forest Plans (for each National Forest), and Resource Management Plans and Management Framework Plans (for BLM Resource Areas). The No Action Alternative includes direction from current land-use plans of 35 National Forests and 17 BLM Districts.

Although substantial variation exists among agency plans, the general management approach is to emphasize or accommodate sustained timber, wood fiber, and livestock forage production in an environmentally prudent manner while managing and protecting other resources and values. Timber and livestock management are integrated and coordinated with the maintenance or enhancement of wildlife and fish habitat, scenic quality, recreation opportunities, and other resource values to achieve overall multiple-use goals and objectives. Management for other resources or values, such as recreation, wilderness, big game and fish habitat, or cultural resources is emphasized in many areas. The existing plans were developed with little or no attempt to coordinate management with other FS or BLM administrative units. There also was no attempt to describe cumulative effects of actions taken over areas larger than the local unit.

Alternative 2 — This alternative applies recent interim direction as the long-term strategy for lands administered by the FS or BLM. The interim direction was developed to retain options for management of affected Federal lands while the EISs were being developed. Specific direction is described in the following Decision Notices:

- Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), February 24, 1995; Eastside: Applies to all or parts of Malheur, Ochoco, Okanogan, Umatilla, and Wallowa-Whitman National Forests and Prineville, Spokane and Vale BLM Districts. UCRB: Applies to all or parts of Bitterroot, Boise, Challis, Clearwater, Nez Perce, Payette, Salmon, and Sawtooth National Forests and Coeur d'Alene and Salmon BLM Districts.
- Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales (Eastside Screens), May 20, 1994, and amended June 5, 1995. Riparian standards were replaced by the riparian management objectives included in the decision for Inland Native Fish Strategy signed July 28, 1995, for those forests not already covered by PACFISH riparian standards (see section above); Applies to all or parts of Colville, Deschutes, Fremont, Malheur, Ochoco, Okanogan, Umatilla, Wallowa-Whitman and Winema National Forests.
- Inland Native Fish Strategy, July 28, 1995. Eastside: Applies to all or parts of Colville, Deschutes, Fremont, Malheur, Ochoco, Okanogan, Wallowa-Whitman and Winema National Forests. UCRB: Applies to all or parts of Bitterroot, Deerlodge, Flathead, Helena, Kootenai, Lolo, Boise, Caribou, Challis, Clearwater, Idaho Panhandle, Payette, Sawtooth, and Humboldt National Forests.

The interim direction emphasizes protection and maintenance of aquatic riparian and wildlife resources while using conservative approaches to management. All other direction from current plans would also continue into the future; the direction described in Alternative 1 applies to those areas not covered by interim direction.

Alternative 3 — This alternative updates existing FS and BLM plans to be consistent with the principles of ecosystem management. Changes in management are prioritized to respond to changing conditions (such as declining forest and rangeland health, local economies at risk, and declining salmon runs), minimize changes to local plans; and rely on local public needs and desires. Each National Forest or BLM unit would emphasize local public input to determine a desired mix of uses, services, restoration and management actions consistent with ecosystem principles which would be incorporated into the land-use plans. Direct involvement with state, county, and tribal governments would be used in planning, decision-making, and implementation of programs.

The alternative emphasizes making only minimal repairs to existing plans that would allow them to be more effective, integrated, and consistent in the face of changed ecological conditions and increasing numbers of appeals and lawsuits. Only those priority conditions that most hinder the effectiveness of existing plans are addressed in this alternative and distinguish it from Alternative 1. The intent of this alternative is to provide a broader dimension for and more integrated management direction about priority large-scale issues that cross administrative boundaries than Alternatives 1 or 2.

Alternative 4 — This alternative is designed to aggressively restore ecosystem health based on the principles of ecosystem management. This would occur through active management, the results of which would resemble endemic disturbance processes such as insects, disease, and fire. The alternative focuses on short-term vegetation management that would improve the likelihood of moving toward or maintaining ecosystem processes that function properly in the long term. Under this alternative, vegetation management is designed to reduce risks to property, products, and economic and social opportunities that can result from large epidemic disturbance events. Direct involvement with state, county, and tribal governments would be used in planning, decision-making, and implementation of programs.

Priority in this alternative is placed on forest, rangeland, and watershed health, assuming that

healthy streams, wildlife populations, and economic and social benefits would follow. Actions taken to achieve desired conditions are designed to produce economic benefits whenever practical. A wide variety of management tools are available under this alternative.

Alternative 5 — This alternative emphasizes production of goods and services, consistent with the principles of ecosystem management, at the sub-regional level. Biological capability and economic efficiency are used to determine relative priority uses for an area, rather than local demands and traditional uses. Areas that are best able to produce products, goods or services, or desired conditions are targeted to do so within the ecological capability of the area. Other uses are expected to exist when they do not conflict with or diminish the priority uses. While a full range of conditions, products, and services may not be provided in all localities, the desired range of conditions, products, and services would be met on a regional basis. Direct involvement with State, county, and tribal governments would be used in planning, decision-making, and implementation of programs.

Under this alternative, both EIS teams (UCRB and Eastside) identified areas across the project area best able to produce products, goods, services, or desired conditions, within the ecological capability of the land. Five major Basin-wide emphasis areas were considered: timber, livestock, aquatic resources, wildlife, and recreation. The assumption used in building this alternative was that each emphasis area has only one priority emphasis. Other uses are likely to occur, but any conflicts would be resolved in favor of the priority use of the emphasis area. These areas are shown on maps 1.4 and 1.5.

Alternative 6 — This alternative emphasizes an adaptive management approach to restoration and maintenance of ecosystems and provision for the social and economic needs of people based on the principles of ecosystem management. While much knowledge of natural resource management has been acquired through experience and research, ecosystems are complex and knowledge about the functions and processes that make up ecosystems is limited. Management strategies would be adjusted based on information gained from continued research and monitoring of ecological, social, and economic conditions and from direct input from State, county, and tribal officials.

This alternative is similar to Alternative 4 but takes a slower, more cautious approach and implies the use of experimental processes, local research, and extensive monitoring. Under this alternative, actions would be implemented on a broad-scale basis only when previous monitoring results or scientific research demonstrates that the actions are effective in achieving desired outcomes. Priorities for restoration would generally be high hazard or high risk areas that have a high or moderate potential for successful restoration. The management direction under this alternative is similar to that under Alternative 4 except for the length of time expected to reach desired conditions and the built-in uncertainty about which management actions would prove to be the most effective.

Alternative 7 — This alternative emphasizes reducing risk to ecological integrity and species viability by establishing a system of reserves with interconnecting corridors on lands administered by the BLM or FS. Reserves would be located to include all representative vegetation types and are intended to be large enough to contain the most likely disturbance events (proposed reserve areas are shown on map 1.6). The level of human use and management would be low within the reserves. Ecological disturbance events are expected and would occur naturally within the reserves. When disturbance events (such as fire or disease) occur, actions would be taken to reduce the likelihood of the event extending beyond the boundary of the reserve. Most restoration activities would occur on lands administered by the FS or BLM outside reserves. Restoration could occur within reserves, however, where there is a high risk for events occurring in the short term that would preclude achieving desired outcomes in the long term (for example, to maintain habitats for endangered

or threatened species or other scarce habitats, or control erosion by rehabilitating roads). Management outside the reserve boundaries includes an emphasis on conserving remaining old forest stands and roadless areas larger than 1,000 acres. Direct involvement with State, county, and tribal governments would be used in planning, decision-making, and implementation of programs.

Reserves would be selected for their representation of vegetation and rare animal species. Although some reserves might be designed around the needs of single species, the intent would be for reserves to conserve biodiversity across the landscape and meet the needs of groups of species or communities. No commercial timber harvest is permitted inside reserves, but limited silvicultural activities that could enhance species viability would be allowed. To improve the long-term conditions for which the reserve was established, grazing would be strictly limited. Dispersed, low-impact recreation use would be allowed as long as it did not affect populations of rare species or their habitat. Management of reserves would focus on long-term maintenance of native processes and conditions with which plant and animal species have evolved. Areas adjacent to reserves (buffers) would be managed to help maintain reserves by avoiding barriers or breaks in the vegetation that would isolate them. Management would be allowed in buffers, but road densities would usually be low. Reserves would be interconnected where possible by vegetative corridors to allow interchange of animals. Management would be allowed within corridors, but habitat conditions that allow for the dispersal of animals would be important considerations when designing management activities.

Interpreting Rule Sets and Management Emphasis Categories

The SIT integrated its assessment and organized subbasins within clusters based on common ecological themes that highlight the similarities of subbasins, grouped within clusters, while acknowledging substantive differences among the subbasins (Quigley and others, 1996, pages 105-123). Six forest and six rangeland clusters emerged representing a synthesis of common management history, resultant conditions, management needs, opportunities, and potential conflicts across the landscape. The EIS teams then developed rule sets to describe the level of various management activities or a general management emphasis that would be applied to the various clusters under each alternative. (Pertinent excerpts from these rule sets are included in appendix I.) These management emphases are: Conserve (C), Restore (R), or Produce (P). Recognizing that management emphasis has more variability than can be reflected by these three categories alone, the categories were refined by adding combinations of emphasis as follows: Restore-Conserve (R-C), Restore-Produce (R-P), and Produce-Conserve (P-C).

The assignment of the six management emphasis categories by alternative and cluster is displayed in tables 1.3 and 1.4. This information also is depicted in seven alternative strategy maps for forest lands and seven alternative maps for rangeland (for maps depicting general emphasis areas for forest and range clusters for each of the alternatives, refer to chapter 2, Landscape Ecology Evaluation of Alternatives).

For each of the six forest clusters, activity levels of Low (L), Moderate (M), or High (H) were assigned for each of the following management activities: harvest, thin, decrease road density, watershed restoration, prescribed burning, and prescribed fire plans. Table 1.5 presents assumptions and definitions for these forest cluster activity levels. Table 1.6 shows a comparison of alternatives by management activity and forest cluster.

For each of the six range clusters, activity levels of Low (L), Moderate (M), or High (H) were assigned for each of the following management activities: graze livestock, improve rangelands, decrease road density, riparian restoration, prescribed burning, and prescribed fire plans. Table 1.5 presents assumptions and definitions for these range cluster activity levels. Table 1.7 shows a comparison of alternatives by management activity and range cluster.

Map 1.4 – Management emphasis areas (primary and secondary priorities) for forest clusters under Alternative 5 (FS- and BLM-administered lands only).

Map 1.5 – Management emphasis areas (primary and secondary priorities) for range clusters under Alternative 5 (FS- and BLM-administered lands only).

Map 1.6 – Location of Alternative 7 proposed reserves on BLM- and FS-administered lands. Selection of proposed reserves was based on roadless areas greater than 400 hectares (1,000 acres) that were distributed across a range of environments.

Table 1.3 — Overall management strategy by alternative (summary of general management emphasis by forest cluster for the Eastside and UCRB EISs).

	Alternative						
Forest Cluster	1	2	3	4	5	6	7
Eastside							
1	C	C	R-C	R-C	C	R-C	C
2	P-C	C	R	R	R-C	R	C
3	P	P-C	R	R	R	R	R-C
4	P	P-C	R-P	R	P	R	R-C
5	P	R-C	R	R	R	R	R-C
6	P-C	C	R-C	R	R-P	R-C	C
UCRB							
1	C	C	R-C	R-C	C	R-C	C
2	P-C	C	R	R	R-C	R	C
3	P	P-C	R	R	R	R	R-C
4	P	P-C	R-P	R	P	R	R-C
5	P	R-C	R	R	R	R	R-C
6	P-C	C	R-C	R	R-P	R-C	C

Adapted from the Eastside and Upper Columbia River Basin Preliminary Draft EISs.

Table 1.4 — Overall management strategy by alternative (summary of general management emphasis by range cluster for the Eastside and UCRB EISs).

	Alternative						
Range Cluster	1	2	3	4	5	6	7
Eastside							
1	P	P-C	R-P	R	R-P	R	R-C
2	C	C	C	R-C	C	R-C	C
3	P-C	C	R-C	R	R-C	R-C	C
4	P	P-C	R-P	R	P-C	R	R-C
5	P	P-C	R	R	P-C	R-C	C
6	P	P-C	R-P	R	R-P	R	R-C
UCRB							
1	P	P-C	R-P	R	R-P	R	R-C
2	C	C	C	R-C	C	R-C	C
3	P-C	C	R-C	R	R-C	R-C	C
4	P	P-C	R-P	R	P-C	R	R-C
5	P	P-C	R	R	P-C	R-C	C
6	P	P-C	R-P	R	R-P	R	R-C

Adapted from the Eastside and Upper Columbia River Basin Preliminary Draft EISs.

Table 1.5 — Cluster activity level assumptions for Alternatives 3 through 7, with definitions.

		Low	Moderate	High
Forest land				
Harvest (commercial) (Percent of all forested area treated per decade)	Alts. 1, 2, 7> Alts. 3-6>	0-4 0-5	4-8 5-9	8-10 9-11
Thin (pre-commercial) (Percent of all forested area treated per decade)		0-3	3-6	6-8
Decrease road density (Percent of total road miles reduced per decade)		0-25	25-50	50+ (Change in road density class)
Watershed restoration (Percent of all forested area treated per decade)		0-3	3-6	6-8
Prescribed burning (Percent of all forested area treated per decade)		0-5	5-9	9-11
Prescribed fire plans (Percent of all forest land with implemented plans per decade)		0-20	20-40	40+
Rangeland				
Livestock management (Percent of all rangeland with improved management)		0-6	6-12	12-20
Improve rangelands (Percent of all rangeland treated per decade)		0-4	4-8	8-11
Decrease road density (Percent of total road miles reduced per decade)		0-25	25-50	50+ (Change in road density class)
Riparian restoration (Percent of all riparian areas treated per decade)		0-25	25-50	50-75
Prescribed burning (Percent of all rangeland treated per decade)		0-3	3-6	6-9
Prescribed fire plans (Percent of all rangeland with implemented plans per decade)		0-20	20-40	40+

Harvest. All commercial harvest methods (such as single tree selection, group selection, shelterwood, seed tree, overstory removal, clearcut, and commercial thinning from above or below).

Thin. All pre-commercial thinnings used to alter forest structure, species composition, density, rate of growth, fuel ladders, fire behavior, etc.

Watershed restoration. Includes increased road maintenance, improved road condition (surface and/or drainage), reduced road related erosion, road obliteration, increased large woody material, riparian plantings, in-channel restoration, etc.

Livestock management. A summation of livestock management variables that affect rangeland health, including: grazing systems, changing riparian grazing management, season of use (length and timing), number of head: change of class, distribution, grazing deferment, and herding.

Improve rangelands. Capital investments such as fencing, stock water improvements, seedings, control of invasion or spread of exotics, and non-fire shrub and juniper control.

Decrease road density. *Permanent closure of primarily unsurfaced roads.*

Riparian restoration. Includes improving road condition (drainage and/or surface), riparian plantings, in-channel restoration, and riparian exclosures.

Prescribed burning. Management ignited fire.

Prescribed fire plan. Allows natural ignition fires to burn when in prescription and/or identifies areas that require prescribed burning.

Table 1.6 — Activity levels by forest cluster and alternative for the Eastside and UCRB EISs.

Action	Alternative 1	2	3	4	5	6	7
Eastside							
Forest Cluster 1							
Harvest	L	L	L	L	L	L	L
Thin	L	L	L	L	L	L	L
Decrease road density	L	L	L	L	L	L	L
Watershed restoration	L	M	M	M	M	M	L
Prescribed burning	L	L	M	H	L	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Primitive Recreation/Aquatics							
Forest Cluster 2							
Harvest	M	L	L	L	L	L	L
Thin	L	L	L	M	L	M	L
Decrease road density	L	L	M	M	L	M	M
Watershed restoration	L	M	M	H	M	M	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Aquatics/Recreation							
Forest Cluster 3							
Harvest	H	M	M	M	M	L	L
Thin	M	L	M	H	H	M	L
Decrease road density	L	L	M	M	M	H	H
Watershed restoration	L	M	M	M	M	M	L
Prescribed burning	L	L	M	M	M	M	M
Prescribed fire plans	L	L	L	M	M	M	H
Alternative 5 Management Priority: Aquatics/Timber							
Forest Cluster 4							
Harvest	H	M	M	M	H	M	L
Thin	M	M	H	H	H	H	L
Decrease road density	L	L	M	M	L	M	M
Watershed restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	L	M	L	M	M
Prescribed fire plans	L	L	L	M	L	M	M
Alternative 5 Management Priority: Timber/Wildlife							
Forest Cluster 5							
Harvest	H	L	M	M	M	L	L
Thin	M	M	H	H	H	H	M
Decrease road density	L	M	H	H	M	M	H
Watershed restoration	L	L	L	M	M	M	L
Prescribed burning	L	L	M	H	M	H	L
Prescribed fire plans	L	L	M	H	H	H	M
Alternative 5 Management Priority: Timber/Livestock							
Forest Cluster 6							
Harvest	M	L	L	L	M	L	L
Thin	L	L	H	H	M	H	L
Decrease road density	L	L	L	M	L	L	L
Watershed restoration	L	L	L	L	L	L	L
Prescribed burning	L	L	M	M	M	M	M
Prescribed fire plans	L	L	M	M	L	M	M
Alternative 5 Management Priority: Wildlife/Recreation							

Table 1.6 (continued)

Action	Alternative 1	2	3	4	5	6	7
Upper Columbia River Basin							
Forest Cluster 1							
Harvest	L	L	L	L	L	L	L
Thin	L	L	L	L	L	L	L
Decrease road density	L	L	L	L	L	L	L
Watershed restoration	L	M	M	M	M	M	L
Prescribed burning	L	L	M	H	L	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Primitive Recreation/Aquatics							
Forest Cluster 2							
Harvest	M	L	L	L	L	L	L
Thin	L	L	L	M	L	M	L
Decrease road density	L	L	M	M	L	M	M
Watershed restoration	L	M	M	H	M	M	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Aquatics/Recreation							
Forest Cluster 3							
Harvest	H	M	M	M	M	L	L
Thin	M	L	M	H	H	M	L
Decrease road density	L	L	M	M	M	H	H
Watershed restoration	L	M	M	M	M	M	L
Prescribed burning	L	L	M	M	M	M	M
Prescribed fire plans	L	L	L	M	M	M	H
Alternative 5 Management Priority: Aquatics/Timber							
Forest Cluster 4							
Harvest	H	M	M	M	H	M	L
Thin	M	M	H	H	H	H	L
Decrease road density	L	L	M	M	L	M	M
Watershed restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	L	M	L	M	M
Prescribed fire plans	L	L	L	M	L	M	M
Alternative 5 Management Priority: Timber/Wildlife							
Forest Cluster 5							
Harvest	H	L	M	M	M	L	L
Thin	M	M	H	H	H	H	M
Decrease road density	L	M	H	H	M	M	H
Watershed restoration	L	L	L	M	M	M	L
Prescribed burning	L	L	M	H	M	H	L
Prescribed fire plans	L	L	M	H	H	H	M
Alternative 5 Management Priority: Timber/Livestock							
Forest Cluster 6							
Harvest	M	L	L	L	M	L	L
Thin	L	L	H	H	M	H	L
Decrease road density	L	L	L	M	L	L	L
Watershed restoration	L	L	L	L	L	L	L
Prescribed burning	L	L	M	M	M	M	M
Prescribed fire plans	L	L	M	M	L	M	M
Alternative 5 Management Priority: Wildlife/Recreation							

Adapted from the Upper Columbia River Basin and Eastside Preliminary Draft EISs.

Table 1.7— Activity levels by forest cluster and alternative for the Eastside and UCRB EISs.

Action	Alternative 1	2	3	4	5	6	7
Eastside							
Range Cluster 1							
Livestock management	L	M	M	M	L	M	H
Improve rangelands	L	L	M	M	L	M	L
Decrease road density	L	L	L	H	M	M	M
Riparian restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	M	H	M	H	M
Prescribed fire plans	L	L	M	H	H	H	H
Alternative 5 Management Priority: Livestock/Timber							
Range Cluster 2							
Livestock management	H	H	H	H	H	H	H
Improve rangelands	L	L	L	L	L	L	L
Decrease road density	L	L	L	L	L	L	L
Riparian restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Recreation/Aquatics							
Range Cluster 3							
Livestock management	M	H	H	H	H	H	H
Improve rangelands	L	L	L	M	M	M	L
Decrease road density	L	L	L	M	L	L	M
Riparian restoration	L	M	M	M	L	L	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	L	L	M	H	M	H	H
Alternative 5 Management Priority: Recreation/Wildlife							
Range Cluster 4							
Livestock management	L	M	M	M	M	M	H
Improve rangelands	L	L	L	M	L	M	L
Decrease road density	L	L	M	M	L	M	M
Riparian restoration	L	L	L	M	M	M	M
Prescribed burning	L	L	M	M	L	L	L
Prescribed fire plans	L	L	L	M	L	M	M
Alternative 5 Management Priority: Wildlife							
Range Cluster 5							
Livestock management	L	M	M	H	M	H	H
Improve rangelands	L	L	M	M	L	L	L
Decrease road density	L	L	L	L	L	L	L
Riparian restoration	L	L	M	M	M	M	L
Prescribed burning	L	L	M	M	L	M	M
Prescribed fire plans	L	L	L	M	L	M	H
Alternative 5 Management Priority: Livestock/Recreation							
Range Cluster 6							
Livestock management	L	M	M	H	M	H	H
Improve rangelands	L	L	M	H	M	M	L
Decrease road density	L	L	L	M	L	M	M
Riparian restoration	L	L	M	M	M	M	M
Prescribed burning	L	L	L	L	L	L	L
Prescribed fire plans	L	L	L	L	L	L	M
Alternative 5 Management Priority: Livestock/Wildlife							

Table 1.7 (continued)

Action	Alternative 1	2	3	4	5	6	7
Upper Columbia River Basin							
Range Cluster 1							
Livestock management	L	M	M	M	L	M	H
Improve rangelands	L	L	M	M	L	M	L
Decrease road density	L	L	L	H	M	M	M
Riparian restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	M	H	M	H	M
Prescribed fire plans	L	L	M	H	H	H	H
Alternative 5 Management Priority: Livestock/Timber							
Range Cluster 2							
Livestock management	H	H	H	H	H	H	H
Improve rangelands	L	L	L	L	L	L	L
Decrease road density	L	L	L	L	L	L	L
Riparian restoration	L	L	L	M	L	M	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	H	H	H	H	H	H	H
Alternative 5 Management Priority: Recreation/Aquatics							
Range Cluster 3							
Livestock management	M	H	H	H	H	H	H
Improve rangelands	L	L	L	M	M	M	L
Decrease road density	L	L	L	M	L	L	M
Riparian restoration	L	M	M	M	L	L	L
Prescribed burning	L	L	M	H	M	M	L
Prescribed fire plans	L	L	M	H	M	H	H
Alternative 5 Management Priority: Recreation/Wildlife							
Range Cluster 4							
Livestock management	L	M	M	M	M	M	H
Improve rangelands	L	L	L	M	L	M	L
Decrease road density	L	L	M	M	L	M	M
Riparian restoration	L	L	L	M	M	M	M
Prescribed burning	L	L	M	M	L	L	L
Prescribed fire plans	L	L	L	M	L	M	M
Alternative 5 Management Priority: Wildlife							
Range Cluster 5							
Livestock management	L	M	M	H	M	H	H
Improve rangelands	L	L	M	M	L	L	L
Decrease road density	L	L	L	L	L	L	L
Riparian restoration	L	L	M	M	M	M	L
Prescribed burning	L	L	M	M	L	M	M
Prescribed fire plans	L	L	L	M	L	M	H
Alternative 5 Management Priority: Livestock/Recreation							
Range Cluster 6							
Livestock management	L	M	M	H	M	H	H
Improve rangelands	L	L	M	H	M	M	L
Decrease road density	L	L	L	M	L	M	M
Riparian restoration	L	L	M	M	M	M	M
Prescribed burning	L	L	L	L	L	L	L
Prescribed fire plans	L	L	L	L	L	L	M
Alternative 5 Management Priority: Livestock/Wildlife							

Adapted from the Upper Columbia River Basin and Eastside Preliminary Draft EISs.

Evaluation of Alternatives Process

Predicting effects, outcomes, and consequences for each alternative required an understanding of current conditions and planned activities. Figure 1.1 shows the flow of information and logic used to project outcomes. The science assessment provided the description of current conditions, risks, and opportunities at the broad scale within the Basin. From this the EIS teams assigned management emphasis and activity levels they believed would appropriately address the risks and opportunities consistent with the underlying theme of the alternative. This in turn led to establishing objectives and standards for specific areas, again, consistent with the underlying theme. Although these were not fully developed, the evaluation of effects required understanding, at least to some degree, how implementation and monitoring might be forthcoming for each alternative. Where no specific direction was provided on these subjects, the SIT made assumptions so that outcomes could be projected.

To evaluate the alternatives, each of the five staff areas of the SIT (landscape ecology, terrestrial, aquatic, social, and economic) used methodology specific to and appropriate for its discipline. However, this meant necessary differences in evaluation techniques. Consequently, each staff area chapter contains a description of the methodology, specific to that discipline, used in the evaluation. The SIT was instructed to predict ecological outcomes of the alternatives without regard to potential political barriers to implementation. There is concern among the SIT that potential challenges to implementation, such as adequate budget allocations, may occur. The analyses do not reflect or include these concerns. However, the concerns were relayed to the EIS teams.

Important changes have occurred in the EIS alternatives between the February 1996 Preliminary Draft EISs, which were evaluated by the SIT, and the Draft EISs as they are at the time of this publication. These changes, and their effect on the evaluation, are summarized in Chapter 8.

The objectives and standards for the EISs, as well as effects, will continue to evolve until the Final Environmental Impact Statements and Records of Decision. The reader is referred directly to the Upper Columbia River Basin and Eastside EISs for insights into changes in the objectives and standards, and subsequent changes in effects, consequences, and outcomes that have occurred since publication of this document.

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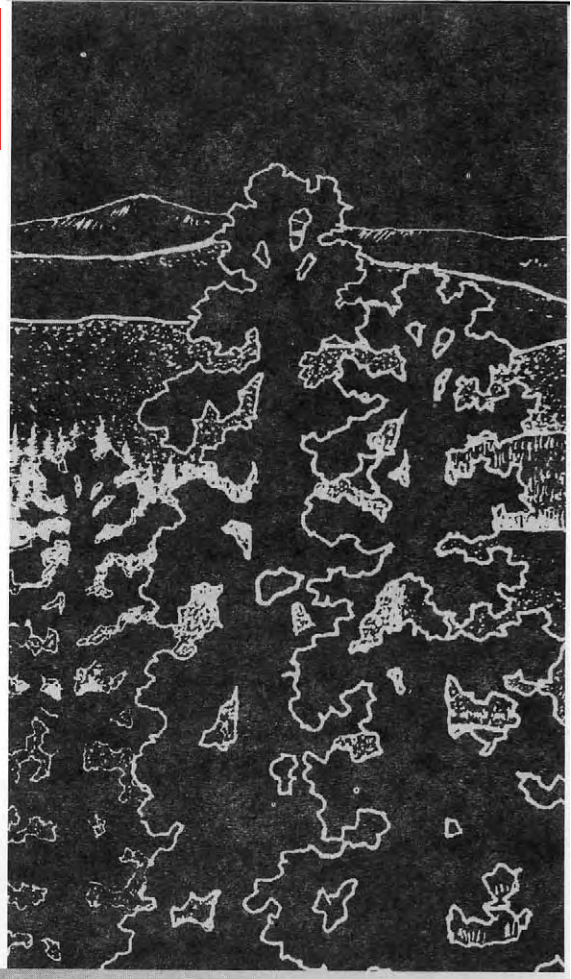
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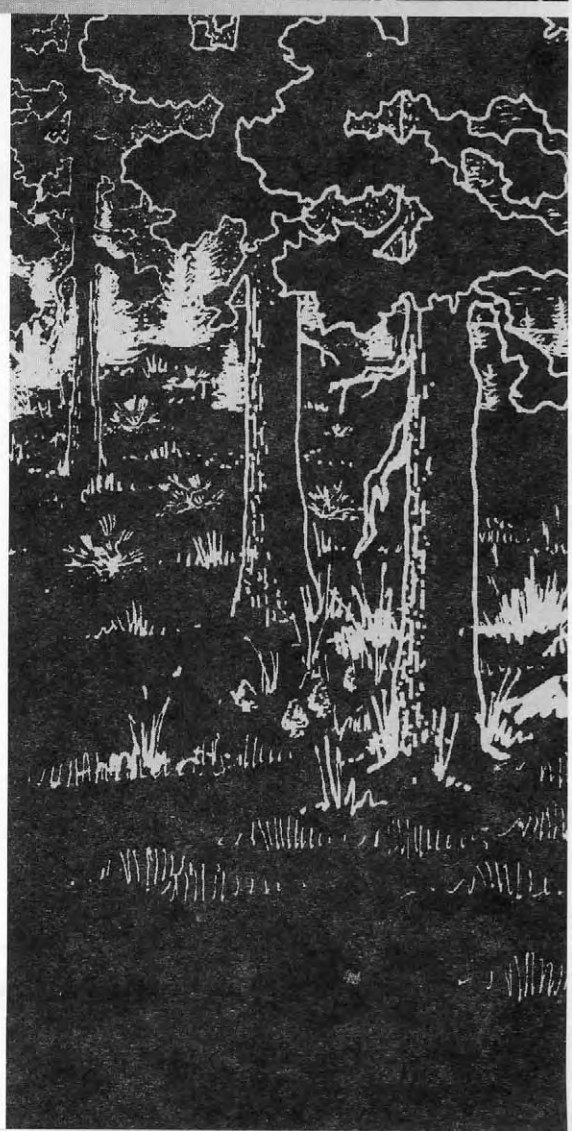
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CHAPTER 2

Landscape Ecology Evaluation of the Preliminary Draft EIS Alternatives

Wendel J. Hann
Michael G. "Sherm" Karl
Jeffrey L. Jones
Rebecca A. Gravenmier
Donald G. Long
James P. Menakis
Robert E. Keane



Wendel J. Hann, Landscape Ecologist, USDA Forest Service and USDI Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA/Boise, ID

Michael G. "Sherm" Karl, Rangeland Management Specialist-Ecologist, USDA Forest Service, Pacific Northwest Research Station, Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA

Jeffrey L. Jones, Ecologist and Wildlife Biologist, USDA Forest Service, Northern Region, Missoula, MT

Donald G. Long, Forester, USDA Forest Service, Intermountain Fire Sciences Laboratory, Missoula, MT

Rebecca A. Gravenmier, Natural Resource Specialist/GIS, USDI Bureau of Land Management, Oregon State Office, Portland, OR

James P. Menakis, Forester, USDA Forest Service, Intermountain Fire Sciences Laboratory, Missoula, MT

Robert E. Keane, Research Ecologist, USDA Forest Service, Intermountain Fire Sciences Laboratory, Missoula, MT

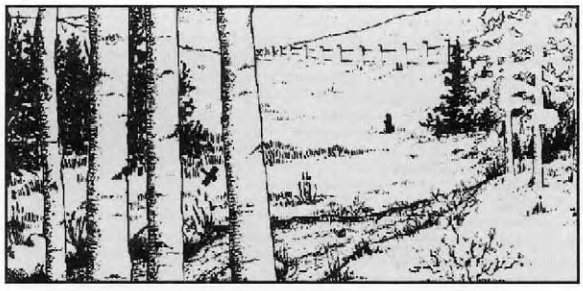


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Introduction

The landscape evaluation of alternatives for the Eastside and Upper Columbia Preliminary Draft Environmental Impact Statements (PDEISs) presents a comparison of outcomes for key landscape variables across the seven alternatives for the Basin.[1] The evaluation process involved simulation and analyses of predicted effects, and also qualitative evaluation, of the alternatives as described in direction to the Science Integration Team (SIT) in a letter dated February 26, 1996.[2] The relationship of the Evaluation of Alternatives to both the assessment and the EIS alternatives is shown in figure 2.1. The relation between the assessment data and EIS scale is shown in figure 2.2.

This chapter has seven sections:

1) Overview of the landscape ecology evaluation of alternatives, including a statement of assumptions.
2) Overview of the simulation methods used for predicting spatial and temporal responses to different levels of management treatments and disturbances.
3) Responses of vegetation to management and other disturbances.
4) Responses of terrestrial vegetation and habitats, and their interrelationships.
5) Evaluation of vegetation response and disturbance patterns.
6) Effects of selected noxious weeds and cheatgrass on rangeland in the Basin.
7) Summary, including conclusions.

The methods used for the evaluation of alternatives involved mapping land management and disturbance prescription response and assumptions based on alternatives developed by the EIS teams. Background information on the development, characteristics, and response of various landscapes to the different types of prescriptions is documented in *Landscape Dynamics of the Basin* (Hann and others, in press), Chapter 3 of the *Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Quigley and others, in press). Vegetation and disturbance responses are modeled using the Columbia River Basin SUccession Model (CRBSUM) (Keane and others 1996), in association with the Columbia River Basin Landscape Analysis Data Base (CRBLAD) (Gravenmier and others, in press), and a variety of associated simulation methods (Hann and others 1997).

The purpose of landscape dynamics evaluation is to predict the effects of the alternatives on landscape components (table 2.1). These components vary depending on the management emphasis of the alternatives (table 2.2; appendix 2-C). The seven different alternative themes in the preliminary draft EIS have a broad range of outcomes considering the variation in landscape components and the differences in spacial location and effects through time.

Landscape Evaluation Process

Direct linkages between each alternative's desired future conditions (DFCs),[3] objectives and standards (appendix I), and the emphasis areas by

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]The version of the EIS alternatives under evaluation here was presented to the SIT on February 26, 1996 in a package titled "Alternatives Package for SIT Evaluation for Eastside and UCRB EISs." On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, Washington, 99362.

[3]Desired Future Condition (DFC) is a portrayal of the land, resource, or social and economic conditions that are expected to result in 50 to 100 years if objectives are achieved; in this document, portrayed as a range of conditions. A vision of the long-term condition of the land. See appendix I for a description of the DFCs for each of the alternatives.

forest and range clusters in the EISs were not always clear. For example, many of the objectives and standards were written for fine-scale features that were not necessarily linked, in either a spatial or temporal context, with the broad-mid-fine scale hierarchy depicted in figure 2.2. Many of the standards apply single size/state conditions to ecological functions that are inherently variable. As such, standards applicable to the finer scales may be unrelated to the mid and broad scale. As an alternative is implemented, potential for conflict between the overall theme, objective, forest and range cluster emphasis, activity levels, mid-scale patterns, and the finer-scale standards exists. To reduce this potential for conflict and proceed with outcome projections, it was necessary to make assumptions relative to management prescriptions, management activities, and ecological "fit" of the single size/state standards. The purpose of the assumptions was to provide clarity about implementation of an alternative.

Treatment prescriptions were assumed to be either traditional or ecological, or to have minimal treatment (as in the reserves) (table 2.3). Treatment emphasis differs among alternatives. Management prescriptions emphasized in Alternatives 1 and 2 are traditional, Alternatives 3 through 6 are ecological, and Alternative 7 is a mix of reserve and ecological. It was also assumed that Alternatives 1 and 2 would be implemented in a traditional programmatic allocation with no emphasis on multi-scale relationships, while Alternatives 3 through 7 would be implemented with varying emphasis on interconnected spatial and temporal scales (figure 2.2).

Assumptions About Landscape Integrity[4] and Management Approaches

Two important measures of landscape integrity at all scales are: (1) ecosystem integrity (both ecological and socioeconomic), and (2) diversity of native habitats and associated processes. Generally, in wildland environments, native communities are more productive and more resilient to disturbances such as fire, drought, and insects/disease, than are communities that have been simplified by traditional agricultural, forest, or range management, or by conversion to exotic[5] communities. As native habitats are simplified or converted to exotics, there is a decline in the native fauna and flora that depend on these habitats. Management that conserves native habitats avoids further declines in native species, productivity and resiliency.

Listed below are the assumptions about the types of management that would be used to implement the alternatives. The assumptions are expectations of how management would sustain landscape integrity on BLM- and FS-administered lands.

Landscape Integrity Assumption 1: Landscape Approach to Management — Through time, the management of BLM- and FS-administered lands shifts increasingly toward a landscape approach. Under this assumption, the BLM- and FS-administered lands are managed as a whole within watersheds and as connected lands between watersheds. Forests and rangelands intermingled within or between watersheds are managed on an integrated basis for both resources and habitats. Hydrologic and riparian regimes within watersheds are managed as integral networks.

Managers recognize that ownership pattern strongly affects implementation of a landscape approach. Watersheds dominated by continuous BLM and FS oversight would have the best chance for achieving long-term desired patterns, while watersheds with mosaic or mixed ownership would have less chance. In contrast, managers recognize that disjunct BLM or FS parcels in environments with little BLM or FS ownership may be highly valuable for remnant native habitats.

[4]Landscape integrity is synonymous to landscape health based on proper functioning systems at a landscape scale. See Chapter 3 of the landscape assessment (Hann and others, in press) for definitions and discussion.

[5]Exotics are non-native plants; biota from a different area or environment that migrated to the area with the assistance of humans.

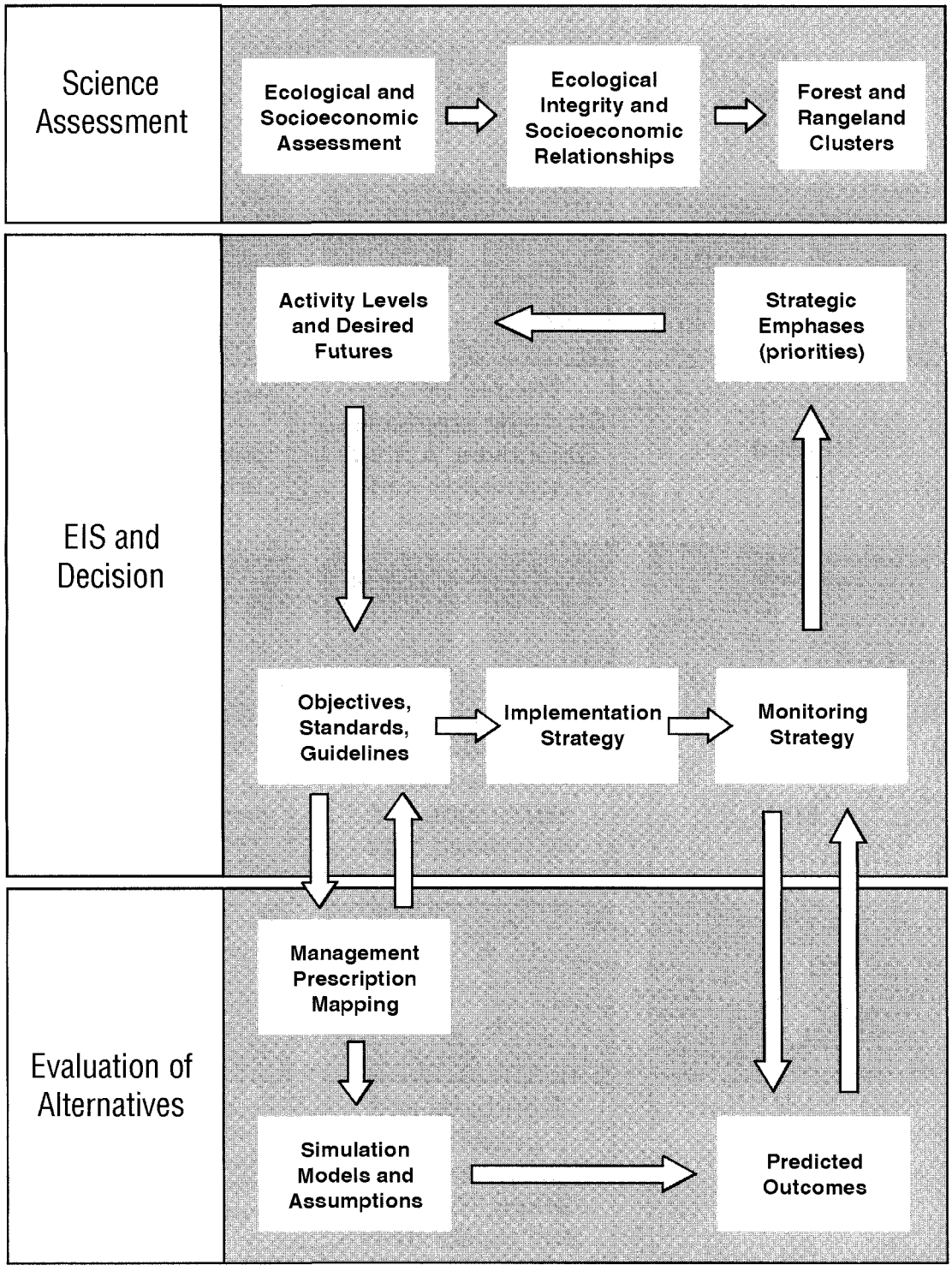


Figure 2.1 — Relationship of Evaluation of Alternatives to the Science Assessment and EISs.

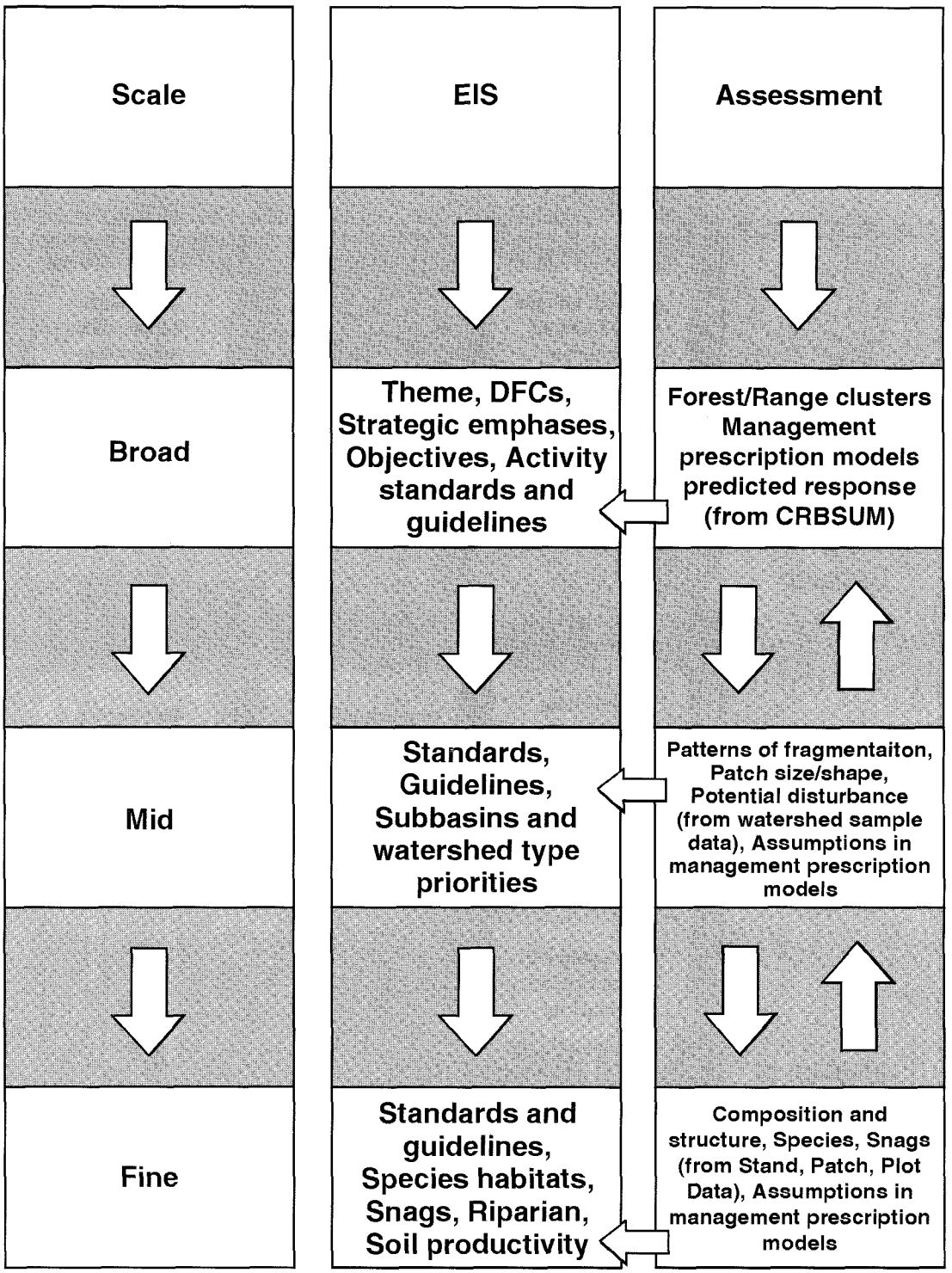


Figure 2.2 — Relationship between Assessment data and EIS scales.

Landscape Integrity Assumption 2: Successful Ability to Mimic/Represent Processes — Managers develop the ability to assess and implement landscape management to more closely resemble native landscape mosaics, biotic community structure and composition, and processes over space and time. This does not infer that these conditions are representative of the historical range of variability (HRV), which is the variability of regional or landscape composition, structure, and disturbances during a period of time for several cycles of the common disturbance intervals and for similar environmental gradients.[6] In essence, managers promote a balance of land use and ecosystem integrity that sustains native habitats while producing human resource values within the limitations of biophysical systems and inherent disturbance processes.

Emphasis should be placed on understanding and managing within the limitations and options of the biophysical template (BPT)[7] to conserve processes associated with native composition and structure. The biophysical template refers to an area's mosaic of inherent patterns of composition and structure, including environmental gradients and dynamics of disturbance that developed through evolutionary time. This concept, developed from work by Jenny (1958) and Major (1951), is described in detail by Hann and others (in press).

The historical range of variability provides an assessment tool to monitor biodiversity for either departure, or similarity of conditions or processes, to native pre-Euro-American settlement. HRV also provides a useful tool for understanding cause and effect, and thus, risk of undesired outcomes. Managing for HRV in a regime that has a substantially unbalanced biophysical composition could cause changes detrimental to native conditions and processes. Unbalanced regimes include areas having: exotic species, historically common species that are now rare, disrupted hydrologic systems, high fuel loading, simplified native diversity, composition and structure that are incompatible with the biophysical succession/disturbance[8] regime, or have degraded soils. Management for HRV is not appropriate for many types of land use that balance restoration and mitigation to sustain ecological integrity and native habitats with socioeconomic resiliency.

Representation of native conditions and processes is generally most successful in natural and natural/human-influenced management areas. In these areas, managers utilize planned and unplanned prescribed fire and flexible wildfire suppression strategies to represent native landscape patterns and represent native fire regime severity and intervals. Livestock grazing is managed in these areas to generally preclude departure from the native succession/disturbance regimes. However, the transition to native patterns occurs carefully to avoid loss of key elements (such as large trees or stronghold rare aquatic populations), site capability, or invasion of exotic species.

On human-influenced management areas, managers use various treatments to produce the types of communities and landscape structures somewhat characteristic of the native regime. These

[6]Historical range of variability (HRV) refers to the "pre-Euro-American settlement" or "native" regime. It is not synonymous with the historic or historical time period which we define as beginning circa 1850.

[7]The biophysical template can be visualized as the biological, physical, and disturbance characteristics of an environment over a period of relatively stable climate. It is the current expression of the collective adaptations of species to competition, disturbances, and the physical environment. It is also the current expression of the soils, landform, and hydrologic system development in response to biotic and geomorphologic processes. Biophysical templates have characteristic succession and disturbance regimes that are governed by the interaction between biotic and abiotic components. They may be altered by any disturbance (or repeated disturbances) that change the relationships between the biotic and abiotic systems.

[8]We provide a classification that integrates aquatic and terrestrial systems, and succession/disturbance. We classified succession/disturbance regimes according to 1) the severity of the disturbance relative to the subsequent change of community composition and structure, 2) the time interval between disturbances, 3) the resiliency or rate of community development in response to the disturbance, and 4) the mosaic created by disturbance through time.

Table 2.1 — Landscape components evaluated for alternatives.

Landscape Component
• Management prescription assumptions.
• Succession/disturbance trends and regimes.
• General trends of fine-scale variables such as snags, upland down wood, riparian down wood, forest riparian, range riparian, and vegetation mosaic patterns.
• Similarity of current vegetation and alternative vegetation to historical range of variability.
• Physiognomic types by potential vegetation group changes.
• Physiognomic type transitions from historical to current and current to 100 years.
• Terrestrial community changes.
• Terrestrial community departure of current from historical range and alternatives from historical range.
• Forest harvest.
• Forest thinning.
• Forest prescribed fire.
• Forest insect/disease susceptibility.
• Forest wildfire.
• Forest wildfire crown susceptibility.
• Range improvements such as seeding, spraying, and woodland cutting.
• Range allotment plan revision assumptions.
• Range prescribed fire.
• Range wildfire.
• Range grazing effects.
• Exotic plants, noxious and undesirable weeds.
• Total wildfire.
• Total prescribed fire.
• Wildfire cost.
• Prescribed fire cost.
• Total fire management cost.
• Wildfire intensity.
• Prescribed fire smoke.
• Wildfire smoke.
• Total smoke and effect on visual condition.
• Ecosystem productivity processes.

treatments may include timber harvest, livestock grazing, prescribed fire, wildfire suppression strategies, range cultural treatments, and forest cultural treatments. Monitoring and evaluation are conducted to compare the outcomes and make improvements in the landscape and community-level treatments.

Landscape Integrity Assumption 3: Hierarchical Assessment, Implementation, Monitoring, and Evaluation — Inventory programs and methods are redesigned based on landscape processes and gradients to integrate ecological conditions and resource values. Vegetation mapping emphasizes techniques such as remote sensing using multi-scale satellite imagery to

provide information that is consistent, continuous, and current. Classification methods for mapping vegetation use hierarchies based on the vegetation's composition and structure. Landscape planning is accomplished in a hierarchical manner reflecting integrated broad- to fine-scale findings in project design. Activities and changes are monitored by sampling mid- and fine-scale data, and then statistically extrapolated to support broad-scale monitoring. The evaluation process integrates broad- to fine-scale landscape conditions to evaluate change, as well as the effects of cumulative activities.

Landscape Integrity Assumption 4: Prioritization and Integration of Activities — Through time, activities that produce commodities and restore landscape conditions are prioritized and then implemented with emphasis on achieving an integrated landscape and maintaining aquatic, terrestrial, and

Table 2.2 — Alternatives by management emphasis and ecological interpretation.

Alternative	Alternative Group[1]	Management Emphasis[2]	Management Interpretation
Alt. 1	A	Existing BLM/FS Plans. Commodity with minimal reserves.	*Traditional prescriptions:* Produce and sustain commodity values. Traditional commodity and wilderness management and wildfire suppression.
Alt. 2	A	Interim BLM/FS Plans. Commodity with reserves.	*Traditional prescriptions:* Provide protection in aquatic riparian ecosystems; same as Alternative 1 in other areas. Reduce traditional commodity and continue traditional wilderness management and wildfire suppression.
Alt. 3	B	Restore/produce with local priority.	*Ecological prescriptions:* Restore, produce, and conserve. Restore and/or conserve areas that have local high priority and produce commodities.
Alt. 4	C	Restore with Basin priority.	*Ecological prescriptions:* Restore, produce, and conserve. Restore and/or conserve areas according to Basin priorities and produce commodities.
Alt. 5	B	Restore/produce with economic efficiency priority.	*Ecological prescriptions:* Conserve, produce, and restore. Produce and/or restore where economically efficient in the Basin and conserve with Basin priorities.
Alt. 6	C	Restore with adaptive management and with Basin priority.	*Ecological prescriptions:* Restore, produce, and conserve with adaptive management. Restore and/or conserve areas based on Basin priorities, and produce commodities with reduced rates in higher risk areas.
Alt. 7	B	Reserve the undeveloped areas; restore/ produce in other areas.	*Ecological/reserve prescriptions:* Minor management in reserves with minimal investment in fire suppression and restoration; same as Alternative 3 in other areas.

[1]Alternative Group:

A = Alternatives with traditional prescriptions that have high departure from native succession/disturbance regimes.

B = Alternatives with ecological prescriptions that have moderate departure from native succession/disturbance regimes due to spatial and temporal fragmentation in response to emphasis on local priorities (alternative 3); economic priorities (alternative 5), or reserve management (alternative 7).

C = Alternatives with ecological prescriptions that have low departure from native succession/disturbance regimes.

[2]Management emphasis – see appendix 2-C for description of catagories; see table 2.4 footnote 1 for definitions.

hydrologic integrity and social and economic resiliency. These priorities are set regionally using assessment results at the subbasin [4th-field Hydrologic Unit (HUC)[9]] level and associated interpretations (see Quigley and others 1996). These priorities are placed in context with national and international integrated priorities scaled at the Basin level. Priorities are set at the watershed and subwatershed scale using a similar analytical process for 5th- and 6th-field HUCs within subbasins. The process of ecosystem risk and opportunity analysis follows the concepts of assessment for proper functioning landscape patterns as described in the Landscape Dynamics assessment by Hann and others (in press).

Landscape Integrity Assumption 5: Concentration of Activities Temporally and Spatially — Through time, the implementation of activities such as access for timber harvest, use of prescribed fire, and road access management tends to be concentrated in time and space to better reflect patterns of the inherent disturbance regimes and biophysical template. In general, disturbances at the watershed level are consistent with the template and concentrated within periods of a few years, across a relatively large part of the watershed, and with relatively long time intervals of little or no disturbance. Management for individual activities occurs over larger areas to represent natural disturbances and

[9]As part of the need to integrate terrestrial and aquatic ecosystem information to address many of the issues related to the biophysical and social ecosystem components within the Basin, it was necessary to develop consistent and continuous delineations of watersheds across the assessment area. A total of approximately 7,500 base unit subwatersheds (6th-field HUCS) were identified within the Basin. Watersheds by their very nature are a nested hierarchy; a small watershed is contained within a larger watershed, which, in turn, is contained within a still larger one. The numeric coding system was based on the one prepared by the USGS in cooperation with the Water Resources Council. This system consists of fields of paired digits referred to as Hydrologic Unit Code (HUC). The first four fields (8 digits) are assigned and published by the USGS and are commonly referred to as 4th-field HUCs. The ICBEMP watershed delineation further subdivides 4th-field hydrologic code units into smaller, nested 5th-field and 6th-field hydrologic units. It is the 6th-field hydrologic unit (referred to as 6th-field HUC or subwatershed) that was used as the basic characterization unit for the ICBEMP assessment effort.

Table 2.3 — General descriptions of traditional, ecological, and reserve management prescriptions.

Management Prescription	Description
Traditional	Emphasis on managing primary natural resource variables related to providing for human needs (such as wood production, livestock, recreation, visual condition, water, and big game). Manage as an aggregation of effects from a fine scale (such as stands, allotments, campgrounds, and point source) with no broader scale context. Measure sustainability directly from the variables. Manage to control landscape dynamics to maximize production of primary natural resource variables.
Ecological	Emphasis on managing relationships of humans and other species with their environments (recognizing primary natural resource variables and their relationship with ecological composition, structure, and function). Manage using broad spatial and temporal scales to provide context for management of finer scale patterns. Measure sustainability from both primary natural resource variables and ecological processes. Manage landscape succession/disturbance regimes to shift current spatial patterns and temporal trajectories to fit the basic biophysical template and represent native succession/disturbance regimes.
Reserve	Emphasis on minimal production of natural resource commodity variables and minimal direct management treatments. Manage landscape dynamics to allow the current spatial patterns to achieve their own balance with the environment through time.

to maintain structures that "fit" the biophysical template. This management shift, prioritized through time, would result in improved landscape integrity and more efficient production of resource values.

Landscape Integrity Assumption 6: Road Management — New road construction is prioritized for low sensitivity landtypes and 6th-field HUC subwatersheds within the context of objectives specifying no net increase in road densities in any cluster or in applicable subwatersheds. Road management prioritizes reductions in road density in moderate-to-high sensitivity watersheds and landtypes. Permanent roads are surfaced with asphalt or stable aggregate to reduce the need for grading and cut/fill slopes, and ditches are stabilized with herbaceous cover. Drainage systems and culverts are reconstructed, as needed, and maintained to eliminate delivery of sediment into streams. Bridges and culverts are reconstructed, as needed, in locations that reduce impacts on the river and stream channel dynamics.

Landscape Integrity Assumption 7: Fire Management — The fire suppression and fuels programs are managed to attain landscape conditions consistent with inherent disturbance processes and within the capabilities of the biophysical system. Fire suppression resources are maintained to manage wildfires when needed. During periods when wildfire activity is low, these resources are used for prescribed fire and fuel management. Large wildfires are managed in the context of the total landscape and risk to lives, property, and resource investments, with a full range of strategies capable of achieving landscape vegetation and fuel management objectives, as well as wildfire suppression.

Wildfire management strategies fully recognize the dangers of various fuel and weather conditions and place emphasis on the safety of firefighters, as well as the need to meet fire suppression objectives. Fuels in wilderness and semi-primitive areas are managed with an active prescribed fire program that includes unplanned ignitions where appropriate, and planned ignitions where needed, to trend toward the appropriate landscape pattern of succession/disturbance regimes and to meet resource objectives.

Landscape Integrity Assumption 8: Forest and Range Integrated Landscape Management — Management activities are designed and implemented to integrate planning, implementation, and monitoring for ecological integrity, while considering social and economic resiliency. Management emphasis shifts towards managing landscape processes to provide the most effective "fit" with the biophysical template and associated pattern of succession/disturbance regimes.

Management would improve the integrity of many processes by managing activities such as harvest, prescribed fire, wildfire, and grazing to mimic or represent effects of native succession and disturbance processes at the physiognomic level. Key processes include photosynthesis, decay, fire, insect/disease, and herbivory. Landscape patterns of succession/disturbance regimes provide a basis for integrated improvement of integrity by "best fit" of treatments to their appropriate landscape position and scale. Through time, management activities that affect these processes would provide for a supply of dead and live standing and down wood that structurally represent the essential range of associated habitats and conditions for nutrient cycling.

By considering net primary productivity and water/nutrient balance at levels consistent with the native system, management would provide for productivity and stress levels consistent with biophysical limitations. Managing for soil cover and structure as appropriate for the biophysical template would provide for long-term soil productivity, and also limit erosion and sediment delivery. Designing roads that reduce sediment delivery and bare soil would improve hydrologic integrity. Monitoring of multi-scale landscape patterns and adjusting for landscape processes would change the trends in community and landscape patterns to be more consistent with inherent disturbance processes. The broad-scale composition

of physiognomic types would become more similar to the biophysical template, in both structure and composition of communities, and landscape patterns of succession/disturbance regimes, at the watershed scale.

Landscape Integrity Assumption 9: Management of Different Potential Vegetation Groups (PVGs)[10] — Management of potential vegetation groups is done in a landscape context with their adjacent PVGs. There is emphasis to avoid both the introduction and spread of exotic plants and noxious weeds. Any seeding that is deemed necessary would use native species whenever possible; any non-native species used should, when possible, be ones that do not produce viable seed. Desired non-native species are used for restoration only if there are no native species that can compete with undesirable exotics or that will stabilize the site.

Over time, the integrity of potential vegetation groups would improve by addressing conditions related to current integrity problems. By improving inventory, remote sensing, and ecological modeling, management would develop a better understanding of potential vegetation groups and their relationships to landscape patterns and succession/disturbance regimes at finer scales.

Through time and with the use of prescribed fire, flexible strategies on wildfire management, noncommercial tree cutting, commercial harvest, livestock grazing, and other treatments, the mix of physiognomic types would show a trend toward a mix consistent with properly functioning landscape systems (also equivalent to landscape health).

Additional information about assumed management of potential vegetation groups is included in appendix 2-A.

[10]A PVG is a group of potential vegetation types (PVTs) that have similar environmental conditions and are dominated by similar types of plants. A potential vegetation type is a physical and biological environment that produces a kind of vegetation, such as the dry Douglas-fir type.

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Simulation Strategies Used for Evaluation of Alternatives

The basic platform we used for simulating the vegetation composition and structure and its associated disturbance for the preliminary draft EIS alternatives was a spatial and temporal model called the Columbia River Basin SUccession Model (CRBSUM) (Keane 1996), along with the Columbia River Basin Landscape Analysis Data Base System (CRBLAD) (Gravenmier and others, in press) and other associated models and data (Hann and others 1997). CRBSUM predicts disturbance dynamics and vegetation response through time at a landscape level. Differences in alternatives were simulated by using various combinations of types, rates, and spatial allocations to subbasin clusters, of disturbances. The data system, called CRBLAD, predicts many other attributes that aid in landscape, aquatic, terrestrial, social, and economic assessment.

Management disturbances assessed included livestock grazing, timber harvest and thinning, range improvements, prescribed fire, and fire suppression emphasis; other disturbances included wildfire, insect and disease mortality, and drought. The simulations of the various alternatives showed how different types of disturbance interact to produce various temporal and spatial mixes of vegetation types and associated attributes. The response for a given spatial location varied depending on the current and potential vegetation types, the type of management assigned to the area in the alternative, and the kinds of disturbances projected in the simulation period.

Prescription Models

The types and rates of disturbances varied among the different potential vegetation types and prescription models (Hann and others, in press; Long and others 1996). While each prescription represented a specific type of management, they generally fell into one of five broad categories of management:

- Traditional management of vegetation for production of commodities using traditional treatments and suppression of wildfires.
- No management of vegetation in reserves (roadless areas), and suppression of wildfires within the National and Regional Interagency fire policy requirement.
- Traditional protection for visual quality or habitat objectives and suppression of wildfires while producing minimal commodities.
- Ecological approach to conserving a balance of ecosystem integrity and native diversity while meeting human resource objectives, and integrating wildfire management with prescribed fire management in roaded areas.
- Ecological approach to restoration of landscapes to achieve a balance between ecosystem integrity and native diversity while meeting human resource objectives, and integrating wildfire management with prescribed fire management in roadless areas.

There were 18 prescriptions: the historical regime and 17 simulations representing various types of management (table 2.4). The historical regime was simulated once for a 100-year period and a second time for a 400-year period. These simulations used the historical (circa 1850s) map as a starting input layer and modeled a 100-year historical range of variability (HRV) and a 400-year HRV.[1]

[1]The HRV (Morgan and others 1994) provides a means of understanding succession/disturbance and the biodiversity relationships of paleoecological and historic systems. It incorporates the relationships between the energy of the system in terms of processes of biomass accumulation and the processes of disturbance that convert or physically transport biomass. HRV can serve as a tool for understanding the causes and consequences of change in ecosystem characteristics over time as well as serve as a benchmark for understanding the effects of human-induced changes of biophysical systems. We simulated the HRV by developing pre-Euro-American settlement succession/disturbance models for each potential vegetation type and simulating change over a 100- or 400-year period from the historical vegetation map (Long and others 1996).

The management regimes were simulated for a 100-year period from current. All prescriptions were simulated for all lands in the Basin and data were stored in a prescription database (Hann and others, in press; Hann and others 1997).

Each prescription had a different response used to simulate the application of management activities and associated effects. The historical prescription set was used to define the historical range of variability (HRV) for the Basin, and also for each EIS area, management class, potential vegetation group (PVG), and subbasin. The historical prescription set was not appropriate for current management due either to differences in objectives and current conditions, or to a change in the response of the potential vegetation (Hann and others, in press).

Table 2.4 — Landscape management prescription (Rx) map symbol legend names.

Prescription Type	Rx	Legend Name
*	HI	Prescription set to model 100-year and 400-year simulations of HRV.
Ecological		
*	A1	Restoration[1] with PNF/P[2]
*	A2	Roaded Land High Restoration with Production[1]
*	A3	Roaded Land High Restoration with Production and Area or PVG Emphasis
*	N1	Conservation[1]
*	N4	Roaded Land Moderate Restoration with Production
Traditional Reserve		
*	C1	Roadless Land with Moderate Fire Suppression
*	N6	Roadless Land with Moderate Fire Suppression and PNF/U[3]
*	P1	Roadless Land Reserve with Moderate Fire Suppression
Traditional Commodity		
*	C2	Roaded Land High Commodity with Low Ecological Mitigation
*	C3	Roaded Land High Commodity with No Ecological Mitigation
*	N3	Roaded Land Moderate Commodity with Low Ecological Mitigation
*	N5	Roaded Land Moderate Commodity with High Exotic Weeds
*	N8	Roaded Land Moderate Commodity with Moderate Ecological Mitigation
*	P3	Roaded Land Very High Commodity with No Ecological Mitigation
Traditional Commodity in Sensitive Areas		
*	N2	Sensitive Visual[4] Area with Moderate Harvest & Livestock
*	N7	Sensitive Visual Area with Moderate Harvest & Low Livestock
	P2	Sensitive Visual Area with Low Commodity & High Wildfire

[1]Management Emphasis definitions:
1) Conservation — Emphasis provides for the protection of rare native elements and systems while maintaining proper functioning systems and restoring systems where there is low risk to rare elements or systems. Some human commodities may be produced but the emphasis is on human values related to protection of native diversity, aesthetics, and recreation.
2) Restoration — Emphasis provides for subsidizing ecological and landscape processes and functions to shift the transition toward proper functioning systems. Considerable human commodities may be produced that are compatible with restoration, as well as conservation of inclusions of rare elements and systems, but the emphasis is on shifting landscapes that are in high departure from the native regime toward proper functioning ecological relationships.
3) Production — Emphasis provides for production of human needs and values by managing in concert with native ecological and landscape processes to maintain or shift to proper functioning systems. This will typically require subsidies to represent native ecological cause-and-effect relationships at landscape levels, along with some restoration and conservation, but the emphasis is on design of system responses that produce commodities and other values.
4) Traditional — Emphasis on the independent management model for producing commodity values, protecting visually or environmentally sensitive areas, or managing reserves to protect semi-primitive characteristics.

[2]Prescribed natural fire program with planned ignition.

[3]Prescribed natural fire program with unplanned ignition.

[4]Traditional sensitive visual area management similar to traditional reserve.

Table 2.5 — General management activity levels[1] by prescription set (Rx).[2]

	Forest Management				Range Management								Prescription Type		
Rx	Harvest	Thin	Rx Fire	Road Density	Grazing Effects	Upland	Riparian	Wood-land	Rx Fire	Road Density	Wildfire Hazard	Exotics Hazard	Trad[3]	Ecol[3]	Allocation Method
H	N	N	N	N	L	N	N	N	N	N	H	N	NA	NA	NA
Ecological Prescriptions															
A1	N	N	H	N	L	N	N	N	M	N	L	L	NA	3-7	Multi-scale
A2	M	H	H	L-M	L	H	H	H	H	L	L	L	NA	3-7	Multi-scale
A3	H	H	H	L-M	L	M	M	H	M	L	L	L	NA	3-7	Multi-scale
N1	N	N	L	N	L	L	L	N	L	N	M	L	NA	3-7	Multi-scale
N4	L	L	L	L	L	L	L	M	L	L	M	M	NA	3-7	Multi-scale
Traditional Reserve Prescriptions															
C1	N	N	L	N	L	N	N	N	L	N	M	M	1-7	NA	Area
N6	N	N	L	N	L	L	N	N	L	N	M	L	1-7	NA	Area
P1	N	N	N	N	L	N	N	N	N	N	H	M	1-7	NA	Area
Traditional Commodity Prescriptions															
C2	H	M	L	M-H	M	M	M	M	M	M	M	H	1-7	NA	Area
C3	H	H	L	H-V	M	M	L	M	M	L	M	H	1-7	NA	Area
N3	H	H	L	M-V	M	L	L	M	L	L	H	H	1-7	NA	Area
N5	M	M	L	L-M	L	L	L	M	L	L	M	H	1-7	NA	Area
N8	H	H	L	M-V	L	L	L	M	L	L	M	H	1-7	NA	Area
P3	H	M	L	H-V	H	L	N	M	L	L	M	H	1-7	NA	Area
Traditional Commodity in Sensitive Areas															
N2	M	M	L	L-M	M	L	L	M	L	L	M	H	1-7	NA	Area
N7	M	M	L	L-M	L	L	L	M	L	L	M	M	1-7	NA	Area
P2	L	N	N	L	L	N	N	L	N	N	H	H	1-7	NA	Area

[1]Levels: L = low; M = moderate; H = high; V = very high; N = none.

[2]As simulated by Columbia River Basin Succession Model.

[3]Rx = prescription; Trad. = traditional prescription; Ecol. = ecological prescription.

Table 2.6 — Management prescriptions (Rx) sorted by conservation, restoration, and production emphasis.

Rx Emphasis	Rx Ability to Achieve Emphasis	Management of Forest Non-Wilderness/ Roaded	Management of Range Non-Wilderness/ Roaded	Wilderness/ Non-Roaded Management
		Prescription		
Conserve	High	N1	N1	
	Moderate	N4	N4, C1	N6[1]
	Low	P1	P1	C1, P1
Conserve - Produce	High	N2, N7	N4	C1
	Moderate	N4 > N5[2]	N1	N1
	Low	P2[1]		N6
Produce	High	P3 > C3> C2	C3	C1
	Moderate	N8, N3	N2, N3	N6
	Low	N7 > N5 > N4		
Restore	High	A1	A2	A1
	Moderate	A1	A3	N1
	Low	N4	N1	
Restore - Conserve	High	A1	A2	A2
	Moderate	N1	N1	N1
	Low	N4	N4	
Restore - Produce	High	A3	A3	A1
	Moderate	A2	A2	N1
	Low	N2 > N4 > N5	N1	

[1]Model not commonly used in simulations.

[2] > = greater than; Rx has a greater emphasis than the next Rx.

The general characteristics of the 17 management prescriptions are described in tables 2.5 and 2.6. General responses of all 18 prescriptions are documented by Hann and others (in press) and Long and others (1996). Documentation of the detailed model probability and associated response data is provided in the landscape assessment data record (Hann and others 1997). Levels of disturbance were identified by management prescription type in relation to management emphasis: conserve, restore, restore-produce, conserve-produce, restore-conserve, or produce (table 2.6). These categories correspond with emphasis categories in the alternatives of the preliminary draft EISs.

Also identified for simulation purposes were relative rankings of fine-scale attributes associated with the prescription (table 2.7). These attributes had substantial fine- and mid-scale differences within a broad-scale disturbance or vegetation type. In the assessment of current and historical conditions, for example, there were substantial differences within a given broad-scale type in:

- Composition and structure of such components as vegetation species and density; snags; down wood; and bare soil.
- Disturbances, such as: fire behavior, grazing effects, insect/disease mortality; and their patterns including patch size and shape, and position relative to biophysical relationships.

In general, these differences were correlated with:

- Roaded areas disturbed by management activities.
- Roadless areas substantially affected by fire exclusion.

Table 2.7 — General attribute response to emphasis of management prescriptions in forest for dead standing/down material conservation and soil exposed to erosion.

Rx[1]	Large Snag Conservation	Large Down Wood Conservation	Duff/Litter Cover	Bare Soil
N4	Moderate	Moderate	Moderate	Low
N5	Moderate	Moderate	Moderate	Moderate
N6	High	High	High	Low
N7	Low	Low	Moderate	Moderate
N8	None	None	Low	High
A2	High	High	High	Low
C2	Low	Low	Moderate	High
N2	Low	Low	Moderate	Moderate
P2	Low	Low	High	Low
A3	Moderate	Moderate	High	Low
C3	None	None	Low	High
N3	None	None	Low	High
P3	None	None	Low	High
A1	High	High	High	Low
C1	High	High	High	Low
N1	High	High	High	Low
P1	Low (lost to wildfire)	Low (lost to wildfire)	Low (lost to wildfire)	High (exposed to wildfire)

[1]Rx = prescription.

- Roadless areas with minimal or no effect by fire exclusion.

We used the response differences between management prescriptions to characterize disturbance probabilities and associated response. Our interpretations of the broad-, mid-, and fine-scale data were done, either quantitatively or qualitatively, based on our hierarchical knowledge of the broad-scale patterns of vegetation and disturbance type and its associated composition, structure, or landscape patterns at mid- and fine-scales.

Alternative Emphasis and Prescription Assignments

Management classes represented areas of different ownership and management emphasis within an EIS area. The BLM- and FS-administered lands included the following five management classes:

- Roadless, natural process dominated areas (wilderness and wilderness-like).
- Roadless, human/natural process dominated areas (typically visually sensitive or semi-primitive areas).
- Roadless, human process dominated areas (typically roadless areas managed for commodities or dispersed recreation or visuals).
- Roaded, human/natural process dominated areas.
- Roaded human process dominated areas.

Spatial and temporal prescription assignments differed by alternative, with prescriptions assigned systematically to stratifications by:

- Subbasin [4th-field hydrologic unit code (HUC)]
- EIS area
- Management class
- Potential Vegetation Group.

To develop an integrated map of management prescriptions for each alternative, we developed a

data file stratified to the subbasin, EIS area, management class, and potential vegetation group that had management emphasis codes from the preliminary draft EISs for forest and range by alternative. We then used the information from the preliminary draft EIS on alternative activity levels, theme, DFCs, and standards to correlate with the "best fit" or management prescription model.

Prescriptions were assigned a management emphasis based on the following factors, in successive order:

- Emphasis maps (preliminary draft EISs, Ch. 3)
- Activity level descriptions
- Desired future conditions (DFCs)
- Theme of the alternative
- Standards of the alternative.

Using this data, we developed a rule set to assign a management prescription code for each map stratification (table 2.6). The rule set was applied and then adjusted for "best fit" based on:

- Our assumptions for the alternatives, as discussed in the "Introduction" section of this chapter.
- Management emphasis and activity levels from the preliminary draft EIS, Chapter 3.
- Themes and desired future conditions of the alternatives.
- Standards from Chapter 3 of the preliminary draft EIS.
- An iterative process for assigning prescriptions and summarizing estimated effects levels to achieve the standards (see appendix I, Vol. II of this document).
- Qualitative review of Chapter 3 of the preliminary draft EISs to check for logical mapping of prescription codes.
- Knowledge of ecological integrity, socioeconomic resiliency, forest and range clusters, and the desired response as written in the preliminary draft EIS, Chapter 3 (see appendix I).
- Correction of errors in management class with the appropriate prescriptions.

Management emphasis maps for forest and range were based on the integrity clusters and preliminary draft EISs. Management emphases are shown on maps 2.1 through 2.14. Descriptions of each kind of management emphasis are provided in appendix 2-C. The prescription assignments for each alternative are shown on maps 2.15 through 2.21. Tables 2B.1 through 2B.28 in appendix 2-B summarize prescription model characteristics for forest and range areas for each EIS area by alternative, based on the prescription assignment and other appropriate information.

Preliminary Draft EIS Alternative Disturbances and Simulated Disturbances

The simulation of alternatives had three objectives for evaluating vegetation and disturbance response at the broad-scale assessment level:

Objective 1. Prescription maps and associated simulation data were adequate to determine the relative differences in trends among the responses for different landscape variables of Alternatives 1 through 7.

Objective 2. Understand the dynamics and variability of the responses of each alternative, based on their ability to be successfully implemented. For this objective, it was important that the simulation would quantify the dynamic cause and effect relationships of management activities, alternative standards, disturbances, and landscape variables through time.

Objective 3. Quantify general levels of differences among activity levels and other disturbances for comparison purposes. For this objective, it was also important to generally quantify any differ-

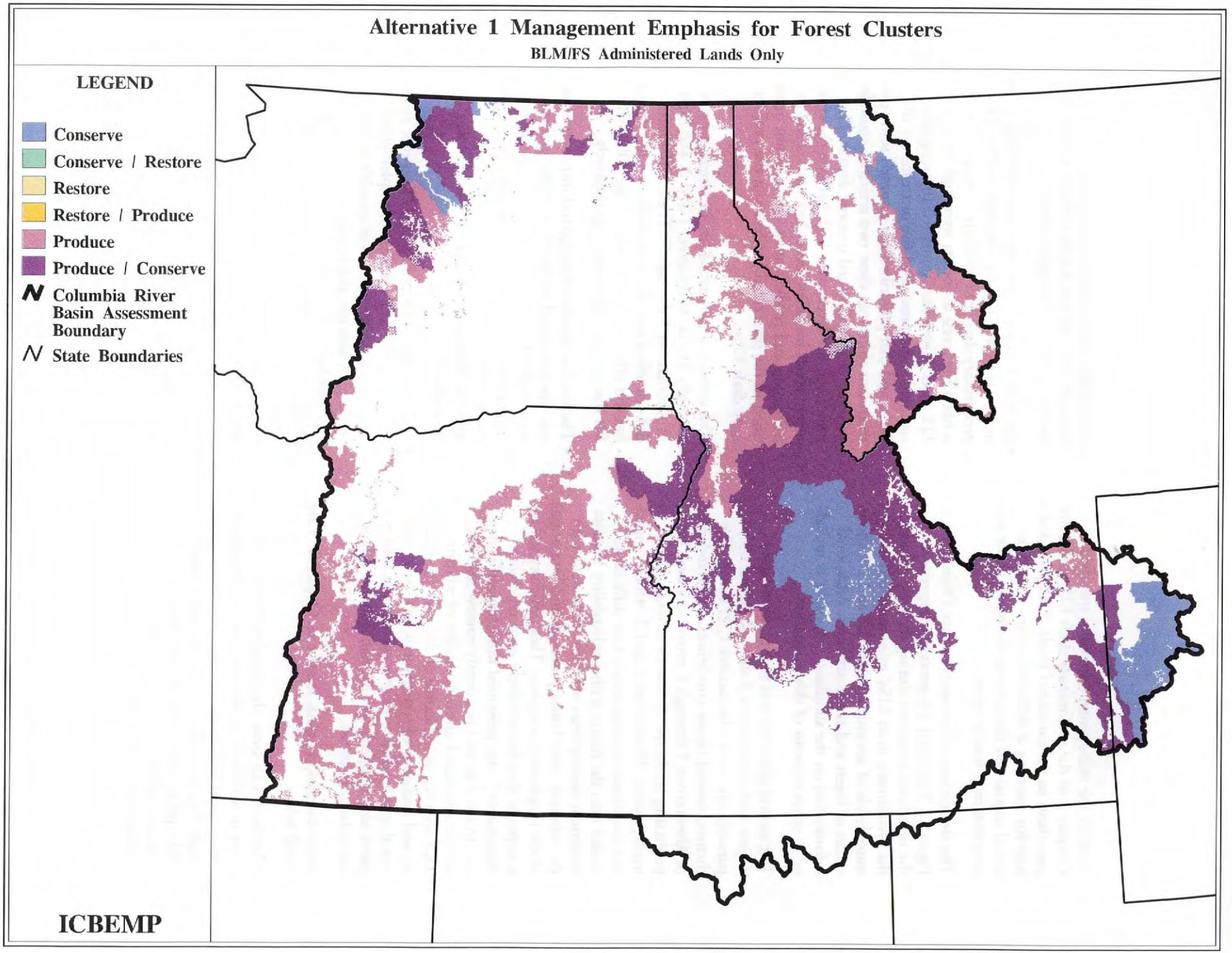
ences in the management activities specified in Chapter 3 of the preliminary draft EISs and compare them to the simulated levels. This provided a base for assessing if differences were related to actual spatial and disturbance factors or if the prescription map was in error.

The simulations of alternatives met Objective 1. Figures 2.3 through 2.6 provide comparisons of the simulated responses during the first decade to the preliminary draft EISs' minimum and maximum levels of activities. Tables 2.8 and 2.9 show values of forest and range activities. Additional information on the simulated responses is included in other sections of this evaluation.

The second objective was met to a moderate degree with Alternatives 3 through 6, but only partially met with Alternatives 1, 2, and 7. The themes, desired future conditions, and standards of Alternatives 3 through 6 provided a base for predicting landscape dynamics in response to management. Alternatives 1 and 2, which emphasize traditional management, were difficult to model into the future with predictability because treatment assumptions were not consistent with the inherent disturbance processes and limitations of the biophysical template. This difficulty led to a response that has relatively poor reliability. Alternative 7 also presented modeling difficulty due to its large and frequently narrow reserves, and an associated unpredictability of wildfire. This response is indicative of the poor predictability and resiliency of systems managed with traditional commodity or reserve patterns, as compared to ecologically based management (Hann and others, in press).

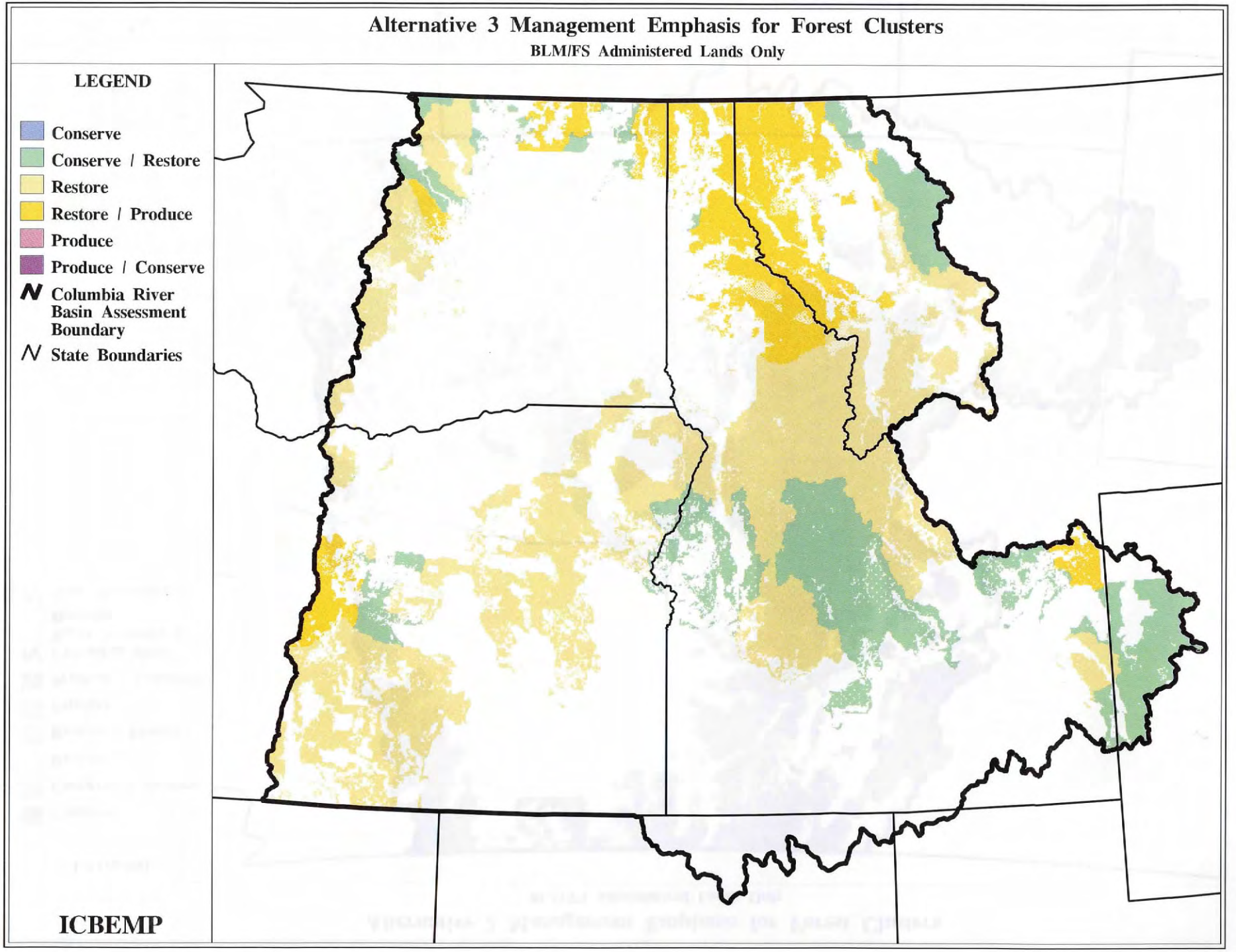
Some discussion points relative to Objective 3 are listed below:

- For both EIS areas, the simulated levels of harvest in forests were relatively close to the preliminary draft EIS levels. Alternative 2 was slightly high, but the difference was not substantial for this spatial and temporal scale. However, because of the transition time necessary to change from from traditional management to ecological management in Alternatives 3 through 7 we are not highly confident that the harvest levels can be implemented.
- For both EIS areas, the simulated thinning levels in forests were generally low compared to the preliminary draft EIS levels. In contrast, the prescribed fire levels in forests were high for both EIS areas. Given that simulated thinning also assumed some prescribed fire or treatment of fuels, and that prescribed fire assumed some pretreatment thinning, these two activities could be grouped or interchanged to some degree. The prescribed fire levels were high because the simulated levels included prescribed natural fire in wilderness and roadless areas, that was not quantified in the prescribed fire levels in the preliminary draft EISs.
- The simulated prescribed fire in rangeland was generally low in Alternatives 1 and 2, and high in Alternatives 3 through 7. These differences did not affect our ability to evaluate Objective 1, but did affect our ability to evaluate Objective 3. We discuss these differences qualitatively.
- The level of simulated rangeland improvements was low compared to the levels in the preliminary draft EIS, which included more than just vegetation improvements. When we included an estimate of other range improvements to improve livestock distribution, the level was comparable.
- The preliminary draft EIS used "livestock management acres" as a measure of implementation by permittees. We used a comparable estimate of range plan revision and implementation levels that combined the responsibilities of both the Bureau of Land Management and the Forest Service for rangeland plan revision within the context of the alternatives and associated implementation of grazing operating plans by permittees.



Map 2.1 – Alternative 1 management emphasis for forest clusters on BLM- and FS-administered lands only.

Map 2.2 – Alternative 2 management emphasis for forest clusters on BLM- and FS-administered lands only.



Map 2.3 – Alternative 3 management emphasis for forest clusters on BLM- and FS-administered lands only.

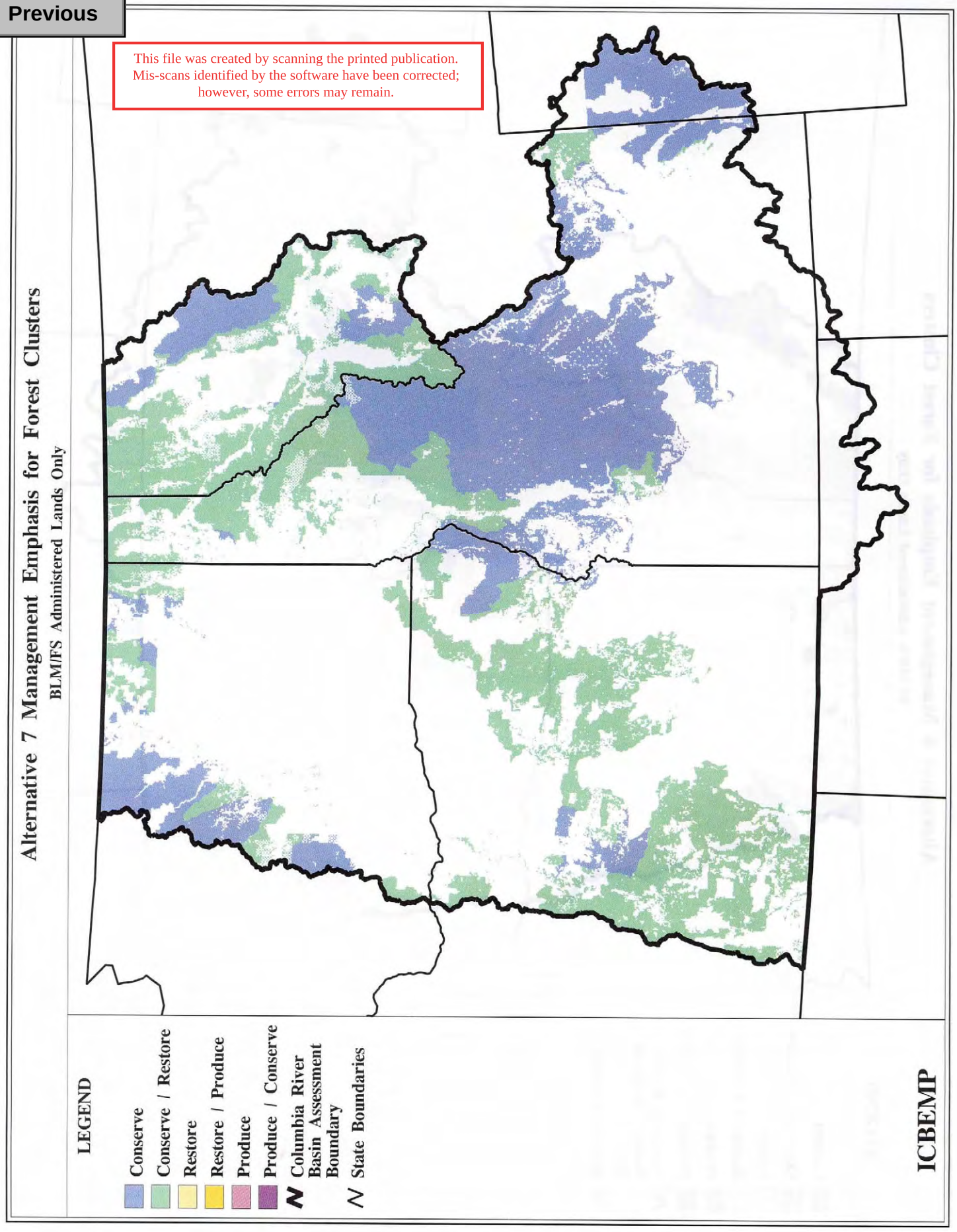
Map 2.4 – Alternative 4 management emphasis for forest clusters on BLM- and FS-administered lands only.

Map 2.5 – Alternative 5 management emphasis for forest clusters on BLM- and FS-administered lands only.

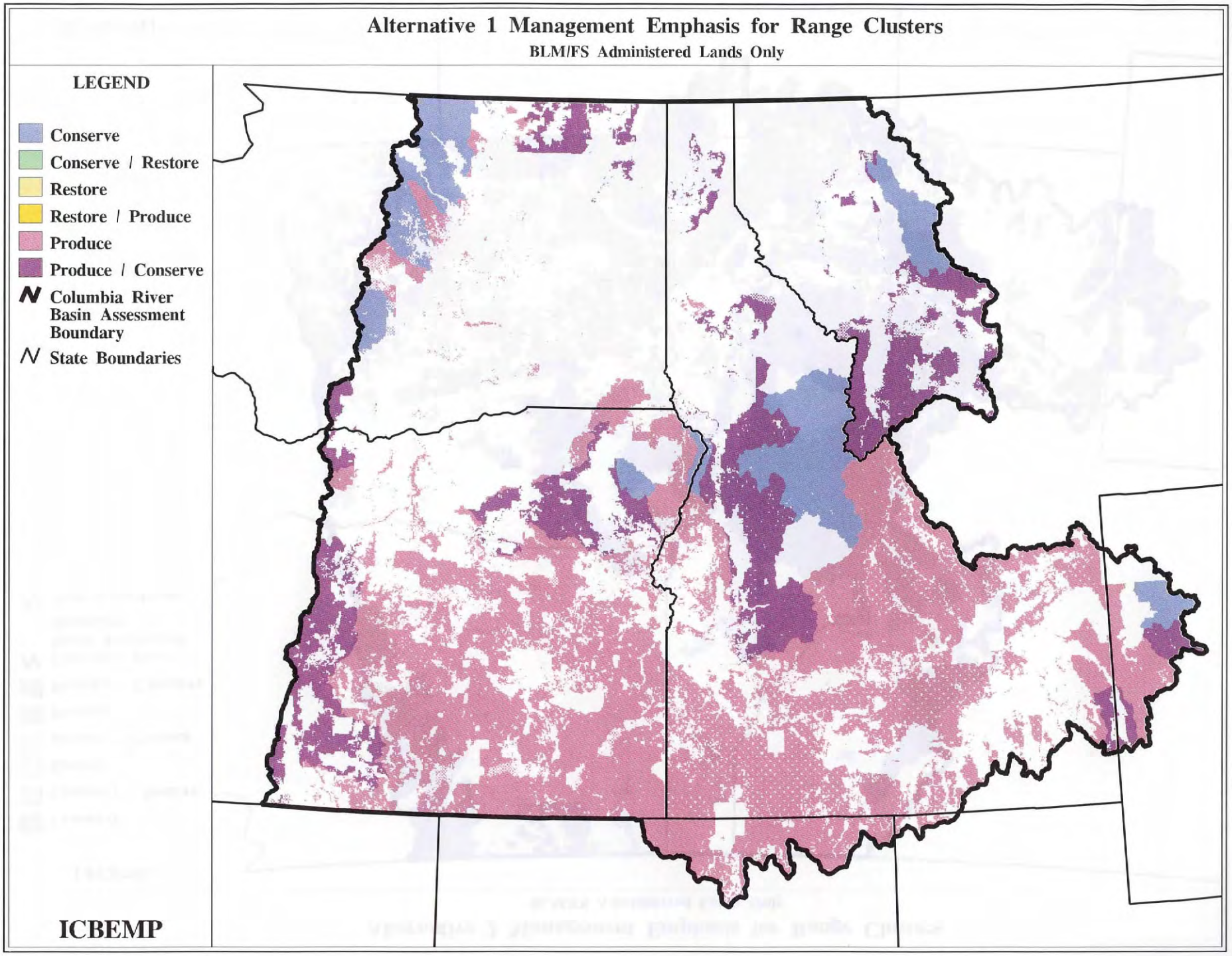
Map 2.6 – Alternative 6 management emphasis for forest clusters on BLM- and FS-administered lands only.

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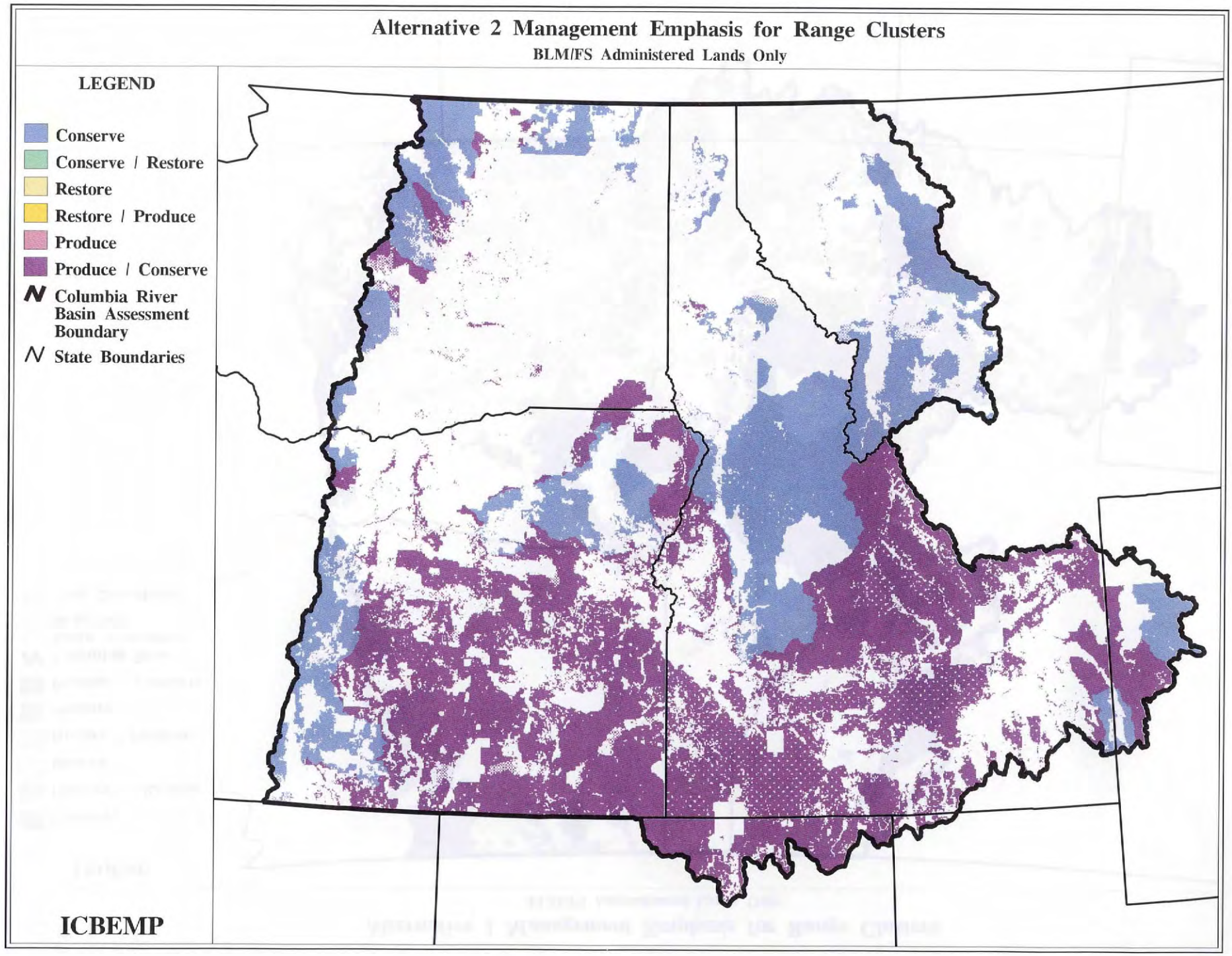
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Mis-scans identified by the software have been corrected;
however, some errors may remain.



Map 2.7 – Alternative 7 management emphasis for forest clusters on BLM- and FS-administered lands only.



Map 2.8 – Alternative 1 management emphasis for range clusters on BLM- and FS-administered lands only.



Map 2.9 – Alternative 2 management emphasis for range clusters on BLM- and FS-administered lands only.

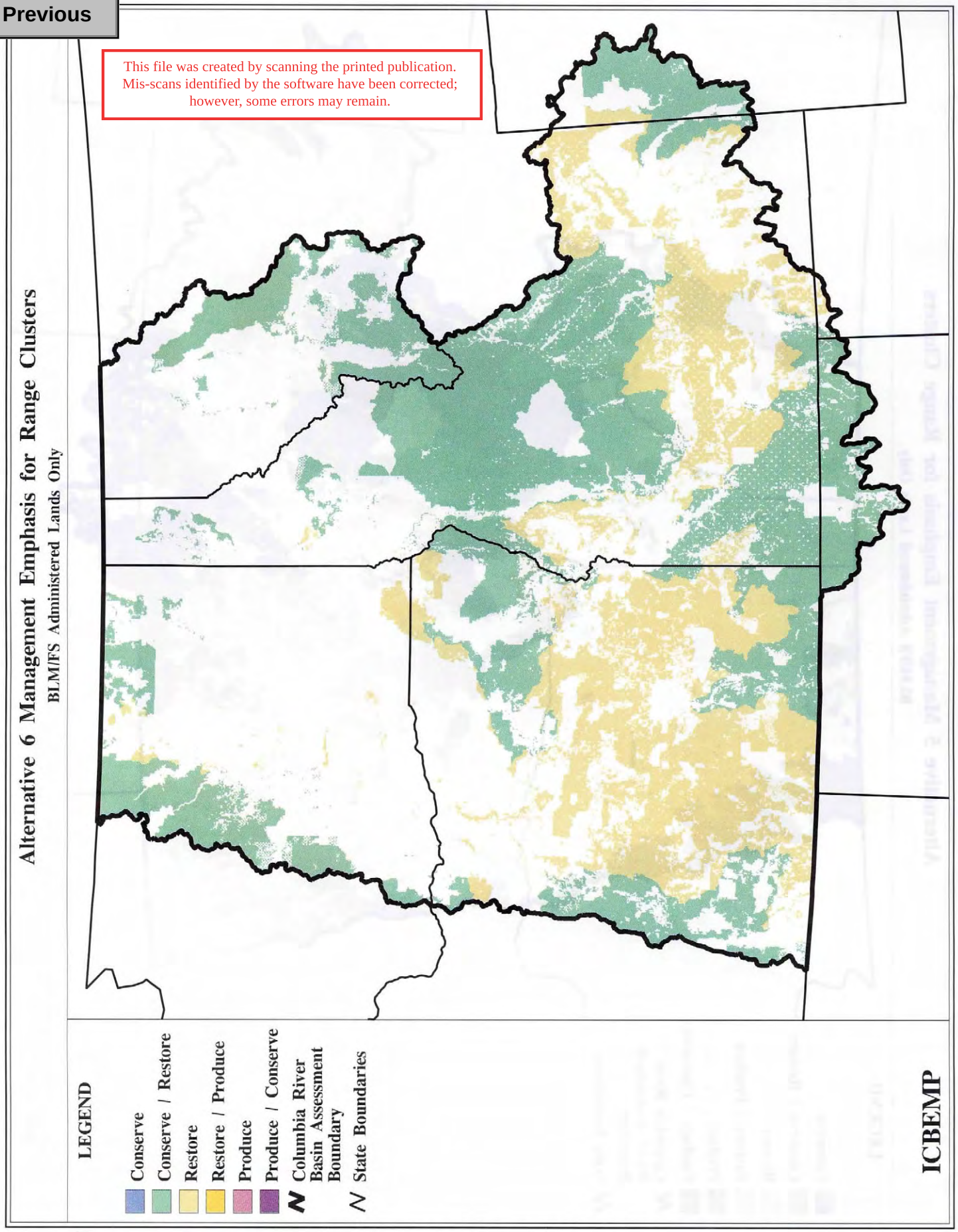
Map 2.10 – Alternative 3 management emphasis for range clusters on BLM- and FS-administered lands only.

Map 2.11 – Alternative 4 management emphasis for range clusters on BLM- and FS-administered lands only.

Map 2.12 – Alternative 5 management emphasis for range clusters on BLM- and FS-administered lands only.

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Map 2.13 – Alternative 6 management emphasis for range clusters on BLM- and FS-administered lands only.

Map 2.14 – Alternative 7 management emphasis for range clusters on BLM- and FS-administered lands only.

Map 2.15 – Alternative 1 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

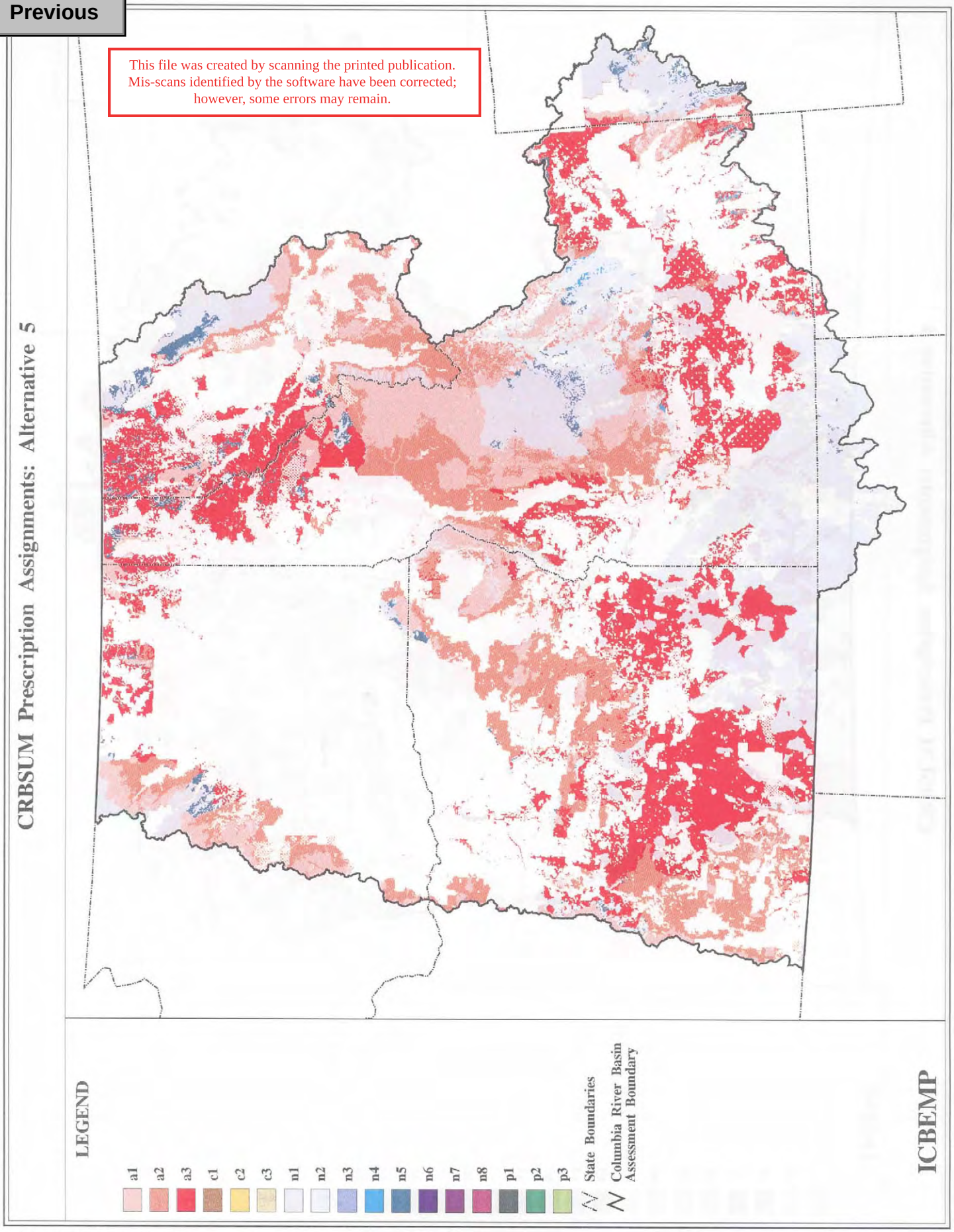
Map 2.16 – Alternative 2 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

Map 2.17 – Alternative 3 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

Map 2.18 – Alternative 4 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

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Mis-scans identified by the software have been corrected;
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Map 2.19 – Alternative 5 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

Map 2.20 – Alternative 6 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

Map 2.21 – Alternative 7 management prescription (Rx) assignments for forest, rangeland, and other potential vegetation groups. Management prescriptions indicate level of management and restoration activities with probability of disturbance events for wilderness and non-wilderness roaded and roadless land management classes.

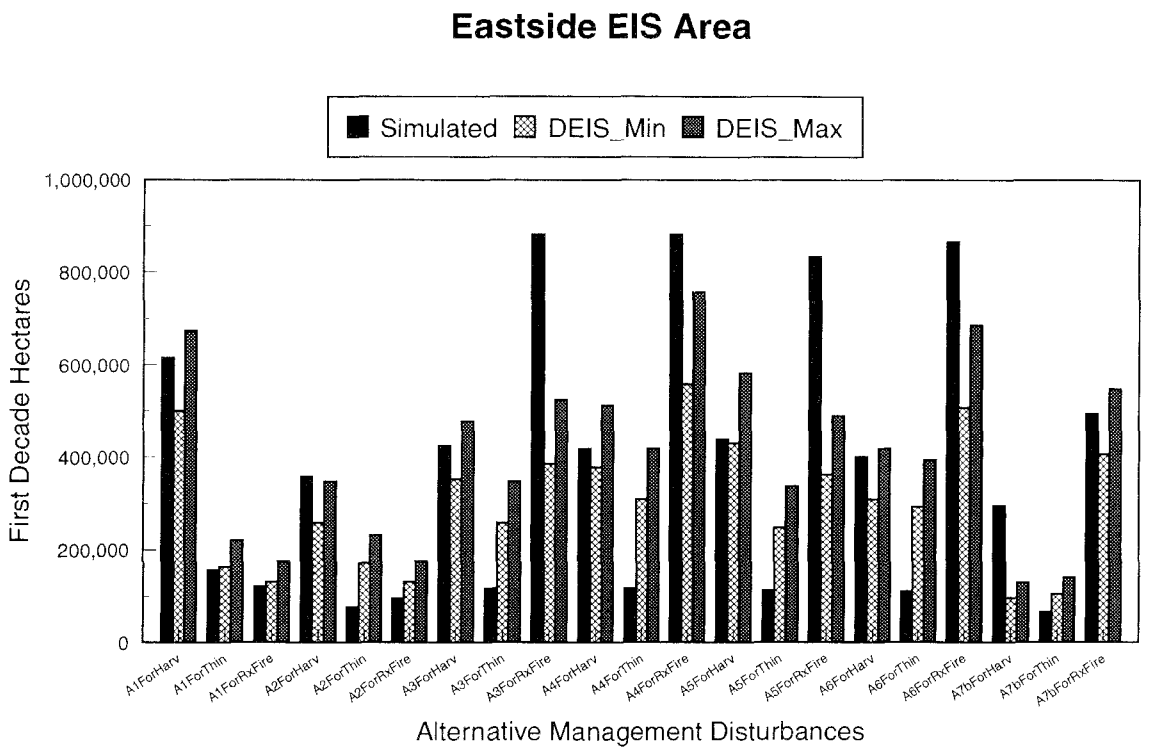


Figure 2.3 — Comparison of simulation with PDEIS forest management disturbances for the Eastside EIS area.

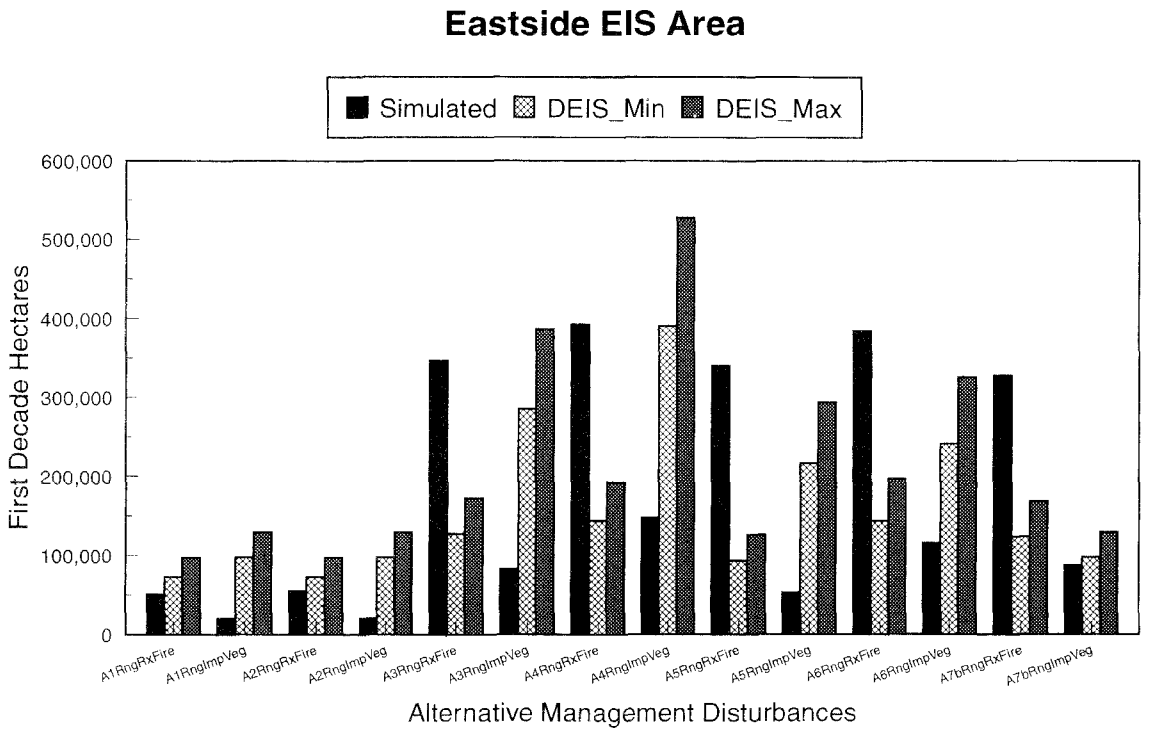


Figure 2.4 — Comparison of simulation with PDEIS range management disturbances for the Eastside EIS area.

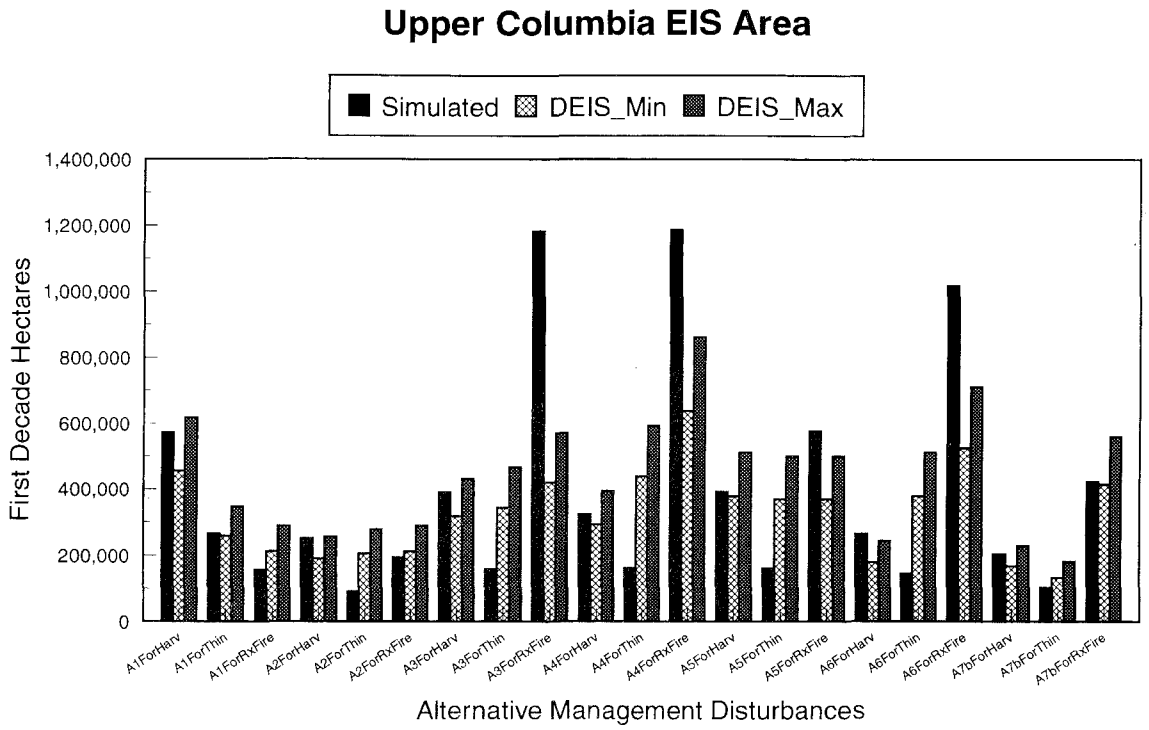


Figure 2.5 — Comparison of simulation with PDEIS forest management disturbances for the UCRB EIS area.

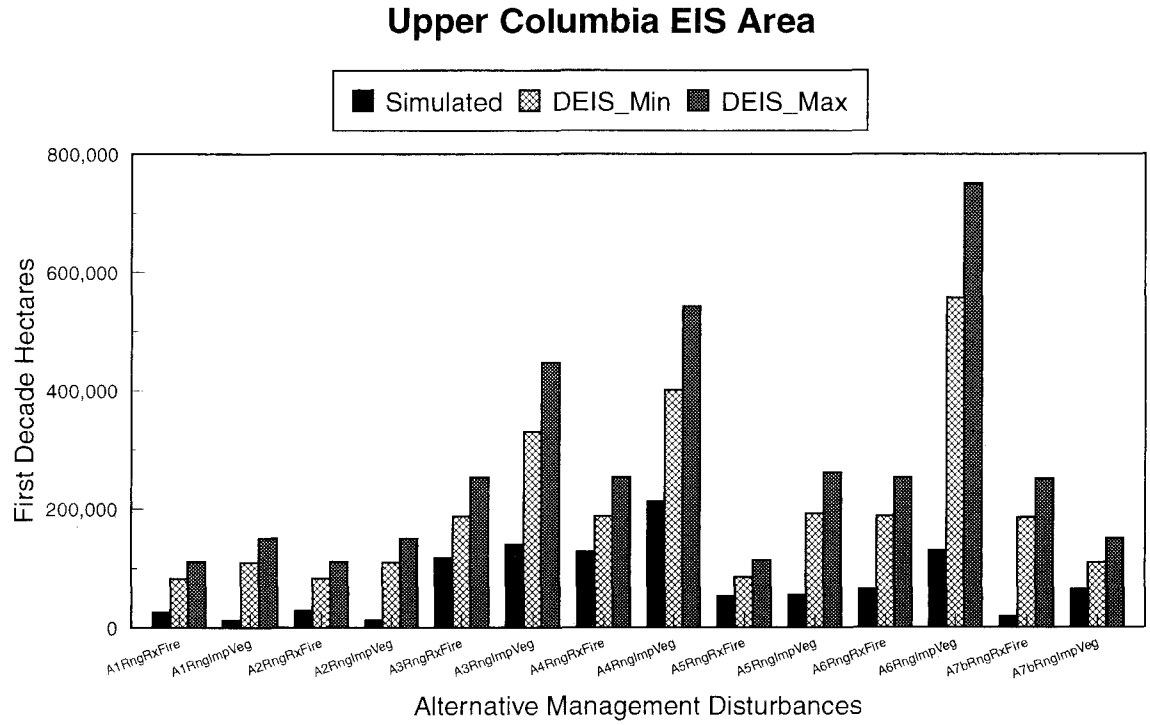


Figure 2.6 — Comparison of simulation with PDEIS range management disturbances for the UCRB EIS area.

Table 2.8 — Alternative simulations compared to the preliminary draft EIS minimum and maximum levels for forest management activities for first decade.

EIS Area[1]	Alternative	Forest Harvest, Simulation	Forest *Harvest*, Preliminary Draft, EIS Minimum	Forest Harvest, Preliminary Draft EIS, Maximum	Forest Thin, Simulation	*Forest Thin*, Preliminary Draft EIS, Minimum	*Forest Thin*, Preliminary Draft EIS, Maximum	*Forest* Prescription Burn, Simulation	Forest Prescription *Burn*, Preliminary Draft EIS, Minimum	Forest Prescription *Burn*, Preliminary Draft EIS, Maximum
		Hectares[2]								
EEIS	1	615,000	500,000	674,000	158,000	164,000	221,000	121,000	132,000	176,000
EEIS	2	358,000	259,000	348,000	77,000	172,000	233,000	95,000	132,000	176,000
EEIS	3	425,000	352,000	478,000	117,000	259,000	348,000	882,000	386,000	524,000
EEIS	4	419,000	378,000	512,000	117,000	310,000	419,000	882,000	558,000	757,000
EEIS	5	439,000	431,000	583,000	113,000	249,000	338,000	834,000	362,000	490,000
EEIS	6	401,000	310,000	419,000	111,000	293,000	395,000	866,000	508,000	686,000
EEIS	7	295,000	97,000	130,000	67,000	105,000	142,000	496,000	407,000	548,000
UCRB	1	573,000	455,000	617,000	265,000	259,000	348,000	156,000	212,000	289,000
UCRB	2	251,000	190,000	257,000	91,000	206,000	279,000	194,000	212,000	289,000
UCRB	3	391,000	318,000	431,000	160,000	344,000	465,000	1,182,000	421,000	571,000
UCRB	4	324,000	293,000	395,000	162,000	439,000	593,000	1,186,000	637,000	862,000
UCRB	5	393,000	378,000	512,000	162,000	370,000	500,000	577,000	370,000	500,000
UCRB	6	265,000	180,000	245,000	146,000	378,000	512,000	1,016,000	524,000	710,000
UCRB	7	204,000	168,000	229,000	103,000	134,000	182,000	423,000	415,000	561,000

[1]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.

[2]Rounded to nearest thousand; hectare = 2.47 acres.

Table 2.9 — Alternative simulations compared to the preliminary draft EIS minimum and maximum levels for range management activities.

EIS Area[1]	Alternative	Range Prescription Burn, SImulation	Range Prescription Burn, Preliminary Draft EIS, Minimum	Range Prescription Burn, Preliminary Draft EIS, Maximum	Range Vegetation Improvement, Simulation	Range Total Improvement, Preliminary Draft EIS, Minimum	Range Total Improvement, Preliminary Draft EIS, Maximum	Range Distribution, Improvement Simulation	Range Plan Implementation, Simulation
		Hectares[2]							
EEIS	1	51,000	73,000	97,000	20,000	97,000	130,000	100,000	200,000
EEIS	2	55,000	73,000	97,000	20,000	97,000	130,000	150,000	500,000
EEIS	3	346,000	127,000	172,000	83,000	285,000	386,000	300,000	500,000
EEIS	4	393,000	144,000	192,000	148,000	391,000	528,000	400,000	1,000,000
EEIS	5	340,000	93,000	125,000	53,000	217,000	293,000	250,000	500,000
EEIS	6	384,000	144,000	196,000	115,000	241,000	326,000	300,000	1,000,000
EEIS	7	328,000	123,000	168,000	87,000	97,000	130,000	150,000	200,000
UCRB	1	26,000	83,000	111,000	12,000	109,000	150,000	90,000	250,000
UCRB	2	28,000	83,000	111,000	12,000	109,000	150,000	110,000	550,000
UCRB	3	117,000	188,000	253,000	140,000	330,000	447,000	275,000	600,000
UCRB	4	127,000	188,000	253,000	212,000	401,000	542,000	300,000	1,200,000
UCRB	5	53,000	85,000	113,000	55,000	192,000	261,000	200,000	750,000
UCRB	6	65,000	188,000	253,000	130,000	556,000	751,000	150,000	1,200,000
UCRB	7	18,000	186,000	251,000	65,000	109,000	150,000	50,000	400,000

[1]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.

[2]Rounded to nearest thousand; hectare = 2.47 acres.

Implementation and Allocation of Activity Levels from Preliminary Draft EIS

The process of modeling management activities and landscape evaluation variables was done differently for Alternatives 1 and 2 than for Alternatives 3 through 7.

Alternatives 1 and 2

For Alternatives 1 and 2, we used a traditional programmatic process that allocated management activities through mapping prescriptions by management region and potential vegetation group to simulate the appropriate levels of management activity by EIS area and subbasin cluster.

Alternatives 3 through 7

To allocate activities for Alternatives 3 through 7, which incorporate multi-scale spatial and temporal relationships, we used a process that was based on the multi-scale assumption identified in the "Introduction" section of this chapter. This process was necessary to achieve the integrated activity sets for Chapter 3 of the preliminary draft EISs, and for the effects predictions and interpretations in this evaluation of alternatives and in Chapter 4 of the preliminary draft EISs.

The following "step-down/step-back" process provides the steps for spatial and temporal allocation of activities that would be consistent with this evaluation of alternatives and with the information provided for the effects in Chapter 4 of the preliminary draft EISs.

1. Prioritize management activity levels spatially and temporally for the selected alternative for subbasins within a cluster using an integrated proper functioning systems (landscape health) assessment for risk and opportunity analysis. Follow the same methods used for the ecosystem integrity analysis, landscape fire risk, and landscape patterns of succession/disturbance regime analysis. Conduct this prioritization to provide "best fit" to minimize risks such as erosion, sediment transport, wildfire, loss of socioeconomic opportunities, terrestrial community departure, riparian degradation, and impact on aquatic strongholds, rare terrestrial species, clean air, and clean water. Prioritizing is necessary because the effects tables were adjusted to fit the landscape assumptions of differences in strategies among Alternatives 3 through 7.

   Assess linkages to adjacent subbasins within the cluster, EIS area, and the Basin to assess cumulative effects. Compare optional "best fits" to select the prescription that minimizes risk and achieves opportunity objectives; then compare with original projections of effects to validate predictions in Chapter 4 of the preliminary draft EISs.

2. Prioritize management activity levels within subbasins at the watershed or subwatershed level, using a similar process. Conduct this prioritization to provide "best fit" to minimize negative effects as listed in Step 1. Summarize effects across watersheds or subwatersheds in the subbasin to assess cumulative effects. As in Step 1, compare optional "best fit" to select the one that minimizes risks and achieves opportunity objectives. Then compare with original projections of effects to validate preliminary draft EIS Chapter 4 predictions.

3. Design projects in context with step 2 and adjust based on site-specific conditions. Statistically extrapolate project data to update, validate, and adjust Steps 1 and 2.

Summary of Confidence in Predictions and Qualifiers

Table 2.10 provides a summary of variables and their comparability between the simulations and the preliminary draft EISs' alternative levels.

Table 2.11 provides a summary about the predictability of the terrestrial vegetation simulation results relative to the preliminary draft EISs' alternatives.

Table 2.12 — Notes on response of potential vegetation groups for CRBSUM evaluation of alternative simulations.

Item	Notes
Simulation Level	The CRBSUM evaluation of alternatives simulations are based on the prescription models mapped at a forest or range level, not at the potential vegetation group (PVG) level. There is varying emphasis by potential vegetation group based on the preliminary draft EISs, alternative desired future conditions, and standards. We did not vary prescriptions models by potential vegetation group within forest or range at the time of simulation due to lack of time and changing desired future conditions and standards within the preliminary draft EISs.
Rangeland Riparian PVGs	The CRBSUM simulation of riparian is non-applicable due to the scale of historical and current riparian mapping. Scale and type of current mapping are too coarse to depict the stringer riparian types and over-emphasize the large patch types. The historical mapping did not map riparian types as separate from the upland forest and range types. The CRBSUM trends in vegetation response by alternative for riparian types are useful when placed in the context of scale. Response trends of the riparian vegetation simulations over time represent a more negative outcome for Alternatives 2 through 6, than for the desired future conditions and the standards for those alternatives. Riparian response trends for Alternatives 1 and 7 are generally correct.
Rangeland Dry Shrub, Dry Grass, and Woodland PVGs	The CRBSUM simulation of these types generally meets the expectations, but does not have the restoration emphasis in Alternatives 4 and 6 that could be simulated if prescriptions were mapped to the potential vegetation group level. Based on the preliminary draft EISs' description of alternatives, there should be more restoration in Alternatives 4 and 6 than Alternatives 3 and 5, which have more than Alternatives 1, 2, and 7. This prioritization is not simulated in the current mapping of prescriptions. However, the current prescription for fire suppression does emphasize increased fire suppression in these potential vegetation groups to reduce rates of increase of annual grasses. Exotic trend response in these potential vegetation groups is correct, except in Alternative 2 where exotics increase more rapidly than other alternatives. However, Alternative 2 exotics are generally replacing upland shrub due to fire and/ or livestock grazing, so their response should be similar to Alternative 1. The upland woodland cutting and the restoration to upland herb and shrub is occurring primarily in these potential vegetation groups, not in the woodland potential vegetation group. There are more dry shrub, dry grass, and woodland potential vegetation groups in the Eastside EIS area than in the Upper Columbia River Basin EIS area.
Rangeland Cool Shrub PVGs	The CRBSUM simulation of this type meets expectations, except for lacking emphasis on restoration using prescribed fire, exotic forb control, and control of encroachment conifer and woodland in Alternatives 4 and 6 that could be simulated if prescriptions were mapped to the potential vegetation group level. Based on the preliminary draft description of alternatives, the restoration level in Alternatives 4 and 6 should be more than Alternatives 3 and 5, which have more than Alternatives 1, 2, and 7. Because this prioritization is not simulated in the current mapping of prescriptions, there is more cool shrub type in the Upper Columbia River Basin EIS area than in the Eastside EIS area.

Table 2.12 (continued)

Item	Notes
Forest PVGs	The CRBSUM simulation of these types generally meets expectations. However, the dry forest potential vegetation group does not have emphasis on using prescribed fire, exotic forb control, and harvest/thinning to restore native structures in Alternatives 4 and 6 that could be simulated if prescriptions were mapped to the potential vegetation group level. Based on the preliminary draft EISs' description of alternative, there should be more restoration in Alternatives 4 and 6 than in Alternatives 3 and 5, which have more than Alternatives 1, 2, and 7. In general, range management is not simulated to the same level in the forest potential vegetation group as in the range potential vegetation group, the desired future conditions, and the standards in the preliminary draft EISs. The reason for this disparity is the time constraint to develop the more complex forested range relationships that occur in these potential vegetation groups.

Table 2.13 — Notes on alternative assumptions relative to spatial prioritization of activities compared to CRBSUM simulation of activities.

Group[1] and Alternative	Notes
Group F	*This group of subbasins represents areas with high levels of urban and wildland interface influence, high fire risks in those zones, and low overall ecological integrity. Subbasins are dominated by the dry forest potential vegetation group (PVG) with intermixed range PVGs.*
Alt. 1 & 2	No particular emphasis in comparison to other groups, except more activities than group H.
Alt. 4 & 6	High emphasis on forest composition, structure, and process restoration activities. Slower rate of implementation in Alternative 6 than Alternative 4.
Alt. 3	Low emphasis on activities relative to Alternatives 4 and 6 due to local concerns for maintenance of forested visual conditions and big game hiding cover.
Alt. 5	Low emphasis on activities relative to Alternatives 4 and 6 due to lack of high net benefit and productivity returns.
Alt. 7	Similar emphasis on activities in this group as for Alternative 3.
Group J	*This group of subbasins represents areas with high to moderate levels of urban and wildland interface influence, high fire risks in those zones, and moderate overall ecological integrity. Subbasins are dominated by the dry forest potential vegetation group, with intermixed range potential vegetation groups.*
Alt. 1 & 2	No particular emphasis compared to other groups, except more activities than group H.
Alt. 4 & 6	High emphasis on forest composition, structure, and process restoration activities in this group. Slower rate of implementation in Alternative 6 than Alternative 4, and less emphasis than in group F.
Alt. 3	Similar emphasis on activities in this group relative to Alternatives 4 and 6.
Alt. 5	Low emphasis on activities relative to Alternatives 4 and 6 due to lack of high net benefit and productivity returns.
Alt. 7	Similar emphasis on activities as Alternative 3.

Table 2.13 (continued)

Group[1] and Alternative	Notes
Group L	*This group includes subbasins that have moderate levels of urban/wildland interface influence, moderate to high fire risk in those zones, and low integrity. Subbasins are typically dominated with woodland, dry shrub, or dry forest potential vegetation groups. Dry forest dominated subbasins are typically intermixed with range potential vegetation groups.*
Alt. 1 & 2	No particular emphasis in comparison to other groups, except more activities than group H.
Alt. 4 & 6	High emphasis on forest and/or range composition, structure, and process restoration activities. Emphasis on exotic control. Emphasis on fire suppression in dry shrub and dry grass potential vegetation groups. Slower rate of implementation in Alternative 6 than in Alternative 4.
Alt. 3	High emphasis on forest management activities due to local concerns. High emphasis on range activities due to concentrated public land base, working relationships with permittees, and available resources.
Alt. 5	Low emphasis on activities relative to Alternatives 4 and 6 due to lack of high net benefit and productivity returns.
Alt. 7	Similar emphasis on activities as in Alternative 3.
Group M	*This group includes subbasins that have low to moderate levels of urban/wildland interface influence, low to rnoderate fire risk in those zones, and fair to high productivity. Integrity on forest dominated subbasins is low, but productivity is high and the succession response relative to restoration opportunities is rapid. However, these subbasins have major historic effects of blister rust on western white pine. Large areas within the forest subbasins are now dominated by shrubs or insect/disease, stress, and fire-susceptible tree species, with high risk of cycling. Range-dominated subbasins have moderate integrity and productivity, with good opportunities to conserve or restore ecological integrity.*
Alt. 1 & 2	No particular emphasis in comparison to other groups, except more activities than group H.
Alt. 4 & 6	High emphasis on: (1) forest and/or range composition, structure, and process restoration activities; (2) western white pine recovery in the forest dominated subbasins; and (3) watershed restoration via road density reductions. Emphasis on fire suppression, exotic control, and restoration of natives in range dominated subbasins. Emphasis on fire suppression in dry shrub and dry grass potential vegetation groups on range dominated subbasins. Slower rate of implementation in Alternative 6 than in Alternative 4.
Alt. 3	Moderate emphasis in forest dominated subbasins on forest management activities due to local concerns. Primary local emphasis will be to maintain flow of timber to the mills. High emphasis in range-dominated subbasins on range activities due to concentrated public land base, working relationships with permittees, and available resources.
Alt. 5	High emphasis on commodity production in the forest dominated subbasins relative to Alternatives 4 and 6. Similar emphasis as group L on range dominated subbasins.
Alt. 7	Similar emphasis as Alternative 3 for forest dominated subbasins. Reserve areas present in the range dominated subbasins.
Group H	*This group includes subbasins that have low urban/wildland interface influence, but high levels of semi-primitive and peripheral developed recreation use, moderate fire risk in those zones, and high integrity. A substantial amount of these subbasins is in wilderness or roadless condition. Forests have low departures from the historic range of variability in comparison to other subbasin groups. These subbasins contain the largest amount of cold forest, which has the historic effect of blister rust on whitebark pine; blister rust causes substantial changes in forest composition, structure, and processes in the subalpine zone. Dry forest potential vegetation groups are also common, and fires in this zone can be large and intense. Intermixed range potential vegetation groups are generally low departure from the historical range of variability.*
Alt. 1 & 2	Less emphasis on activities at the broad scale compared to other groups due to high amounts of designated wilderness. However, substantial projected roading at the watershed level in roadless areas around wilderness areas.

Table 2.13 (continued)

Group[1] and Alternative	Notes
Alt. 4 & 6	High emphasis on conservation of high integrity and associated forest and/or range composition, structure, and processes via protection from development and management for natural processes, such as prescribed natural fire, including both planned and unplanned ignitions. High emphasis on whitebark pine recovery in the cold forest potential vegetation groups.
Alt. 3	High emphasis on conservation due to local concerns about development and visuals. Moderate emphasis on restoration of whitebark pine. Moderate emphasis on restoring composition, structure, and processes.
Alt. 5	Low emphasis on commodity production. High emphasis on recreation use. Low emphasis on restoration, relative to Alternatives 4 and 6.
Alt. 7	Primarily in reserve areas. Expect unpredictable fire and insect/stress events. Successional cycles not expected to achieve restoration objectives since areas have tendency toward urban/wildland interface areas where there is high concern for maintaining visual conditions. Consequently, many fire starts would be suppressed. Only large fires would not be controlled. Exotics would continue to spread. No recovery of whitebark pine.

[1]Refers to map 2.22 "FS and BLM Lands CRBSUM Forest and Range Cluster Groups."

Group F: high urban/wildland interface, low integrity, moderate-high fire risk.

Group J: high urban/wildland interface, moderate integrity, moderate fire risk.

Group L: moderate urban/wildland interface, low integrity, high fire risk.

Group M: low urban/wildland interface, low-moderate integrity, moderate fire risk.

Group H: low urban/wildland interface, high integrity, moderate fire risk.

Map 2.22 – Groups of forest and range clusters based on similarities in aquatic, forest, and rangeland integrity, fire risk, and urban-rural/wildland interface for summarizing CRBSUM response.

Table 2.14 — River subbasin grouping for display of preliminary draft EIS BLM/FS management and other disturbances, and associated effects.

Subbasin Group Legend	Description
High Urban/Wildlands (F) Low Integrity Mod-High Fire Risk	▸ Dry river subbasins with high amounts of urban/wildland interface and moderate to high fire risk in those areas. ▸ Generally low consideration of aquatic, and mixed low to moderate consideration for forest and range integrity. ▸ Low amounts of wilderness and semi-primitive areas. ▸ Moderate to high amounts of BLM- and FS-administered lands. ▸ Includes forest cluster 6 and some range clusters 3 and 6.
High Urban/Wildlands (J) Low Integrity Moderate Fire Risk	▸ River subbasins with high/some moderate amounts of urban/wildland interface and moderate fire risk in those areas. ▸ Generally moderate consideration for aquatic and range, and low to moderate for forest integrity. ▸ Moderate amounts of wilderness and semi-primitive areas, typically in the headwaters. ▸ Moderate to high amounts of BLM- and FS-administered lands. ▸ Includes forest cluster 3 and some range cluster 3.
Mod Urban/Wildlands (L) Low Integrity High Fire Risk	▸ Dry forest or range-dominated river subbasins with moderate amounts of urban/wildland interface and high fire risk in those areas. ▸ Low consideration for forest integrity and low, with some moderate consideration for aquatic and range integrity. ▸ Low amounts of wilderness and semi-primitive areas. ▸ Mixed low to high amounts of BLM- and FS-administered lands. ▸ Includes forest clusters 5 and 7, and primarily range clusters 3 and 6.
Low Urban/Wildlands (M) Low-Moderate Integrity Moderate Fire Risk	▸ Moist forest-dominated or cooler range-dominated river subbasins with low urban/wildland interface and moderate fire risk in those areas. ▸ Low to moderate consideration for aquatic and forest integrity, with moderate to high for range integrity. ▸ Low to moderate levels of wilderness and semi-primitive areas. ▸ High amounts of BLM- and FS-administered lands. ▸ Includes forest clusters 4 and 7, and primarily range clusters 5 and 7.
Low Urban/Wildlands (H) High Integrity Moderate Fire Risk	▸ River subbasins with low amounts of urban/wildland interface and moderate fire risk in those areas. ▸ High, with some moderate, consideration of forest, range, and aquatic integrity. ▸ High amounts of wilderness and semi-primitive areas. ▸ High amounts of BLM- and FS-administered lands. ▸ Forest clusters 1 and 2, and primarily range clusters 2 and 5.

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Evaluation of Landscape Disturbances

To evaluate the landscape's response to variation in alternative management of disturbance, we grouped disturbances that change vegetation into general categories for forest or rangeland systems. These groups consider management treatments as well as unplanned disturbance events. Forest disturbance groups include: prescribed fire, thinning and harvest, wildfire, crown wildfire, and forest mortality susceptibility. Range disturbance groups include: prescribed fire, range nonstructural and structural improvements, plan revision/implementation, grazing, the invasion of exotic plants, and wildfire. These lists do not include all disturbances and changes occurring on the landscape over time, but rather the types of disturbance events most directly influenced by the alternatives presented in the preliminary draft EISs for the Eastside (EEIS) and the Upper Columbia River Basin (UCRB EIS).

Landscapes are dynamic, continually changing in association with natural and human-influenced biotic growth, death, and environmental fluctuations (White and Pickett 1985). Because of this continual change, we were unable to predict the long-term effects of all the disturbances likely to occur across the landscape. Our objective in this evaluation of landscape disturbances was to predict the outcomes that would be different as a result of implementing the various management strategies in the alternatives. The effects of disturbances were evaluated primarily by the area affected over the first decade (1 to 10 years) and long term (50 to 100 years). Disturbance areas were summarized by Ecological Reporting Unit (ERU), potential vegetation group (PVG), management area, and class.

Relation of Disturbance Levels and Standards in Preliminary Draft EISs to Evaluation of Alternatives

It is important to emphasize that the management-prescribed disturbance levels for harvest, prescribed fire, grazing, range improvement, and roads from the preliminary draft EISs do not necessarily represent the ecological or resource outcomes in the long term. These activity levels are the levels estimated by the EIS teams based on the alternative theme, desired future conditions, and funding constraints for the first decade. Activity levels that can actually be implemented are contingent upon actual cause-and-effect relationships. Landscape conditions change spatially and temporally in response to relationships between components and natural and human-influenced disturbances. The standards of the preliminary draft EISs often represent single state/size conditions that do not represent the "best fit" to the biophysical system in concert with inherent disturbance processes. In order to avoid conflicts of single state/size standards with the alternative theme, DFCs, and activity levels we assumed that such standards would be changed to reflect an "ecological landscape fit" prior to implementation of substantial amounts of activities.

The CRBSUM model is designed to simulate cause-and-effect relationships across space and through time. The activity levels in the preliminary draft EISs include adjustments for cause-and-effect relationships based upon two iterations of desired levels, CRBSUM modeling of disturbances and outcomes, and analysis feedback. Sufficient time was not available to resolve differences between the desired activity levels and CRBSUM model projections to integrate the effects of broad-, mid-, and fine-scale alternative direction in the preliminary draft EISs. However, these differences may not substantially effect the relative differences between alternatives. There are substantial conflicts between single state/size standards and biophysical capabilities and inherent disturbance processes. However, as mentioned previously, we assumed these standards would be fitted ecologically, based on landscape patterns of biophysical conditions and succession/disturbance regimes, prior to substantial management-induced change.

For comparison of the 100-year average outcomes of terrestrial communities, physiognomic types, disturbance, and associated resource values (such as grazing, scenic integrity, and timber volume), we can generally assume that the relative relationships between the desired activity levels in the preliminary draft EISs and the modeled activity levels are similar. For mid- and fine-scale attributes, the statistical variability of the correlates with broad-scale attributes that were used for projections is generally higher than the variability associated with relatively refined changes in activity levels. Consequently, we are generally confident that the relative differences between alternatives for all attributes reflect the general differences between alternatives at all scales.

Forest Disturbances

Prescribed Fire — In both EIS areas, Alternatives 1 and 2 project substantially less prescribed fire in forests than any of the other alternatives in the first decade, as well as over the long term (table 2.15, figures 2.7 and 2.8). Alternative 7 would have more prescribed fire than Alternatives 1 and 2, but about half the level of Alternatives 3 through 6. However, the prescribed fire in Alternatives 3 through 6 would be primarily designed to mimic native fire processes. Prescribed fire in the non-reserve areas of Alternative 7 would be similar to Alternative 3. Some prescribed natural fires (unplanned ignitions) would occur in the reserves of Alternative 7, but because of national fire suppression policy constraints, most fires would not be allowed to burn as prescribed natural fires. Consequently the fires that occur would be wildfires.

There were relatively small differences in levels of prescribed fire in the two EIS areas. Within the Eastside EIS area, the projections for Alternatives 3, 4, and 6 had similar amounts of area affected. In the Upper Columbia River Basin EIS area, Alternatives 3 and 4 were projected to affect slightly more area than Alternative 6. In both EIS areas, Alternative 5 was projected to affect slightly less area with prescribed fire than Alternative 6.

Thinning and Harvest — In both EIS areas, thinning was projected to be substantially higher in Alternative 1 than all other alternatives and less in Alternative 2 (table 2.15 and figures 2.9 and 2.11). However, the thinning practices of Alternative 1 and Alternative 2 would be traditional treatments, rather than treatments designed to mimic native disturbance regimes as in Alternatives 3 through 7. Thinning treatments to mimic native structure would be emphasized in Alternatives 3 through 6, and the non-reserve portions of Alternative 7. These kinds of treatments would achieve similar vegetation structures as, or in combination with, prescribed burning that mimics native fire regimes. Alternative 7 would have a thinning level similar to Alternative 2, and the levels of area thinned by Alternatives 3 through 6 would be very similar.

The projected levels of harvest among alternatives followed a pattern similar to the levels of thinning (table 2.15 and figures 2.10 and 2.12). The ecological harvest treatments of Alternatives 3 through 6 would result in vegetation structure and composition similar to the native regime. Vegetation structure and composition from thinning and harvest in Alternative 7 non-reserve areas would be similar to Alternative 3, and reserve areas would be primarily affected by wildfire. Although we simulated little change between alternatives for Other ownerships,[1] we assume that Alternatives 2, 6, and 7, with substantially lower harvest and thinning levels, would result in increased harvest on Other forest ownerships.

Wildfire — The projected amount of wildfire was highest in Alternative 7, which would burn approximately 9 percent of the area each decade (figures 2.13 and 2.14; table 2.15). Alternatives 1 and 2 would burn about 7 percent, and Alternatives 3 through 6 would burn approximately 5 percent. Considering the amount of BLM/FS lands, these differences among alternatives are substantial.

[1]All ownerships - all lands in the Basin or EIS area; BLM/FS ownerships - public lands administered by the BLM and FS in the Basin or EIS area; Other ownerships - private, state, tribal, and non-BLM/FS federal public lands (such as National Parks, and Fish and Wildlife Service Refuges) in the Basin or EIS area.

Table 2.15 — Percent of BLM/FS lands disturbed in the first decade and in the long-term (50 to 100 years).

Projection Years	Management Area	Alternative 1	2	3	4	5	6	7
Forest - Harvest								
First decade	EEIS	13.68	7.95	9.42	9.31	9.73	8.91	6.57
First decade	UCRB	7.77	3.40	5.30	4.40	5.33	3.60	2.77
Long-term	EEIS	12.26	7.22	8.87	8.70	8.90	8.33	5.92
Long-term	UCRB	7.17	3.14	5.09	4.64	5.01	3.82	2.79
Forest - Thinning								
First decade	EEIS	3.52	1.71	2.61	2.59	2.54	2.49	1.48
First decade	UCRB	3.59	1.24	2.16	2.21	2.20	1.97	1.41
Long-term	EEIS	5.09	2.48	3.14	3.17	3.08	3.01	1.80
Long-term	UCRB	3.88	1.28	1.87	1.88	2.05	1.67	1.26
Forest - Prescribed Fire								
First decade	EEIS	2.04	1.60	14.89	14.91	14.07	14.61	8.37
First decade	UCRB	1.52	1.91	11.56	11.60	9.55	9.94	4.13
Long-term	EEIS	2.42	2.11	15.74	15.76	14.96	15.43	8.81
Long-term	UCRB	1.66	1.95	11.65	11.66	9.61	10.03	4.03
Forest - Wildfire								
First decade	EEIS	7.81	8.13	5.58	5.61	5.81	5.82	9.41
First decade	UCRB	5.86	6.14	4.27	4.25	4.64	4.61	7.72
Long-term	EEIS	7.88	8.21	5.19	5.21	5.40	5.42	9.33
Long-term	UCRB	6.28	6.72	4.35	4.38	4.87	4.93	8.40
Range - Exotics[1]								
First decade	EEIS	0.64	2.61	0.30	0.33	0.35	0.27	0.51
First decade	UCRB	1.35	1.71	0.70	0.75	1.04	0.41	0.52
Long-term	EEIS	0.89	0.89	0.39	0.49	0.46	0.43	0.58
Long-term	UCRB	1.28	1.28	0.81	0.90	1.00	0.54	0.60
Range - Prescribed Fire								
First decade	EEIS	0.90	0.96	6.02	6.86	5.94	6.70	5.72
First decade	UCRB	0.41	0.43	1.78	1.93	0.81	0.99	0.88
Long-term	EEIS	0.62	0.60	2.96	3.05	2.92	2.97	2.51
Long-term	UCRB	0.36	0.33	0.98	0.99	0.54	0.58	0.45
Range - Range Improvement								
First decade	EEIS	0.23	0.23	0.95	1.68	0.60	1.30	0.98
First decade	UCRB	0.10	0.10	1.23	1.88	0.48	1.14	0.57
Long-term	EEIS	0.40	0.43	0.66	0.85	0.53	0.72	0.56
Long-term	UCRB	0.15	0.15	0.65	0.76	0.32	0.40	0.22
Range - Grazing Effects								
First decade	EEIS	35.75	25.05	34.98	39.58	35.12	37.38	28.94
First decade	UCRB	17.30	11.79	18.96	20.21	17.40	12.58	9.04
Long-term	EEIS	37.69	27.00	35.36	38.19	36.00	36.71	29.36
Long-term	UCRB	18.37	11.77	18.92	20.41	18.51	13.85	10.27
Range - Wildfire								
First decade	EEIS	9.04	9.50	6.87	6.90	7.20	7.14	9.41
First decade	UCRB	10.11	9.67	7.02	7.03	8.47	8.27	12.57
Long-term	EEIS	10.83	15.26	7.39	7.26	7.96	7.65	10.40
Long-term	UCRB	11.79	13.01	7.20	7.16	9.22	8.53	12.75

[1]Qualitatively reduced in Alternative 2 due to an error in the simulation.

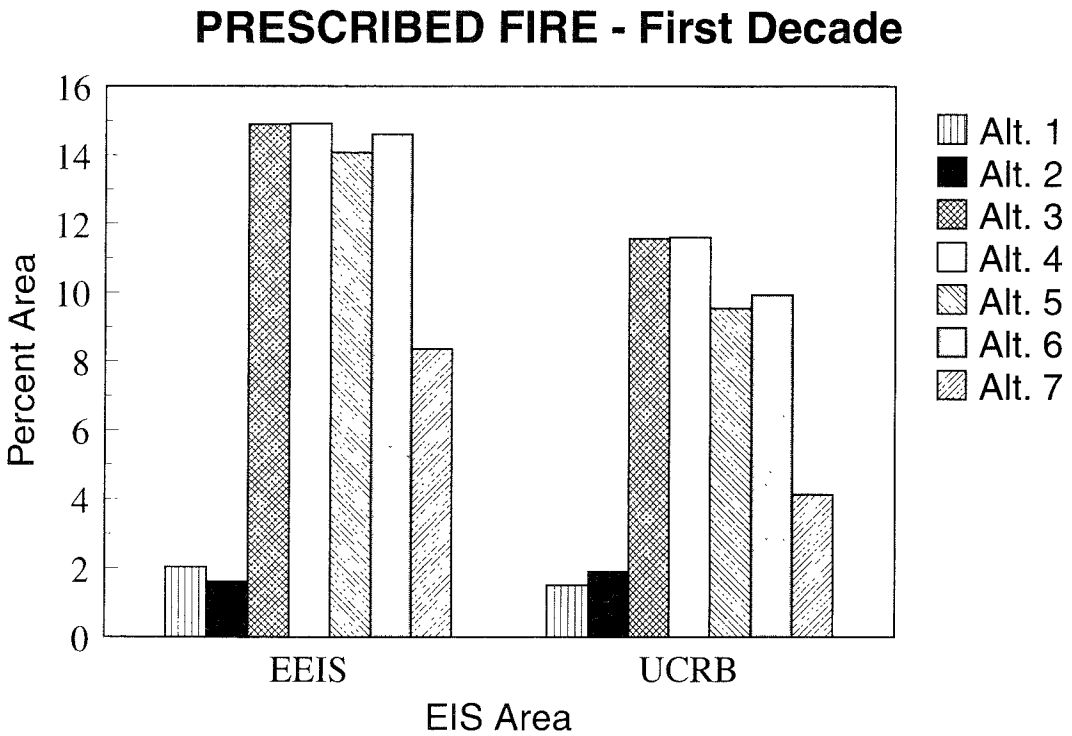


Figure 2.7 — Percent of BLM- and FS-administered lands disturbed by prescribed fire for all forest PVGs for years 1-10.

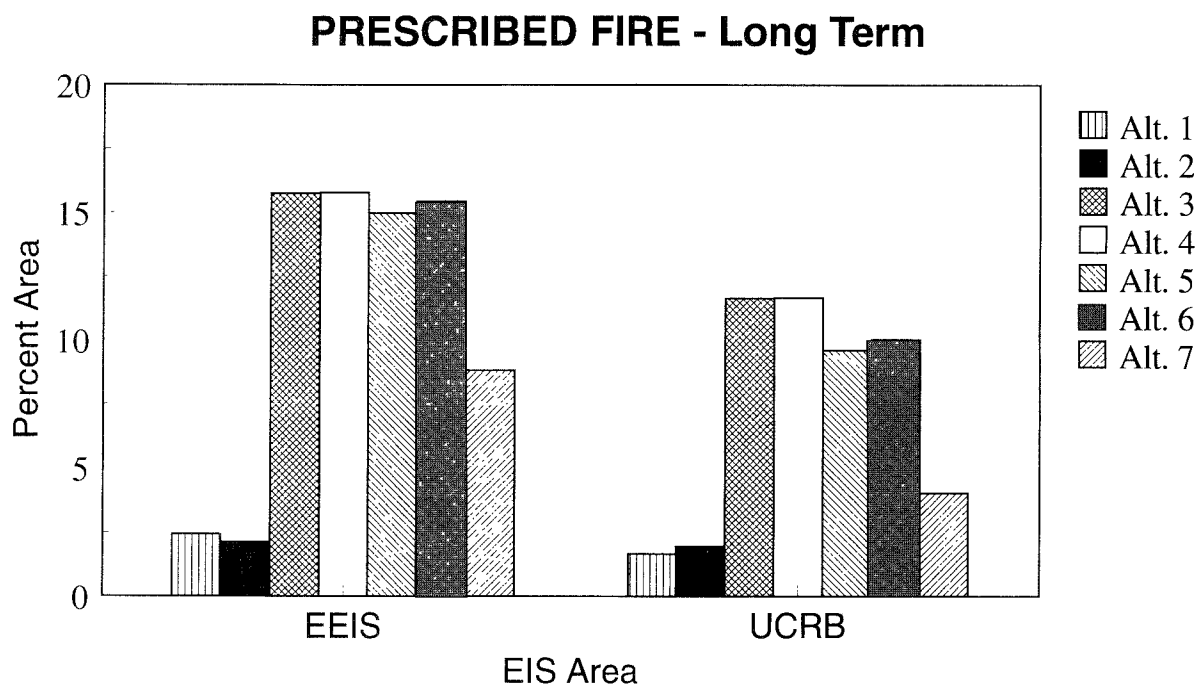


Figure 2.8 — Percent of BLM- and FS-administered lands disturbed by prescribed fire for all forest PVGs by decade over 100 years.

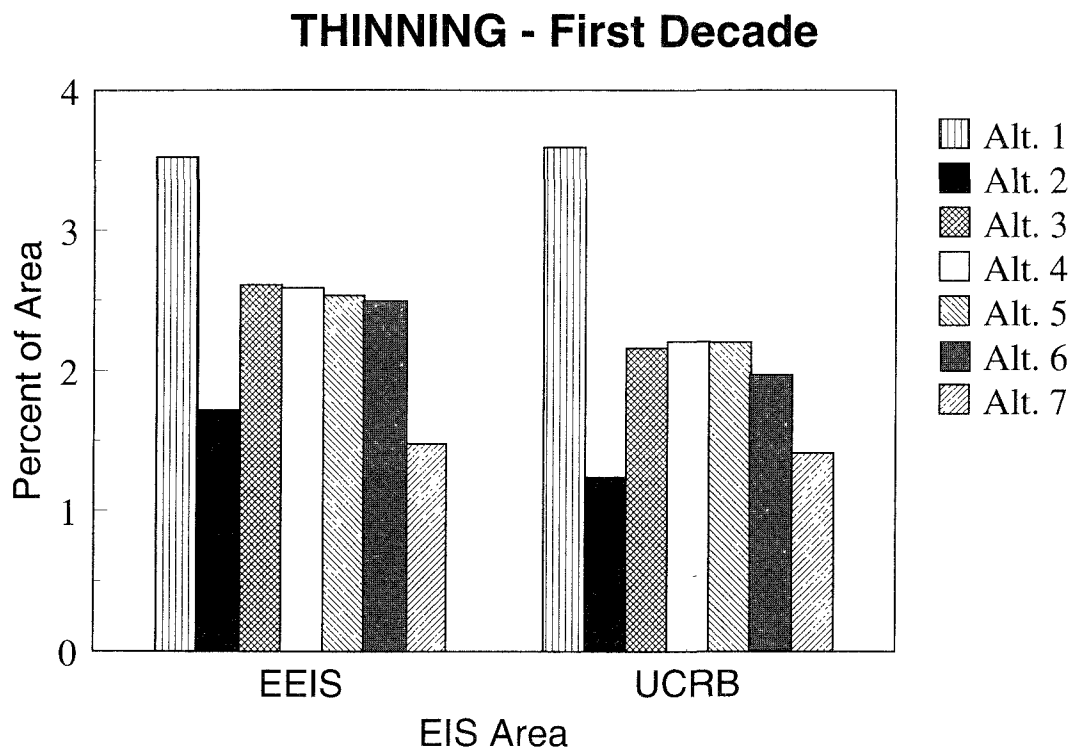


Figure 2.9 — Percent of BLM- and FS-administered lands disturbed by thinning for all forest PVGs for years 1-10.

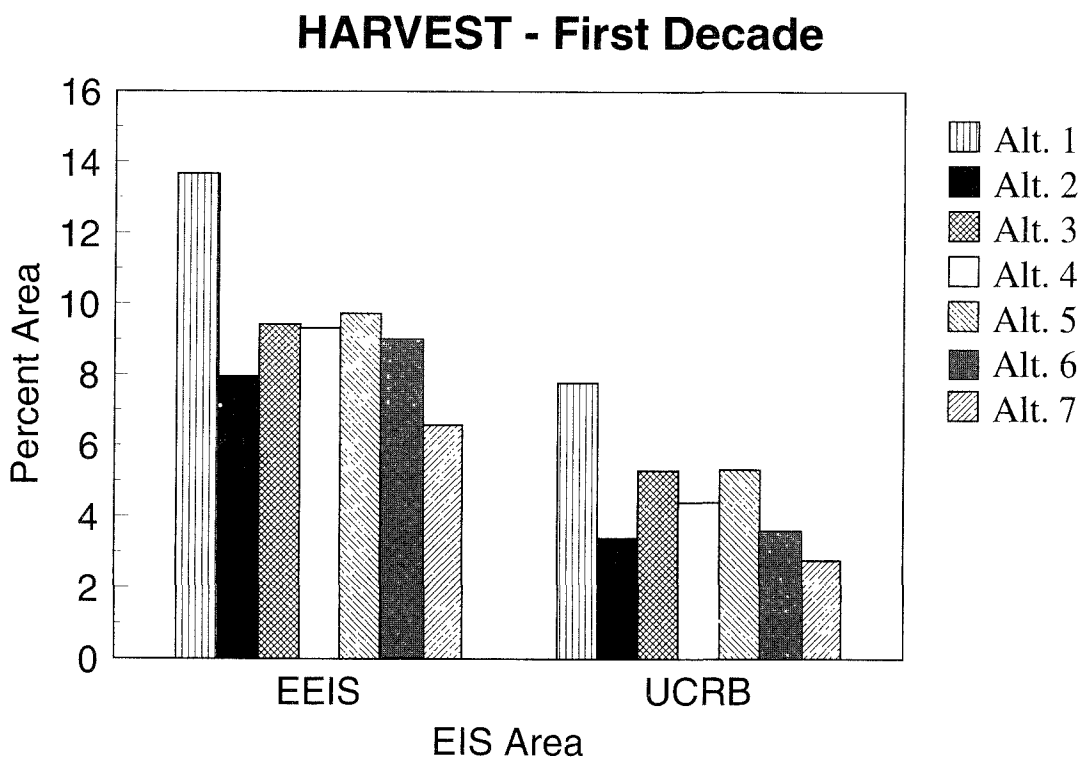


Figure 2.10 — Percent of BLM- and FS-administered lands disturbed by harvest for all forest PVGs for years 1-10.

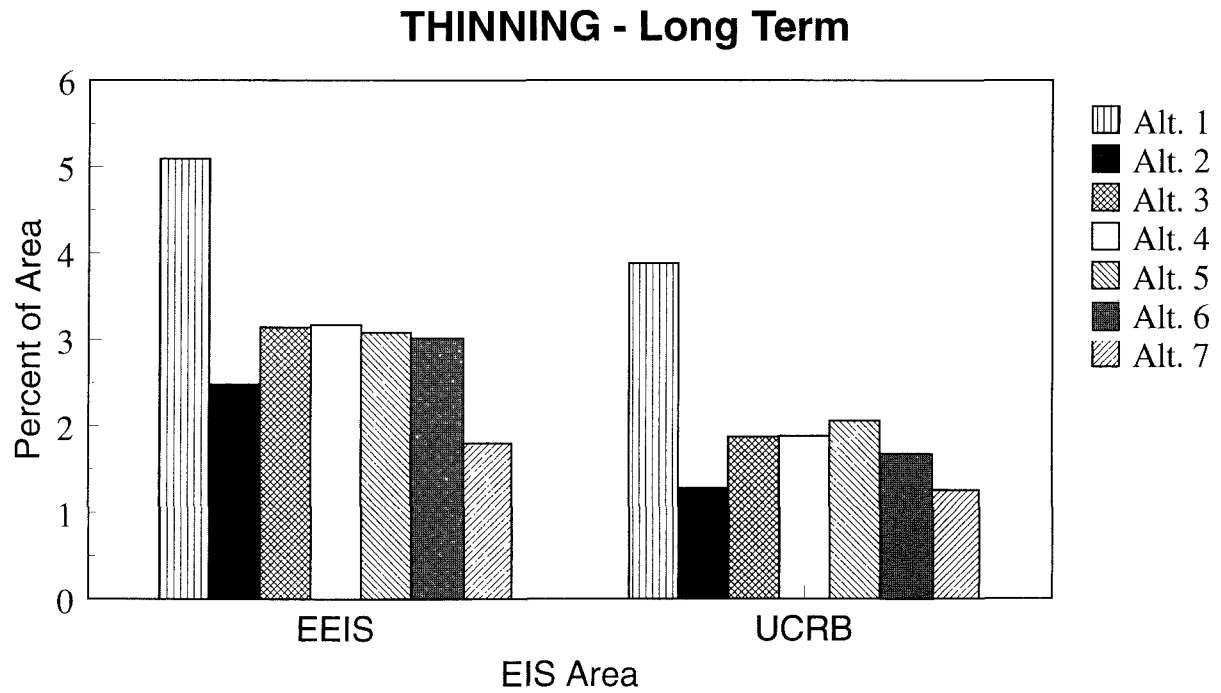


Figure 2.11 — Percent of BLM- and FS-administered lands disturbed by thinning for all forest PVGs by decade over 100 years.

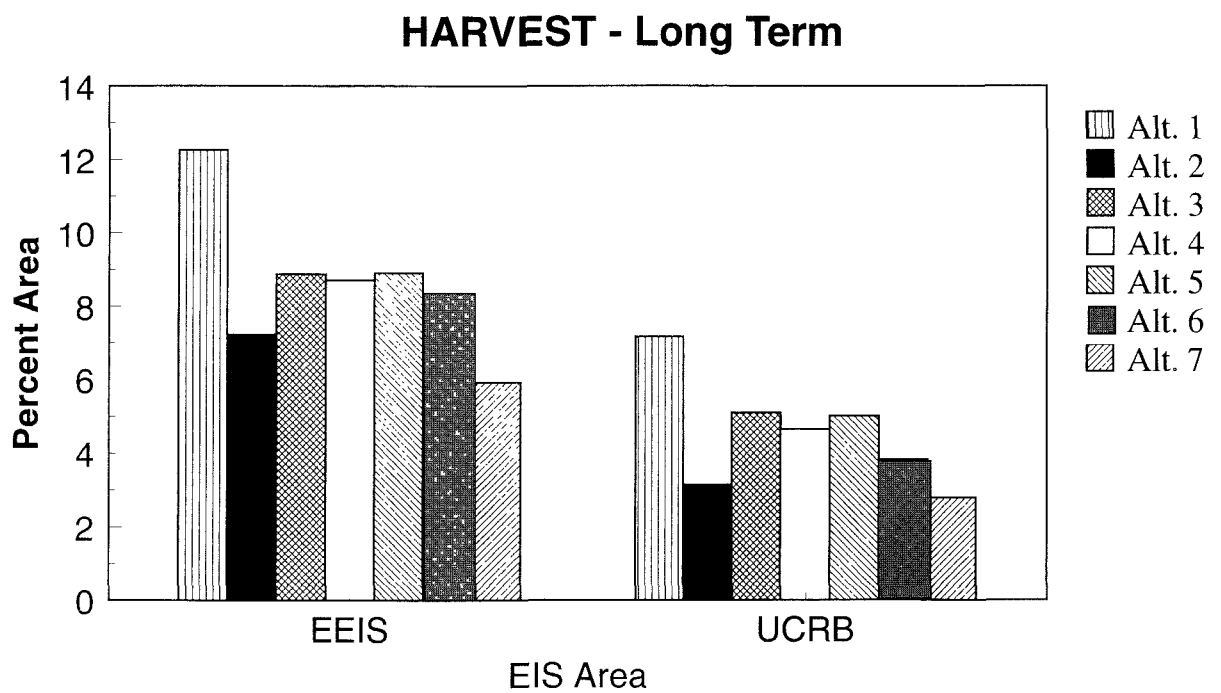


Figure 2.12 — Percent of BLM- and FS-administered lands disturbed by harvest for all forest PVGs by decade over 100 years.

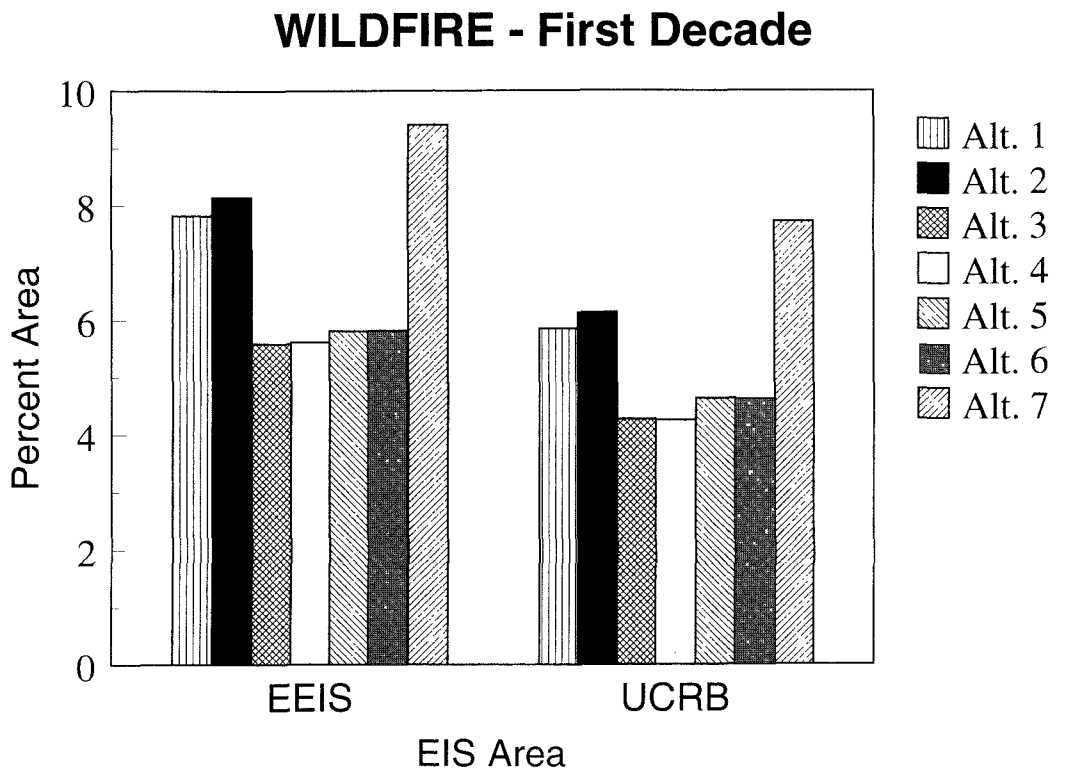


Figure 2.13 — Percent of BLM- and FS-administered lands disturbed by wildfire for all forest PVGs for years 1-10.

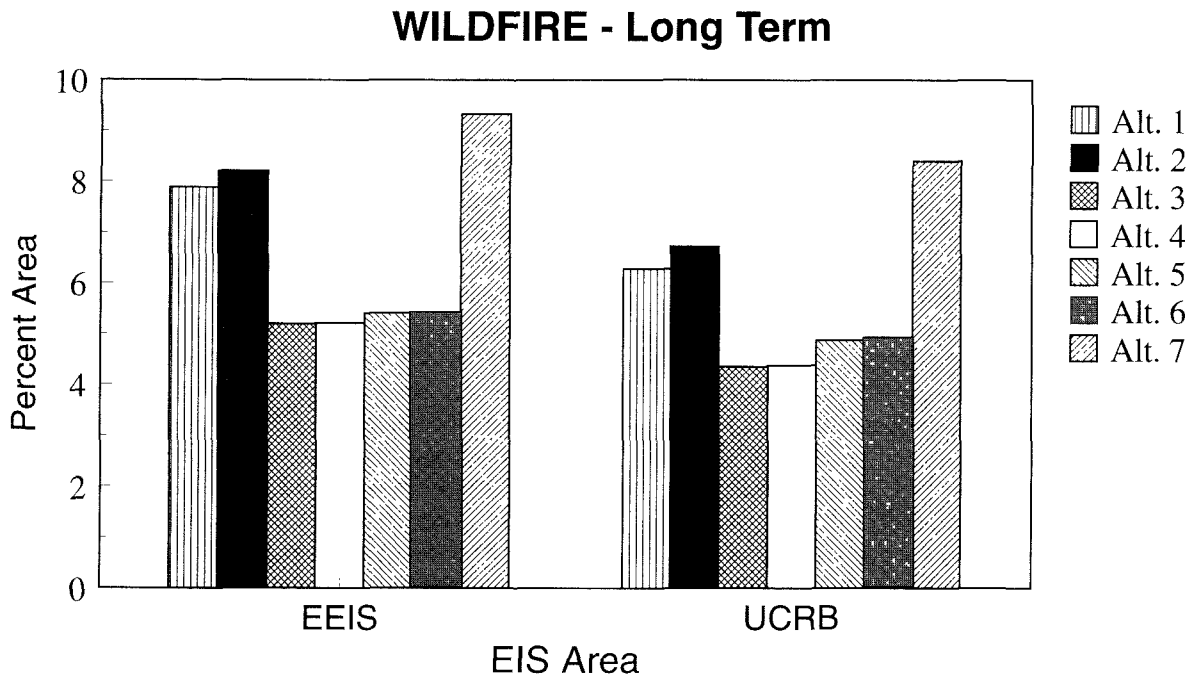


Figure 2.14 — Percent of BLM- and FS-administered lands disturbed by wildfire for all forest PVGs by decade over 100 years.

Forest Crown Wildfire — In the simulation, we modeled the differences in forest wildfires exhibiting crown fire behavior (table 2.16). For each alternative, we projected the average amount of net crown fire per decade for a 100-year period. The current amount of crown fire is well below the historical level due to wildfire suppression activities. Although the area of crown fire simulated by Alternatives 1 and 2 was not significantly different for BLM- and FS-administered lands, both alternatives were projected to have substantial increases compared to the current level due to continued development of high-risk fuel types and patterns.

The only other alternative with levels similar to the no action alternatives was Alternative 7, which would have a high probability of large wildfires with erratic behavior in the reserve areas. Alternatives 4, 3, 6, and 5, respectively, would have lower amounts of crown fire on BLM- and FS-administered lands in both EIS areas, as well as the Basin as a whole. Alternative 4 has substantially less crown fire than 5 and 6 in the UCRB but similar amounts in the EEIS area. Alternative 5 has somewhat higher levels of wildfire than 4, 3, and 6, respectively, but less than 7.

The results for Alternative 6 in the Upper Columbia River Basin EIS area are somewhat higher than expected from the activity levels stated in the preliminary draft EIS. This disparity could be corrected through more refined mapping of management prescriptions to high-risk subbasins, urban-rural/wildland interface areas and potential vegetation groups. Similarly, the amount in Alternative 4 could be reduced through further prioritization of high-risk subbasins, urban-rural/wildland interface areas, and potential vegetation groups. However, a key reason for the higher levels in Alternative 6 compared with Alternative 4 is the slower rate of activities during the first decade. Alternative 3 generally would have less crown fire than Alternative 5, because Alternative 3 has more emphasis on management of fuels in high-risk dry subbasins and potential vegetation groups. Response on Other lands was generally the same across all alternatives because of no assumed difference in the management of fuels and fire between alternatives on Other lands. However, the strategic reduction of crown fire risk in Alternative 4 would also result in an associated reduction of wildfire risk on adjacent lands of Other ownerships. In contrast, the lack of strategic reduction of crown fire risk in Alternatives 1, 2, 3, 5, and 7 and lower levels of restoration activities in Alternatives 6 and 7 would result in increased risks to adjacent lands in Other ownerships.

Forest Mortality Susceptibility — We modeled the net insect and disease mortality susceptibility in forests for the alternatives for 100 years (table 2.17). Currently, on BLM- and FS-administered lands, the potential tree mortality from insects and disease is nearly twice the historical levels. The shift to more insect- and disease-vulnerable forests is attributed to fire exclusion and past harvest practices (Hann and others, in press; Hessburg and others 1996).

For the Basin, the insect and disease potential of Alternatives 1 and 2 would have similar increases on BLM- and FS-administered lands relative to the current condition. In the Eastside EIS area, the increases would be substantial, at approximately 3 percent of the land area. However, the insect and disease susceptibility in the Upper Columbia River Basin EIS area would decrease as a result of Alternatives 1 and 2. This increase in the EEIS area and decrease in the UCRB EIS area is caused by differences in long-term response to pre-settlement disturbance and early and recent historical managements rather than by the alternatives. The relative differences between alternatives indicate the differences related to alternative management strategies. Although Alternative 4 would reduce the susceptibility more than all other alternatives for the Basin as a whole and for the two EIS areas, insect and disease mortality would still be well above historical levels. Alternative 6 would have the next lowest susceptibility, although its level would be very similar to Alternatives 3 and 5 for the Basin and both EIS areas. Alternative 7 would have a level slightly below the no action alternatives, but higher than Alternatives 3 through 6.

Table 2.16 — Net forest crown fire at year 100.[1]

Management Area	Ownership	Total Hectares	Historical	Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
			Hectares of Disturbance								
EEIS	BLM/FS	11,768,500	42,500	29,900	38,400	38,600	15,200	13,500	16,400	14,100	35,600
EEIS	Other[3]	16,648,500	48,700	28,000	38,800	38,800	38,800	38,800	38,800	38,800	38,800
GYE[2]	BLM/FS	1,514,100	6,500	5,200	5,900	7,000	4,100	3,400	4,800	5,300	7,200
UCRB	BLM/FS	16,978,700	72,100	43,000	51,300	55,900	29,400	26,600	35,700	33,200	63,800
UCRB	Other[3]	11,555,600	38,300	20,100	28,200	28,200	28,200	28,200	28,200	28,200	28,200
Total BLM/FS		30,261,300	121,100	78,100	95,600	101,500	48,600	43,500	56,900	52,600	106,600
Total Other[3]		28,204,100	87,000	48,100	67,000	67,000	67,000	67,000	67,000	67,000	67,000
Total All		58,465,400	208,200	126,200	162,600	166,500	115,600	110,500	123,800	119,100	172,100
			Percent of EIS Ownership								
EEIS	BLM/FS		0.36	0.25	0.33	0.33	0.13	0.11	0.14	0.12	0.30
EEIS	Other[3]		0.29	0.17	0.23	0.23	0.23	0.23	0.23	0.23	0.23
GYE	BLM/FS		0.43	0.34	0.39	0.46	0.27	0.22	0.32	0.35	0.48
UCRB	BLM/FS		0.42	0.25	0.30	0.33	0.17	0.16	0.21	0.20	0.38
UCRB	Other[3]		0.33	0.17	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Total BLM/FS			0.40	0.26	0.32	0.34	0.16	0.14	0.19	0.17	0.35
Total Other[3]			0.31	0.17	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Total All			0.36	0.22	0.28	0.28	0.20	0.19	0.21	0.20	0.29

[1]Hectare = 2.47 acres; rounded to the nearest 100. Net infers the effect of mosaic pattern differences between alternatives.

[2]The Greater Yellowstone Ecosystem (GYE) area is not part of the decision for the UCRB EIS, but is included for completeness and cumulative effects within the Assessment area.

[3]Minor adjustments to Alternatives 2 (EEIS, UCRB, and Total), 6 (UCRB and Total), and 7 (EEIS, UCRB, and Total) modeled values for Other lands to correct errors in projections. Attempts to model differences in contagion effects of BLM and FS on Other lands did not successfully project differences.

Table 2.17 — Net forest insect and disease mortality susceptibility at year 100.[1]

Management Area	Ownership	Total Hectares	Historical	Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
			Hectares of Disturbance								
EEIS	BLM/FS	11,768,500	957,700	1,900,100	2,204,000	2,289,500	1,560,000	1,368,800	1,559,500	1,425,800	1,885,200
EEIS	Other[3]	16,648,500	895,100	1,249,100	1,985,600	1,985,600	1,985,600	1,985,600	1,985,600	1,985,600	1,985,600
GYE[2]	BLM/FS	1,514,100	273,000	485,900	560,200	536,700	414,500	356,800	427,400	400,900	499,800
UCRB	BLM/FS	16,978,700	1,781,900	3,588,000	3,298,500	3,332,800	2,344,700	2,069,500	2,506,300	2,393,800	3,143,700
UCRB	Other[3]	11,555,600	827,400	1,400,600	1,618,600	1,618,600	1,618,600	1,618,600	1,618,600	1,618,600	1,618,600
Total BLM/FS		30,261,300	3,012,500	5,974,000	6,062,600	6,159,000	4,319,200	3,795,100	4,493,100	4,220,500	5,528,700
Total Other[3]		28,204,100	1,722,500	2,649,700	3,604,200	3,604,200	3,604,200	3,604,200	3,604,200	3,604,200	3,604,200
Total All		58,465,400	4,735,000	8,623,700	9,666,800	9,027,700	7,923,400	7,399,300	8,097,300	7,824,700	8,925,000
			Percent of EIS Ownership								
EEIS	BLM/FS		8.1	16.1	18.7	19.5	13.3	11.6	13.3	12.1	16.0
EEIS	Other[3]		5.4	7.5	11.9	11.9	11.9	11.9	11.9	11.9	11.9
GYE	BLM/FS		18.0	32.1	37.0	35.4	27.4	23.6	28.2	26.5	33.0
UCRB	BLM/FS		10.5	21.1	19.4	19.6	13.8	12.2	14.8	14.1	18.5
UCRB	Other[3]		7.2	12.1	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Total BLM/FS			10.0	19.7	20.0	20.4	14.3	12.5	14.8	13.9	18.3
Total Other[3]			6.1	9.4	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Total All			8.1	14.8	16.5	15.4	13.6	12.7	13.9	13.4	15.3

[1]Hectare = 2.47 acres; rounded to the nearest 100. Net infers the effect of mosaic pattern differences between alternatives.

[2]The Greater Yellowstone Ecosystem (GYE) area is not part of the decision for the UCRB EIS, but is included for completeness and cumulative effects within the Assessment area.

[3]Minor adjustments to Alternatives 2 (EEIS, UCRB, and Total) and 7 (EEIS, UCRB, and Total) modeled values for Other lands to correct errors in projections. Attempts to model differences in contagion affects of BLM and FS on Other lands did not successfully project differences.

The insect and disease susceptibility of Alternative 4 may be higher than the preliminary draft EIS standards (appendix I), and the activity levels would indicate. However, the current cluster strategy lacks adequate spatial prioritization. This disparity could be corrected through a more refined mapping effort of prescriptions by high-risk subbasins and potential vegetation groups. The insect and disease response on Other lands was similar among alternatives, but there would be some contagion effects to Other lands. However, the strategic reduction of insect and disease risks in Alternative 4 would also result in an associated reduction of wildfire risk on adjacent lands of Other ownerships. In contrast, the lack of strategic reduction of insect and disease risk in Alternatives 1, 2, 3, 5 and 7 and lower levels of restoration activities in Alternatives 6 and 7 would result in increased risks to adjacent lands in other ownerships.

Forest Disturbance Summary — The total direct disturbances for wildfire, prescribed fire, thinning, and harvest varied among alternatives on BLM- and FS-administered lands (table 2.18). There was little simulated difference in disturbance among alternatives for Other lands because the alternatives only affected BLM- and FS-administered lands. However, there are some contagion effects relative to crown fire risk, insect and disease mortality, and harvest levels. The first decade and long-term average total direct disturbance areas for BLM- and FS-administered lands varied primarily between the no action (1 and 2), restoration (3-6), and reserve (7) alternatives. The areas of disturbance on BLM- and FS-administered lands of the no action Alternative 2 would be substantially below the HRV average, while Alternative 1 (also a no action alternative) would be only slightly below the HRV average. The disturbances resulting from Alternatives 3 through 6 would be similar to, or somewhat above, the historical average. Although the areas of disturbance resulting from Alternatives 7 and 1 would be similar, the dominant disturbance in Alternative 7 is wildfire, whereas timber harvest is the dominant disturbance in Alternative 1. The restoration alternatives that would be somewhat above HRV (Alternatives 3, 4, and 5) do not have activity levels high enough to shift the current trajectory toward HRV because of the lack of the high current departure across the Basin. Appendices 2D, 2E, 2F, 2G, 2H, and 2I provide more detailed first decade, long-term, ERU, PVG, and forest and range cluster group information.

Rangeland Disturbances

Prescribed Fire — The levels of prescribed fire in Alternatives 1 and 2 are low compared to the other alternatives (figures 2.15 and 2.16, table 2.15). These two alternatives would have a traditional type of treatments designed to increase forage quantity and quality, whereas the prescribed fire in Alternatives 3 through 6 would be

Table 2.18 — Percent of Basin forested and rangeland potential vegetation groups (PVGs) affected by decade by direct disturbance (wildfire, prescribed fire, thinning, harvest, seeding, exotic control) by alternative.

Vegetation Type	Ownership Class	Projection Years	HRV	Alternative						
				1	2	3	4	5	6	7
Forest	BLM/FS	First decade	21	18	13	24	23	22	22	18
Forest	BLM/FS	Long-term	21	18	14	24	24	23	22	18
Forest	Other	First decade	29	25	29	25	25	25	25	26
Forest	Other	Long-term	29	26	29	26	26	26	26	26
Range	BLM/FS	First decade	23	11	11	12	14	12	13	15
Range	BLM/FS	Long-term	23	12	15	10	10	11	11	14
Range	Other	First decade	33	15	15	15	15	15	16	15
Range	Other	Long-term	33	19	19	19	19	19	18	18

designed to mimic native fire processes and maintain native vegetation composition and structure. Alternatives 3 and 5 would have moderate levels of prescribed fire, Alternatives 4 and 6 would have relatively high levels, and Alternative 7 would have levels similar to Alternative 3 in the non-reserve areas and very little prescribed fire in the reserve areas.

Range Improvements and Plan Revision/ Implementation — The alternatives were evaluated for their level of range structural and non-structural improvements, and the revision and implementation of new range allotment plans (figures 2.17 and 2.18, table 2.15). Range improvements consisted of woodland cutting, forage seeding, and weed control. These activities occurred at low levels in Alternatives 1 and 2; moderate levels in Alternatives 3, 5, and 7; and relatively high levels in Alternatives 4 and 6, with the highest levels in Alternative 4. Range improvements were at very low amounts within the reserve areas of Alternative 7.

Grazing — Within both EIS areas, there would be more vegetation succession effects from grazing under Alternative 1 than under Alternatives 3 through 6. This is because Alternative 1 has less emphasis on proper livestock distribution and little emphasis on representing native herbivory patterns and processes. The effects of grazing in Alternative 2 would be similar to Alternative 1, except for less impact in riparian areas. Alternative 7 would have grazing levels similar to Alternative 3 in the non-reserve areas, but no livestock grazing in the reserves. Alternatives 4 and 6 would have grazing that best represents the native regime.

Total grazing effects for the first decade would range from a high in Alternative 4, to a low in Alternative 2 (figure 2.19). Total grazing effects over the long term (100 years) would range from a high for Alternatives 1 and 4, to a low for Alternative 2 (figure 2.20). We estimate that the historical grazing effect levels ranged from 20 to 40 percent, with only 2 percent of the area per year grazed at levels that would change successional pathways. Grazing may not negatively affect ecosystem patterns and processes. The processes, composition, and structure of native ecosystems can be maintained if grazing is properly managed. For example, by substantially reducing fine fuels, grazing also reduces the associated probability of wildfire and subsequent invasion of exotics. Consequently, we conclude it is not the amount of grazing, but the type and timing of grazing that may cause departure in native composition and structure, or loss of riparian or upland soil capability. The alternatives mimic the native regime from closest fit to least fit in order of 6, 4, 3, 7, 5, 2, and 1.

Exotic Herbland — The levels of exotic herbland were predicted to be highest for Alternatives 1 and 2, lowest for Alternatives 3, 4, 5, and 6, and intermediate in Alternative 7 (figures 2.21 and 2.22, table 2.15). The amount of exotic herbland within the non-reserve areas of Alternative 7 was expected to be similar to Alternative 3. Predictability of amount in the reserve areas of Alternative 7 is poor because of multiple possible outcomes in response to erratic fire patterns, increase of big game and wild horses, and lack of restoration of currently disturbed areas.

Rangeland Wildfire — Alternatives 1 and 2 were expected to have relatively high levels of wildfire, and Alternative 4 much lower levels (figures 2.23 and 2.24, table 2.15). Alternatives 4 and 6 were predicted to have wildfire levels much lower than Alternative 1 and 2, and slightly less than Alternatives 3 and 5. The amount of wildfire expected in the non-reserve portions of Alternative 7 would be similar to Alternative 3, but quite high and with erratic behavior and effects inside the reserves.

Within the reserves, areas characterized as dry grass and dry shrub would be most affected by the severe effects of wildfires. The cool shrub and riparian potential vegetation groups would be less likely to have severe fire effects. Wildfire behavior in the reserves in Alternative 7 would be much more erratic than for other alternatives. Consequently, the fire effects in the reserves would be less predictable than for the other alternatives.

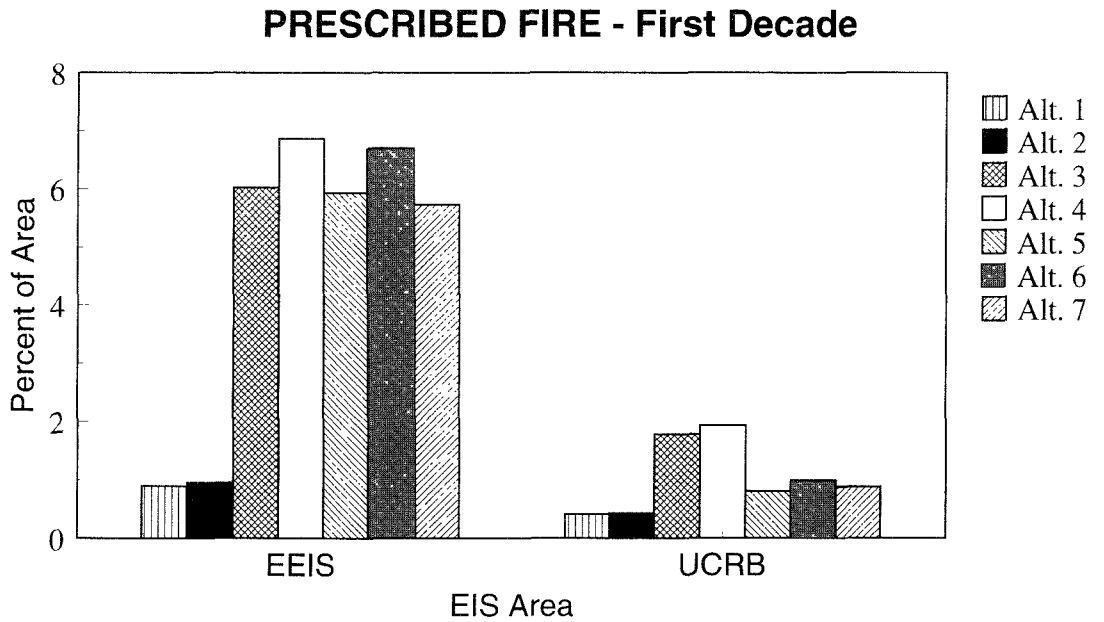


Figure 2.15 — Percent of BLM- and FS-administered lands disturbed by prescribed fire for all rangeland and riparian PVGs for years 1-10.

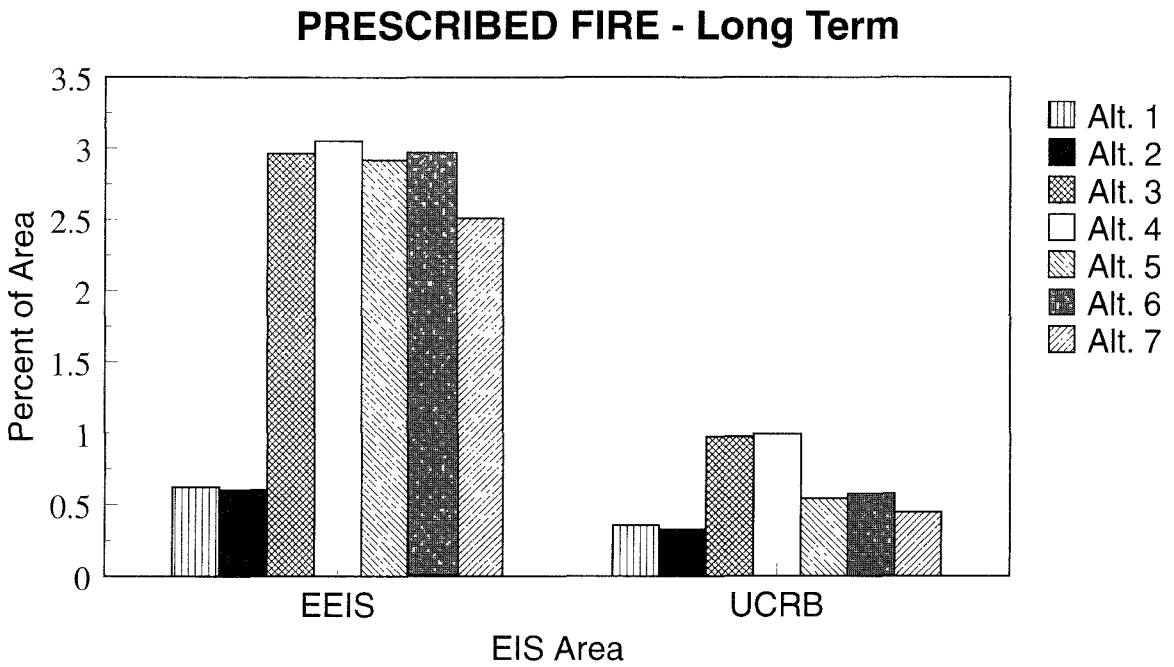


Figure 2.16 — Percent of BLM- and FS-administered lands disturbed by prescribed fire for all rangeland and riparian PVGs by decade over 100 years.

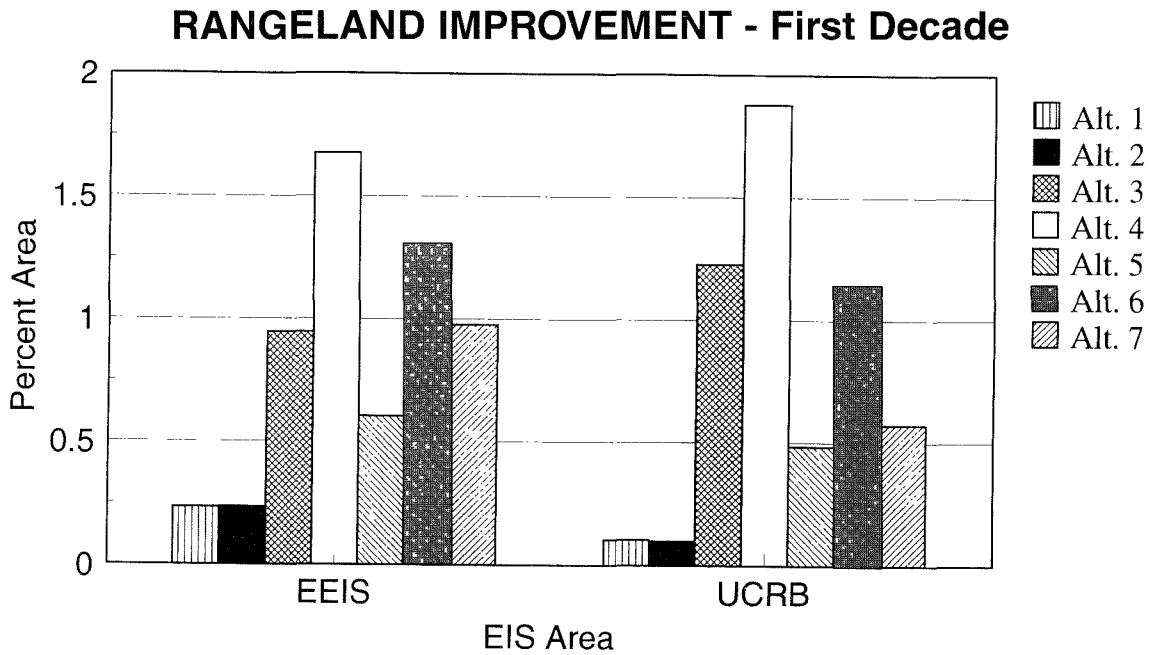


Figure 2.17 — Percent of BLM- and FS-administered lands disturbed by nonstructural rangeland improvement for all rangeland and riparian PVGs for years 1-10.

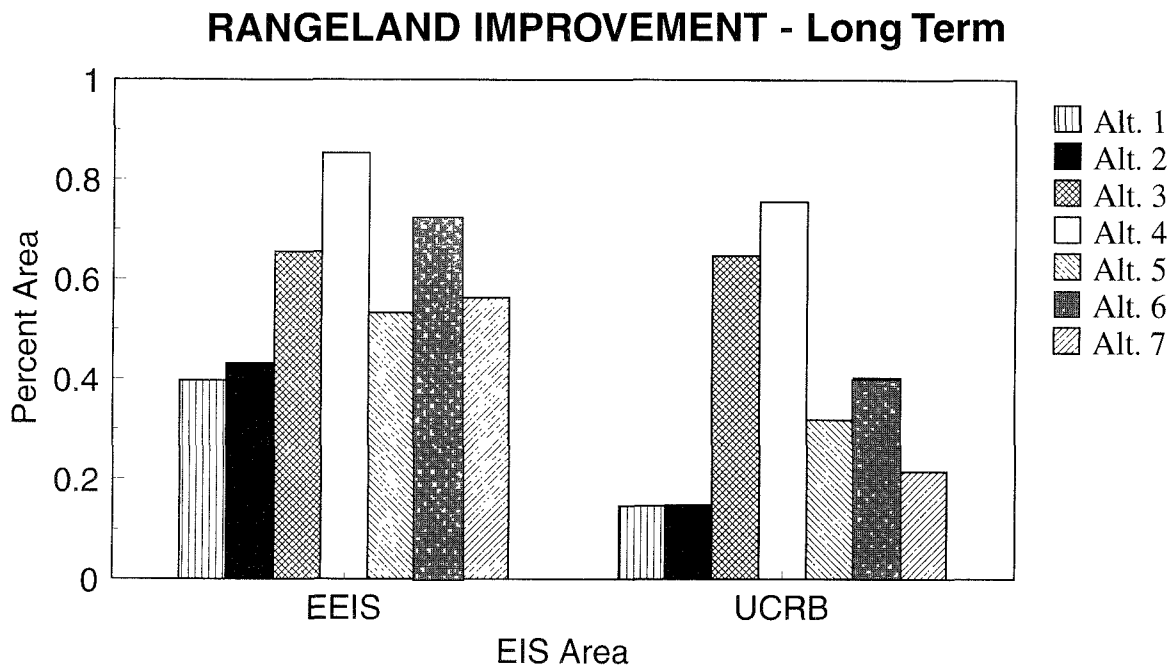


Figure 2.18 — Percent of BLM- and FS-administered lands disturbed by nonstructural rangeland improvement for all rangeland and riparian PVGs by decade over 100 years.

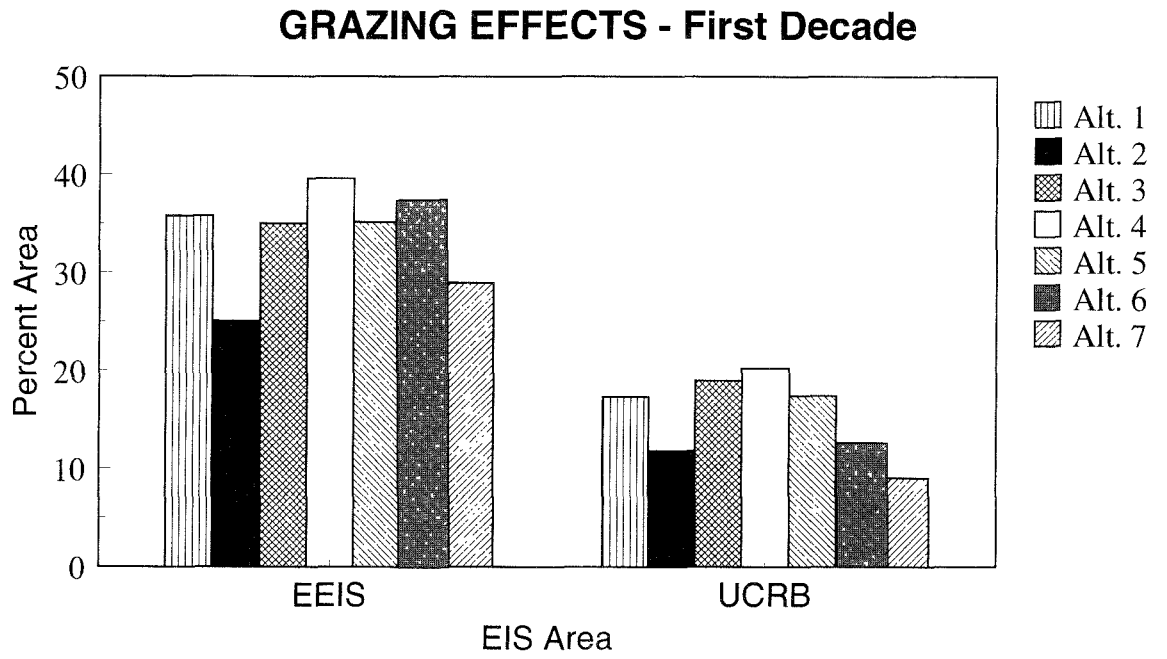


Figure 2.19 — Percent of BLM- and FS-administered lands disturbed by grazing effects for all rangeland and riparian PVGs for years 1-10.

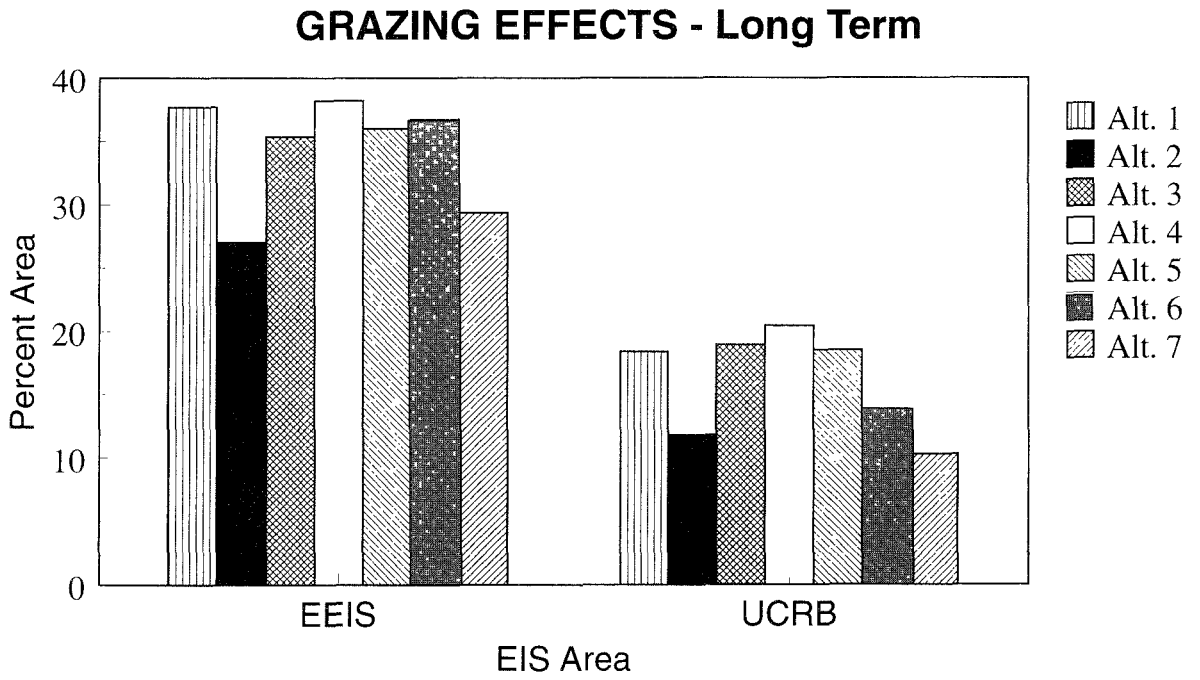


Figure 2.20 — Percent of BLM- and FS-administered lands disturbed by grazing effects for all rangeland and riparian PVGs by decade over the 100 years.

Rangeland Disturbance Summary — The effects of grazing relate to the ability of management to mimic ecosystem processes and to maintain native vegetation composition and structure. The effects would vary by alternative, depending on:

- Amounts of grazing, wildfire, and exotics relative to the amount of improvements and restoration of rangeland vegetation and livestock distribution.
- Amount of prescribed fire.
- Intensity of revising and implementing rangeland allotment plans.

Direct rangeland disturbances, including vegetation improvements, prescribed fire, and wildfire, that were projected for the first decade would affect from 10 to 15 percent of the area per decade, with Alternatives 1 and 2 disturbing the least area, and Alternative 7 disturbing the most area. Rangeland disturbance projections for Alternatives 3, 4, 5 and 6 for the two EIS areas were similar. The HRV average is almost twice this level. However, given the use of grazing to represent herbivory and reduction of fine fuels in Alternatives 3, 4, and 6, this level is probably appropriate. Disturbance patterns have high departure from the native regimes in Alternatives 1 and 2 and moderate departure in Alternatives 5 and 7.

Landscape Scale Disturbances

Total Direct Disturbance — An evaluation of total direct disturbance across all landscapes provides an indicator when compared to the average disturbance for the 400-year simulation (table 2.18). Total disturbance includes prescribed fire, wildfire, timber harvest and thinning on both forests and rangelands. These disturbances were assumed to represent disturbances similar to the native regime in Alternatives 3 through 6. Grazing effects were not included in Alternatives 3 through 7 because they were assumed to mimic native grazing and not cause direct change.

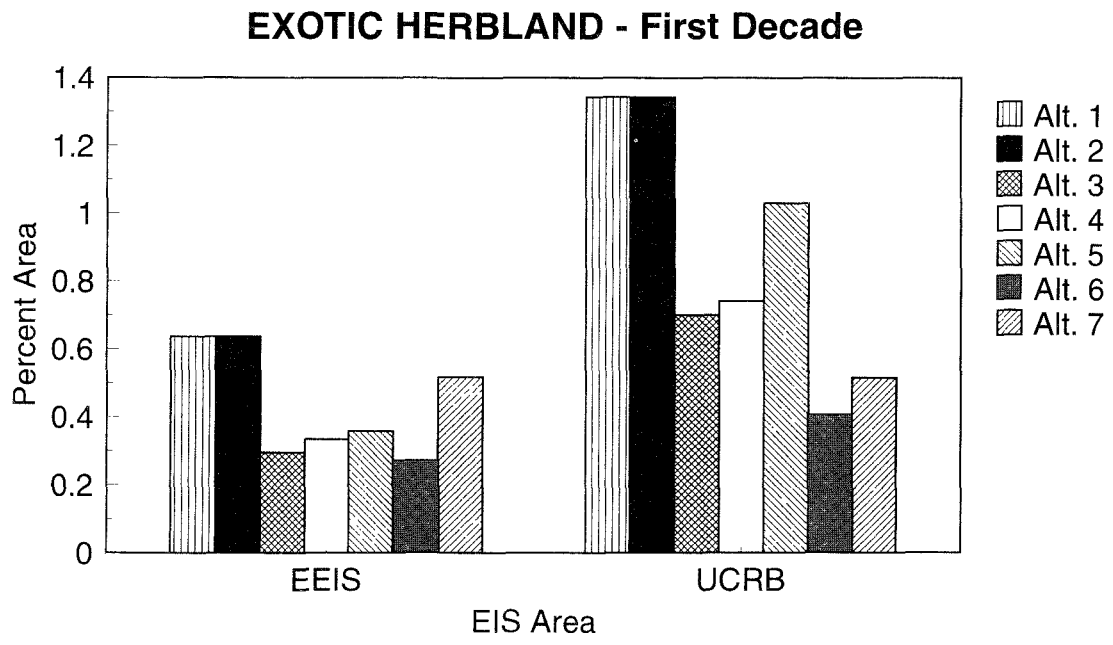


Figure 2.21 — Percent of BLM- and FS-administered lands disturbed by exotics for all rangeland and riparian PVGs for years 1-10. Exotics in Alternative 2 were simulated at too high a level, so they have been adjusted to be similar with Alternative 1.

Alternatives 1 and 2 are considerably less than the average total direct disturbance on BLM- and FS-administered land because of low levels of prescribed fire and high emphasis on wildfire suppression. Alternative 2 is less than Alternative 1 because of lower harvest in riparian buffer areas and in the late-seral forest. On Other ownerships the amount of harvest increases in Alternative 2 compared to Alternative 1 because of reduced timber availability on public lands. Alternative 7 is similar in total amount to Alternative 1 on BLM- and FS-administered land because of reduced amounts of timber harvest and prescribed fire, but higher amounts of wildfire. Alternatives 3, 4, 5, and 6 all had similar levels of total disturbance; their differences were primarily related to spatial location by subbasin and type of disturbance.

Wildfire — The projected levels of wildfire among alternatives differed primarily between the no action alternatives (1 and 2), the restoration alternatives (3 through 6), and the reserve alternative (7). The restoration alternatives would result in approximately a 20 percent reduction in wildfires compared to the no action alternatives in the first decade and in the long term (table 2.15 and figures 2.13, 2.14, 2.23, and 2.24). There were minor differences between Alternatives 3 through 6 in the first decade, but differences were more pronounced in the long term. In general, Alternatives 3 and 4 would have somewhat less wildfire than Alternatives 5 and 6, but for different reasons. Alternative 3, due to its local emphasis, would have higher levels of traditional fire suppression in combination with some restoration, while Alternative 4 would place more emphasis on proactive restoration. Alternative 5 would have higher wildfire due to higher risk in the low production areas. This would occur because restoration and production projects would be prioritized to the moist forest and productive range subbasins, with

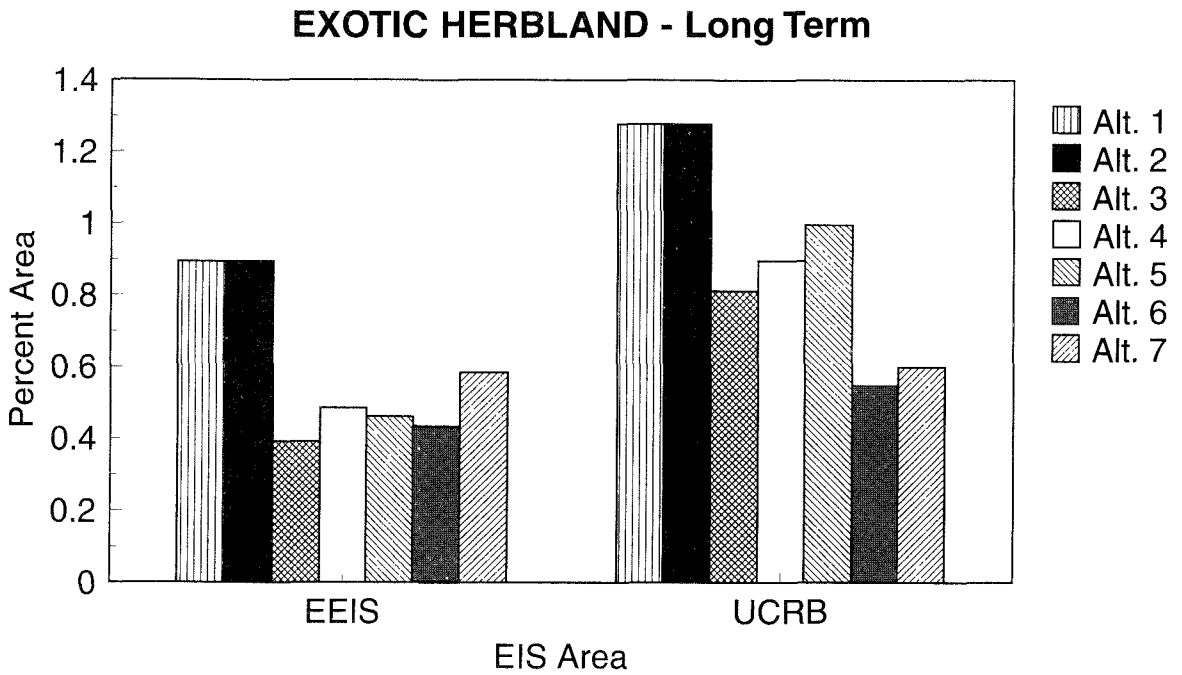


Figure 2.22 — Percent of BLM- and FS-administered lands disturbed by exotics for all range and riparian PVGs by decade over 100 years. Exotics in Alternative 2 were simulated at too high a level, so they have been adjusted to be similar with Alternative 1.

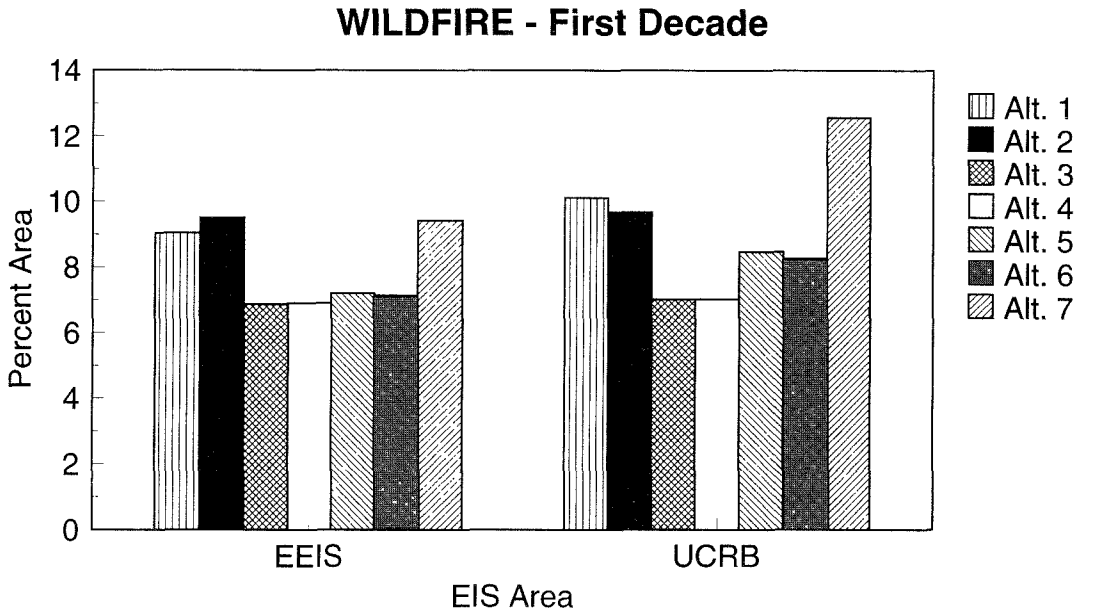


Figure 2.23 — Percent of BLM- and FS-administered lands disturbed by wildfire for all rangeland and riparian PVGs for years 1-

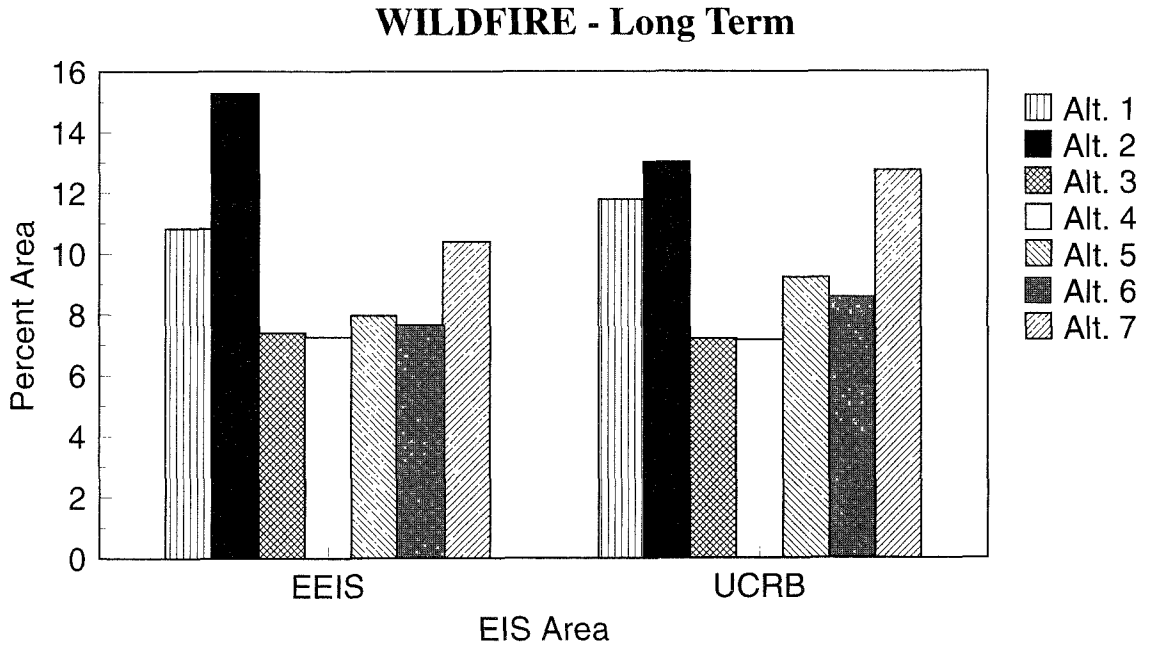


Figure 2.24 — Percent of BLM- and FS-administered lands disturbed by wildfire for all rangeland and riparian PVGs by decade over 100 years.

low proactive restoration in the dry forest and range subbasins. Alternative 6 would have higher wildfire related to lower levels of restoration activities compared to Alternative 4. Particularly, the low levels of restoration in the first decade predispose Alternative 6 to higher risks in the long term. Wildfire levels could be substantially reduced in Alternatives 4 and 6 through more refined spatial and temporal prioritization of high-risk subbasins and subwatersheds, potential vegetation groups, and the urban-rural/wildland interface area. This refinement would generally not be possible in the other alternatives since their themes and standards do not emphasize Basin-wide restoration and reduction of fire risk.

Soil Disturbances — Total soil disturbance was modeled as a summary characteristic for comparing alternatives (Hann and others 1997). Values modeled were the combined soil disturbances for the BLM- and FS-administered lands (table 2.19). The Other lands were not summarized since alternatives did not influence them. For the Basin, the highest levels of cumulative soil disturbance would be produced in Alternatives 1 and 2, the no action alternatives. The least amount of disturbance would be produced in Alternatives 4, 6, and 7, which had little difference among them. Alternative 5 would produce the most disturbance of Alternatives 3 through 7, and Alternative 3 slightly less than Alternative 5. These trends would be similar for both EIS areas.

Ability to Mimic Native Composition and Structure — We evaluated the alternatives by comparing their general ability to mimic or represent native ecological processes. The long-term simulation of HRV wildfire provided a basis for this comparison. The total change of direct forest and rangeland disturbance was compared between the HRV and alternative simulations. Harvest and wildfire were generally assumed to be equivalent to lethal crown fire, and thinning and prescribed fire were generally assumed to be equivalent to mixed and nonlethal fires. Grazing effects, invasion by and control of exotics, rangeland restoration, and range allotment plan revisions/implementation were also evaluated.

Alternatives 1 and 2 would emphasize traditional treatments that do not attempt to mimic the types of fire regimes, herbivory patterns, and other effects that are consistent with the biophysical regime and inherent disturbance processes. Alternatives 4 and 6 have the strongest direction and potential for implementing ecological treatments that mimic native processes. Given the complex nature of these regimes and the emphasis

Table 2.19 — Forest and rangeland soil disturbance summary by preliminary draft EIS alternatives for BLM- and FS-administered lands.

	Hectares[1] of Disturbance by Alternative						
EIS Area[2]	1	2	3	4	5	6	7
EEIS	3,150,800	2,973,100	2,412,000	2,297,000	2,562,700	2,334,200	2,351,500
GYE	59,800	43,200	47,000	46,200	47,700	38,900	38,900
UCRB	2,225,100	1,948,100	1,692,400	1,663,400	1,993,800	1,652,800	1,692,000
Assessment[3] Area Total	5,435,704	4,964,400	4,151,400	4,006,600	4,604,200	4,025,900	4,082,400

[1]Hectare = 2.47 acres; rounded to nearest 100.

[2]EEIS = Eastside EIS area.
GYE = Greater Yellowstone Ecosystem area (not part of decision for EEIS/UCRB, but included for completeness and cumulative effects within Assessment area).
UCRB = Upper Columbia River Basin area.

[3]Total includes soil disturbance associated with: harvest, thinning, wildfire, prescribed fire, grazing, exotics, and range improvements. Total may sum to more than the EIS area due to overlap of disturbance types. All data should be displayed as relative values among alternatives.

of Alternative 6 on technology development and transfer, we believe that Alternative 6 would most closely mimic or represent native effects at a project level. Alternative 4 would have higher activity levels, and thus more closely mimic or represent native processes in terms of total disturbance at a landscape scale. Alternatives 1 and 2 would have the least ability to mimic the native regime, while Alternatives 3, 5, and 7 would have intermediate levels.

Although the effects of Alternatives 4 and 6 would be similar, Alternative 4 would have a more rapid rate of implementation and, consequently, increased potential for error at mid- and fine-scales on sensitive sites. However, the slower implementation rate of Alternative 6 leads to higher potential for wildfire and invasion of exotics. Alternative 3 would have potential to diverge considerably from the native regime because of its emphasis on local priorities and its minimal change from the current forest and resource plans. Alternative 5 would also diverge considerably from the natural regimes due to its emphasis on economic efficiency and more production types. Alternative 7 would vary according to reserve/non-reserve allocations, with its non-reserve areas similar to Alternative 3 and its reserve areas tending toward large, erratic fires that do not mimic the native regime.

Additional detail about fire behavior, patterns, and effects is presented in this chapter in the section on evaluation of vegetation response and disturbance patterns.

Spatial Distribution of Disturbances — For evaluation purposes, we aggregated forest and range clusters into five groups [F, J, L, M, and H (map 2.22 and table 2.14)][2] based upon their composition of potential vegetation type groups, ownership, amounts of wilderness, forest and rangeland integrity, fire risk, and urban/wildland interface (table 2.14).

The Eastside EIS area:

- Was dominated by group L.
- Had a small amount of group M.
- Had a moderate amount of group F.
- Had small amounts of groups J and H.

The Upper Columbia River Basin EIS area:

- Was dominated by groups M and H.
- Had a moderate amount of groups F and J.
- Had a relatively small amount of group L.

Forest disturbances were separated into four groups: prescribed fire, thinning, harvest, and wildfire (table 2.20). The amount of each type of disturbance varied, by alternative, in terms of its spatial allocation to the subbasin groups. Alternatives 1 and 2 would have activities relatively evenly distributed considering the size of each group. However, the wilderness prescribed natural fire program in subbasin group H in Alternative 2 would be considerably higher than in Alternative 1. Differences among Alternatives 3 through 7 are very apparent when looking at the spatial allocation of activities across the forest and range cluster groups. Relative to restoration, Alternatives 4 and 6 would generally place the highest mix of activities in the areas with the lowest integrity. Those areas would tend to be concentrated in groups L and J for the Eastside EIS; and in M, F, and J for the Upper Columbia River Basin EIS. For the Eastside EIS, the harvest, thinning, and prescribed fire disturbances would be concentrated spatially and temporally in areas J and L, where there is a high risk in the urban/wildland interface involving BLM- and FS-administered lands. Harvest, thinning, and prescribed fire disturbances for the Upper Columbia River Basin would be concentrated spatially and temporally in areas F, J, and M; these areas have a high risk in the urban/wildland interface involving BLM- and FS-administered lands.

[2]Group F: high urban/wildland interface, low integrity, moderate-high fire risk. Group J: high urban/wildland interface, moderate integrity, moderate fire risk. Group L: moderate urban/wildland interface, low integrity, high fire risk. Group M: low urban/wildland interface, low-moderate integrity, moderate fire risk. Group H: low urban/wildland interface, high integrity, moderate fire risk.

Table 2.20 — Percent of average yearly disturbance hectares for BLM- and FS-administered lands for the long-term by forest and range cluster group.

Disturbance	Cluster Group	Alternative						
		1	2	3	4	5	6	7
Forest-Harvest	H	0.16	0.09	0.19	0.20	0.14	0.17	0.06
Forest-Harvest	J	0.10	0.10	0.09	0.09	0.09	0.08	0.10
Forest-Harvest	L	0.38	0.43	0.37	0.39	0.38	0.42	0.50
Forest-Harvest	M	0.28	0.33	0.29	0.24	0.31	0.25	0.29
Forest-Harvest	F	0.08	0.05	0.06	0.08	0.09	0.07	0.05
Forest-Prescribed Fire	F	0.07	0.07	0.07	0.07	0.09	0.05	0.02
Forest-Prescribed Fire	H	0.42	0.46	0.36	0.36	0.31	0.31	0.08
Forest-Prescribed Fire	J	0.07	0.08	0.08	0.08	0.09	0.08	0.11
Forest-Prescribed Fire	L	0.32	0.26	0.31	0.31	0.35	0.34	0.52
Forest-Prescribed Fire	M	0.12	0.13	0.19	0.19	0.17	0.21	0.26
Forest-Thinning	J	0.11	0.10	0.10	0.10	0.10	0.10	0.11
Forest-Thinning	F	0.09	0.05	0.07	0.09	0.09	0.07	0.05
Forest-Thinning	M	0.34	0.37	0.34	0.33	0.37	0.34	0.37
Forest-Thinning	H	0.16	0.11	0.17	0.17	0.13	0.16	0.07
Forest-Thinning	L	0.31	0.38	0.32	0.32	0.31	0.33	0.40
Forest-Wildfire	F	0.08	0.08	0.08	0.07	0.06	0.09	0.07
Forest-Wildfire	H	0.41	0.42	0.40	0.40	0.45	0.43	0.52
Forest-Wildfire	J	0.09	0.09	0.09	0.09	0.08	0.08	0.08
Forest-Wildfire	L	0.25	0.24	0.24	0.24	0.22	0.22	0.17
Forest-Wildfire	M	0.18	0.18	0.19	0.20	0.19	0.18	0.15
Range-Exotics	H	0.10	0.02	0.19	0.16	0.16	0.15	0.09
Range-Exotics	J	0.01	0.00	0.02	0.02	0.01	0.02	0.01
Range-Exotics	L	0.46	0.68	0.33	0.38	0.27	0.52	0.44
Range-Exotics	M	0.31	0.27	0.35	0.31	0.43	0.16	0.35
Range-Exotics	F	0.11	0.04	0.12	0.13	0.12	0.16	0.12
Range-Grazing	H	0.07	0.05	0.08	0.07	0.07	0.04	0.04
Range-Grazing	F	0.04	0.04	0.04	0.05	0.04	0.05	0.05
Range-Grazing	J	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Range-Grazing	L	0.57	0.58	0.55	0.58	0.55	0.66	0.65
Range-Grazing	M	0.32	0.32	0.32	0.29	0.32	0.24	0.25
Range-Prescribed Fire	J	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Range-Prescribed Fire	L	0.48	0.50	0.52	0.52	0.60	0.59	0.60
Range-Prescribed Fire	M	0.26	0.23	0.19	0.19	0.11	0.11	0.07
Range-Prescribed Fire	F	0.20	0.25	0.25	0.25	0.28	0.28	0.33
Range-Prescribed Fire	H	0.05	0.02	0.03	0.03	0.01	0.01	0.01
Range-Wildfire	M	0.31	0.30	0.32	0.33	0.39	0.38	0.33
Range-Wildfire	J	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Range-Wildfire	L	0.50	0.57	0.50	0.50	0.42	0.45	0.40
Range-Wildfire	H	0.09	0.06	0.09	0.09	0.10	0.09	0.16
Range-Wildfire	F	0.09	0.07	0.08	0.08	0.08	0.08	0.11
Rangeland Improvement	M	0.21	0.22	0.36	0.29	0.12	0.08	0.06
Rangeland Improvement	L	0.54	0.57	0.46	0.54	0.72	0.77	0.78
Rangeland Improvement	J	0.00	0.00	0.01	0.01	0.01	0.01	0.00
Rangeland Improvement	H	0.03	0.03	0.08	0.06	0.03	0.03	0.00
Rangeland Improvement	F	0.21	0.18	0.09	0.10	0.12	0.12	0.15

Alternative 3, which places more emphasis on local prioritization and minimal consideration on Forest and Resource plans, would have less concentrated activities than Alternatives 4 and 6. Alternative 5, which emphasizes restoration and production on the more productive lands, would focus activities more in groups L and M in the Eastside EIS area, and groups M and H in the Upper Columbia River Basin EIS area. Alternative 7, which has fewer activities due to its reserve areas, would have management disturbances distributed similar to Alternative 3 for the non-reserve areas.

Alternative Management Activity Levels

There is considerable difference among alternatives regarding the flexibility in the amounts of management activity levels that would produce the same desired effects relative to landscape patterns, processes, and associated soil disturbances described in the theme, DFCs, and standards. The more consistent an alternative's trajectory is with biophysical limitations and inherent disturbance processes, the greater the probability that planned and unplanned disturbances are consistent with the patterns and processes in which native aquatic and terrestrial species have evolved (Hann and others, in press). This leads to greater flexibility in the management of disturbance. There are several key points related to this consistency:

- Alternatives that are more consistent with the biophysical regime and inherent disturbance processes provide higher predictability of cause-and-effect relationships to other variables (such as erosion and sediment delivery, wildfire, or timber harvest) that affect aquatic, terrestrial, social, and economic conditions. Consequently, hierarchical analysis of landscape dynamics and associated effects on aquatic, terrestrial, social, and economic conditions provides a context and template that can improve the confidence in analysis. This has the potential to reduce the cost of analysis and associated monitoring and inventory.
- Alternatives that are more consistent with the biophysical regime and inherent disturbance processes have lower probabilities for unexpected events. This in turn leads to higher probabilities of achieving the alternative theme, desired future condition, standards, and predicted effects. Consequently, there is more flexibility across space and through time to adjust activities and still achieve standards for aquatic and terrestrial conservation, clean air and water, and maintenance or improvement of ecosystem integrity.
- Alternatives that are more consistent with the biophysical regime and inherent disturbance processes have activities that are more concentrated in time and space. Consequently, activities at mid- and fine-scales can be implemented at lower cost per unit of area, and there is a lower probability of losing investments to unexpected disturbance events.

To assess the flexibility of management activity levels in relation to broad-, mid-, and fine-scale patterns, processes, and effects, we used:

- Information from the multiple stochastic simulations of CRBSUM (Keane and others 1996).
- Summary of mid-scale dynamics (Hessburg and others 1996; Ottmar and others 1996).
- Multi-scale analysis of landscape dynamics (Hann and others, in press).
- Estimates of response that would be obtained from multiple stochastic simulations at a mid- and fine-scale level.

Estimates at the mid- and fine-scale levels were based on our analysis of multi-scale relationships within the various model prescriptions assigned to the alternative strategies, which included:

- Multi-scale data in CRBSUM prescription models.
- CRBLAD data system.
- Mid- and fine-scale projection models.
- Mid-scale landscape dynamics (Hessburg and others 1996; Ottmar and others 1996).

- Fine-scale plot data (Hann and others, in press; Hann and others 1997).

It is important to emphasize that the estimates for the mid- and fine-scale levels are useful for displaying differences across alternatives at the Basin scale, but would not likely be adequate for implementation. Three variables were evaluated to provide a basis for determining the flexibility between alternatives:

- Similarity of an alternative's trajectory to the biophysical and succession/disturbance regime of multi-scale patterns and processes across space and through time.
- Alternative theme, DFCs, and standards, that would provide for consistency of forest and range activities in producing effects similar to the native regime.
- Consistency of the alternative's theme, DFCs, and standards; adjusted by the alternative's flexibility and emphasis, to adjust standards in order to improve consistency with the biophysical regime and inherent disturbance processes.

Because of the large departures of the trajectories of the no action alternatives (1 and 2) from the biophysical regime and succession/disturbance regime, the predictability of disturbance response for these two alternatives is poor (table 2.21). These predictability ratings produce low confidence in the ability of Alternatives 1 and 2 to achieve their projected activity levels, in both the short and long term, coincidental to meeting the theme and DFCs. Alternatives 4 and 6 have the highest predictability based on the assumption that single state/size standards (such as riparian buffers) would be refitted to the biophysical template within the first decade. Alternatives 3, 5 and 7 have respectively less confidence. Alternative 4 has higher confidence than Alternative 6 because of higher rates of restoration of high risk wildfire, road, and riparian conditions in the first decade.

Large differences also exist in the flexibility among alternatives to consider how the various activities might substitute for each other and still produce the same effects (such as harvest, thinning, or grazing for prescribed fire). For example, because most activities in the no action alternatives fit a traditional commodity or reserve pattern, and also have high potential for variability in effects between administrative units, those two alternatives have low flexibility to mix activities. As a result, the confidence in producing the predicted effects is relatively low, even without changing the activity levels or exchanging activities.

Alternatives 7, 5, 3, 4, and 6 have successively increased levels of confidence. The no action alternatives also have very low connectivity between standards of different scales and high potential for one or two fine-scale standards to change the outcome at a coarser scale in a manner that is either unpredictable or does not achieve the desired outcomes or standards. Alternatives 7, 5, 3, 4 and 6

Table 2.21 — Difference in confidence and flexibility of projected management-implementation activity levels based on a revitalized index for multi-scale relationships.

	Alternative						
	1	2	3	4	5	6	7
Biophysical Regime Response Predictability	0.20	0.20	0.55	0.90	0.40	0.80	0.35
Activity Mixing Flexibility to Produce Similar Effects	0.15	0.10	0.60	0.80	0.30	0.85	0.20
Connectivity Between Biophysical Regime and Standards of Different Scales	0.10	0.15	0.25	0.80	0.25	0.90	0.25
Relative Activity Level Flexibility	1.00	1.00	3.13	5.56	2.20	5.67	1.80

have respectively greater levels of flexibility. The high levels in Alternatives 6 and 4 are based on the assumption that single state/size standards (such as riparian buffers) will be adjusted and fit to the biophysical template within the first decade.

By combining the three variables (similarity of trajectory, activity consistency, and scale connectivity), a relative index of the flexibility in the total activity levels was determined. The no action alternatives would have the lowest combined values and provide the base index of 1.0. A base index of 1.0 generally indicates that there would be little relative room for adjustments in implementing and monitoring the management activity levels as well as low confidence in ability to produce the predicted effects.

Alternatives 4 and 6 would have the highest flexibility for implementation of activities because they have: predictable outcomes, activities that can be exchanged for each other and still produce the same effects, and standards that are potentially well connected between scales. However, this level of flexibility is based on assumptions that a multi-scale process of regional and subregional implementation analysis, watershed analysis, and monitoring will be implemented and maintained. It is important to emphasize that this is an assumption that was not apparent from the text in Chapter 3 of the preliminary draft EISs. Our modeling of multi-scale relationships was not adequate to determine the actual flexibility in management activity levels but acceptable for the relative comparisons. We emphasize that the flexibility index rating is only a relative comparison and cannot be used to adjust activity levels until a multi-scale implementation analysis is conducted as described in the landscape assumptions. There is a risk with Alternative 6 that the slower rate of implementation compared to Alternative 4 may result in the loss of key elements (such as large, old trees to wildfire or erosion from roads) which is not adequately reflected in the predictability variable.

Because of the adaptive management approach, Alternative 6 was rated with a high index for flexibility and Alternative 4 was rated second highest. Although Alternative 6 would have a lower level of activities than Alternative 4 in the first decade, it could produce a higher level of activities in the long term due to the adaptive management approach. Alternative 4 is considered to have more rapid rates of activity implementation than Alternative 6, because of less emphasis on watershed analysis and adaptive management. Compared to the no action alternatives, the activity levels in Alternatives 4 and 6 could be increased substantially based on the landscape assumptions discussed in this chapter, without changing the alternative's broad-scale trajectory or effects, including implementation cost. *We emphasize that at the broad- and mid-scales it is not the amount of management activities by area that drives the effects, but the design, rate of implementation, spatial pattern, and timing that are the critical variables.*

Alternatives 3 and 5 generally would have moderate predictability potential for exchanging activities, and for connection of standards between scales. These two alternatives differ substantially from Alternatives 4 and 6. Alternative 3 emphasizes local priorities and has a minimal change of forest and resource plans, consequently providing less emphasis on Basin-wide priorities and consistency of management for the biophysical regime and inherent disturbance processes. Alternative 5 emphasizes economic efficiency with active management in the productive lands, which (like Alternative 3) results in less emphasis on Basin-wide priorities and consistency of management for the biophysical regime and inherent disturbance processes. Of particular concern, the spatial allocation of restoration activities in Alternative 5 places low emphasis on less productive lands which often have the highest risks for unpredictable events and loss of biophysical capability. Alternative 7 is a mix of a reserve approach, which has low predictability, and management similar to Alternative 3 on the non-reserve areas, which has moderate predictability.

Simulations Compared to Alternative Management Activities

The simulated combined forest management activities are within or very close to the range given in Chapter 3 of both preliminary draft EISs

for all alternatives. Alternative 2 is slightly low because of lower than desired prescribed fire and thinning, but harvest is slightly high so they could be exchanged (table 2.22 and figures 2.25 and 2.26). Alternative 3 is a little high because of higher levels of simulated prescribed fire than desired. However, this can be exchanged to increase low levels of simulated thinning. Alternative 7 is slightly high for the EEIS area because of higher simulated than desired harvest in the nonreserve areas, but this can be exchanged to in crease low levels of simulated thinning.

Simulated rangeland combined-management activities are within or very close to the range given in Chapter 3 of both preliminary draft EISs for all alternatives. Alternatives 1 and 2 are low for the UCRB area because of a low simulation of prescribed fire and range vegetation improvements (table 2.23 and figures 2.27 and 2.28). However, this may be an actual effect when considering the low level of current range management budgets, compared to the expectations of the forest and resource plans. Alternative 2 is somewhat low for the UCRB for reasons similar to Alternative 1. Alternatives 3, 4, 5 and 6 in the EEIS area are high because of higher levels of simulated prescribed fire than desired from the preliminary draft EIS Chapter 3 activity levels. We feel the preliminary draft EISs may have underestimated these levels given the amount of decadent shrublands, and woodland and conifer encroachment, in the EEIS area; and that the simulated level better reflects the DFCs and themes of Alternatives 3 and 4 than the Chapter 3 activity levels.

Relative to these critical variables, Alternatives 4 and 6 have the highest ability, Alternatives 3, 5 and 7 moderate ability, and Alternatives 1 and 2 the lowest ability, to transition landscapes toward consistency with their biophysical regime and inherent landscape disturbance processes; thus conserving or improving ecosystem integrity. *We emphasize again, however, that at the broad- and mid-scales, it is not the amount of management activities by area that drives landscape response, but the design, rate of implementation, spatial pattern, and timing of treatments within and across years that are the critical variables.*

Table 2.22 — Forest vegetation management and prescribed fire for first decade.

EIS Area	Alternative	Preliminary Draft EIS, Minimum	Simulation Activities	Preliminary Draft EIS, Maximum
			Hectares[2]	
EEIS[1]	1	796,000	894,000	1,071,000
	2	563,000	530,000	757,000
	3	997,000	1,424,000	1,350,000
	4	1,246,000	1,418,000	1,688,000
	5	1,042,000	1,386,000	1,411,000
	6	1,111,000	1,378,000	1,500,000
	7	609,000	858,000	820000
UCRB[1]	1	926,000	994,000	1,254,000
	2	608,000	536,000	825,000
	3	1,083,000	1,733,000	1,467,000
	4	1,369,000	1,672,000	1,850,000
	5	1,118,000	1,132,000	1,512,000
	6	1,082,000	1,427,000	1,467,000
	7	717,000	730,000	972,000

[1]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.

[2]Rounded to nearest thousand; includes harvest, thinning and prescribed fire (planned and unplanned ignitions).

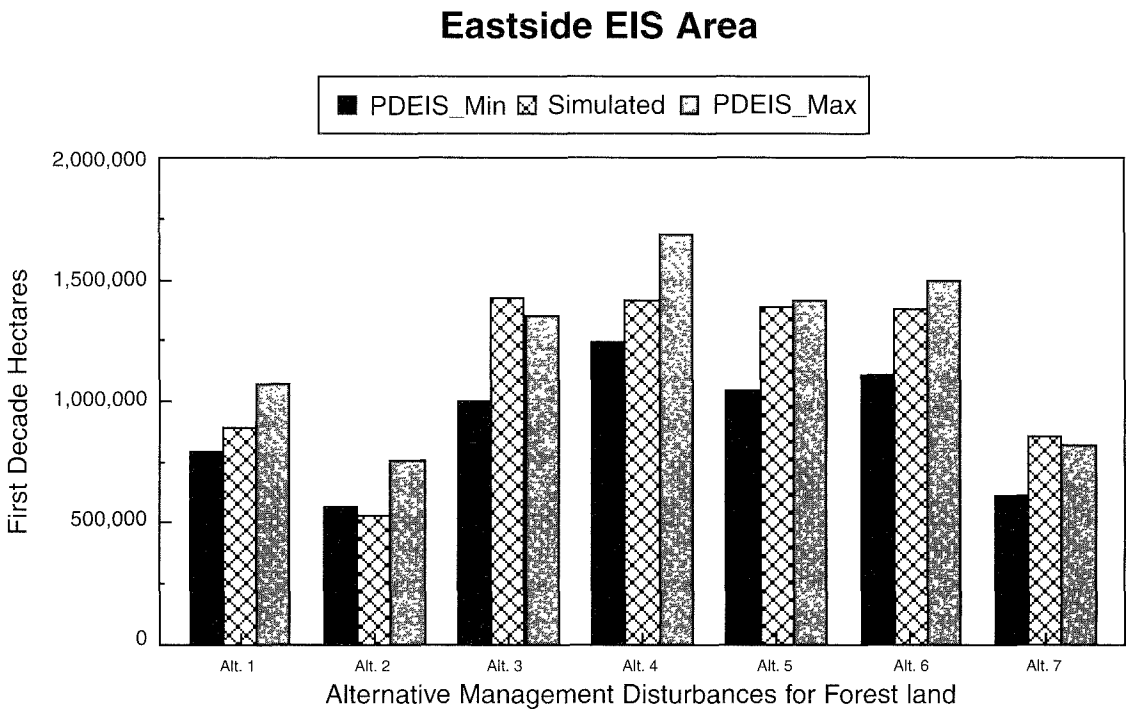


Figure 2.25 — Simulation compared to alternative management activities for BLM- and FS-administered forest land of the EEIS.

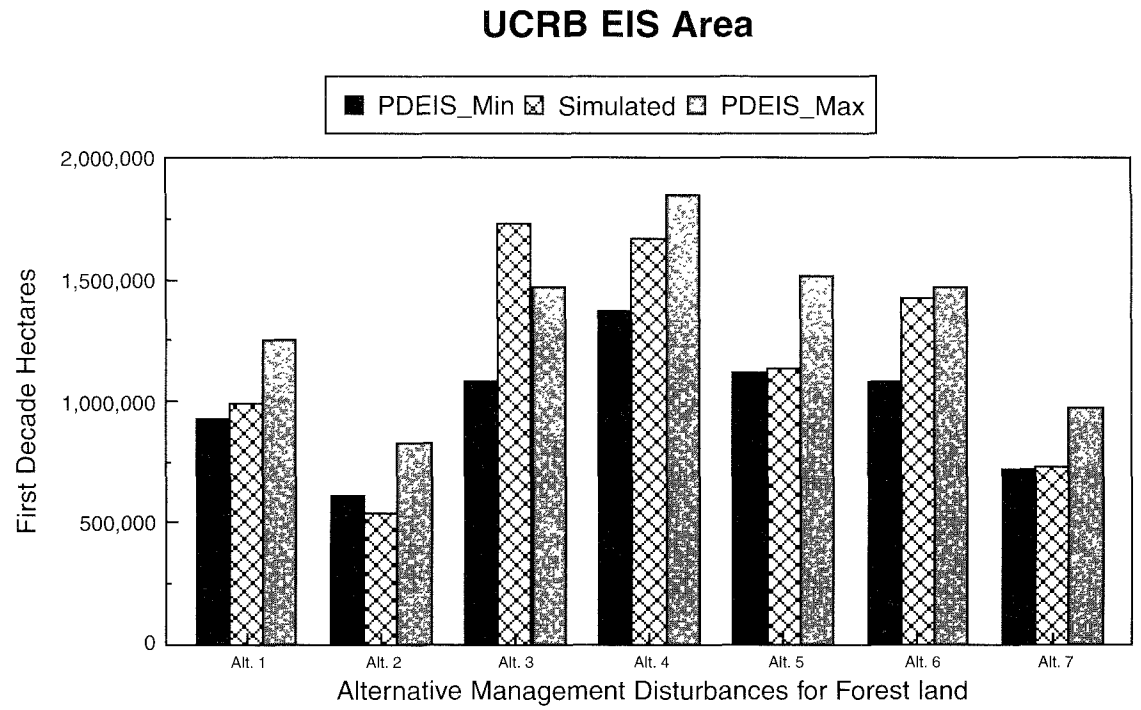


Figure 2.26 — Simulation compared to alternative management activities for BLM- and FS-administered forest land of the UCRB.

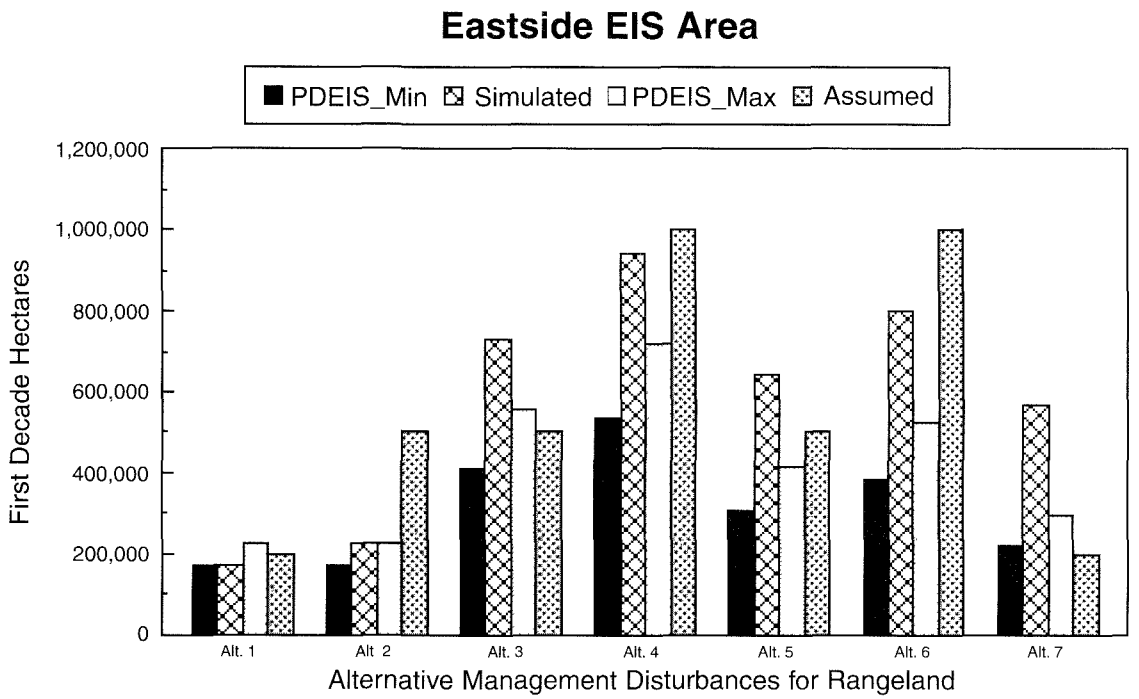


Figure 2.27 — Simulation compared to alternative management activities for BLM- and FS-administered rangeland of the EEIS.

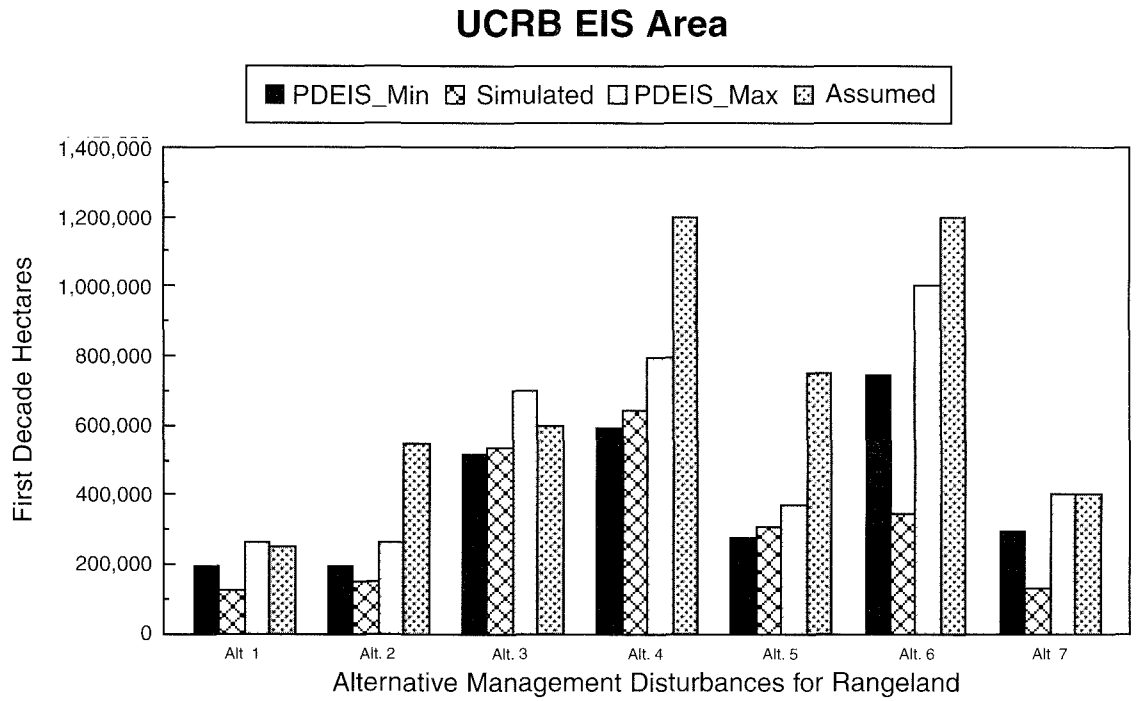


Figure 2.28 — Simulation compared to alternative management activities for BLM- and FS-administered rangeland of the UCRB.

Table 2.23 — Rangeland improvements and prescribed fire activities for first decade.

EIS Area	Alternative	Preliminary Draft EIS, Minimum	Simulation Activities	Preliminary Draft EIS, Maximum	Assumed[1] AMP Revision/ Implementation
		Hectares[3]			
EEIS[2]	1	170,000	171,000	227,000	200,000
	2	170,000	225,000	227,000	500,000
	3	412,000	729,000	558,000	500,000
	4	535,000	941,000	720,000	1,000,000
	5	310,000	643,000	418,000	500,000
	6	385,000	799,000	522,000	1,000,000
	7	220,000	565,000	298,000	200,000
UCRB[2]	1	192,000	128,000	261,000	250,000
	2	192,000	150,000	261,000	550,000
	3	518,000	532,000	700,000	600,000
	4	589,000	639,000	795,000	1,200,000
	5	277,000	308,000	374,000	750,000
	6	744,000	345,000	1,004,000	1,200,000
	7	295,000	133,000	401,000	400,000

[1]Assumed for simulation purposes; not in preliminary draft EIS Chapter 3.

[2]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.

[3]Rounded to nearest thousand; includes structural and nonstructural range improvements plus prescribed fire (planned and unplanned ignitions).

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Terrestrial Communities

The composition of communities across a landscape directly affects ecosystem processes and functions. Because of this interrelationship, we attempt to understand how the various community components interact and respond to differences in their environment to accurately portray subsequent ecosystem changes.

Each of landscape's vegetation communities has ecological implications at multiple scales. The landscapes change over time and space, that is temporally and spatially. Because these changes are so numerous and complex, our ability to detect change varies. However, by studying the magnitude and rates at which landscape composition varies, we can improve our ability to predict the effects of change on ecological processes and functions. We can also estimate the landscape's suitability and the probability of persistence for relevant biota, namely the plants and animals that live there. To better understand the complexity of ecosystem dynamics, such studies must be conducted across multiple temporal and spatial scales.

For evaluation of terrestrial community departures, we used a continuous coverage of broad-scale vegetation data to assess the historic-to-current and projected future change of vegetation communities within 164 subbasins of the Basin. An assessment of broad-scale vegetation changes across larger geographic scales within the Basin was needed to provide a context for potential ecological effects across varying spatial and temporal scales. For example, do historic-to-current trends continue into the future, and are the future trends consistent between the Basin as a whole and the two EIS areas, and among all ownerships and BLM- and FS- administered lands within these two regions?

We hoped that quantitative data about the spatial differences of broad-scale vegetation change would help biologists and botanists to infer persistence probabilities of relevant biota. As an example, a species may be either widely- or sparsely-distributed throughout a landscape, or be restricted to relatively smaller areas within a landscape in peripheral, disjunct, or endemic distribution patterns (Lesica and Shelly 1991).

The persistence of widely- or sparsely-distributed species may be more closely associated with the community composition of the entire Basin. Conversely, the persistence of other species having smaller geographic ranges in peripheral, disjunct or endemic distributions may be more closely correlated with the community composition of smaller landscapes such as the two EIS areas. Because of these different landscape correlations among species, we discuss the historic-to-current period change in composition of broad-scale vegetation communities throughout the Basin as a whole; within the two EIS assessment regions, which are the Eastside EIS and the Upper Columbia EIS areas; and within different ownership strata of these two regions.

We evaluated the proportional change of a community's areal extent, which is its class change. In the evaluation, we realized that a community's areal extent may not currently exhibit substantial ecological consequences if changes have occurred to the community within some expected range of variation in which biological entities and processes have since evolved. Therefore, only by comparing the magnitude of change to some historical range of expected conditions can we infer trends in ecosystem structure, composition, and functions.

Currently, there is a significant lack of information about the broad-scale habitat relationships and the population responses to habitat change for most species occurring in the Basin. A comparison of the projected availability of broad-scale vegetation community types to their expected historical range of conditions allows coarse-filter inferences of the risks to species persistence (Hunter 1991). A primary assumption of a coarse-filter approach to habitat assessment is: *If the areal extent of a community or habitat occurs within its estimated histor-*

ical range of conditions, then most species that have adapted to those historical conditions should be able to persist into the future. The likelihood of persistence decreases substantially as the availability of a community type falls below its historical range, and increases substantially when a community's extent occurs above its historical range. Fitness of many species is also strongly correlated with fine-scale habitat attributes. Although we addressed fine-scale attributes through statistical inference, we could not precisely simulate fine-scale attribute distribution in response to DEIS alternatives.

Methods for Evaluating Terrestrial Communities

We aggregated 41 cover types and 25 structural stages into 24 terrestrial communities, grouping them according to similarities in moisture, temperature, elevation, structure, and use by vertebrate species (table 2.24).

Trends were quantified for each alternative by the percent of change in terrestrial communities between historic and current periods, and between current and 100-year projections. Future availabilities of terrestrial communities were simulated by CRBSUM, which is a spatially explicit, deterministic vegetation simulation model with stochastic properties (Keane and others 1996).

Ecologically significant trends within a community were said to occur if the community's areal extent changed by at least 20 percent within the stratum being assessed. We evaluated current and future availabilities of each community in respect to the predicted historical range. Historical ranges of the areal extent of vegetation community types were simulated for each stratum by CRBSUM. Minimum and maximum historical values were defined for a single 400-year run, with the outputs simulated for years 0, 50, 100, 200, 300, and 400. Initial conditions were denoted as year 0 for both the historical simulations and the alternative simulation process (Menakis and others 1996).

Trends were summarized for the following six region and ownership strata:

- ICBEMP Assessment Area: all ownerships.
- ICBEMP Assessment Area: BLM- and FS-administered lands.
- Eastside EIS area: All ownerships.
- Eastside EIS area: BLM- and FS-administered lands.
- Upper Columbia River Basin EIS area: All ownerships.
- Upper Columbia River Basin EIS area: BLM- and FS-administered lands.

Assumptions and Notes About Simulation Methods and Results

Following are some assumptions and notes about simulation methods and results for riparian, exotic, and terrestrial communities.

Riparian Communities — The areal extent for riparian types such as riparian herblands, shrublands, and woodlands was underestimated historically and not accurate for the current period (Jones and Hann 1996). Based on mid-scale samples (Hessburg and others 1996) we assumed that riparian communities had ecologically significant declines between historic and current periods.

Although the current extent of riparian types was not accurate, the predicted future trends (not amounts) for riparian communities are considered reasonable. Therefore, our discussion of riparian types in the following text will be limited to projected future trends.

Trends in riparian community responses for Alternatives 2 through 6 were more negative than suggested by the objectives and the standards (appendix I) for those alternatives. To estimate riparian community effects more precisely for those five alternatives, we suggest that more reliance be placed on DEIS alternative objectives and standards than on our simulations.

Table 2.24 — Cover type and structural stage composition of terrestrial communities.

Terrestrial Community		Cover Types	Structural Stages
Agriculture		Cropland/hay/pasture	N/A[1]
Barren/rock		Barren	N/A
Water		Water	N/A
Urban		Urban	N/A
Subalpine forests:	early-seral mid-seral late-seral multi-layer late-seral single-layer	Whitebark pine/alpine larch, mountain hemlock, Engelmann spruce/ subalpine fir, whitebark pine	1 2, 3, 4, 5 6 7
Montane forests:	early-seral mid-seral late-seral multi-layer late-seral single-layer	Pacific silver fir/mountain hemlock, grand fir/white fir, red fir, interior Douglas-fir, western larch, western white pine, lodgepole pine, western red cedar/western hemlock, Sierra mixed conifer	1 2, 3, 4, 5 6 7
Lower montane forests:	early-seral mid-seral late-seral multi-layer late-seral single-layer	Interior ponderosa pine, Pacific poderosa pine	1 2, 3, 4, 5 6 7
Upland woodlands		Limber pine, Oregon white oak juniper woodlands, mixed conifer woodlands, juniper/sagebrush	All
Upland shrublands		Antelope bitterbrush/bluebunch wheatgrass, mountain mahogany, mountain big sagebrush, low sagebrush, salt desert shrub, chokecherry/serviceberry/rose, big sagebrush	All
Upland herblands		Agropyron bunchgrass, native forb, fescue/bunchgrass	All
Alpine tundra		Alpine tundra	All
Riparian woodlands		Aspen, cottonwood/willow	All
Riparian shrublands		Wetland/shrub	All
Riparian herblands		Herbaceous wetlands	All
Exotic herblands		Exotic forb/annual grass	All

[1]N/A = Not Applicable.

Exotic Herbland — The areal extent of the exotic herbland community compared to other alternatives was overestimated for the 100-year projection of Alternative 2. Since the projected increase in exotic herblands was derived from primarily the upland shrubland community, the areal extent of upland shrubland was underestimated for the Alternative 2 projection. However, we believe that the objectives of Alternative 2 are similar to those of Alternative 1, at least regarding the dispersal and control of exotic plants. Consequently, modeled values of the exotic herblands, upland shrubland, and upland herbland communities were adjusted to those of Alternative 1. Rates of increase for the exotic community were modeled conservatively for all alternatives. Because of these modeling adjustments, the exotic community would likely increase at a faster rate than projected.

Terrestrial Communities in Alternative 7 — Terrestrial communities were modeled using a first iteration of management prescriptions (Rx) rather than the second and improved iteration; as a result of lack of time. Consequently, the trends that would be more representative of the preliminary draft EIS Alternative 7 are qualitatively discussed in reference to the simulation. An improved simulation would be more of an average between the simulated Alternative 7 and the simulation of Alternative 3.

Results of Evaluating Terrestrial Communities by Alternative

Alternative 1

ICBEMP Assessment Area: All Ownerships — Ecologically significant trends were projected for 58 percent of the terrestrial communities in this region and stratum (table 2.25). Increases of approximately 200 to 400 percent were projected to occur in three communities: early-seral lower montane, and the late-seral multi-layer communities of lower montane and subalpine. Conversely, there would be decreases of more than 50 percent in four others: the late-seral single-layer communities of montane and subalpine, and the herbland and woodland riparian communities.

Alternative 1 would reverse the significant historic to current trends for 8 of 16 communities. However, significant losses would continue for the late-seral lower montane single layer, all three riparian communities, and the upland shrubland communities. Conversely, significant increases would continue for the exotic herbland, mid-seral lower montane, and upland woodland communities.

Under Alternative 1, 62 percent of the communities of the entire Basin would likely fall outside of their historical ranges after 100 years (table 2.26). While the areal extents of five communities that currently occur outside of their historical ranges would likely fall within their historical ranges, two types currently within their historical ranges would likely occur outside.

ICBEMP Assessment Area: BLM- and FS-administered Lands — Ecologically significant changes were projected between the current period and year 100 across 58 percent of the terrestrial communities in this region and stratum (table 2.27).

Significant historic to current period trends would be reversed for 5 of 11 types: early-seral lower montane, early-seral subalpine, late-seral single- and multi-layer subalpine, and upland herbland. Significant historic to current declines would continue in all three riparian communities and the late-seral lower montane single-layer communities, whereas positive trends would continue for the exotic herbland community.

Under Alternative 1, about 34 percent of the terrestrial communities on BLM- and FS-administered lands in the Basin would likely occur at levels outside of their historical ranges after 100 years (table 2.28).

Eastside EIS: All Ownerships — We detected ecologically significant class changes between current and year 100 for 67 percent of the terrestrial communities in this region and stratum (table 2.29).

Table 2.25 — Historical and future trends[1] of the areal extent of terrestrial communities for all ownerships within the Basin. Values are expressed as percent change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Agricultural	N/A[2]	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.9
Alpine	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	-8.4	-18.5	-2.2	-10.1	-11.6	-11.0	-14.1	-2.2
Early-seral Lower Montane Forest	-76.8	408.1	315.7	465.7	467.7	459.9	451.7	303.0
Early-seral Subalpine Forest	48.2	-42.4	-44.0	-9.1	-8.2	-22.1	-24.9	-50.0
Exotic Herbland[3]	N/A	84.2	84.2	29.1	27.7	51.0	17.5	94.5
Late-seral Montane Forest Multi-layer	-11.2	36.7	58.3	54.9	57.9	50.7	62.1	82.8
Late-seral Montane Forest Single-layer	8.4	-62.6	-46.8	-40.1	-38.0	-39.1	-35.2	-23.0
Late-seral Lower Montane Forest Multi-layer	-34.5	225.2	193.2	159.6	159.6	164.9	165.2	215.1
Late-seral Lower Montane Forest Single-layer	-80.6	-30.9	-1.9	123.2	123.2	113.9	112.5	13.9
Late-seral Subalpine Forest Multi-layer Multi-layer	-63.8	266.4	277.2	221.6	228.1	242.5	262.4	366.0
Late-seral Subalpine Forest Single-layer	36.3	-55.9	-55.2	-55.9	-56.0	-55.7	-56.1	-62.4
Mid-seral Montane Forest	58.6	-20.3	-25.5	-25.0	-25.4	-23.8	-24.8	-32.0
Mid-seral Lower Montane Forest	53.0	19.3	6.5	-2.9	-2.8	-1.3	-2.2	-3.2
Mid-seral Subalpine Forest	-1.0	-10.3	-17.4	-23.5	-22.5	-21.0	-19.7	-17.1
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-66.8	87.5	66.0	99.7	108.1	92.0	105.6	80.1
Upland Shrubland	-30.5	-21.7	-24.5	-19.2	-20.4	-19.5	-19.0	-19.4
Upland Woodland	49.5	9.4	11.1	3.5	2.3	4.7	4.1	-1.0
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]N/A = Not Applicable.

[3]Amunt adjusted in Alternative 2 due to errors in modeling.

Table 2.26 — Areal extent (percentage) of terrestrial communities for minimum, maximum, and initial historical; current; and future projections for year 100 for the preliminary draft EISs alternatives for all ownerships within the Basin.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Agricultural	0.0	0.0	0.0	16.1	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Alpine	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Early-seral Montane Forest	7.7	8.7	8.7	7.9	6.5	7.8	7.1	7.0	7.1	6.8	7.8
Early-seral Lower Montane Forest	1.1	2.7	1.1	0.3	1.3	1.1	1.5	1.46	1.4	1.4	1.0
Early-seral Subalpine Forest	0.8	1.2	1.2	1.8	1.0	1.0	1.6	1.7	1.4	1.3	0.9
Exotic Herbland[1]	0.0	0.0	0.0	2.1	3.8	3.8	2.7	2.6	3.1	2.4	4.0
Late-seral Montane Forest Multi-layer	3.8	6.6	3.8	3.4	4.6	5.3	5.2	5.3	5.1	5.5	6.2
Late-seral Montane Forest Single-layer	0.8	1.4	0.8	0.8	0.3	0.5	0.5	0.5	0.5	0.5	0.7
Late-seral Lower Montane Forest Multi-layer	1.7	2.3	2.2	1.4	4.6	4.2	3.7	3.7	3.8	3.8	4.5
Late-seral Lower Montane Forest Single-layer	4.8	5.6	5.6	1.1	0.7	1.1	2.4	2.4	2.3	2.3	1.2
Late-seral Subalpine Forest Multi-layer	1.2	2.5	1.2	0.4	1.6	1.7	1.4	1.5	1.5	1.6	2.1
Late-seral Subalpine Forest Single-layer	0.2	0.6	0.6	0.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Mid-seral Montane Forest	10.2	12.0	10.5	16.6	13.2	12.4	12.5	12.4	12.7	12.5	11.3
Mid-seral Lower Montane Forest	3.9	4.9	4.9	7.5	9.0	8.0	7.3	7.3	7.4	7.4	7.3
Mid-seral Subalpine Forest	2.2	2.7	2.7	2.7	2.4	2.2	2.1	2.1	2.1	2.2	2.2
Riparian Herbland[2]	0.3	1.0	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Riparian Shrubland[2]	0.4	0.8	—	—	0.3	0.3	0.3	0.3	0.3	0.2	0.2
Riparian Woodland[2]	1.0	1.3	—	—	0.7	0.9	0.8	0.8	0.8	0.7	0.9
Rock/Barren	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Upland Herbland	14.9	21.5	14.9	4.9	9.3	8.2	9.9	10.3	9.5	10.1	8.9
Upland Shrubland	27.0	36.7	36.7	25.5	20.0	19.3	20.6	20.3	20.5	20.6	20.6
Upland Woodland	1.9	2.3	1.9	2.8	3.1	3.2	2.9	2.9	3.0	3.0	2.8
Urban	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

[1]Amount adjusted in Alternative 2 due to errors in modeling.

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the future changes are somewhat useful if used as trends.

Table 2.27 — Historical and future trends[1] of the areal extent of terrestrial communities for BLM- and FS-administered lands within the Basin. Values are expressed as percent change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Agricultural	N/A[2]	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.9
Alpine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	9.2	-20.3	-25.9	-8.6	-10.6	-9.8	-13.6	-23.9
Early-seral Lower Montane Forest	-70.9	354.2	271.5	445.5	448.6	436.3	423.2	251.4
Early-seral Subalpine Forest	46.6	-44.9	-44.2	-8.2	-7.3	-22.6	-25.6	-50.8
Exotic Herbland[3]	N/A[2]	30.1	30.1	-67.7	-70.2	-28.9	-64.6	-46.2
Late-seral Montane Forest Multi-layer	4.0	23.9	58.1	46.9	50.7	41.7	56.0	89.1
Late-seral Montane Forest Single-layer	-5.1	-54.6	-30.1	-18.3	-14.8	-16.7	-10.3	8.4
Late-seral Lower Montane Forest Multi-layer	-13.6	118.1	142.2	20.6	20.6	28.3	28.8	174.6
Late-seral Lower Montane Forest Single-layer	-79.3	-5.1	-28.0	275.3	275.4	258.3	255.8	0.5
Late-seral Subalpine Forest Multi-layer	-61.4	235.0	252.9	186.3	193.3	209.0	230.7	349.7
Late-seral Subalpine Forest Single-layer	28.7	-55.3	-54.6	-55.3	-55.4	-55.0	-55.5	-62.7
Mid-seral Montane Forest	28.7	-12.2	-13.9	-19.7	-20.3	-17.7	-19.3	-24.3
Mid-seral Lower Montane Forest	9.6	53.9	31.7	-4.4	-4.3	-0.4	-2.7	6.4
Mid-seral Subalpine Forest	-2.6	-15.1	-17.3	-30.2	-29.2	-27.4	-25.9	-17.0
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-20.1	80.6	29.3	106.3	124.0	90.0	113.5	131.0
Upland Shrubland	-7.8	-16.0	-20.4	-12.0	-14.0	-12.6	-13.3	-15.7
Upland Woodland	-11.6	44.5	49.0	29.3	26.1	32.5	30.7	18.0
Urban	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]NA = Not Applicable.

[3]Amount adjusted in Alternative 2 due to errors in modeling.

Table 2.28 — Areal extent (percentage) of terrestrial communities for minimum, maximum, and initial historical; current; and future projections for year 100 for preliminary draft EIS alternatives for BLM- and FS-administered lands within the Basin.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Alpine	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Early-seral Montane Forest	9.5	10.2	10.1	11.0	8.8	8.2	10.1	9.8	9.9	9.5	8.4
Early-seral Lower Montane Forest	1.1	2.4	1.1	0.3	1.4	1.2	1.7	1.7	1.7	1.6	1.1
Early-seral Subalpine Forest	1.2	2.2	2.2	3.2	1.7	1.8	2.9	2.9	2.4	2.3	1.6
Exotic Herbland[1]	0.0	0.0	0.0	2.2	2.9	2.9	0.7	0.7	1.6	0.8	1.2
Late-seral Montane Forest Multi-layer	5.0	8.8	5.0	5.2	6.4	8.2	7.6	7.8	7.3	8.0	9.8
Late-seral Montane Forest Single-layer	1.1	1.8	1.1	1.0	0.5	0.7	0.8	0.9	0.8	0.9	1.1
Late-seral Lower Montane Forest Multi-layer	1.7	2.2	2.1	1.8	4.0	4.5	2.2	2.2	2.4	2.4	5.1
Late-seral Lower Montane Forest Single-layer	4.6	5.6	5.5	1.1	1.1	0.8	4.3	4.3	4.1	4.1	1.2
Late-seral Subalpine Forest Multi-layer	2.1	4.0	2.1	0.8	2.7	2.8	2.3	2.3	2.4	2.6	3.6
Late-seral Subalpine Forest Single-layer	0.4	1.1	1.1	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Mid-seral Montane Forest	13.7	16.9	15.7	20.3	17.8	17.4	16.3	16.1	16.7	16.3	15.3
Mid-seral Lower Montane Forest	3.4	5.1	5.1	5.5	8.5	7.3	5.3	5.3	5.5	5.4	5.9
Mid-seral Subalpine Forest	3.6	4.6	4.6	4.5	3.8	3.7	3.2	3.2	3.3	3.4	3.8
Riparian Herbland[2]	0.0	0.3	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Riparian Shrubland[2]	0.1	0.2	—	—	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Riparian Woodland[2]	1.2	1.4	—	—	0.9	1.3	1.1	1.0	1.1	1.1	0.9
Rock/Barren	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Upland Herbland	5.7	14.0	5.7	4.5	8.2	5.8	9.3	10.1	8.6	9.7	10.4
Upland Shrubland	25.2	34.0	34.0	31.3	26.3	24.9	27.6	26.9	27.4	27.2	26.4
Upland Woodland	1.8	2.4	2.4	2.1	3.1	3.2	2.7	2.7	2.8	2.8	2.5
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

[1]Amount adjusted in Alternative 2 due to errors in modeling

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the future changes are somewhat useful if used as trends.

Table 2.29 — Historical and future trends[1] of the areal extent of terrestrial communities for all ownerships within the Eastside EIS. Values are expressed as percednt change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Agricultural	0.0	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.9
Alpine	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	10.6	-38.7	-21.3	-31.3	-31.9	-31.2	-32.3	-17.9
Early-seral Lower Montane Forest	-57.0	326.8	266.0	361.5	364.3	362.4	363.1	240.5
Early-seral Subalpine Forest	226.9	-35.9	-40.9	-15.0	-15.2	-17.9	-18.1	-43.4
Exotic Herbland[2]	0.0	188.3	188.3	126.0	122.3	138.0	105.4	263.3
Late-seral Montane Forest Multi-layer	93.7	-22.0	-11.5	-12.9	-12.2	-14.8	-11.6	-3.1
Late-seral Montane Forest Single-layer	142.3	-90.5	-89.2	-81.1	-81.2	-82.2	-81.6	-80.3
Late-seral Lower Montane Forest Multi-layer	-12.5	155.3	125.2	107.7	107.7	108.6	108.1	150.2
Late-seral Lower Montane Forest Single-layer	-75.9	-57.4	-29.3	56.1	55.9	53.1	54.2	-23.8
Late-seral Subalpine Forest Multi-layer	-32.7	94.2	104.5	80.5	83.5	83.0	88.9	156.7
Late-seral Subalpine Forest Single-layer	-29.4	-57.7	-56.2	-61.7	-63.3	-61.7	-63.0	-67.2
Mid-seral Montane Forest	62.4	-3.7	-8.6	-6.5	-6.6	-6.0	-6.8	-13.9
Mid-seral Lower Montane Forest	49.0	12.9	2.5	-8.5	-8.5	-7.8	-8.2	-8.4
Mid-seral Subalpine Forest	-66.7	89.2	72.1	52.7	53.5	57.6	56.3	69.7
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-76.8	184.3	153.3	202.7	218.9	197.3	215.3	136.1
Upland Shrubland	-31.1	-28.4	-32.2	-26.6	-28.4	-26.5	-27.0	-25.3
Upland Woodland	110.3	-27.6	-26.3	-33.9	-35.1	-33.8	-34.6	-26.3
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]Amount adjusted in Alternative 2 due to errors in modeling.

Table 2.30 —Areal extent (percentage) of terrestrial communities for minimum, maximum and initial historical; current; and future projections; for year 100 for the preliminary draft EIS alternatives and all ownerships within the Eastside EIS.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Agricultural	0.0	0.0	0.0	20.4	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Alpine	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Early-seral Montane Forest	5.9	7.4	5.9	6.5	4.0	5.1	4.5	4.4	4.5	4.4	5.3
Early-seral Lower Montane Forest	0.8	3.5	0.8	0.3	1.4	1.2	1.5	1.5	1.5	1.5	1.1
Early-seral Subalpine Forest	0.2	0.4	0.2	0.7	0.4	0.4	0.6	0.6	0.5	0.5	0.4
Exotic Herbland[1]	0.0	0.0	0.0	1.6	4.6	4.6	3.6	3.5	3.8	3.3	5.8
Late-seral Montane Forest Multi-layer	2.5	4.4	2.5	4.8	3.8	4.3	4.2	4.2	4.1	4.3	4.7
Late-seral Montane Forest Single-layer	0.5	1.0	0.5	1.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Late-seral Lower Montane Forest Multi-layer	1.9	3.0	2.7	2.3	6.0	5.3	4.8	4.8	4.9	4.9	5.8
Late-seral Lower Montane Forest Single-layer	5.7	8.6	8.6	2.1	0.9	1.5	3.2	3.2	3.2	3.2	1.6
Late-seral Subalpine Forest Multi-layer	0.4	0.9	0.4	0.3	0.5	0.6	0.5	0.5	0.5	0.5	0.7
Late-seral Subalpine Forest Single-layer	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0
Mid-seral Montane Forest	5.6	7.1	5.6	9.1	8.8	8.3	8.5	8.5	8.6	8.5	7.8
Mid-seral Lower Montane Forest	4.6	6.3	6.3	9.4	10.7	9.7	8.6	8.6	8.7	8.7	8.6
Mid-seral Subalpine Forest	0.8	1.6	1.6	0.5	1.0	0.9	0.8	0.8	0.8	0.8	0.9
Riparian Herbland[2]	0.4	1.0	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Riparian Shrubland[2]	0.4	0.8	—	—	0.3	0.3	0.4	0.4	0.4	0.3	0.3
Riparian Woodland[2]	0.1	0.1	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	17.2	26.6	17.2	4.0	11.3	10.1	12.1	12.7	11.8	12.6	9.4
Upland Shrubland	30.4	42.7	42.7	29.4	21.1	19.9	21.6	21.1	21.6	21.5	22.0
Upland Woodland	2.3	2.7	2.3	4.8	3.5	3.6	3.2	3.1	3.2	3.2	3.6
Urban	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

[1]Amount adjusted in Alternative 2 due to errors in modeling

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the current to future changes are somewhat useful if used as trends.

Historic to current significant trends would be reversed for nearly 50 percent of the communities. Significant declines would continue for six communities: the late-seral single-layer lower montane and subalpine, all three riparian communities, and upland shrubland. Conversely, an historic to current significant increasing trend would continue for exotic herbland and mid-seral lower montane forest communities.

Under Alternative 1, the areal extents of 67 percent of the terrestrial communities of all lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges after 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands — We detected ecologically significant class changes between current and year 100 for 67 percent of the terrestrial communities in this region and stratum (table 2.31).

Historic to current significant trends would be reversed for 60 percent of the communities. However, historic to current significant declines would continue for five communities: late-seral single-layer lower montane and subalpine, and all three riparian types. Conversely, an historic to current significant increasing trend for exotic herblands would continue.

Under Alternative 1, the areal extents of 50 percent of the terrestrial communities on BLM- and FS-administered lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 62 percent of the terrestrial communities in this region and stratum (table 2.33). Six communities would increase by more than 100 percent, whereas three communities would decrease by at least 50 percent: late-seral subalpine single-layer, riparian herbland, and riparian woodland types.

Historic to current significant trends would be reversed for 68 percent of the communities. However, historic to current significant declines would continue for three communities: riparian herbland and riparian woodland, and upland shrubland types. Conversely, an historic to current significant increasing trend would continue for exotic herbland and mid-seral lower montane forest communities.

Under Alternative 1, the areal extents of 62 percent of the terrestrial communities of the entire Upper Columbia River Basin would not likely occur within their historical ranges after 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands — Ecologically significant class changes were detected between current and year 100 for 62 percent of the terrestrial communities in this region and stratum (table 2.35). Six communities would increase by more than 100 percent, whereas three communities would decrease by at least 50 percent: late-seral subalpine single-layer, and riparian herbland and riparian woodland types.

Historic to current significant trends would be reversed for 80 percent of the communities. While historic to current significant declines would continue for the riparian herbland and riparian woodland types, an historic to current significant increasing trend would continue for mid-seral lower montane forest.

Under Alternative 1, the areal extents of 38 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Alternative 2

ICBEMP Assessment Area: All Ownerships — We observed ecologically significant trends for 54 percent of the terrestrial communities in this region and stratum (table 2.25). Four communities would increase by at least 100 percent: early-seral lower montane forest, exotic herblands and the late-seral multi-layer lower montane and subalpine forests. Exotic herblands may be overestimated in

this alternative and may increase at a slower rate, similar to Alternative 1. Conversely, late-seral subalpine single-layer forest and riparian woodland communities would decline by about 50 percent.

Significant historic to current trends would reverse for 9 of 17 communities. Significant historic to current period declines would continue in the upland shrubland and all three riparian types, whereas significant historic to current period increases would continue in the exotic herbland, mid-seral lower montane forest, and upland woodland types.

Under Alternative 2, the areal extents of 58 percent of the terrestrial communities of the entire Basin would not likely occur at levels within their historical ranges within 100 years (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered Lands — Ecologically significant trends were projected across 67 percent of the terrestrial communities in this region and stratum (table 2.27). Four communities would increase by more than 100 percent: early-seral lower montane forest, exotic herblands and the late-seral multi-layer lower montane and subalpine. Conversely, the late-seral single-layer subalpine forest would decrease by more than 50 percent.

Significant historic to current trends would reverse for 6 of 11 communities. However, significant historic to current period losses would continue through year 100 for late-seral single-layer lower montane forests. Conversely, the historic to current increasing trend would continue for the exotic herbland community.

Under Alternative 2, the areal extents of 50 percent of the terrestrial communities on BLM- and FS-administered lands in the Basin would not likely occur at levels within their historical ranges in 100 years (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.29). Five communities would increase by more than 100 percent: early-seral lower montane, exotic herblands, late-seral multi-layer lower montane and subalpine, and upland herbland. Conversely, the late-seral single-layer montane and subalpine types would decrease by at least 50 percent.

Historic to current period significant trends would reverse for 53 percent of the communities. However, historic to current significant declines would continue for: late-seral single-layer lower montane and subalpine, and upland shrubland. Conversely, an historic to current significant increasing trend would continue for exotic herbland and mid-seral lower montane forest communities.

Under Alternative 2, the areal extents of approximately 67 percent of the terrestrial communities on all lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.31). There would be increases of more than 100 percent in the areal extent of three communities: early-seral lower montane forest, exotic herbland, and upland herbland. However, declines of more than 50 percent would occur in the areas of three late-seral single-layer communities: montane, lower montane, and subalpine.

Historic to current significant trends would reverse for 67 percent of the communities. However, historic to current significant declines would continue for two communities: late-seral single-layer lower montane and subalpine forest types. Conversely, an historic to current significant increasing trend would continue for exotic herblands.

Under Alternative 2, the areal extents of 58 percent of the terrestrial communities on BLM- and FS-administered lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Table 2.31 — Historical and future trends[1] of the areal extent of terrestrial communities for BLM- and FS-administered lands within the Eastside EIS. Values are expressed as percent change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Alpine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	73.3	-44.5	-47.0	-33.7	-34.6	-33.5	-35.1	-42.0
Early-seral Lower Montane Forest	-44.0	320.5	265.3	385.7	391.0	387.3	388.8	217.3
Early-seral Subalpine Forest	232.0	-41.3	-42.8	-17.7	-17.9	-20.9	-21.2	-45.6
Exotic Herbland[2]	N/A[3]	116.6	506.0	-40.4	-49.8	-10.0	-40.9	-2.3
Late-seral Montane Forest Multi-layer	133.9	-29.6	-11.9	-17.5	-16.7	-20.1	-15.9	-0.8
Late-seral Montane Forest Single-layer	151.8	-89.2	-87.1	-73.8	-73.9	-75.4	-74.6	-72.3
Late-seral Lower Montane Forest Multi-layer	4.9	71.0	89.2	-5.9	-6.0	-4.5	-5.3	129.8
Late-seral Lower Montane Forest Single-layer	-75.8	-40.5	-50.0	169.5	169.2	164.1	166.1	-40.0
Late-seral Subalpine Forest Multi-layer	-36.1	85.2	99.1	68.0	71.8	71.2	78.6	164.4
Late-seral Subalpine Forest Single-layer	-31.7	-57.9	-56.2	-62.4	-64.1	-62.4	-63.8	-68.5
Mid-seral Montane Forest	17.8	15.1	15.4	9.6	9.4	10.6	9.2	5.1
Mid-seral Lower Montane Forest	-3.6	55.0	34.8	-8.5	-8.4	-6.2	-7.6	2.5
Mid-seral Subalpine Forest	-72.1	92.9	91.0	42.5	43.5	49.2	47.5	87.6
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-30.1	284.4	155.2	350.8	409.0	331.3	388.5	336.0
Upland Shrubland	-7.6	-22.1	-28.9	-18.9	-22.1	-18.7	-21.2	-21.0
Upland Woodland	27.6	-15.1	-11.3	-33.7	-37.2	-33.4	-35.7	-11.2
Urban	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]Amount adjusted in Alternative 2 due to errors in modeling.

[3]N/A = Not Applicable.

Table 2.32 — Areal extent (percentage) of terrestrial communities for minimum, maximum and initial historical; current; and future projections for year 100, for the preliminary draft EIS alternatives on BLM- and FS-administered lands within the Eastside EIS area.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Agricultural	0.0	0.0	0.0	16.1	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Alpine	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Early-seral Montane Forest	6.2	10.0	6.2	10.7	6.0	5.7	7.1	7.0	7.1	7.0	6.2
Early-seral Lower Montane Forest	0.8	3.7	0.8	0.4	1.8	1.5	2.1	2.1	2.1	2.1	1.3
Early-seral Subalpine Forest	0.4	0.9	0.4	1.4	0.8	0.8	1.2	1.2	1.1	1.1	0.8
Exotic Herbland[1]	0.0	0.0	0.0	1.5	3.3	3.3	0.9	0.8	1.4	0.9	1.5
Late-seral Montane Forest Multi-layer	3.8	6.3	3.8	8.8	6.2	7.8	7.3	7.3	7.0	7.4	8.7
Late-seral Montane Forest Single-layer	0.7	1.3	0.7	1.8	0.2	0.2	0.5	0.5	0.4	0.5	0.5
Late-seral Lower Montane Forest Multi-layer	2.1	3.8	3.3	3.5	6.0	6.6	3.3	3.3	3.3	3.3	8.0
Late-seral Lower Montane Forest Single-layer	6.5	11.2	11.2	2.7	1.6	1.3	7.3	7.3	7.1	7.2	1.6
Late-seral Subalpine Forest Multi-layer	0.8	1.7	0.8	0.5	1.0	1.1	0.9	0.9	0.9	1.0	1.4
Late-seral Subalpine Forest Single-layer	0.2	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mid-seral Montane Forest	9.4	10.3	9.5	11.3	12.9	13.0	12.3	12.3	12.4	12.3	11.8
Mid-seral Lower Montane Forest	4.2	8.0	8.0	7.7	11.9	10.4	7.1	7.1	7.2	7.1	7.9
Mid-seral Subalpine Forest	1.6	3.3	3.3	0.9	1.8	1.8	1.3	1.3	1.4	1.4	1.8
Riparian Herbland[2]	0.0	0.5	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.3
Riparian Shrubland[2]	0.1	0.3	—	—	0.6	0.6	0.6	0.6	0.6	0.6	0.2
Riparian Woodland[2]	0.1	0.1	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	3.8	17.1	3.8	2.7	10.3	6.8	12.0	13.6	11.5	13.0	11.6
Upland Shrubland	30.2	43.2	43.2	39.9	31.1	28.4	32.4	31.1	32.4	31.5	31.5
Upland Woodland	2.0	3.1	3.1	4.0	3.4	3.5	2.6	2.5	2.6	2.5	3.5
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

[1]Amount adjusted in Alternative 2 due to errors in modeling.

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the future changes are somewhat useful if used as trends.

Table 2.33 — Historical and future trends[1] of the areal extent of terrestrial communities for all ownerships within the Upper Columbia River Basin. Values are expressed as percent change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Agricultural	0.0	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.9
Alpine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	-19.8	-8.2	9.5	-0.6	-2.6	-0.9	-5.8	6.8
Early-seral Lower Montane Forest	-86.8	541.0	395.4	635.3	636.7	620.6	596.6	402.5
Early-seral Subalpine Forest	19.5	-43.3	-44.4	-8.1	-7.6	-24.7	-26.8	-51.0
Exotic Herbland[2]	0.0	21.7	21.7	-28.7	-28.7	-1.0	-35.2	-6.4
Late-seral Montane Forest Multi-layer	-57.0	146.4	193.5	192.6	201.5	180.4	210.5	257.2
Late-seral Montane Forest Single-layer	-54.8	3.0	57.7	68.6	77.7	72.0	85.5	116.9
Late-seral Lower Montane Forest Multi-layer	-67.4	503.4	463.8	366.8	367.2	389.4	392.5	471.9
Late-seral Lower Montane Forest Single-layer	-94.8	340.5	383.2	1063.3	1062.6	960.2	928.3	530.2
Late-seral Subalpine Forest Multi-layer	-63.6	341.3	352.5	295.4	304.8	318.8	341.5	441.8
Late-seral Subalpine Forest Single-layer	50.7	-55.9	-55.2	-55.6	-55.5	-55.4	-55.9	-62.1
Mid-seral Montane Forest	64.5	-27.8	-33.3	-33.5	-34.0	-31.7	-32.9	-40.1
Mid-seral Lower Montane Forest	59.6	28.6	12.0	5.5	5.3	8.0	6.7	4.4
Mid-seral Subalpine Forest	21.7	-17.6	-24.2	-27.0	-26.1	-26.1	-24.4	-24.2
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-54.7	25.9	12.0	35.2	38.0	25.5	35.9	43.8
Upland Shrubland	-29.8	-13.3	-14.8	-9.9	-10.5	-10.8	-9.0	-11.8
Upland Woodland	-34.4	173.0	176.4	168.4	167.2	175.1	175.1	112.0
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]Amount adjusted in Alternative 2 due to errors in modeling.

Table 2.34 — Areal extent (percentage) of terrestrial communities for minimum, maximum, and initial historical; current; and future projections for year 100 for preliminary draft EIS alternatives for all ownerships within the Upper Columbia River Basin.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Agricultural	0.0	0.0	0.0	12.5	12.2	12.2	12.2	12.2	12.2	12.2	12.2
Alpine	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Early-seral Montane Forest	8.4	11.3	11.3	9.1	8.3	9.9	9.0	8.8	9.0	8.5	9.7
Early-seral Lower Montane Forest	1.5	2.1	1.5	0.2	1.3	1.0	1.5	1.5	1.4	1.4	1.0
Early-seral Subalpine Forest	1.1	2.2	2.2	2.7	1.5	1.5	2.5	2.5	2.0	2.0	1.3
Exotic Herbland[1]	0.0	0.0	0.0	2.6	2.6	4.3	1.9	1.9	2.6	1.7	2.5
Late-seral Montane Forest Multi-layer	4.8	8.6	4.8	2.1	5.1	6.0	6.0	6.2	5.8	6.4	7.3
Late-seral Montane Forest Single-layer	1.0	2.1	1.0	0.5	0.5	0.7	0.8	0.8	0.8	0.9	1.0
Late-seral Lower Montane Forest Multi-layer	1.3	1.8	1.8	0.6	3.5	3.3	2.7	2.7	2.8	2.9	3.3
Late-seral Lower Montane Forest Single-layer	2.7	4.0	2.8	0.1	0.6	0.7	1.7	1.7	1.5	1.5	0.9
Late-seral Subalpine Forest Multi-layer	1.6	3.7	1.6	0.6	2.6	2.6	2.3	2.4	2.4	2.6	3.2
Late-seral Subalpine Forest Single-layer	0.3	0.9	0.9	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Mid-seral Montane Forest	13.0	16.8	14.3	23.5	16.9	15.7	15.6	15.5	16.0	15.7	14.1
Mid-seral Lower Montane Forest	3.4	4.2	3.7	6.0	7.7	6.7	6.3	6.3	6.5	6.4	6.2
Mid-seral Subalpine Forest	3.2	3.7	3.6	4.4	3.6	3.3	3.2	3.2	3.2	3.3	3.3
Riparian Herbland[2]	0.2	1.0	—	—	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Riparian Shrubland[2]	0.4	0.8	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Riparian Woodland[2]	1.2	1.6	—	—	0.8	1.0	0.9	0.9	0.9	0.9	1.1
Rock/Barren	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Upland Herbland	12.3	17.2	13.1	5.9	7.4	6.6	8.0	8.2	7.4	8.0	8.5
Upland Shrubland	24.8	32.5	32.5	22.8	19.8	19.5	20.6	20.4	20.4	20.8	20.1
Upland Woodland	1.5	1.8	1.5	1.0	2.7	2.7	2.6	2.6	2.7	2.7	2.1
Urban	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

[1]Amount adjusted in Alternative 2 due to errors in modeling.

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the future changes are somewhat useful if used as trends.

Table 2.35 — Historical and future trends[1] of the areal extent of terrestrial communities for BLM- and FS-administered lands within the Upper Columbia River Basin. Values are expressed as percent change.

Terrestrial Community	Historical Trend	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
Alpine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early-seral Montane Forest	-13.5	-9.9	-16.8	0.8	-2.1	0.3	-5.5	-17.1
Early-seral Lower Montane Forest	-81.0	389.1	275.1	507.6	509.4	489.1	459.0	284.0
Early-seral Subalpine Forest	17.1	-45.4	-44.2	-6.4	-5.8	-24.8	-27.1	-51.4
Exotic Herbland[2]	N/A[3]	-1.4	-1.4	-77.6	-77.6	-35.8	-73.5	-62.0
Late-seral Montane Forest Multi-layer	-43.9	100.6	168.4	153.9	164.2	139.8	174.6	242.0
Late-seral Montane Forest Single-layer	-62.1	20.9	104.0	125.4	139.9	130.7	152.2	198.3
Late-seral Lower Montane Forest Multi-layer	-42.0	246.5	286.8	93.0	93.4	118.4	121.9	296.0
Late-seral Lower Montane Forest Single-layer	-92.1	393.6	219.3	1470.0	1468.9	1316.4	1268.6	437.9
Late-seral Subalpine Forest Multi-layer	-57.0	283.5	303.9	236.0	245.7	260.2	283.7	396.1
Late-seral Subalpine Forest Single-layer	40.9	-55.2	-54.6	-54.9	-54.8	-54.6	-55.1	-62.3
Mid-seral Montane Forest	37.7	-21.2	-23.6	-30.0	-30.7	-27.2	-29.1	-34.1
Mid-seral Lower Montane Forest	30.3	50.9	26.5	-0.9	-1.1	4.9	2.0	9.6
Mid-seral Subalpine Forest	20.3	-21.3	-23.6	-32.2	-31.1	-31.1	-29.1	-23.6
Rock/Barren	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upland Herbland	-16.0	21.1	-5.2	36.9	41.8	20.4	33.4	71.4
Upland Shrubland	-7.7	-10.1	-12.2	-5.6	-6.4	-6.8	-5.7	-10.6
Upland Woodland	-50.4	190.3	196.2	182.3	180.3	193.9	193.5	85.3
Urban	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Historical trend = percent change between historical and current periods.
Future trend = percent change between current period and year 100 for each alternative.

[2]Amount adjusted in Alternative 2 due to errors in modeling.

[3]NA = Not Applicable.

Table 2.36 — Areal extent (percentage) of terrestrial communities for minimum, maximum, and initial historical; current; and future projections for year 100 for preliminary draft EIS alternatives for BLM- and FS-administered lands within the Upper Columbia River Basin.

Terrestrial Community	Historical Minimum	Historical Maximum	Historical Initial	Current Level	Alt. 1 Yr. 100	Alt. 2 Yr. 100	Alt. 3 Yr. 100	Alt. 4 Yr. 100	Alt. 5 Yr. 100	Alt. 6 Yr. 100	Alt. 7 Yr. 100
	Percentage										
Alpine	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Early-seral Montane Forest	9.3	12.6	12.6	10.9	9.8	9.1	11.0	10.7	10.9	10.3	9.0
Early-seral Lower Montane Forest	1.2	1.8	1.4	0.3	1.3	1.0	1.6	1.6	1.6	1.5	1.0
Early-seral Subalpine Forest	1.6	3.5	3.5	4.1	2.2	2.3	3.8	3.8	3.0	3.0	2.0
Exotic Herbland[1]	0.0	0.0	0.0	2.9	2.9	2.9	0.7	0.7	1.9	0.8	1.1
Late-seral Montane Forest Multi-layer	5.3	10.1	5.3	3.0	6.0	8.0	7.6	7.9	7.2	8.2	10.2
Late-seral Montane Forest Single-layer	1.3	2.3	1.3	0.5	0.6	1.0	1.1	1.2	1.1	1.2	1.5
Late-seral Lower Montane Forest Multi-layer	1.1	1.6	1.5	0.9	3.0	3.4	1.7	1.7	1.9	1.9	3.4
Late-seral Lower Montane Forest Single-layer	2.1	3.7	2.1	0.2	0.8	0.5	2.6	2.6	2.3	2.3	0.9
Late-seral Subalpine Forest Multi-layer	2.2	5.2	2.2	0.9	3.6	3.8	3.2	3.3	3.4	3.6	4.7
Late-seral Subalpine Forest Single-layer	0.5	1.5	1.5	2.1	0.9	0.9	0.9	0.9	0.9	0.9	0.8
Mid-seral Montane Forest	15.6	20.9	18.7	25.7	20.3	19.7	18.0	17.8	18.7	18.3	17.0
Mid-seral Lower Montane Forest	2.9	3.9	3.5	4.5	6.8	5.7	4.5	4.5	4.7	4.6	4.9
Mid-seral Subalpine Forest	4.5	5.5	5.3	6.4	5.0	4.9	4.3	4.4	4.4	4.5	4.9
Riparian Herbland[2]	0.0	0.2	—	—	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Riparian Shrubland[2]	0.1	0.1	—	—	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Riparian Woodland[2]	0.9	1.0	—	—	0.7	1.0	0.9	0.8	0.8	0.8	0.7
Rock/Barren	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Upland Herbland	6.9	12.7	6.9	5.8	7.0	5.5	8.0	8.3	7.0	7.8	10.0
Upland Shrubland	23.7	30.3	30.3	28.0	25.1	24.6	26.4	26.2	26.1	26.4	25.0
Upland Woodland	1.6	1.9	1.9	1.0	2.8	2.8	2.7	2.7	2.8	2.8	1.8
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

[1]Amount adjusted in Alternative 2 due to errors in modeling.

[2]Due to problems with resolution of historic mapping, the historic to current trend is not applicable. However, the future changes are somewhat useful if used as trends.

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 62 percent of the terrestrial communities in this region and stratum (table 2.33). The areal extent of six communities would increase by more than 100 percent, whereas there would be declines of at least 50 percent in the areas of three communities: late-seral subalpine single-layer forest, and riparian herbland and riparian woodland.

Historic to current significant trends would reverse for 68 percent of the communities, whereas historic to current significant declines would continue for three others: riparian herbland and riparian woodland, and upland shrubland. Conversely, an historic to current significant increasing trend would continue for exotic herblands and mid-seral lower montane forest types.

Under Alternative 2, the areal extents of 58 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 62 percent of the terrestrial communities in this region and stratum (table 2.35). Seven communities would increase by more than 100 percent, whereas the late-seral subalpine single-layer forest community would decrease by more than 50 percent.

Historic to current significant trends would reverse for 73 percent of the communities. Historic to current significant increasing trends would continue for exotic herblands and mid-seral lower montane forests.

Under Alternative 2, the areal extents of at least 50 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historic ranges in 100 years (table 2.36).

Alternative 3

ICBEMP Assessment Area: All Ownerships — Alternative 3 would result in ecologically significant trends across 54 percent of the terrestrial communities in this region and stratum (table 2.25). Five communities would increase by approximately 100 percent or more, whereas there would be declines of more than 50 percent in three communities: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Trends would reverse for 9 of 17 communities that had significant historic to current trends. Significant losses would continue for all three riparian communities and the upland shrubland. An increasing trend of the exotic herblands and upland woodlands would continue.

Under Alternative 3, the areal extents of 71 percent of the communities on all lands in the Basin would not likely occur within their historical range by year 100 (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered Lands —We detected ecologically significant trends across 50 percent of the terrestrial communities in this region and stratum (table 2.27). There would be increases of more than 100 percent in four communities: early-seral montane, late-seral lower montane single layer, late-seral subalpine multi-layer, and upland herbland. Conversely, there would be decreases of more than 50 percent in two other communities: exotic herblands and the late-seral single-layer subalpine forest type.

Trends would reverse for 82 percent of the communities that had historic to current significant changes.

Under Alternative 3, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands in the Basin would not likely occur within their historical ranges by year 100 (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.29). There would be increases of more than 100 percent in the areal extent of four communities: early-seral lower montane, exotic herbland, late-seral multi-layer lower montane, and upland herbland. Conversely, the late-seral single-layer montane and subalpine types would decrease by at least 50 percent.

Historic to current significant trends would reverse for 63 percent of the communities. However, historic to current significant declines would continue for two communities: late-seral single-layer subalpine, and upland shrubland. Conversely, an historic to current significant increasing trend would continue for the exotic herbland community.

Under Alternative 3, the areal extents of 75 percent of the terrestrial communities on all lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for half of the terrestrial communities in this region and stratum (table 2.31). The areal extent would increase by more than 100 percent in three communities: early-seral lower montane forest, late-seral single-layer lower montane, and upland herbland. There would be declines of more than 50 percent in two communities: late-seral single-layer montane and subalpine forest types.

Historic to current significant trends would reverse for 73 percent of the communities. Historic to current significant declines would continue for the late-seral single-layer subalpine forest type.

Under Alternative 3, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.33). There would be increases of more than 100 percent in the areal extents of six communities: early-seral lower montane forest; late-seral multi-layer montane, lower montane, and subalpine; late-seral single-layer lower montane; and upland woodland. In fact, late-seral single-layer lower montane would increase by more than 1,000 percent. Conversely, there would be at least 50 percent declines in three communities: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Historic to current significant trends would reverse for 74 percent of the communities. However, historic to current period significant declines would continue for three communities: riparian herbland and riparian woodland types, and upland shrubland. Conversely, the historic to current increasing trend for the mid-seral lower montane would continue.

Under Alternative 3, the areal extents of 62 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.35). The areal extents of six communities would increase by more than 100 percent; in fact, the late-seral single-layer lower montane forest community would increase by almost 1,500 percent. Conversely, the exotic herbland and late-seral single-layer subalpine forest would decrease by approximately 50 percent or more.

Historic to current period significant trends would reverse for 87 percent of the communities.

Under Alternative 3, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Alternative 4

ICBEMP Assessment Areas: All Ownerships — Ecologically significant trends between the current period and year 100 were detected for 58 percent of the terrestrial communities in this region and stratum (table 2.25). Five communities would increase by more than 100 percent, whereas decreases of more than 50 percent would be expected in three communities: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Trends would reverse for 59 percent of the communities that had significant trends from historic to current. Historic to current period significant declines would be expected to continue in all three riparian communities and the upland shrubland type, whereas increases would be expected to continue in the exotic herbland community.

Under Alternative 4, 71 percent of the terrestrial communities on all lands in the Basin would not likely occur at levels within their historical ranges in 100 years (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered Lands — Under Alternative 4, we detected ecologically significant trends for 54 percent of the communities (table 2.27). There would be increases of at least 100 percent in the areal extents of four communities: early-seral lower montane, late-seral single-layer lower montane, late-seral multi-layer subalpine, and upland herbland. Conversely, there would be decreases of nearly 50 percent or more in two communities: exotic herbland and the late-seral single-layer subalpine forest type.

Trends for 9 of the 11 communities that had significant historic to current period changes would reverse.

Under Alternative 4, the areal extents of 42 percent of the communities on BLM- and FS-administered lands in the Basin would be expected to occur outside of their predicted historical range in 100 years (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.29). There would be increases of more than 100 percent in the areal extent of four communities: early-seral lower montane, exotic herbland, late-seral multi-layer lower montane, and upland herbland. The areas of late-seral single-layer montane and subalpine types would decrease by at least 50 percent.

Historic to current significant trends would reverse for 63 percent of the communities. However, historic to current significant declines would continue for five communities: late-seral single-layer subalpine, all three riparian types, and upland shrubland. Conversely, an historic to current significant increasing trend for the exotic herbland community would continue.

Under Alternative 4, the areal extents of 75 percent of the terrestrial communities on all lands in the Eastside EIS area within the Basin would not likely occur within their historical ranges in 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 54 percent of the terrestrial communities in this region and stratum (table 2.31). There would be increases of more than 100 percent in the areal extents of three communities: early-seral lower montane forest, late-seral single-layer lower montane, and upland herbland; whereas there would be declines of approximately 50 percent or more in three other communities: exotic herbland and late-seral single-layer montane and subalpine forest types.

While historic to current significant trends would reverse for 73 percent of the communities, historic to current significant declines would continue for the late-seral single-layer subalpine forest type.

Under Alternative 4, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.33). Increases of more than 100 percent would be expected in the areal extents of six communities: early-seral lower montane forest; late-seral multi-layer montane, lower montane, and subalpine; late-seral single-layer lower montane; and the upland woodland. In fact, late-seral single-layer lower montane would increase more than 1,000 percent. Conversely, there would be declines of more than 50 percent in the late-seral single-layer subalpine forest type.

Historic to current significant trends would reverse for 74 percent of the communities. While historic to current significant declines would continue for the upland shrubland, the historic to current increasing trend would continue for the mid-seral lower montane forest type.

Under Alternative 4, the areal extents of 62 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.35). The areal extents of six communities would increase by more than 100 percent; in fact, the late-seral single-layer lower montane forest community would increase by nearly 1,500 percent. Conversely, the exotic herbland and late-seral single-layer subalpine forest communities would decrease by at least 50 percent.

Under Alternative 4, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Alternative 5

ICBEMP Assessment Area: All Ownerships — In this region and stratum, 58 percent of the terrestrial communities were predicted to have significant ecological trends by year 100 of Alternative 5 (table 2.25). There would be increases between the current period and year 100 of more than 100 percent in four communities: early-seral lower montane forest, late-seral single- and multi-layer lower montane forest, and late-seral multi-layer subalpine forest. Conversely, three other communities would decline by at least 50 percent: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

While trends would reverse for 59 percent of the communities that had significant historic to current period trends, declining trends would continue for all three riparian communities and the upland shrublands through year 100. The significant historic to current increasing trend of exotic herblands and upland woodlands would continue.

Under Alternative 5, the availabilities of 71 percent of the terrestrial communities on all lands in the Basin would not likely occur within their historical ranges by year 100 (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered lands —We observed ecologically significant trends for 54 percent of the terrestrial communities on BLM- and FS-administered lands in this region and stratum (table 2.27). Increases of more than 100 percent would occur between the current period and year 100 in three communities: early-seral and late-seral single-layer lower montane forest and the late-seral multi-layer subalpine forest. Conversely, decreases of more than 50 percent would occur in the late-seral single-layer subalpine forest type.

Under Alternative 5, the availability of 46 percent of the terrestrial communities on BLM- and FS-administered lands in the Basin would not likely

occur within their expected historical ranges in 100 years (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.29). The areal extents would increase by more than 100 percent in four communities: early-seral and late-seral multi-layer lower montane, exotic herblands and the upland herbland, whereas the late-seral single-layer montane and subalpine, as well as the riparian woodland type, would decrease by at least 50 percent.

Historic to current period significant trends would reverse for 63 percent of the communities. However, historic to current significant declines would continue for five communities: late-seral single-layer subalpine, all three riparian types, and the upland shrublands. Conversely, an historic to current significant increasing trend would continue for the exotic herbland community.

Under Alternative 5, the areal extents of 75 percent of the terrestrial communities of all lands in the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 of Alternative 5 for 54 percent of the terrestrial communities in this region and stratum (table 2.31). The areal extents would increase by more than 100 percent in three communities: early-seral and late-seral single-layer lower montane and the upland herbland; there would be declines of more than 50 percent in two other communities: late-seral single-layer montane and subalpine forest types.

Historic to current significant trends would reverse for 73 percent of the communities, but historic to current significant declines would continue for the late-seral single-layer subalpine forest type.

Under Alternative 5, the areal extents of 42 percent of the terrestrial communities on the BLM- and FS-administered lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.33). The areal extents would increase by more than 100 percent in six communities: early-seral lower montane forest; late-seral multi-layer montane, lower montane, and subalpine; late-seral single-layer lower montane; and upland woodland. In fact, late-seral single-layer lower montane would increase by 960 percent. Conversely, areal extents would decline by more than 50 percent in three communities: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Historic to current significant trends would reverse for 74 percent of the communities. Historic to current significant declines would continue for only three communities: the riparian herbland and riparian woodland types and the upland shrubland. Conversely, the historic to current increasing trend for the mid-seral lower montane would continue through year 100.

Under Alternative 5, the areal extents of 58 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 62 percent of the terrestrial communities in this region and stratum (table 2.35). The areal extents of seven communities would increase by more than 100 percent; in fact, the late-seral single-layer lower montane forest community would increase by approximately 1,300 percent. Conversely, the late-seral single-layer subalpine forest type would decrease by at least 50 percent.

Historic to current significant trends would reverse for 73 percent of the communities. However, the significant historical increase of the mid-seral lower montane forest would continue through year 100.

Under Alternative 5, the areal extents of 38 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Alternative 6

ICBEMP Assessment Area: All Ownerships —Ecologically significant trends were observed across 50 percent of all terrestrial communities within the Basin (table 2.25). The areal extent of five communities would increase by more than 100 percent: early-seral and late-seral single- and multi-layer lower montane, late-seral multi-layer subalpine, and upland herbland. Conversely, there would be decreases of at least 50 percent in three others: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Historic to current significant trends would reverse for 65 percent of the communities by year 100 of Alternative 6. However, all three riparian types and the upland shrubland communities would be expected to continue their historical declines through year 100. Conversely, the availability of exotic herblands and upland woodland communities would be expected to continue to increase.

Under Alternative 6, the availability of 67 percent of the terrestrial communities on all lands in the Basin would not likely occur within the expected historical ranges in 100 years (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered Land —We detected ecologically significant trends with 54 percent of the terrestrial communities on BLM- and FS-administered lands in this region and stratum (table 2.27). Four communities would increase by more than 100 percent: early-seral and late-seral single-layer lower montane forest, late-seral multi-layer subalpine, and upland herbland. Conversely, two communities would decrease by at least 50 percent: exotic herbland and late-seral single-layer subalpine forest.

Trends would reverse on 9 of 11 communities that had significant historical trends.

Under Alternative 6, the availabilities of 45 percent of the terrestrial communities on BLM- and FS-administered lands in the Basin would not likely occur within their expected historical ranges by year 100 (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.29). The areal extents of four communities would increase by more than 100 percent: early-seral lower montane, exotic herbland, late-seral multi-layer lower montane, and upland herbland; whereas the late-seral single-layer montane and subalpine types would decrease by at least 50 percent.

Historic to current significant trends would reverse for 63 percent of the communities. However, historic to current significant declines would continue for two others: late-seral single-layer subalpine, and the upland shrubland. Conversely, an historic to current significant increasing trend would continue for the exotic herbland community.

Under Alternative 6, the areal extents of 75 percent of the terrestrial communities on all lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 of Alternative 6 for 58 percent of the terrestrial communities in this region and stratum (table 2.31). The areal extents of three communities would increase by more than 100 percent: early-seral and late-seral single-layer lower montane and the upland

herblands; whereas the area of two communities would decline by more than 50 percent: late-seral single-layer montane and subalpine forests.

Historic to current significant trends would reverse for 73 percent of the communities. However, historic to current significant decline would continue for late-seral single-layer subalpine forests.

Under Alternative 6, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 67 percent of the terrestrial communities in this region and stratum (table 2.33). Increases of more than 100 percent would occur in the areal extents of six communities: early-seral lower montane, late-seral multi-layer montane and subalpine, late-seral single- and multi-layer lower montane, and upland woodland. In fact, late-seral single-layer lower montane would increase by approximately 930 percent. Conversely, declines of more than 50 percent would occur in the area of three communities: late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Historic to current significant trends would reverse for 74 percent of the communities. However, historic to current significant declines would continue for three others: riparian herbland and riparian woodland types, and the upland shrubland. Conversely, the historical increasing trend for the mid-seral lower montane would continue through year 100.

Under Alternative 6, the areal extents of 58 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.35). The areal extents of seven communities would increase by more than 100 percent; in fact, the late-seral single-layer lower montane forest community would increase by nearly 1,300 percent. Conversely, the exotic herblands and late-seral single-layer subalpine forest communities would decrease by at least 50 percent.

Historic to current significant trends would reverse for 80 percent of the communities. The significant historical increase of mid-seral lower montane forest would continue through year 100.

Under Alternative 6, the areal extents of 29 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Alternative 7

ICBEMP Assessment Area: All Ownerships —We detected ecologically significant trends for 50 percent of all terrestrial communities across the Basin (table 2.25). Increases of more than 200 percent would occur in three communities: early-seral and late-seral multi-layer lower montane forest, and late-seral multi-layer subalpine forest. Conversely, decreases of at least 50 percent would occur in three others: early-seral subalpine forest, late-seral single-layer subalpine forest, and riparian woodland. If we had had time to improve the simulation of this alternative, we believe the percentage increases and decreases would be dampened considerably (see the previous section on "Simulation Strategies").

Trends for 71 percent of the communities that had historic to current significant changes would reverse. However, all three riparian communities and the upland shrubland would continue to have significant declines through year 100. Conversely, the exotic herbland community would continue to increase.

Under Alternative 7, the areal extents of 54 percent of the communities on all lands in the Basin would not likely occur within their expected historical ranges by year 100 (table 2.26).

ICBEMP Assessment Area: BLM- and FS-administered Lands —We detected significant ecological trends across 54 percent of the terrestrial communities occurring on BLM- and FS-administered lands in this region and stratum (table 2.27). Four communities would increase by more than 100 percent: early-seral and late-seral multi-layer lower montane forest, late-seral multi-layer subalpine forest, and upland herbland. Conversely, two communities would decrease by at least 50 percent: early-seral and late-seral single-layer subalpine forests.

Trends would reverse for 8 of 11 communities that experienced significant historical trends.

Under Alternative 7, the areal extents of 42 percent of the communities on BLM- and FS-administered lands in the Basin would not likely occur within their historical ranges in 100 years (table 2.28).

Eastside EIS: All Ownerships —We detected ecologically significant class changes between current and year 100 for 58 percent of the terrestrial communities in this region and stratum (table 2.29). The areal extents of five communities would increase by more than 100 percent: early-seral and late-seral multi-layer lower montane, exotic herbland, late-seral multi-layer subalpine, and upland herbland. However, the late-seral single-layer communities of the montane and subalpine forests would decrease by at least 50 percent.

Historic to current significant trends would reverse for 63 percent of the communities. However, historic to current significant declines would continue for three communities: late-seral single-layer lower montane forest and subalpine forest, and upland shrubland types. Conversely, an historic to current significant increasing trend for the exotic herbland community would continue.

Under Alternative 7, the areal extents of 71 percent of the terrestrial communities on all lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges after 100 years (table 2.30).

Eastside EIS: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 of Alternative 7 for 58 percent of the terrestrial communities in this region and stratum (table 2.31). The areal extents of three communities would increase by more than 100 percent: early-seral and late-seral multi-layer lower montane forest, late-seral multi-layer subalpine forest and upland herbland. However, declines of more than 50 percent would occur in two communities: late-seral single-layer montane and subalpine forest types.

Historic to current significant trends would reverse for 73 percent of the communities. However, historic to current significant declines would continue for late-seral single-layer lower montane and subalpine forest types.

Under Alternative 7, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands within the Eastside EIS area of the Basin would not likely occur within their historical ranges in 100 years (table 2.32).

Upper Columbia River Basin: All Ownerships —We detected ecologically significant class changes between current and year 100 for 63 percent of the terrestrial communities in this region and stratum (table 2.33). The areal extents of eight communities would increase by more than 100 percent, and further they would increase by more than 400 percent in five communities: early-seral, and late-seral single- and multi-layer lower montane forest; and late-seral multi-layer subalpine forest. Conversely, there would be declines of more than 50 percent in the area of four communities: early-seral and late-seral single-layer subalpine forest, and the riparian herbland and riparian woodland types.

Historic to current significant trends would reverse for 74 percent of the communities. However, historic to current significant declines would continue for three communities: the riparian

herbland and riparian woodland types, and upland shrubland. Conversely, the historical increasing trend for the mid-seral lower montane would continue through year 100.

Under Alternative 7, the areal extents of 58 percent of the terrestrial communities on all lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.34).

Upper Columbia River Basin: BLM- and FS-administered Lands —We detected ecologically significant class changes between current and year 100 for 71 percent of the terrestrial communities in this region and stratum (table 2.35). The areal extents of six communities would increase by more than 100 percent. Conversely, three communities would decrease by at least 50 percent: early-seral and late-seral single-layer subalpine and exotic herbland.

Historic to current significant trends would reverse for 80 percent of the communities. The significant historical increase of mid-seral lower montane forest would continue through year 100.

Under Alternative 7, the areal extents of 42 percent of the terrestrial communities on BLM- and FS-administered lands in the Upper Columbia River Basin would not likely occur within their historical ranges in 100 years (table 2.36).

Discussion

The initial historical estimates of community type area generally depict the Basin's composition during the latter 1800s. Although believed to be generally correct, the estimates represent only single points that are more like averages of the Basin's composition. Using this single historical estimate as a baseline to estimate the trend of a habitat area could give unrealistic results.

We believe that a comparison with an historical range, rather than a single point estimate, provides a more realistic accounting of habitat changes. We assume that native biota adapted to the historical dynamic landscapes. Further, we recognize that few, if any, species are solely dependent on the areal extent of a single vegetation community. Instead, we believe that the fitness of most species is more closely associated with the availability and juxtaposition of several, to many, community types within some geographical area.

Considering these factors and assumptions, we believe our coarse-filter approach of basing habitat change on an historical range provides a useful data set for estimating the persistence probabilities of native biota. *When the simulations project that a community type would occur well above its historical range, those species whose fitness is closely correlated with the availability of that type would have substantially fewer risks to their persistence. Conversely, when projection of a community type indicates a likelihood of occurrence well below its historical range within some geographical area, there would be probable substantial risks to the persistence of correlated species.*

Differences among the alternatives are discussed below by EIS area and terrestrial community. Comparisons are included about both ownership strata, including all lands and BLM- and FS-administered lands within each EIS area. Terrestrial communities are grouped by montane forests, subalpine forests, upland communities, riparian communities, and exotic herblands.

Alternative projections are not addressed for the Basin as a whole, nor for BLM-and FS-administered lands within the Basin. Also not addressed are differences among alternatives for the five communities that remained constant through our modeling projections: agriculture, alpine, barren/rock, urban, and water.

Additional detail about the treatment activities, disturbances, and subsequent transitions that provided a basis for our terrestrial community projections is included in this chapter in the discussion about vegetation response and disturbance patterns.

Because geographic and ownership stratum vary, the trends are often inconsistent between the Basin as a whole and the two EIS areas, and among the ownership strata of those regions. For example, trends of the mid-seral montane forest

community are substantially different between the Eastside EIS and the Upper Columbia River Basin analysis areas. In the Eastside EIS area as a whole, the areal extent of the mid-seral montane community type would decline between 4 and 14 percent for all alternative projections, whereas its area would increase across BLM- and FS-administered lands within the Eastside EIS area.

Similarly, in the Upper Columbia River Basin, the area of the mid-seral montane community would decline from 28 to 40 percent across the area as a whole, but declines across BLM- and FS-administered lands within the Upper Columbia River Basin would be less substantial, from 21 to 34 percent.

Eastside EIS Area

Montane Forests —

Early-Seral Lower Montane Forest. The 100-year projections of all alternatives would increase the areal extent of the early-seral lower montane forest community to a level within its historical range across all ownerships, and across BLM- and FS-administered lands within the Eastside EIS area (figure 2.29; tables 2.30 and 2.32). For both strata, Alternatives 3 through 6 had comparable projections for this community, followed in areal extent by Alternatives 1, 2, and 7.

Mid-seral Lower Montane Forest. For the Eastside EIS area as a whole, none of the alternatives would decrease mid-seral lower montane forest to a level within its historical range (figure 2.30; table 2.30). However, the 100-year projection for Alternatives 3 through 7 showed either a decrease or a very slight increase in the areal extent of this community, such that the projections were within the historical range across BLM- and FS-administered lands within the Eastside EIS (table 2.31 and 2.32). All restoration alternatives had comparable projections. Alternatives 1 and 2 had areal projections that exceeded the historical range on BLM- and FS-administered lands within the Eastside EIS area.

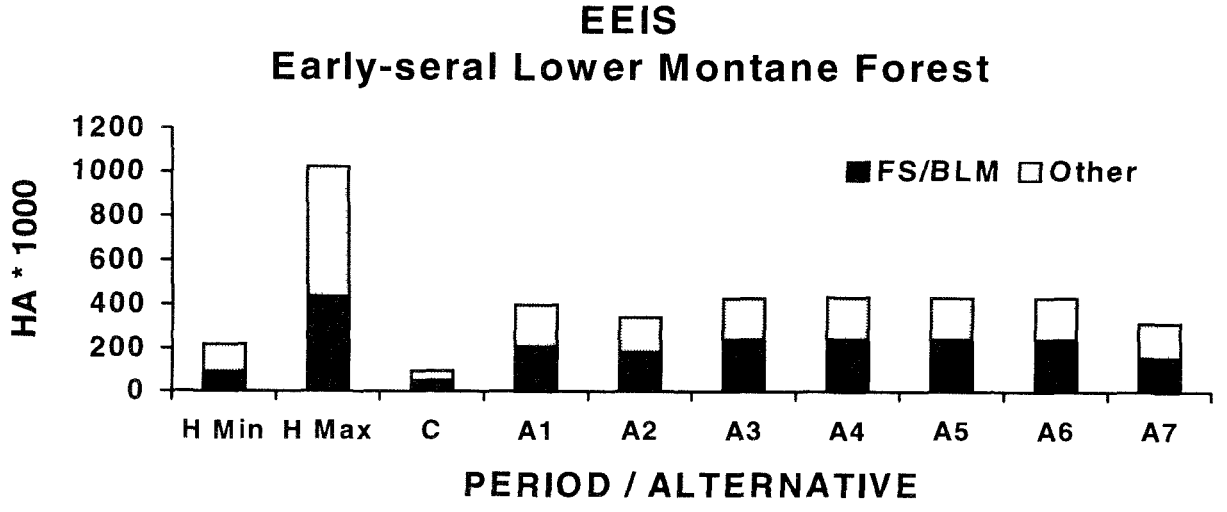
Late-seral Lower Montane Single-layer Forest. The 100-year projections of Alternatives 1, 2, and 7 would decrease the extent of this community and projections would lie below the historical range for both ownership strata (figure 2.31; tables 2.30 and 2.32). Alternatives 3 through 6, however, would increase this community's areal extent to within its historical range on BLM- and FS-administered lands within the Eastside EIS area, but projections for the alternatives across all ownerships still fell well below the historical range. There were no detectable measurable differences among Alternatives 3 through 6.

Late-seral Lower Montane Multi-layer Forest. The 100-year projections of this community's area across all ownerships within the Eastside EIS area were well above its historical range for all alternatives (figure 2.32; table 2.30). However, on BLM- and FS-administered lands, this community's areal extent would remain within its historical range for Alternatives 3 through 6 (table 2.32). Alternatives 1, 2, and 7 were projected to exceed the historical range of this community on BLM- and FS-administered lands.

Early-seral Montane Forest. All alternatives would decrease this community's areal extent from the current period (figure 2.33; tables 2.30 and 2.32). Across all ownerships, none of the alternative projections of this community type fell within its historical range. However, on BLM- and FS-administered lands, the 100-year projections for Alternatives 3 through 6 were within their historical range, whereas the outcomes for Alternatives 1, 2, and 7 were below.

Mid-seral Montane Forest. No alternative would be effective in reducing this community's areal extent to within its historical range across either ownership stratum within the Eastside EIS area (figure 2.34; tables 2.30 and 2.32). There were very few differences among the 100-year projections for any of the alternatives.

Late-seral Montane Single-layer Forest. All alternatives would significantly decrease this community's areal extent to a level well below its historical range (figure 2.35; tables 2.30 and 2.32). There were no substantial differences among the projections for Alternatives 3 through 7, which were somewhat higher than Alternatives 1 and 2.



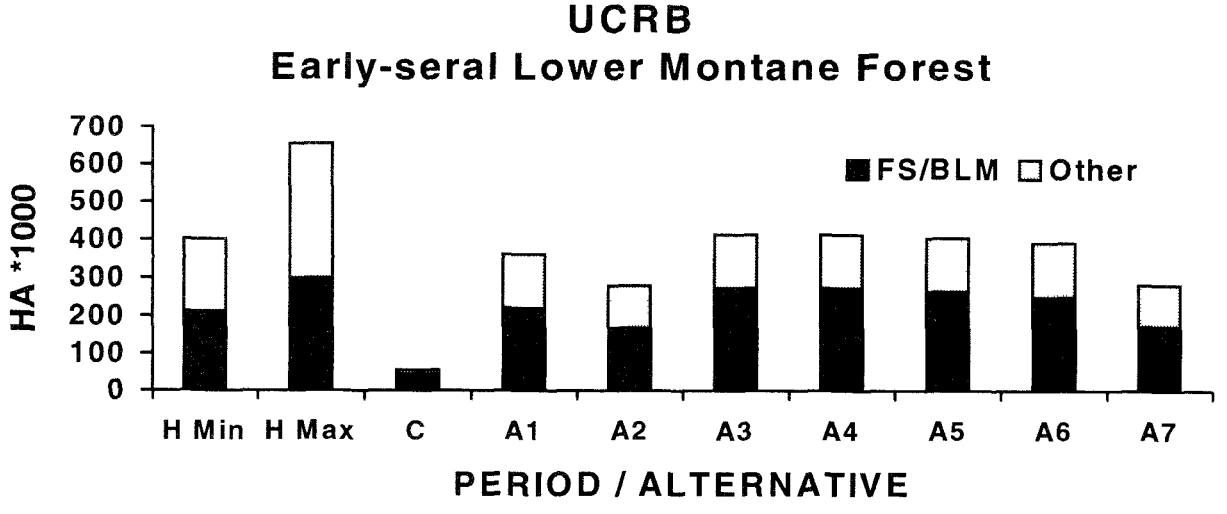
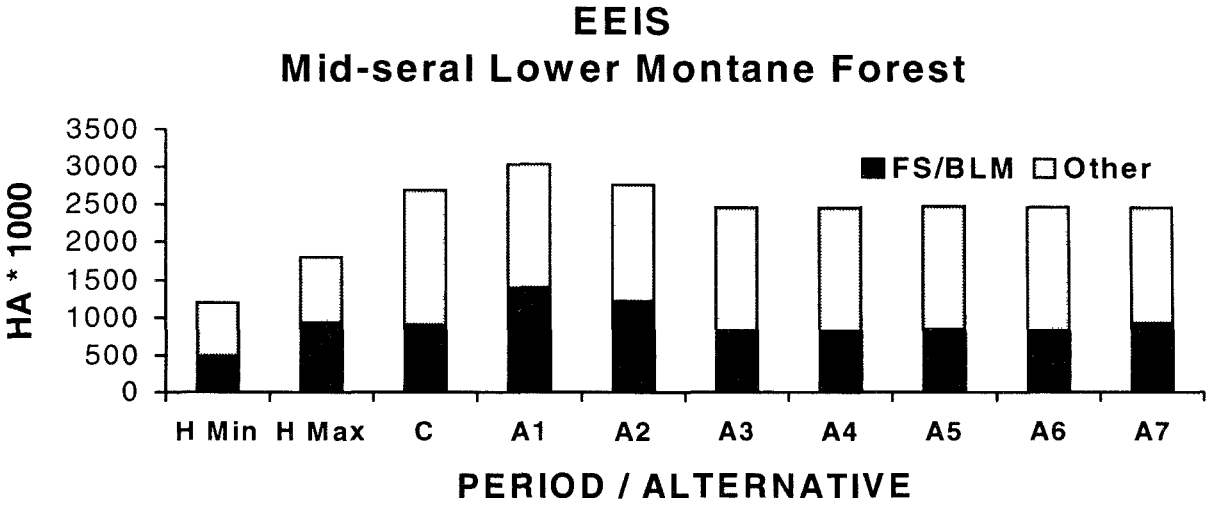


Figure 2.29 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the early-seral lower montane forest community for the Eastside and Upper Columbia River Basin EIS areas.



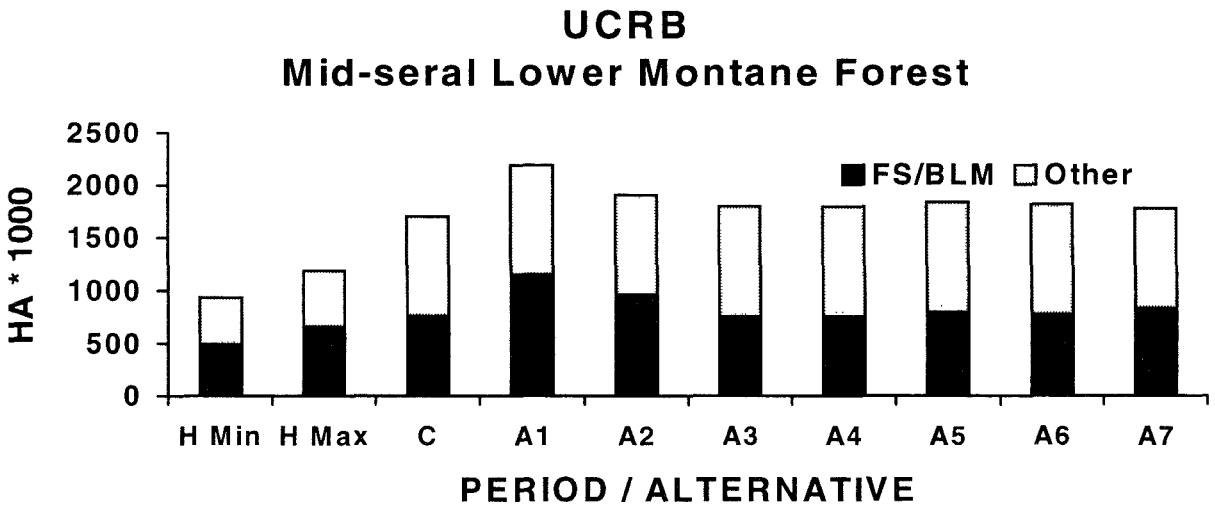


Figure 2.30 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the mid-seral lower montane forest community for the Eastside and Upper Columbia River Basin EIS areas.

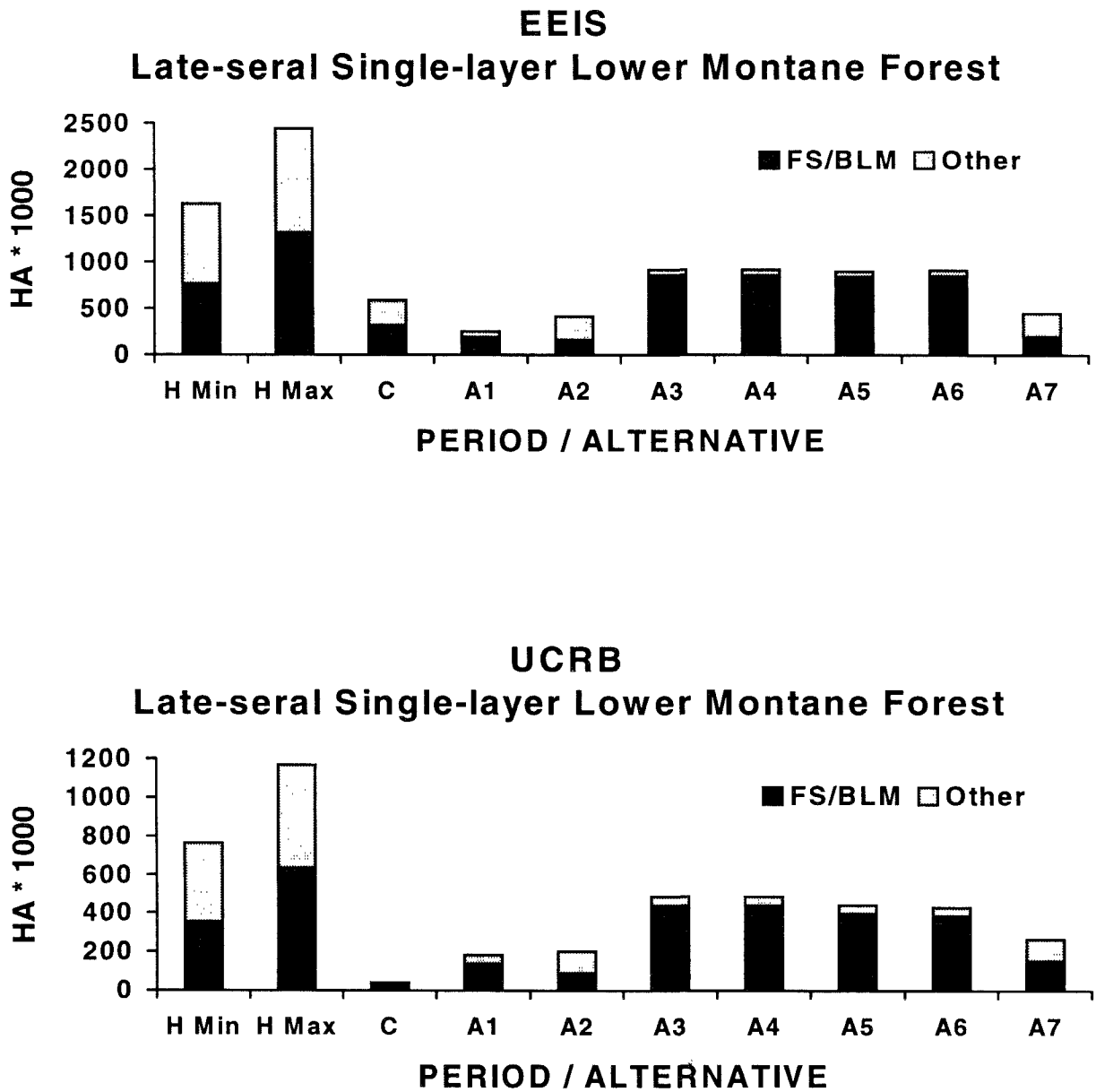
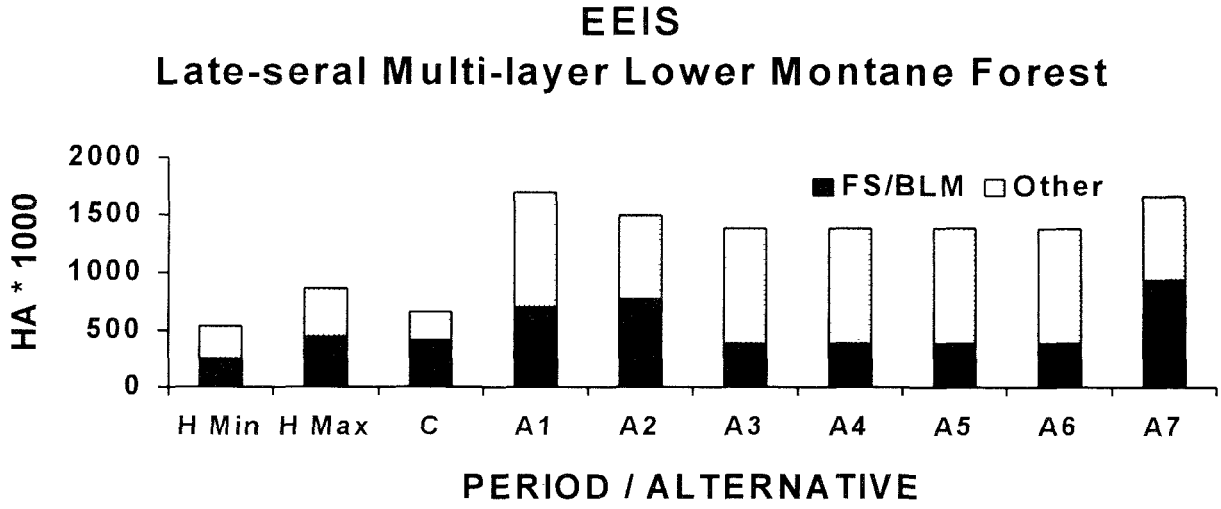


Figure 2.31 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral single-layer lower montane forest community for the Eastside and Upper Columbia River Basin EIS areas.



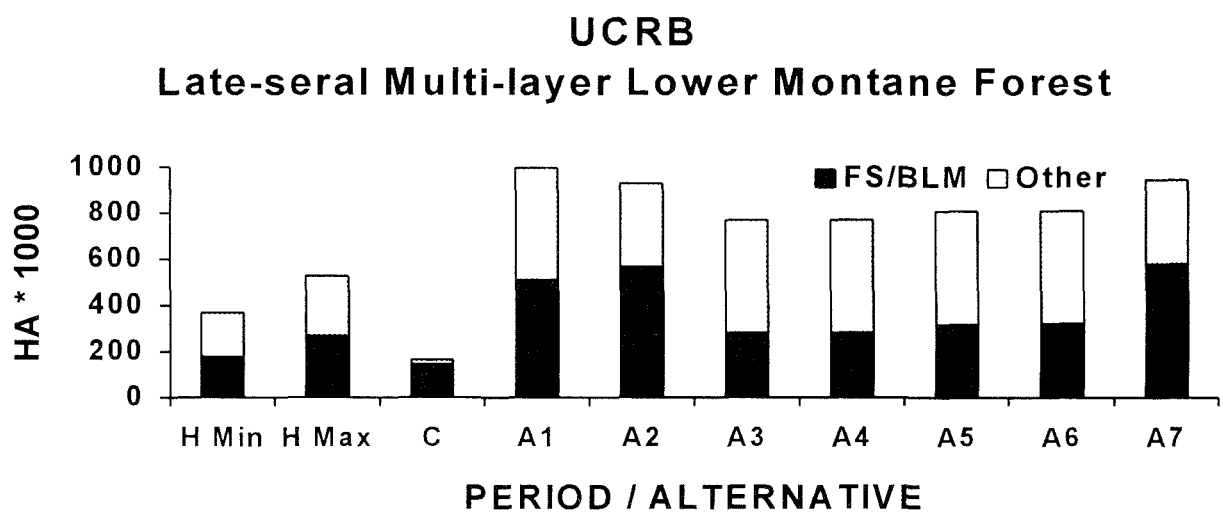
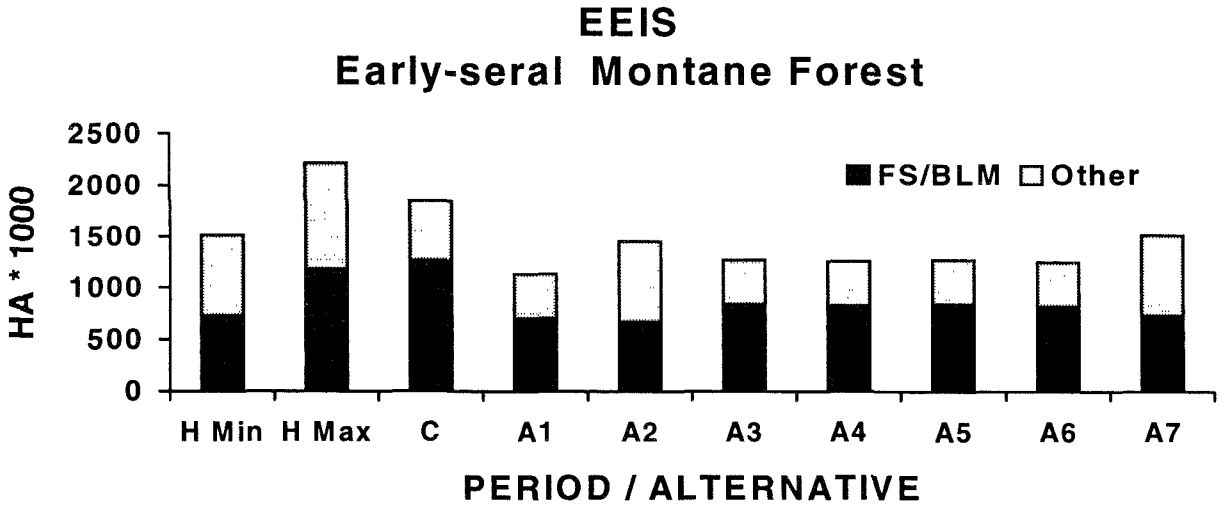


Figure 2.32 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral multi-layer lower montane forest community for the Eastside and Upper Columbia River Basin EIS areas.



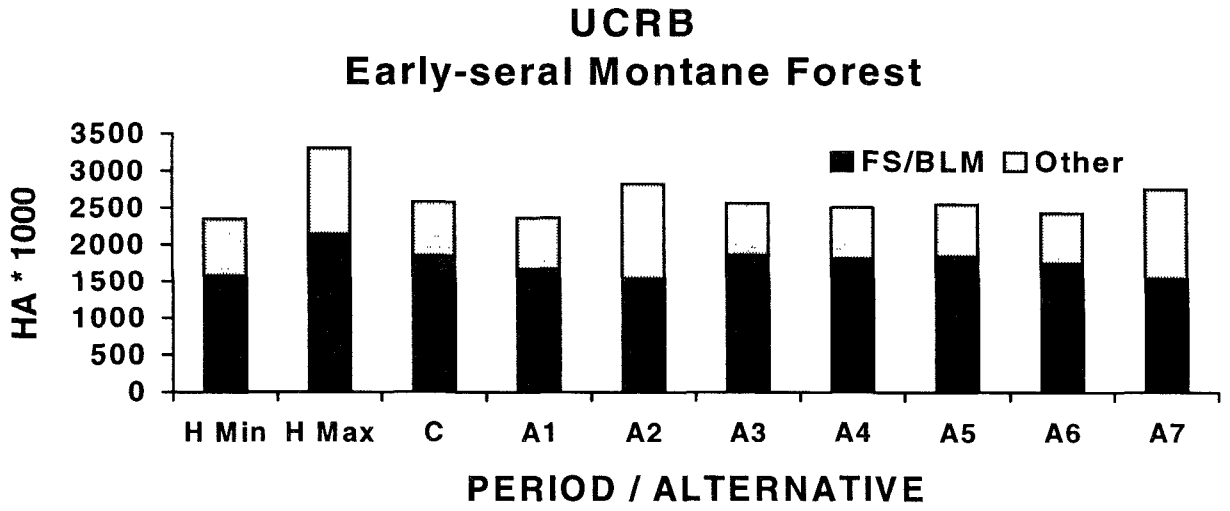


Figure 2.33 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the early-seral montane forest community for the Eastside and Upper Columbia River Basin EIS areas.

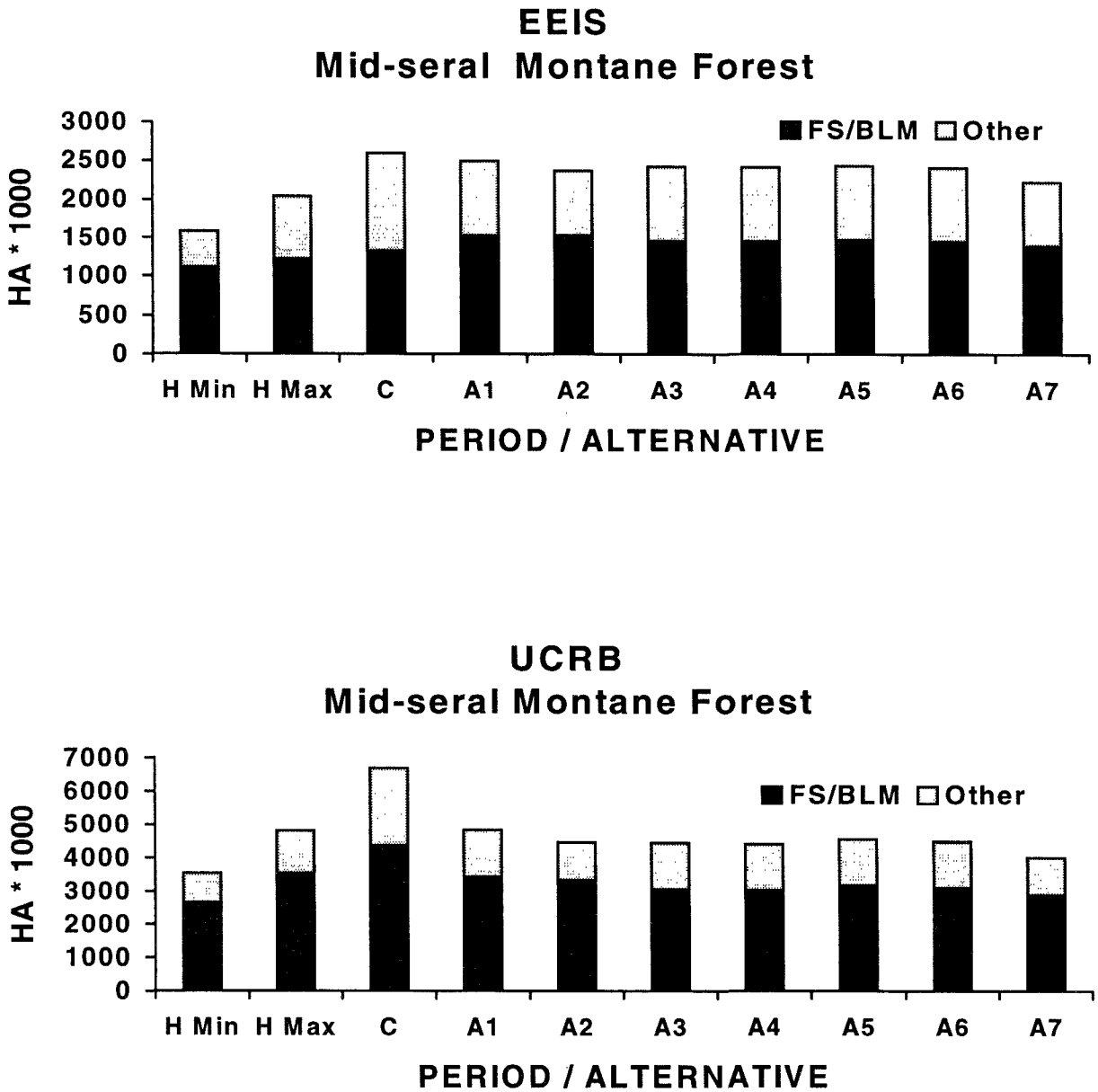


Figure 2.34 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the mid-seral montane forest community for the Eastside and Upper Columbia River Basin EIS areas.

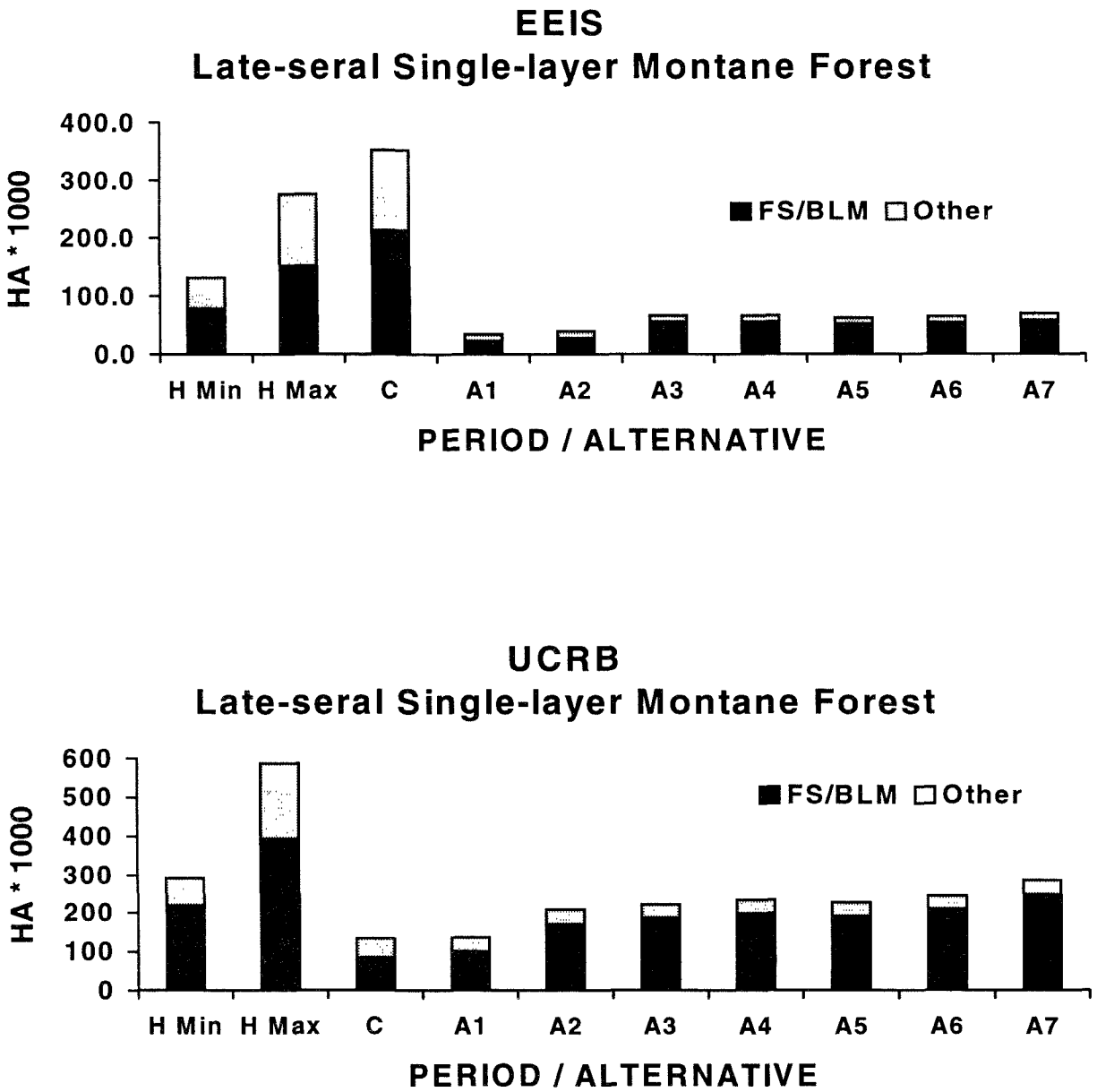


Figure 2.35 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral single-layer montane forest community for the Eastside and Upper Columbia River Basin EIS areas.

Late-seral Montane Multi-layer Forest — For the Eastside EIS area as a whole, all alternatives except Alternative 7 projected this community's occurrence within its historical range (figure 2.36; table 2.30). However, on BLM- and FS-administered lands, Alternatives 2 through 7 projected occurrence well above the historical range (table 2.32). There were very few discernible differences in the projections of Alternatives 2 through 6.

Subalpine Forests —

Early-seral Subalpine Forest. The early-seral subalpine forest was historically relatively rare within the Eastside EIS area; its historical maximum extent did not exceed approximately 130,000 hectares. Although all alternatives would decrease this community's areal extent, only Alternatives 1, 2, and 7 would reduce its extent to levels within its historical range for both ownership strata (figure 2.37; tables 2.30 and 2.32). There were few differences among the projections for Alternatives 3 through 6, all of which would result in areas above the historical range, particularly for the BLM- and FS-administered lands.

Mid-seral Subalpine Forest. Although all alternatives would increase this community's areal extent, only Alternatives 1, 2, and 7 would result in areas within its historical range across both the entire Eastside EIS area and the BLM- and FS-administered lands within the Eastside EIS area (figure 2.38; tables 2.30 and 2.32). No substantial differences among total areas were projected for Alternatives 3 through 6.

Late-seral Subalpine Single-layer Forest. Historically, this community was relatively rare within the Eastside EIS; its historical maximum extent did not appear to exceed 55,000 hectares. All alternatives would decrease this community's areal extent to well below its historical range across the entire Eastside EIS area and also across BLM- and FS-administered lands within the Eastside EIS area (figure 2.39; tables 2.30 and 2.32). There was little substantial difference among the projections of any alternative.

Late-seral Subalpine Multi-layer Forest. Historically, this community was also relatively rare within the Eastside EIS area; it never exceeded 250,000 hectares. All alternatives would increase this community's areal extent to a level within its historical range across the Eastside EIS area as a whole, and across BLM- and FS-administered lands within the Eastside EIS area (figure 2.40; tables 2.30 and 2.32). There was little discernible difference among the projections for Alternatives 1 through 6; Alternative 7 would result in the largest area of this community within the Eastside EIS area.

Upland Communities —

Upland Herblands. As a result of agricultural conversion on private ownerships, no alternative projections were close to the historical range of the upland herbland community across the Eastside EIS area as a whole (figure 2.41; table 2.30). However, on BLM- and FS-administered lands, all alternatives would increase this community's areal extent to a level within its historical range (table 2.32). The 100-year projections did not substantially vary among the alternatives for either ownership stratum.

Upland Shrublands. There was little variability among the simulation projections for the upland shrubland community (figure 2.42; tables 2.30 and 2.32). The 100-year projections for the Eastside EIS area as a whole were well below the historical range for this community. All projections for BLM- and FS-administered lands closely approached the historical minimum value for the upland shrubland community, except for Alternative 2, which actually fell below the historical range. However, because simulation modeling problems with the spread of exotic herblands for Alternative 2 distorted the projections, we believe the area for this community under Alternative 2 should be very similar to Alternative 1.

In summary, it appears that all alternatives would have areas of upland shrubland within their historical range on BLM- and FS-administered lands, although only marginally above their historical minimum value.

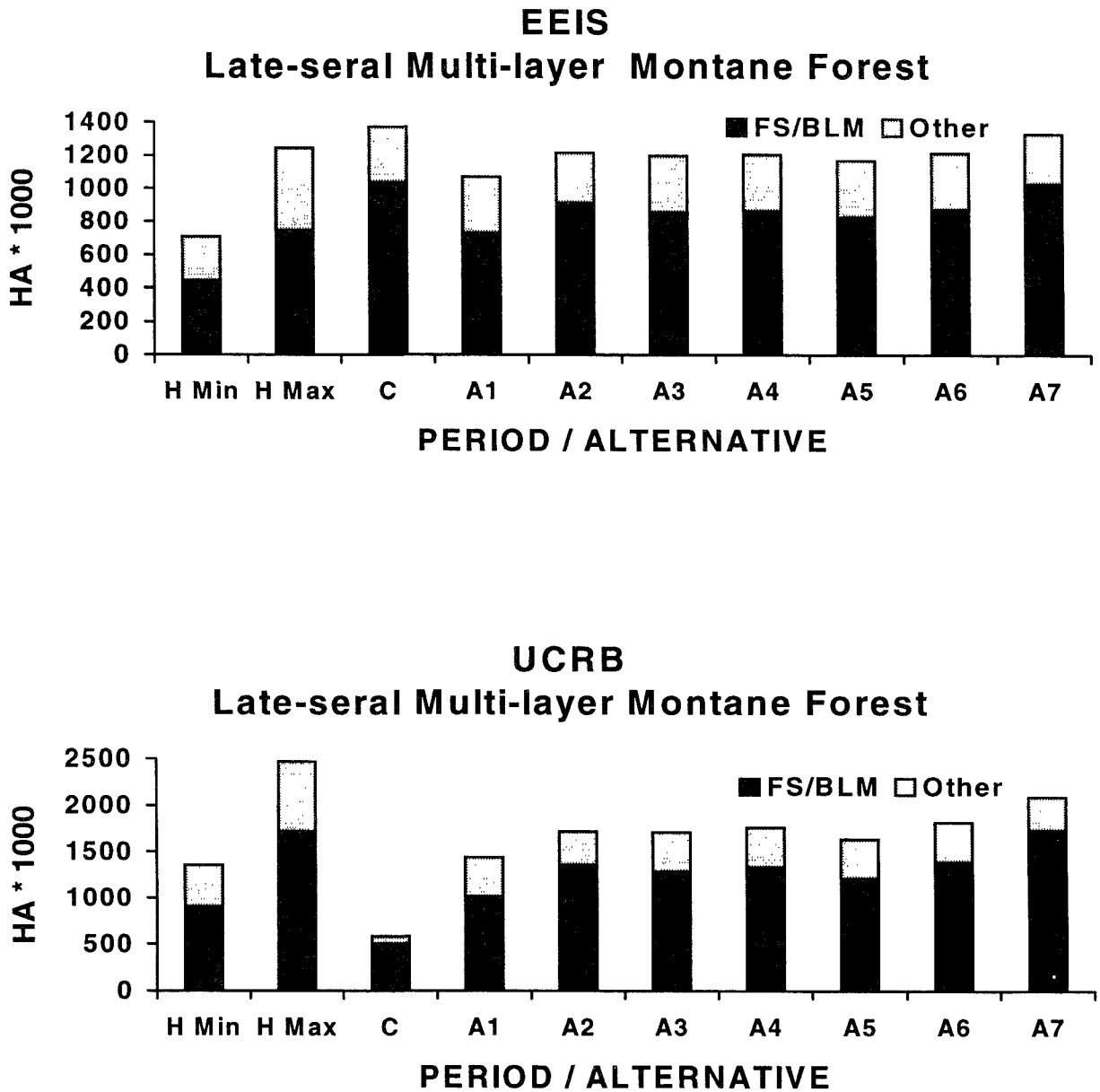


Figure 2.36 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral multi-layer montane forest community for the Eastside and Upper Columbia River Basin EIS areas.

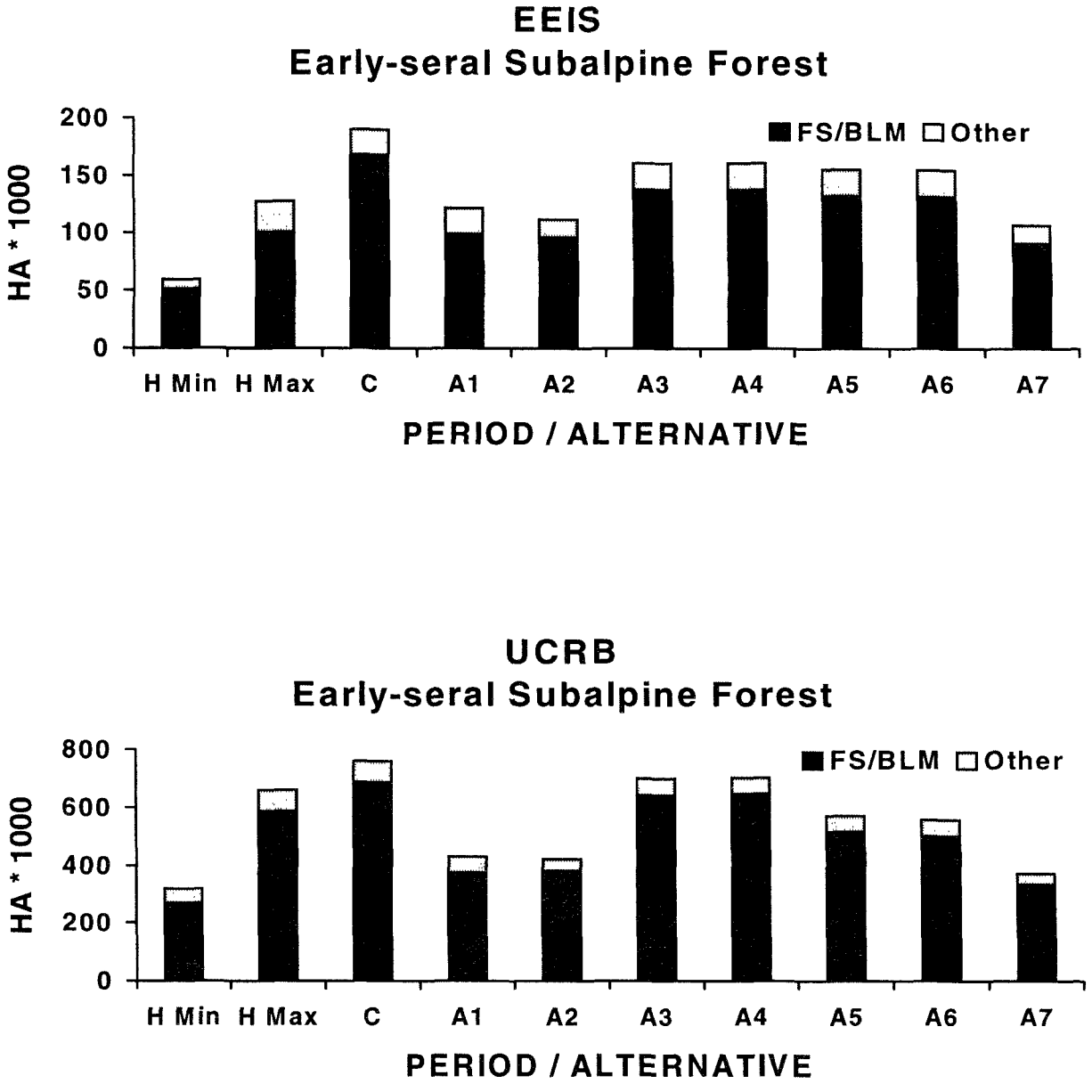


Figure 2.37 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the early-seral subalpine forest community for the Eastside and Upper Columbia River Basin EIS areas.

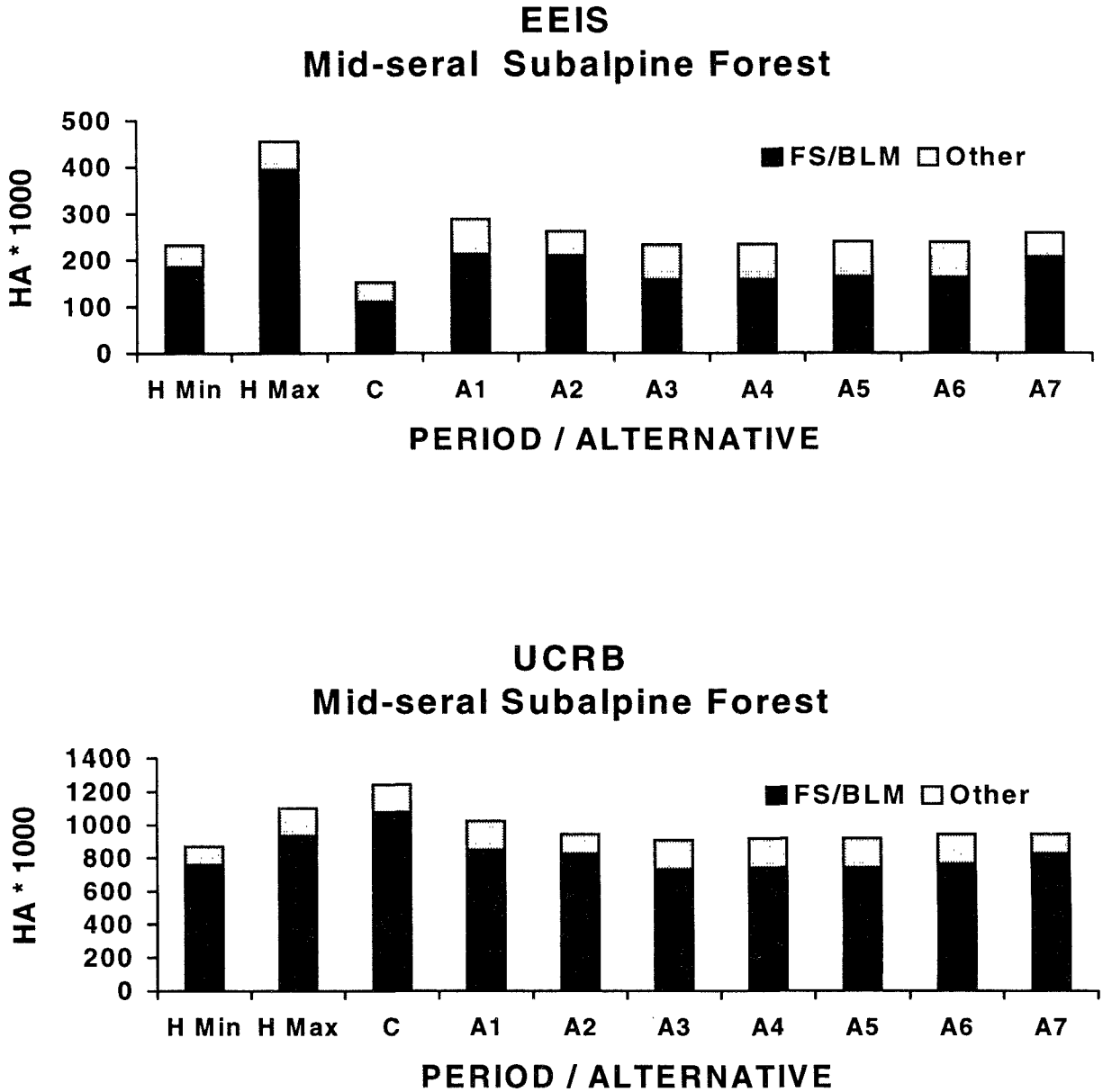
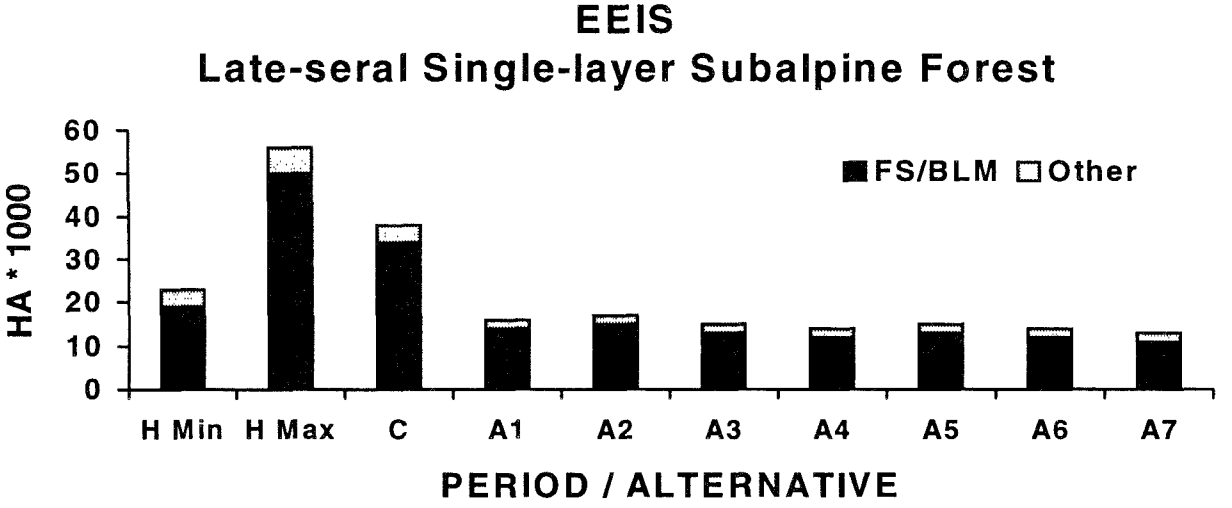


Figure 2.38 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the mid-seral subalpine forest community for the Eastside and Upper Columbia River Basin EIS areas.



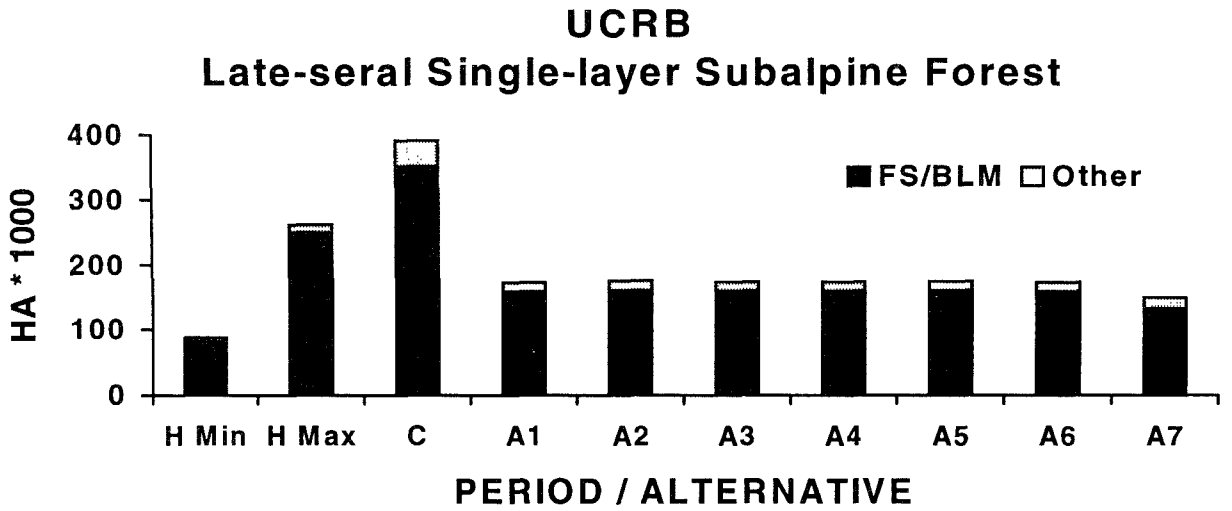
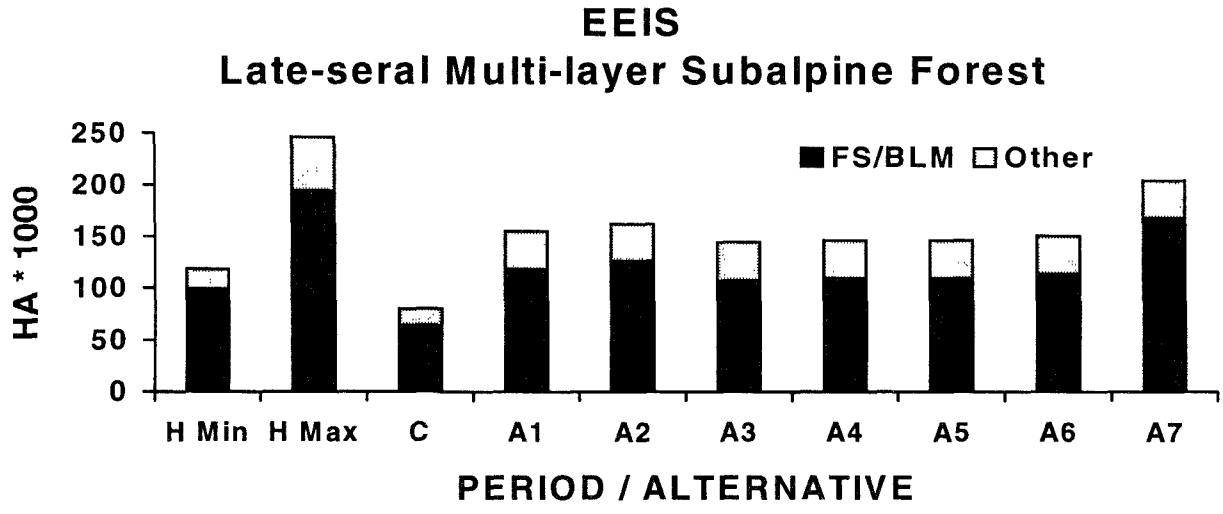


Figure 2.39 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral single-layer subalpine forest community for the Eastside and Upper Columbia River Basin EIS areas.



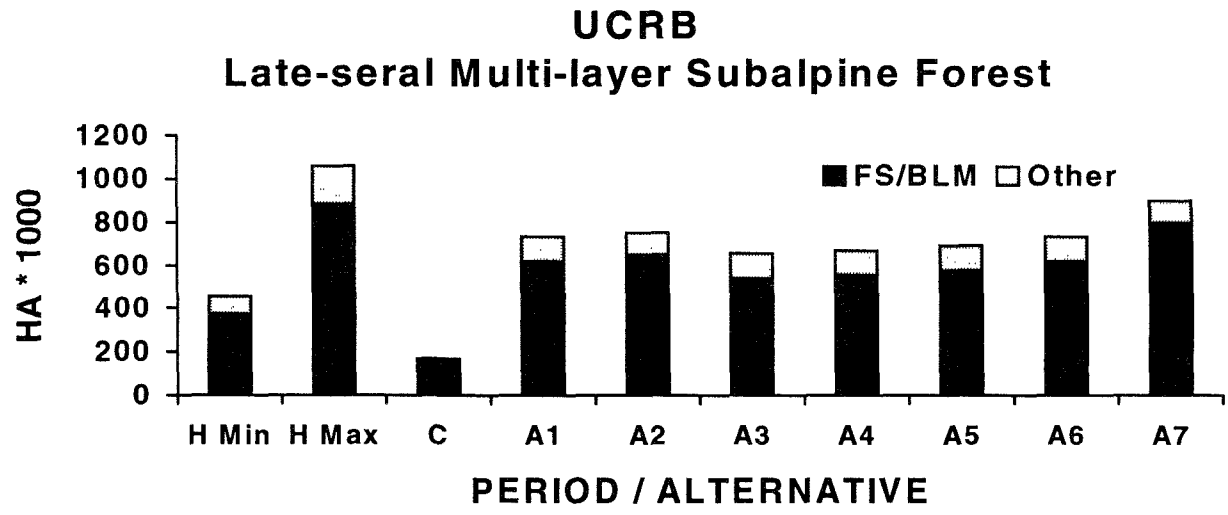
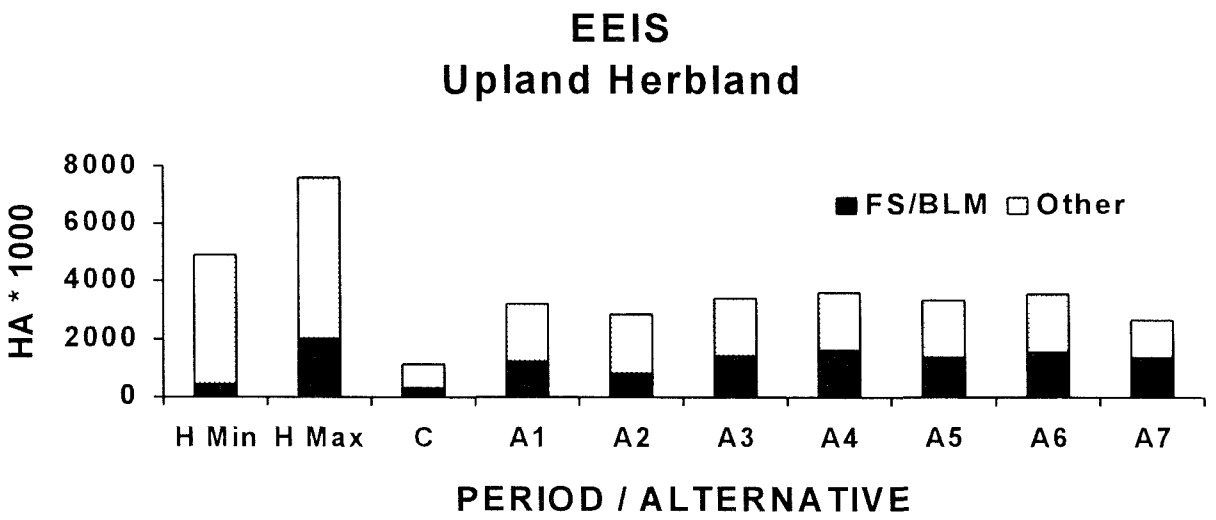


Figure 2.40 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the late-seral multi-layer subalpine forest community for the Eastside and Upper Columbia River Basin EIS areas.



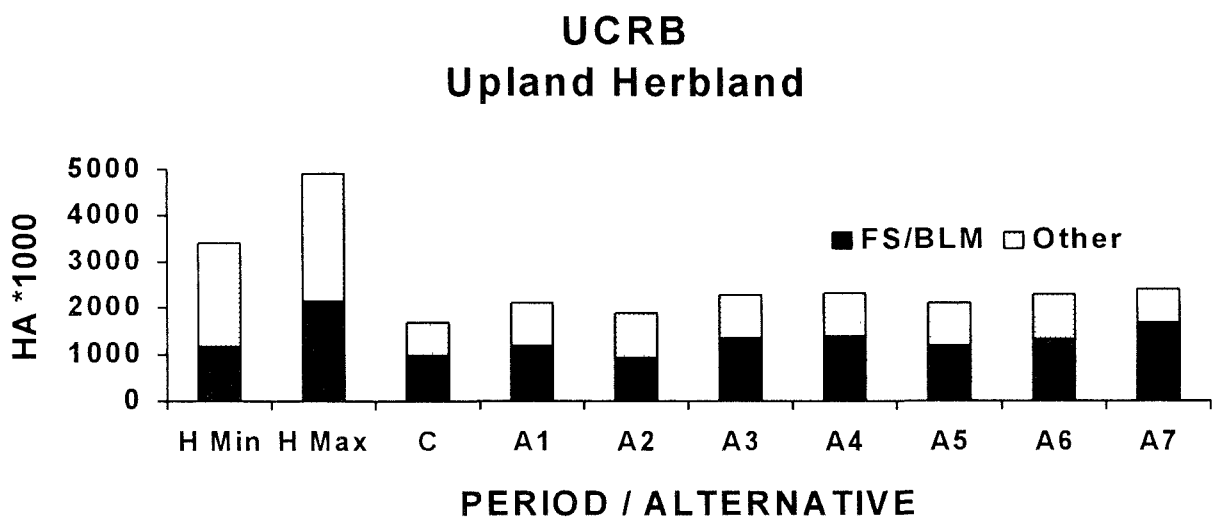


Figure 2.41 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the upland herbland community for the Eastside and Upper Columbia River Basin EIS areas.

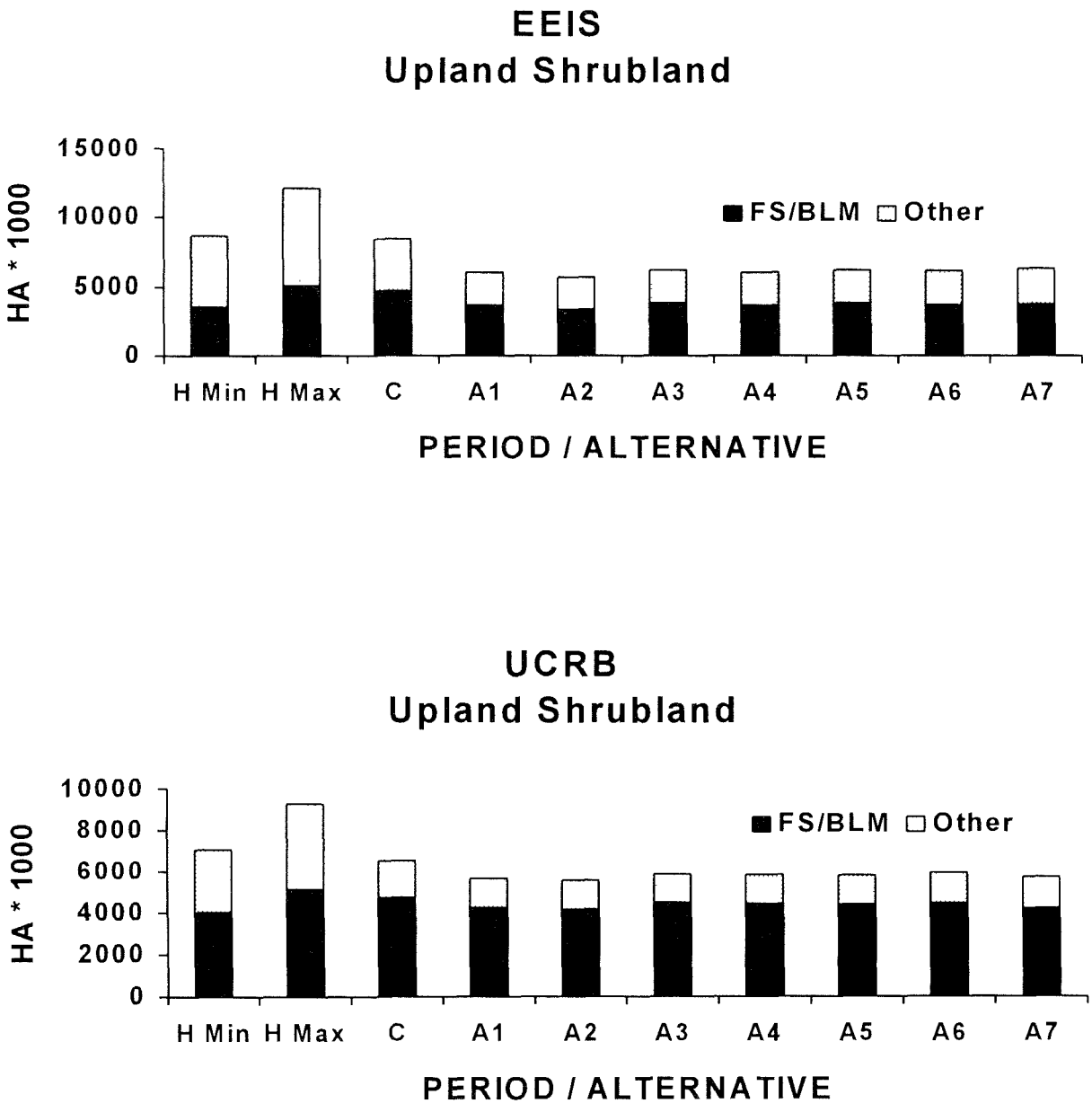


Figure 2.42 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the upland shrubland community for the Eastside and Upper Columbia River Basin EIS areas.

Upland Woodlands. All alternatives would decrease this community's areal extent, for both ownership strata (figure 2.43; tables 2.30 and 2.32). However, for the Eastside EIS area as a whole, all alternatives would result in areas of upland woodlands that exceed the historical range. On BLM- and FS-administered lands within the Eastside EIS area, Alternatives 3 through 6 would have areas within the historical range of the upland woodland community.

Riparian Communities —

Riparian Herblands, Shrublands, and Woodlands. As stated previously, we could not accurately estimate the historical range of riparian communities, nor do we feel confident with our estimates for the current period and 100-year projections. This low level of accuracy and confidence is due to the coarse scale of our simulations, which overemphasized the very large patches and did not accurately portray outcomes. However, the future trends for All and Other lands should generally be correct. We believe our projections represent a more negative outcome for BLM- and FS-lands in Alternatives 2, 3, 4, 5, 6 and 7 than suggested by the objectives and standards (figs. 2.44, 2.45 and 2.46).

Overall, at our scale of analysis, there was little variability among the alternative projections except for Alternative 7. The substantial differences in the areal extents of the riparian herblands and riparian shrublands for Alternative 7 are attributed to the amount of wildfire likely to occur within the reserve areas.

Exotic Herbland Communities —

Exotic Herbland. We are uncertain about our estimates of the exotic herbland community's areal extent for both the current period and 100-year projections. However, on a relative basis among alternatives, the future trend is generally correct (figure 2.47). Because the rate of increase used for the exotic herbland community was very conservative, the exotic herbland community is likely to increase at a faster rate than projected. Because our 100-year projection for Alternative 2 was distorted due to modeling difficulties, the projection was adjusted to be similar to Alternative 1. The projected extent for exotic herblands under Alternative 7 may be high relative to the other action alternatives (3 through 6), particularly for all ownerships in the EEIS. While exotic herblands will generally increase on BLM- and FS-administered lands in reserves, exotic herblands on lands outside reserves will probably not increase more rapidly than under Alternative 3.

Additional detail about the alternative outcomes relating to exotic herblands is included in this chapter in the discussion about the effects of alternatives on selected noxious weeds and cheatgrass.

Upper Columbia River Basin

Montane Forests —

Early-Seral Lower Montane Forest. No projection of any alternative showed an increase in this community's areal extent to a level within its historical range across all ownerships within the Upper Columbia River Basin (figure 2.29; table 2.34). However, we expect that Alternatives 1, and 3 through 6, would substantially increase this community's area to within its historical range on BLM- and FS-administered lands in this basin (table 2.36).

Mid-seral Lower Montane Forest. No alternative would reduce this community's areal extent to within its historical range for either ownership stratum (figure 2.30; tables 2.34 and 2.36). While all restoration alternatives have comparable projections, Alternatives 1 and 2 have areal projections above the historical range for both ownership strata within the Upper Columbia River Basin. Alternatives 3 through 7 would not measurably change the area of the mid-seral lower montane community type.

Late-seral Lower Montane Single-layer Forest. The 100-year projections of all alternatives would substantially increase this community's areal extent (figure 2.31; tables 2.34 and 2.36).

However, for the Upper Columbia River Basin area as a whole, no alternative has projections within its historical range. Alternatives 3 through 6 would increase the areal extent of this community (with no measurable difference among alternatives) to within its historical range on BLM- and FS-administered lands within the Upper Columbia River Basin.

Late-seral Lower Montane Multi-layer Forest. The 100-year projections of this community's areal extent across all ownerships within the Upper Columbia River Basin were well above the historical range for all alternatives (figure 2.32; table 2.34). On BLM- and FS-administered lands, Alternatives 3 through 6 would reduce the area of this community to a level nearly within its historical range (table 2.36). Alternatives 1 and 2 would substantially exceed the historical range of this community for BLM- and FS-administered lands.

Early-seral Montane Forest. The 100-year projections for this community's areal extent were very similar (figure 2.33; tables 2.34 and 2.36). All alternatives, except for Alternative 1, were projected to be within this community's historical range across all ownerships within the Upper Columbia River Basin. On BLM- and FS-administered lands, the 100-year projections for Alternatives 1, and 3 through 6, were within the community's historical range, whereas the outcomes for Alternatives 2 and 7 were below its historical range.

Mid-seral Montane Forest. Of the forested environments, the mid-seral montane forest community composes the largest proportion of the Upper Columbia River Basin. All alternatives, except for Alternative 1, would reduce this community's areal extent to within its historical range across both ownership strata within the Upper Columbia River Basin (figure 2.34; tables 2.34 and 2.36). The projection for Alternative 1 was still slightly above the historical range across all ownerships. There was very little difference among the 100-year projections for any of the alternatives.

Late-seral Montane Single-layer Forest. With the exception of Alternative 1, all alternatives would measurably increase this community's areal extent. Overall, however, the projections of all alternatives were still well below its historical range (figure 2.35; tables 2.34 and 2.36). There was no substantial difference among the projections for Alternatives 2 through 6, which would exceed that for Alternative 1, but be somewhat less than Alternative 7. Most of the increased area of this community would be accrued across BLM- and FS-administered lands.

Late-seral Montane Multi-layer Forest. For the Upper Columbia River area as a whole, all alternatives except for Alternative 7 projected this community's occurrence within its historical range across both ownership strata (figure 2.36; tables 2.34 and 2.36). On BLM- and FS-administered lands, the 100-year projection of Alternative 7 was slightly more than this community's historical range. There was very little discernible difference in the projections of Alternatives 2 through 6, which would have greater increases than Alternative 1 but less increase than Alternative 7.

Subalpine Forests —

Early-seral Subalpine Forest. This community type was historically relatively rare within the Upper Columbia River Basin; its historical maximum extent did not exceed approximately 650,000 hectares. About 90 percent of the early-seral subalpine forest community occurs within BLM- and FS-administered lands within the Upper Columbia River Basin. All alternatives would decrease this community's areal extent, but Alternatives 3 and 4 are closer to the historical range in both ownership strata (figure 2.37; tables 2.34 and 2.36).

Mid-seral Subalpine Forest. All alternatives would decrease this community's areal extent to within its historical range across the entire Upper Columbia River Basin, and across BLM- and FS-administered lands within the Basin (figure 2.38; tables 2.34 and 2.36). There was little substantial difference in total area projected among any of the alternatives.

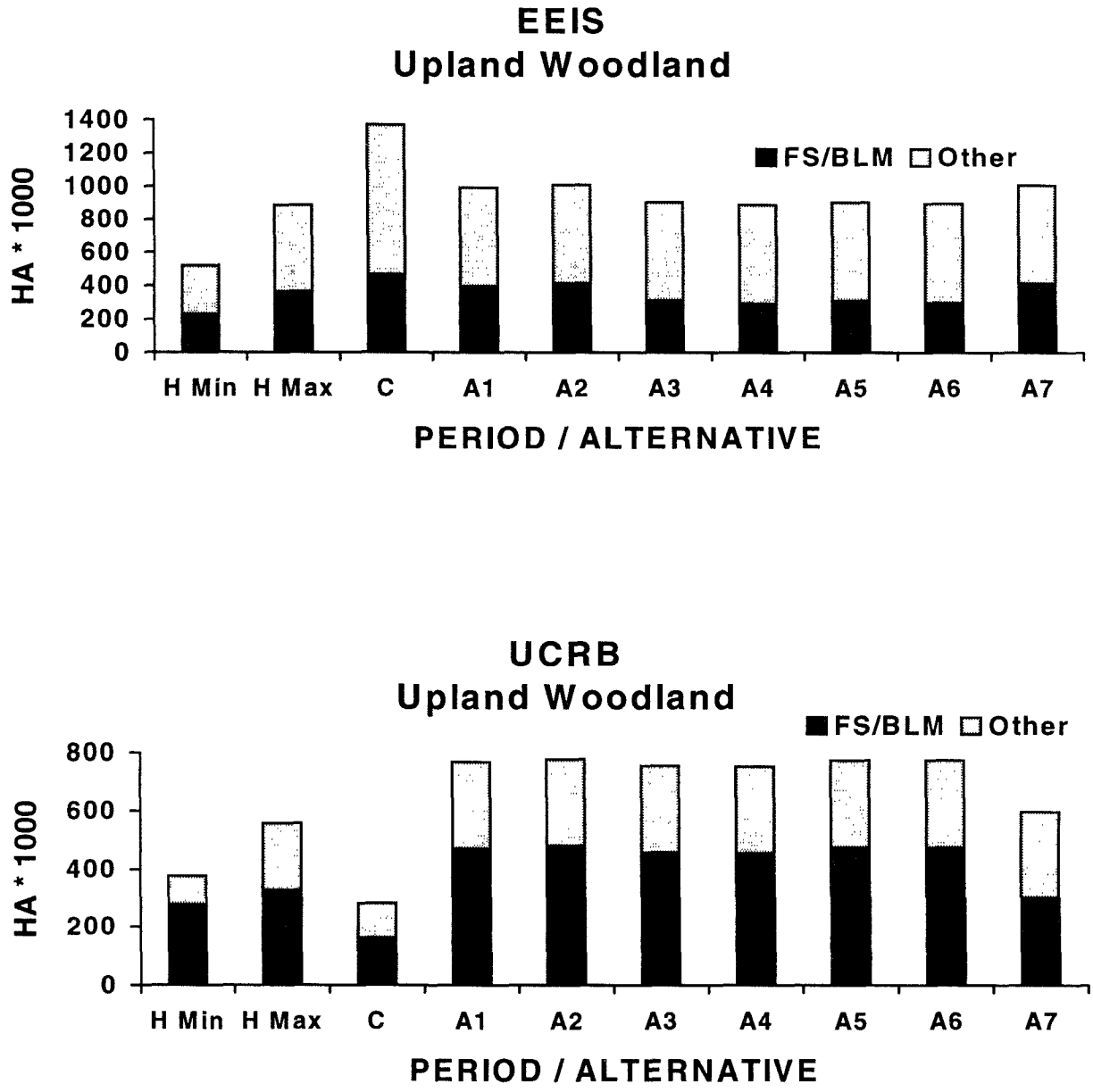
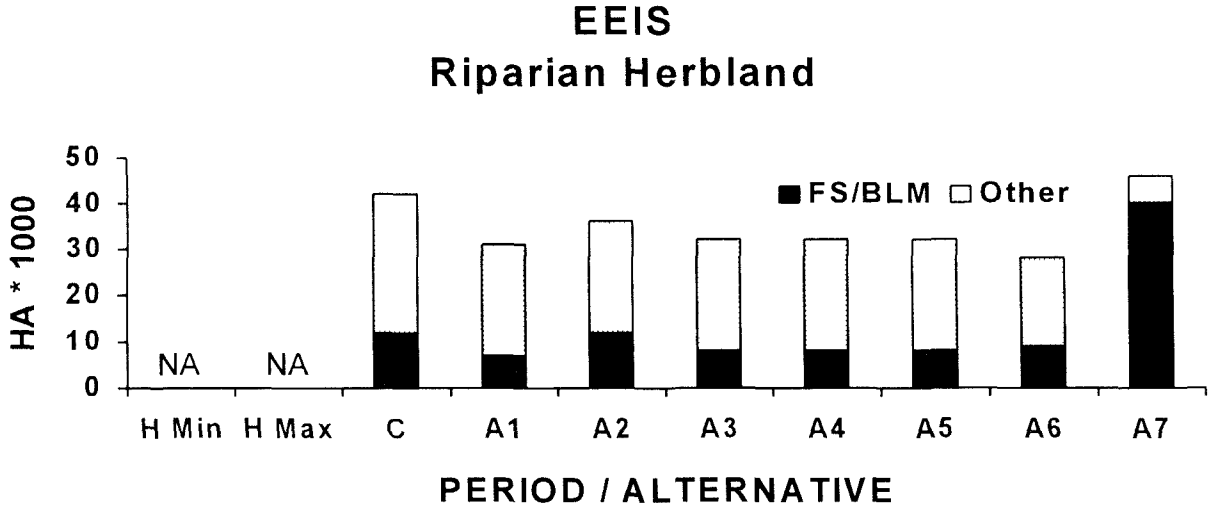


Figure 2.43 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the upland woodland community for the Eastside and Upper Columbia River Basin EIS areas.



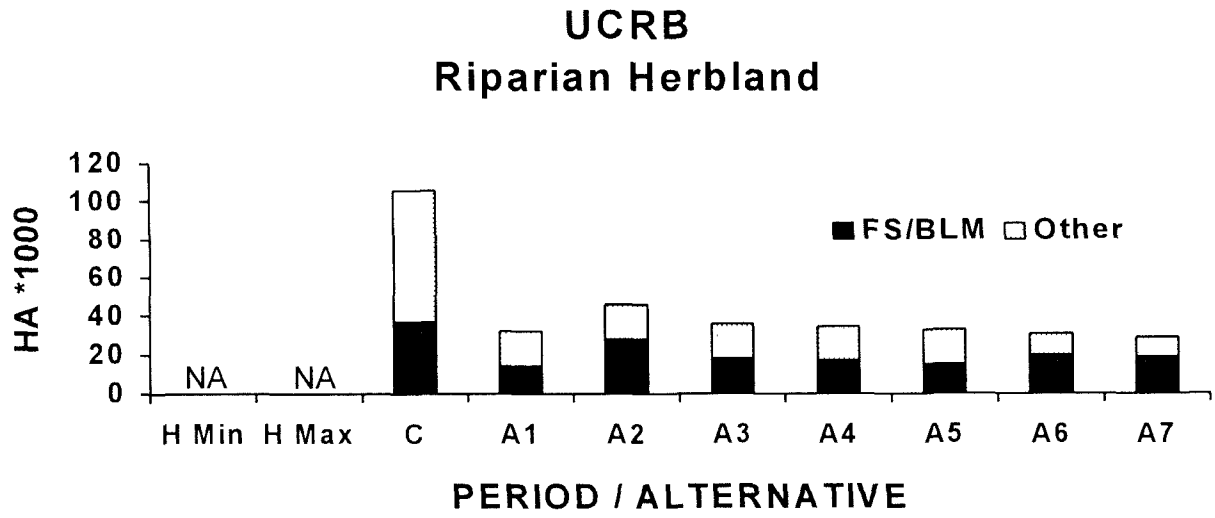


Figure 2.44 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the riparian herbland community for the Eastside and Upper Columbia River Basin EIS areas.

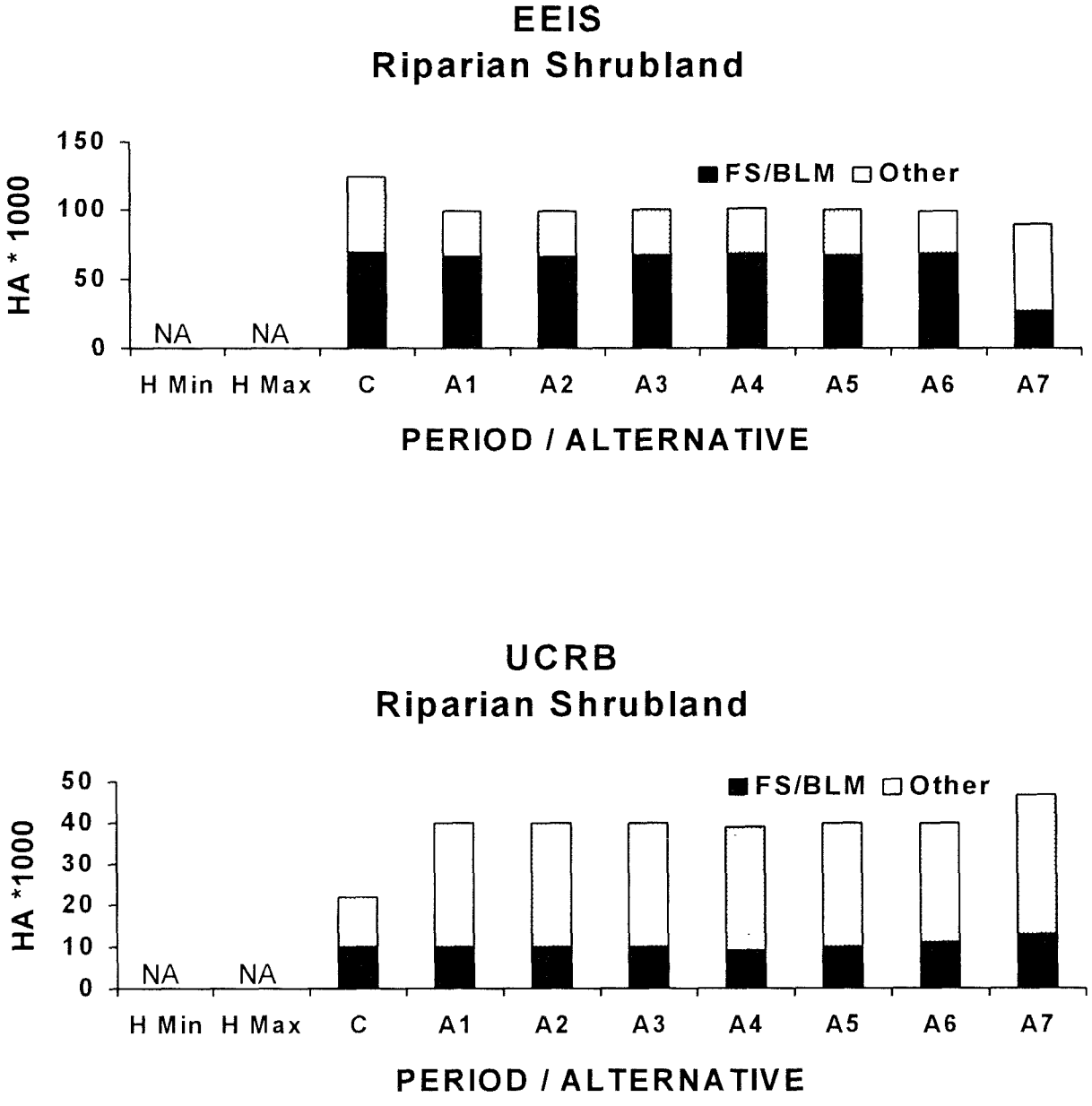


Figure 2.45 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the riparian shrubland community for the Eastside and Upper Columbia River Basin EIS areas.

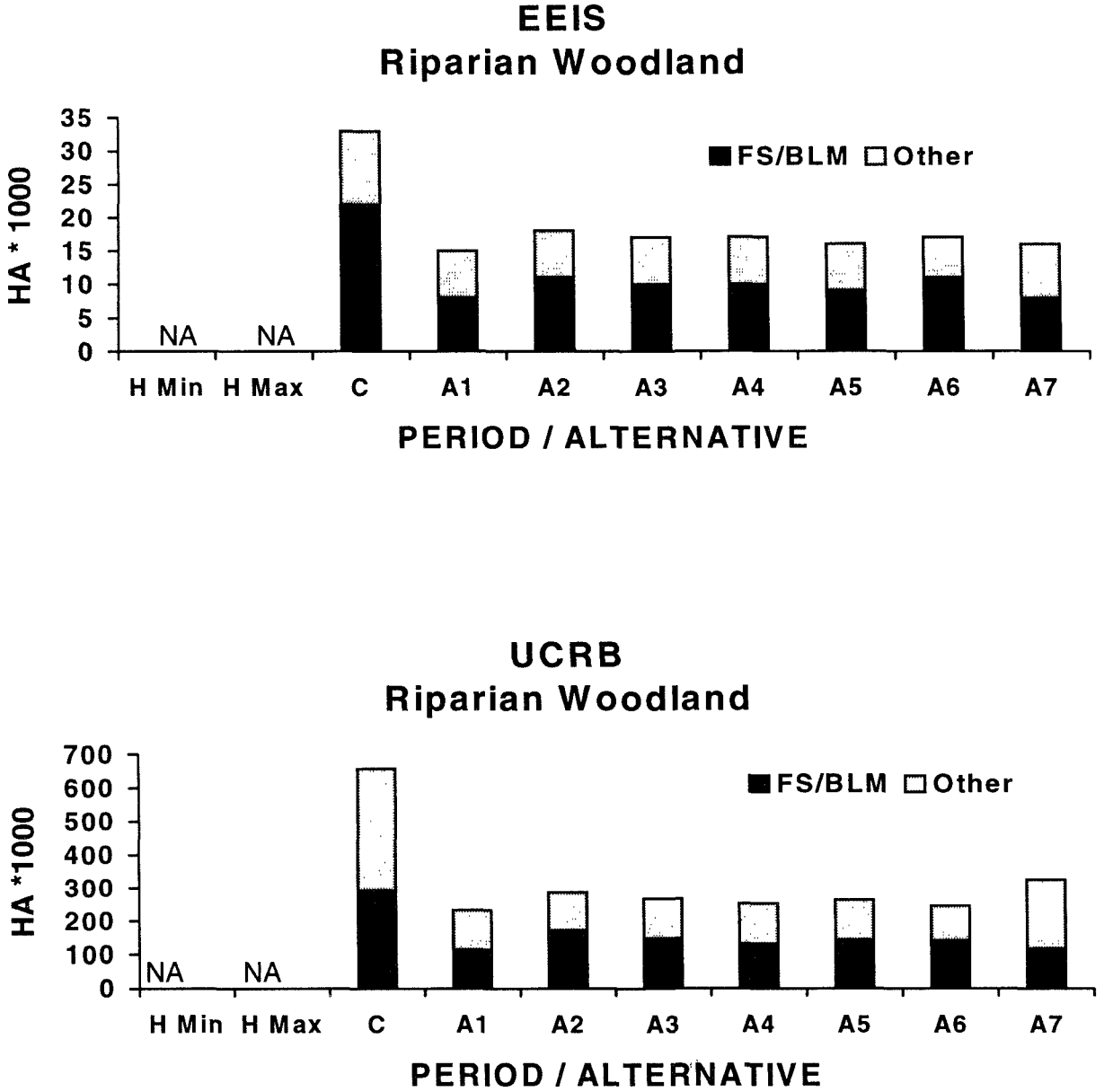


Figure 2.46 — Comparison of the historical range to current and future (100 year) projections for alternatives 1 through 7 for the riparian woodland community for the Eastside and Upper Columbia River Basin EIS areas.

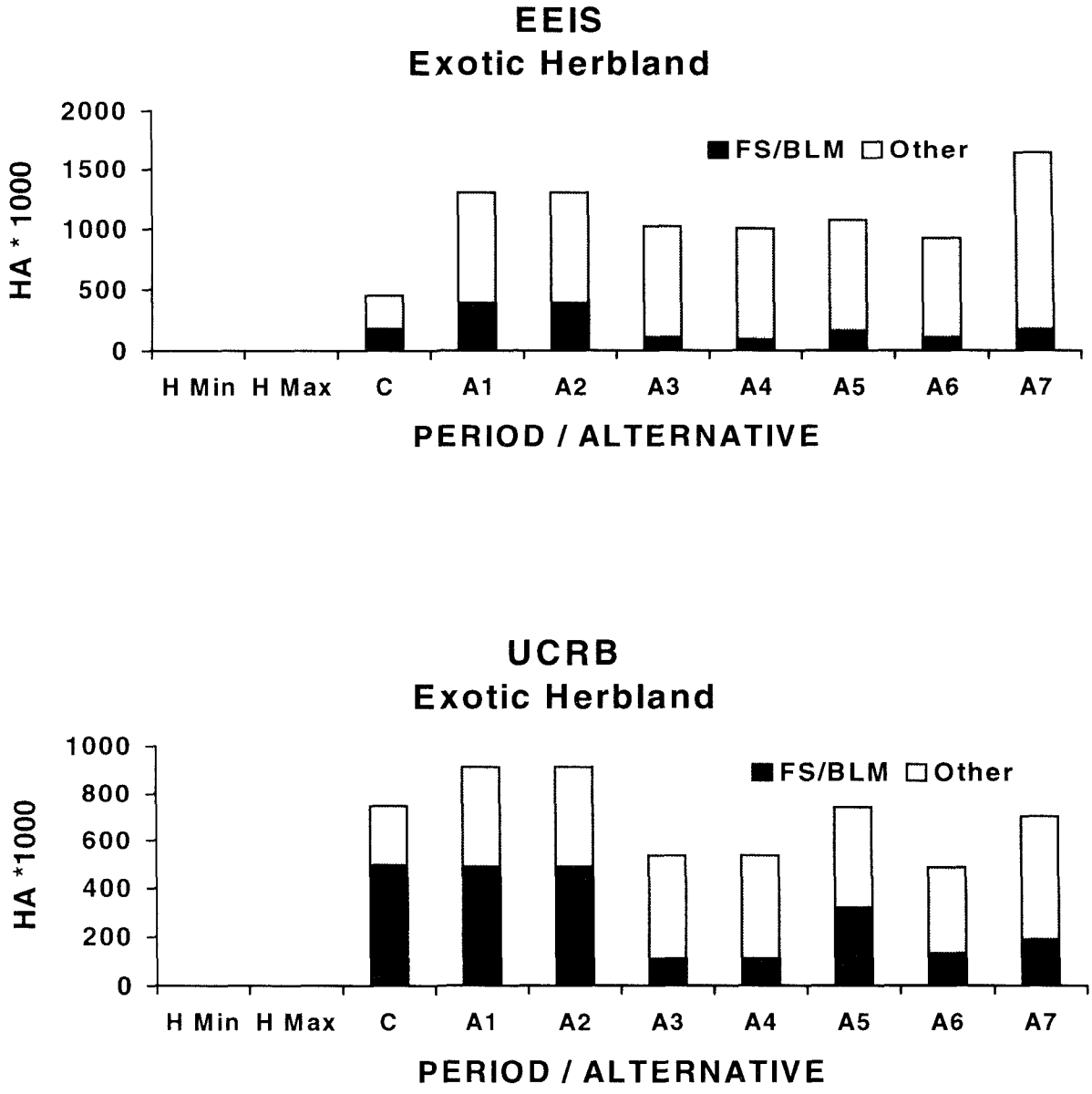


Figure 2.47 — Comparison of the historical range to current and future (100 year) projections for Alternatives 1 through 7 for the exotic herbland community for the Eastside and Upper Columbia River Basin EIS areas. Amount in Alternative 2 adjusted due to errors in modeling.

Late-seral Subalpine Single-layer Forest. Historically, this community was relatively rare within the Upper Columbia River Basin; its historical maximum extent did not appear to exceed 250,000 hectares. Virtually all of this community is found on BLM- and FS-administered lands within the Upper Columbia River Basin. All alternatives would substantially decrease this community's areal extent to within its historical range across the entire Upper Columbia River Basin, and across BLM- and FS-administered lands within the Basin (figure 2.39; tables 2.34 and 2.36). There was little substantial difference among the projections of any alternative.

Late-seral Subalpine Multi-layer Forest. All alternatives would substantially increase this community's areal extent to a level within it historical range across the Upper Columbia River Basin as a whole, and across BLM- and FS-administered lands within the Basin (figure 2.40; tables 2.34 and 2.36). There was little discernible difference among the projections for Alternatives 1 through 6; Alternative 7 would result in the largest area of this community within the Upper Columbia River Basin.

Upland Communities —

Upland Herbland. Primarily as a result of agricultural conversion on private ownerships, no alternative projections were similar to the historical range of the upland herbland community across the Upper Columbia River Basin as a whole (figure 2.41; tables 2.34 and 2.36). However, on BLM- and FS-administered lands, all alternatives except Alternative 2 would increase this community's areal extent to a level within its historical range. The 100-year projections did not vary substantially among the alternatives for either ownership stratum.

Upland Shrubland. Historically, the upland shrubland community comprised the largest proportion of the Upper Columbia River Basin, but currently its areal extent is somewhat less than the mid-seral montane forest. There was little variability among the simulation projections for the upland shrubland community (figure 2.42; tables 2.34 and 2.36). While the 100-year projections for the Upper Columbia River Basin as a whole fell well below the historical range for this community, all projections for BLM- and FS-administered lands were within the historical range.

Upland Woodland. The upland woodland community within the Upper Columbia River Basin is comprised almost entirely of the mixed-conifer woodland cover type. Historically, however, the upland woodland community composed a relatively small proportion of this basin. All alternatives would substantially increase the areal extent of upland woodlands to a level well above its historical range for the Upper Columbia River Basin as a whole and for BLM- and FS-administered lands (figure 2.43; tables 2.34 and 2.36). There was little variability among the projections of Alternative 1 through 6, which were somewhat greater than Alternative 7.

Riparian Communities —

Riparian Herbland, Shrubland, and Woodland. As stated previously, we could not accurately estimate the historical range of riparian communities, nor do we feel confident with our estimates for the current period and 100-year projections. The reason for this uncertainty is that our simulations were conducted at too coarse a scale, which overemphasized the very large patches and did not accurately portray outcomes.

The future trends, however, should generally be correct for All and Other lands. Alternatives 2 through 7 represent a more negative outcome than suggested by their objectives and the standards. Overall because of similar standards, there was little variability among the Alternatives 2 through 7 projections.

Exotic Herbland Communities —

Exotic Herbland. We are uncertain about our estimates of the areal extent of the exotic herbland community for both the current period and 100-year projections. However, on a relative basis

among alternatives the future trend should generally be correct. Some of our uncertainty about exotic herbland is related to the very conservative estimate we used for the exotic herbland's rate of increase, which means the exotic herbland community may likely increase at a faster rate than projected. Also, our 100-year projection for Alternative 2 is adjusted due to modeling difficulties to be similar to Alternative 1. The projected extent for exotic herblands under Alternative 7 may be too great relative to the other action alternatives (3 through 6), particularly for all ownerships in the UCRB EIS area. While exotic herblands will generally increase on BLM- and FS-administered lands in reserves, exotic herblands on land outside reserves will probably not increase more rapidly than under Alternative 3.

Additional detail relating to exotic herbland and the alternative outcomes is included in this chapter's discussion about the effects of alternatives on selected noxious weeds and cheatgrass.

Summary

We would recommend that any future analysis of broad-scale communities as terrestrial habitats use the physiognomic type groups stratified by potential vegetation group (PVG) or, for a coarser grouping, by forest and rangeland. The changing nature of lower montane, montane, subalpine and non-forest terrestrial communities in relation to existing vegetation cover types with no tie to the biophysical environment is a substantial hindrance to this analysis. Without the tie to the biophysical environment little inference can be made relative to temperature, moisture, soils, terrain, or consistency of the terrestrial communities with the biophysical system and inherent succession and disturbance processes.

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Terrestrial Community Departures

The lack of available information about the broad-scale habitat relationships and the population responses to habitat change for most plant and animal species occurring in the Interior Columbia River Basin creates difficulties for scientists and managers in predicting the effects of future habitat outcomes on the persistence of resident taxa (Hann and others, in press; Jones and Hann 1996). However, estimating broad-scale habitat departures from historical ranges of conditions provides an index of broad-scale vegetation changes in the context of natural systems. Further, determining how habitat changes with the dynamics of natural systems provides a means of conducting coarse-filter inferences of risks to species persistence (Hunter 1991).

A primary assumption of this coarse-filter approach to habitat assessment is that conservation of the areal extent of a community or habitat within its historical conditions should also allow species adapted to those ranges to persist into the future. In addition, we recognize that the fitness of many, if not most, species is also strongly correlated with the future condition of fine-scale habitat attributes. However, it is not feasible to compute a fine-scale habitat assessment of a future landscape having the extent and complexity of the Basin.

In our evaluation, we compared the current and projected future (alternative year 100) broad-scale habitat availabilities within a subbasin (see map 2.23) to a range of estimated historical conditions. *We assumed that a species' persistence within a subbasin was not at risk if the projected area of their primary habitat, as described in the Species-Environment Relations database (Marcot and others, in press), fell within the 75th percent mid-range of the historical data. We assumed that risk to persistence increased substantially when habitat availability fell below the 75th percent mid-range of the historical data. Furthermore, the likelihood of extirpation within a subbasin increased when habitat availability fell below the 100th percent range of the historical data. Conversely, persistence likelihood within a subbasin increased as habitat availability exceeded the 75th percent mid-range of the historical data.*

Methods of Evaluating Terrestrial Community Departures

Terrestrial community type departures were developed to estimate the magnitude of broad-scale habitat changes in forests and rangelands within subbasins. We used 1-km^2 (one square kilometer) resolution continuous broad-scale data, summarized by subbasin, to assess habitat departures of forest and rangeland ecosystems.

We aggregated 42 cover types and 25 structural stages into 24 terrestrial community types by further collapsing the communities having late-seral single-layer and late-seral multi-layer structures into a "late" class. Next, we estimated the departure from historical condition ranges by subbasin for 12 terrestrial communities, including nine forest terrestrial community types and three upland rangeland types (table 2.24). We estimated current departures for terrestrial community types that comprised at least one percent of the subbasin area for any output period of the historical simulated run, current period, or 100-year projection of an alternative.

Because their historical occurrences were typically underestimated and their current occurrences typically overestimated (Hann and others, in press; Jones and Hann 1996), the following communities were not included in the determination of departure values:

- Anthropogenic community types such as cropland, exotic herbland, and urban areas.
- Community types that remained relatively stable between historical and current periods such as alpine, rock/barren, and water types.
- Riparian community types.

Terrestrial community departures were determined by comparing the current and projected future areal extent of each type to modeled 75th and 100th percentile historical ranges of each type. Historical ranges were developed for individual subbasins using a single 400-year run of CRBSUM, and cover type and structural stage outputs for historical years 0, 50, 100, 200, 300, and 400. Initial conditions for the historical CRBSUM run and the methods for simulation are described in Long and others (1996).

Minimum and maximum values from the simulation were used to define the historical range. We then calculated the 75th percentile historical mid-range by adding or subtracting 12.5 percent of the historical range to the historical minimum and historical maximum, respectively. Five departure classes were defined based on the relationships between the current and projected future areas of each community type, relative to the simulated 75th and 100th percentile historical ranges (table 2.37, figure 2.48).

Current and projected alternative future departures of the 12 terrestrial community types for each subbasin were mapped using a computerized geographical inventory system (GIS) (Hann and others, in press). The 84 maps were then assessed for gross patterns of community departures across the Basin. The spatial distribution of community departures was summarized using the ERUs of the Basin developed by Jensen and others (in press).

We feel the errors in mapping the management prescriptions in Alternatives 2 and 7 discussed earlier in this chapter do not result in significant inaccuracies in this departure analysis. The community groups selected and the analytical techniques should substantially dampen the effects of those errors.

Results of Evaluating Terrestrial Community Departures

Percentages relative to the historical mid-range of a community in the following discussions relate to the increase or decrease from the current percent of communities in departure class 3, which is the historical mid-range, to the projected percent for the subject alternative. For example, for the early-seral lower montane forest discussed directly below for Alternative 1, the 1,000 percent increase relates to the increase from 4 to 47 percent of the subbasins having that community within their historical mid-range.

Alternative 1 Departures

Alternative 1 would decrease the average frequency of subbasin membership in class 1 and class 5 departures to 27 and 25 percent, respectively (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 36 percent. The 100-year projection for Alternative 1 indicated that the mid-seral lower montane forest, mid-seral montane forest, and upland woodland communities would differ the most in a positive direction from their historical conditions; at least 50 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. The early-seral montane and two upland communities, herbland and shrubland, would deviate the most in a negative direction; at least 59 percent of the subbasins would contain these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 1 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 1 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions. The number of subbasins having this community within its historical mid-range would increase by over 1,000 percent (table 2.39). This increase would primarily occur throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great

Basin, Columbia Plateau, and Southern Cascades ERUs (map 2.24).[1]

Mid-seral Lower Montane Forest. The 100-year projection of Alternative 1 indicated that virtually all subbasins in the Basin would contain the mid-seral lower montane forest community at a level well above its historical mid-range (table 2.39). This community's areal extent would dramatically increase across much of the forested areas of the Upper Columbia River Basin EIS area (UCRB), and also within the Upper Klamath ERU and adjacent areas of the Eastside EIS area (EEIS).

Late-seral Lower Montane Forest. Alternative 1 would increase the areal extent of this community substantially in respect to the current period. The number of subbasins having the late-seral lower montane forest community within its historical mid-range would increase by over 400 percent (table 2.39). This increase would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs. However, the areal extent of this community would decrease well below its historical mid-range throughout a substantial portion of the Southern Cascades ERU.

Early-seral Montane Forest. Alternative 1 would increase the number of subbasins having this community within its historical mid-range by 61 percent (table 2.39). However, the increasing trend would not be consistent across the Basin. Alternative 1 would result in a substantial areal increase of early-seral montane forests within many subbasins of the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Upper Snake, and Snake Headwaters ERUs, whereas a substantial areal decline would occur within the Northern Cascades, Blue Mountains, and Central Idaho Mountains ERUs.

Mid-seral Montane Forest. The 100-year projection for Alternative 1 indicated that the number of subbasins having the mid-seral montane forest community within its historical mid-range would increase by 61 percent (table 2.39). This would predominantly be attributed to an areal increase in mid-seral montane forests throughout the Central Idaho Mountains and Upper Klamath ERUs. Conversely, we projected areal declines of this community throughout many subbasins within the Northern Glaciated Mountains and Upper Clark Fork ERUs.

Late-seral Montane Forest. Alternative 1 would increase the number of subbasins having the late-seral montane forest community within its historical mid-range by almost 390 percent (table 2.39). This increase would predominantly be due to areal increases in late-seral forests throughout the North Cascades, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal declines of the late-seral montane community within the Southern Cascades and Upper Klamath ERUs would also increase the frequency of subbasins having this community within its historical mid-range. The Blue Mountains and Columbia Plateau ERUs would contain some subbasins with increases and others with decreases, which would increase the frequency of subbasins having the late-seral montane forest community within its historical mid-range.

Subalpine Community Departures in Alternative 1 —

Early-seral Subalpine Forest. The 100-year projection for Alternative 1 suggested that the number of subbasins having the early-seral subalpine forest community within its historical mid-range would increase by 180 percent (table 2.39). This increase would largely be due to areal declines in early-seral subalpine forests throughout the Central Idaho Mountains, Blue Mountains, and Snake Head-

[1]A total of 13 ERUs were delineated for the Basin based on terrestrial and aquatic biophysical environment, as well as social/economic criteria. These delineations were used extensively by the different Science Integration Team (SIT) staff areas in the reporting of assessment results at the regional level.

waters ERUs. An areal increase of the early-seral subalpine forest community within the Northern Glaciated Mountains ERU would also increase the frequency of subbasins having this community within its historical mid-range.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range would increase by 170 percent for the 100-year projection of Alternative 1 (table 2.39). This increase would primarily be due to areal increases of mid-seral subalpine forests throughout the Upper Klamath and Central Idaho ERUs. Areal declines of this community in several subbasins of the Upper Clark Fork ERU, and to a lesser extent the Northern Glaciated Mountains ERU, would also increase the frequency of subbasins having this community within its historical mid-range.

Late-seral Subalpine Forest. Alternative 1 would increase the frequency of subbasins having the late-seral subalpine forest community within its historical mid-range by 367 percent (table 2.39). This increase would predominantly be due to an areal increase of late-seral subalpine forests throughout the Northern Cascades, Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Upper Snake ERUs. Areal declines of this community in several subbasins of the Upper Klamath would also increase the frequency of subbasins having this community within its historical mid-range.

Upland Community Departures in Alternative 1 —

Upland Herbland. The 100-year projection for Alternative 1 suggested that the frequency of subbasins having areas of the upland herbland community within its historical mid-range would increase by 117 percent (table 2.40). This increase would largely be due to an areal increase of upland herbland within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. The 100-year projection for Alternative 1 indicated that the frequency of subbasins having an areal extent of the upland herbland community within its historical mid-range would remain about the same as the current period (table 2.40). However, the spatial distribution of these subbasins would change substantially. The most obvious changes would be an increase in class 3 subbasins within the Central Idaho Mountains ERU, and a decrease in class 3 subbasins within the western portion of the Northern Great Basin ERU.

Upland Woodland. Alternative 1 would increase the frequency of subbasins containing areas of the upland woodland community within its historical mid-range by 62 percent (table 2.40). However, those subbasins having a substantial component of this community would be dominated by class 5 departures. The increased number of subbasins falling within the historical mid-range would largely be due to areal increases of the upland

Table 2.37—Terrestrial community departure classes.

Departure Class	Relationship of Current Area to Historical Ranges
1	Current area is smaller than minimum historical range.
2	Current area is equal to or greater than historical minimum, and equal to or less than 75 percent historical mid-range.
3	Current area is within 75 percent of historical mid-range.
4	Current area is greater than 75 percent historical mid-range, and equal to or less than historical maximum.
5	Current area is greater than historical maximum.

woodland community within subbasins of the Central Idaho Mountains ERU. In addition, areal declines of upland woodland in the Columbia Plateau and Owyhee Uplands ERUs would also contribute to an increased frequency of class 3 subbasins.

Alternative 2 Departures

Alternative 2 would decrease the average frequency of subbasin membership in class 1 and class 5 departures to 27 and 25 percent, respectively (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 36 percent. The 100-year projection for Alternative 2 suggested that the mid-seral lower montane forest and upland woodland communities would deviate the most, in a positive direction, from historical conditions; at least 72 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. The upland herbland and upland shrubland communities would deviate the most in a negative direction; at least 63 percent of the subbasins would contain these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

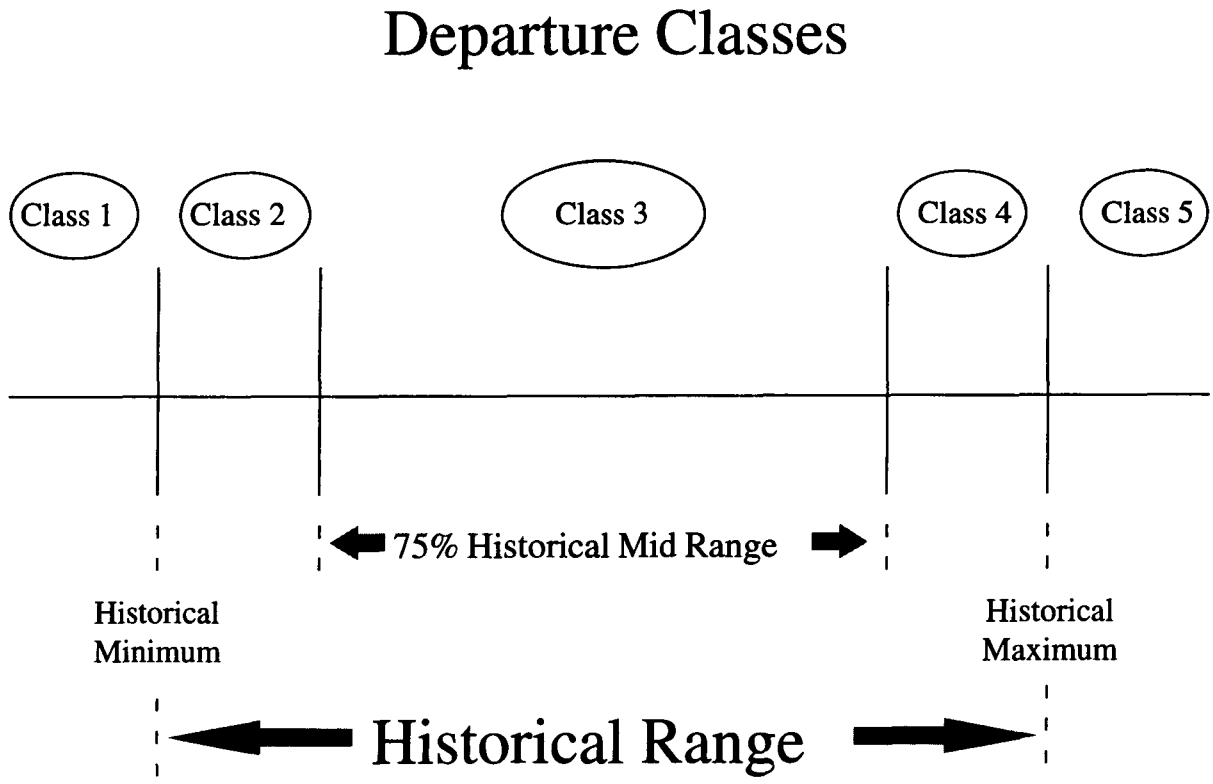


Figure 2.48 — Relationship between current areal extent of broad-scale terrestrial communities and their respective historical ranges.

Table 2.38 — Average subbasin frequency distribution across 12 terrestrial community group departure classes.

	Percent of Subbasin by Departure Class[1]				
Alternative	1	2	3	4	5
Current	47.6	8.3	13.8	2.3	28.0
1	27.0	8.8	35.8	3.7	24.8
2	26.9	8.7	35.8	3.6	25.1
3	27.3	8.8	32.4	4.2	27.3
4	27.6	8.6	31.9	4.4	27.5
5	26.8	8.7	33.7	3.9	26.9
6	26.6	9.3	33.7	4.2	26.4
7	25.2	8.0	40.6	3.3	22.8

[1]Departure class: See table 2.37 and figure 2.48.
Due to rounding, total percents of departures classes may sum to more or less than 100 percent.

Montane Community Departures in Alternative 2 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 2 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions; the number of subbasins having this community within its historical mid-range would increase by 950 percent (table 2.39). This would largely occur throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great Basin, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. The 100-year projection of Alternative 2 indicated that virtually all subbasins within the Basin would contain the mid-seral lower montane forest community at a level well above its historical mid-range (table 2.39). The areal extent of this community would increase dramatically across much of the forested areas of the Upper Columbia River Basin, and also within the Upper Klamath ERU and adjacent areas of the Eastside EIS area.

Late-seral Lower Montane Forest. Alternative 2 would substantially increase the availability of the late-seral lower montane forest community above the current conditions. The number of subbasins having the areal extent of this community type within its historical mid-range would increase by over 400 percent (table 2.39). Its areal increase would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs. However, the area of the late-seral lower montane forest community would decrease to a point well below its historical mid-range throughout a substantial portion of the Southern Cascades ERU.

Early-seral Montane Forest. Alternative 2 would increase the number of subbasins having the early-seral montane forest community within its historical mid-range by 83 percent. However, this increasing trend would not be consistent across all subbasins within the Basin (table 2.39). Alternative 2 would result in a substantial areal increase of early-seral montane forests within many subbasins of the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs. However, substantial areal declines of these forests would occur within the Blue Mountains and Central Idaho Mountains ERUs. In addition, the early-seral montane forest community would decrease substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within its southern half.

Map 2.23 – Subbasins (4th field hydrologic unit codes) of the Basin. There are 164 subbasins and portions of subbasins in the Basin, and they range from approximately 500,000 to 1,000,000 hectares in size. This stratification was the basic data element for addressing ecological integrity and landscape patterns.

Table 2.39 — Summary of subbasin frequency distribution by current and projected future (alternative year 100) forest terrestrial community group departures.

Terrestrial Community Group	Alternative	Number of Subbasins[1]	Percent Subbasin by Departure Class[2]				
			1	2	3	4	5
Lower Montane Early-seral Forest	Current	117	79	15	4	1	2
	1	119	20	19	47	3	11
	2	118	31	20	42	1	7
	3	118	17	20	45	3	15
	4	118	17	21	45	2	15
	5	118	19	20	42	3	15
	6	118	19	22	42	2	15
	7	119	30	17	45	0	8
Lower Montane Mid-seral Forest	Current	125	23	5	10	3	58
	1	124	0	0	2	2	95
	2	124	0	0	6	2	92
	3	124	0	0	10	9	81
	4	124	0	0	12	6	81
	5	124	0	0	10	7	83
	6	124	0	0	12	6	82
	7	124	0	0	13	4	83
Lower Montane Late-seral Forest	Current	125	78	8	7	0	6
	1	125	45	8	38	3	6
	2	125	48	4	37	3	8
	3	125	37	8	35	5	15
	4	125	37	10	34	5	15
	5	125	39	7	36	4	14
	6	125	39	8	33	6	14
	7	125	41	6	37	4	12
Montane Early-seral Forest	Current	136	44	7	18	4	28
	1	136	51	8	29	1	11
	2	135	32	8	33	4	23
	3	135	41	11	30	2	16
	4	135	42	13	26	1	17
	5	135	40	12	31	1	16
	6	135	42	12	30	1	16
	7	135	32	8	34	4	22
Montane Mid-seral Forest	Current	133	19	3	19	2	57
	1	130	2	2	34	12	51
	2	130	5	5	38	12	40
	3	130	3	5	42	11	39
	4	130	3	4	44	12	38
	5	130	1	5	42	12	41
	6	130	1	6	42	10	41
	7	130	11	5	46	6	32

Table 2.39 (continued)

Terrestrial Community Group	Alternative	Number of Subbasins[1]	Percent Subbasin by Departure Class[2]				
			1	2	3	4	5
Montane							
Late-seral Forest	Current	127	59	4	9	1	27
	1	126	34	10	44	2	9
	2	128	27	9	43	5	15
	3	127	30	7	46	4	13
	4	127	30	6	45	6	13
	5	127	28	11	44	4	13
	6	127	28	8	46	5	14
	7	128	23	4	48	6	19
Subalpine							
Early-seral Forest	Current	75	21	3	20	0	56
	1	70	9	13	56	6	17
	2	70	9	14	54	6	17
	3	72	4	10	29	4	53
	4	73	3	10	26	5	56
	5	73	4	8	38	4	45
	6	71	4	13	38	7	38
	7	70	11	14	66	1	7
Subalpine							
Mid-seral Forest	Current	90	38	9	20	3	30
	1	92	13	9	54	3	21
	2	91	16	16	48	5	13
	3	90	28	9	42	4	17
	4	90	29	7	42	4	18
	5	90	28	7	46	3	17
	6	90	29	6	44	3	18
	7	90	13	10	60	4	12
Subalpine							
Late-seral Forest	Current	91	63	9	12	0	16
	1	91	23	10	56	3	8
	2	91	20	11	57	0	12
	3	91	37	8	45	1	9
	4	91	35	9	46	1	9
	5	91	35	7	47	3	8
	6	91	30	11	48	1	10
	7	91	12	10	51	4	23

[1]Subbasins (4th field HUCs) having at least 1 percent of the terrestrial community group.

[2]Departure class: See table 2.37 and figure 2.48.
Due to rounding, total percents of departure classes may sum to more or less than 100 percent.

Mid-seral Montane Forest. The number of subbasins having the mid-seral montane forest community within its historical mid-range would nearly double as a result of implementing Alternative 2 (table 2.39). The increased number of subbasins falling within the historical mid-range would primarily be due to areal increases in mid-seral montane forests throughout the Central Idaho Mountains, Upper Klamath, and Northern Great Basin ERUs. In addition, our projected declines of this community throughout many subbasins within the Northern Glaciated Mountains, Lower Clark Fork, and Upper Clark Fork ERUs would also increase the frequency of class 3 departures.

Map 2.24 – The Ecological Reporting Units (ERUs) of the Basin. ERUs are aggregates of subwatersheds (6th field hydrologic unit codes) that generally represent similar terrestrial and aquatic characteristics.

Table 2.40 — Summary of subbasin frequency distribution (percent) by current and future (alternative year 100) range community group departure classes.

Terrestrial Community Group	Alternative	Number of Subbasins[1]	Percent Subbasin by Departure Class[2]				
			1	2	3	4	5
Upland Herbland	Current	145	66	15	12	0	7
	1	145	59	9	26	3	3
	2	145	63	6	31	0	1
	3	145	61	7	29	2	1
	4	145	61	6	26	4	3
	5	145	61	6	30	1	1
	6	145	59	9	26	3	3
	7	145	56	5	37	0	3
Upland Shrubland	Current	129	47	14	22	8	9
	1	128	63	13	22	2	1
	2	128	70	10	18	2	1
	3	128	62	15	20	2	1
	4	128	65	12	20	2	1
	5	128	62	16	20	2	1
	6	128	63	13	22	2	1
	7	129	65	12	22	0	1
Upland Woodland	Current	104	34	7	13	6	40
	1	94	5	4	21	4	65
	2	95	2	1	22	3	72
	3	94	7	5	16	3	68
	4	94	9	5	17	5	64
	5	94	4	5	18	3	69
	6	94	5	4	21	4	65
	7	98	8	5	28	7	52

[1]Subbasins (4th field HUCs) having at least 1 percent of the terrestrial community group.

[2]Departure class: See table 2.37 and figure 2.48.
Due to rounding, the percent totals for departure classes may sum to more or less than 100 percent.

Late-seral Montane Forest. The 100-year projection for Alternative 2 indicated that the number of subbasins having the late-seral montane forest community within its historical mid-range would increase by 378 percent (table 2.39). This increase would largely be due to areal increases in late-seral forests throughout the North Cascades, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal decreases in the late-seral montane community within the Southern Cascades and Upper Klamath ERUs would also increase the frequency of subbasins having this community within its historical mid-range. The Blue Mountains and Columbia Plateau ERUs would have some subbasins with areal increases and others with areal declines, which would increase the frequency of subbasins having this community within its historical mid-range.

Subalpine Community Departures in Alternative 2 —

Early-seral Subalpine Forest. Alternative 2 would increase the number of subbasins having the early-seral subalpine forest community within its historical mid-range by 170 percent (table 2.39). This increase would primarily be a result of areal decreases in early-seral subalpine forests throughout the Central Idaho Mountains, Blue

Mountains, and Snake Headwaters ERUs. Areal increases of the early-seral subalpine forest community within the Northern Glaciated Mountains ERU would also increase the frequency of subbasins having this community within its historical mid-range.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range would increase by 140 percent as a result of implementing Alternative 2 (table 2.39). This increase would largely be due to an increase of mid-seral subalpine forests throughout the Southern Cascades and Central Idaho Mountains ERUs. Areal declines of this community in several subbasins of the Lower Clark Fork, Upper Clark Fork, and the Northern Glaciated Mountains ERUs would also increase the frequency of subbasins having the mid-seral subalpine forest community within its historical range mid-range.

Late-seral Subalpine Forest. Alternative 2 would increase the frequency of subbasins having the late-seral subalpine forest community within its historical mid-range by 375 percent (table 2.39). This increase would predominantly be due to areal increases of late-seral subalpine forests throughout the Northern Cascades, Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Upper Snake ERUs. Conversely, the areal declines of this community in several subbasins of the Upper Klamath and Central Idaho Mountains ERUs would also increase the frequency of subbasins having this community within its historical mid-range.

Upland Community Departures in Alternative 2 —

Upland Herbland. The 100-year projection for Alternative 2 indicated that the frequency of subbasins having areas of upland herbland community at levels within its historical mid-range would increase by 158 percent relative to the current period (table 2.40). This increase would mostly be attributed to the areal increase of upland herbland within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. Relative to the current period, Alternative 2 would not substantially change the frequency of subbasins having the upland shrubland community within its historical mid-range (table 2.40). However, the spatial distribution of these subbasins would change substantially. The most obvious changes expected would be an increase of class 3 subbasins in the Central Idaho Mountains ERU, and a decrease of class 3 subbasins in the western portion of the Northern Great Basin ERU.

Upland Woodland. Alternative 2 would increase the frequency of subbasins having areas of the upland woodland community within its historical mid-range by 69 percent (table 2.40). However, as with the current period, the Basin would still be dominated by class 5 departures. The increased number of those subbasins falling within the historical mid-range would predominantly be due to areal increases of the upland woodland community within subbasins of the Central Idaho Mountains ERU. In addition, the areal declines of upland woodland in the Columbia Plateau and Owyhee Uplands ERUs would also contribute to an increased frequency of class 3 subbasins.

Alternative 3 Departures

Alternative 3 would decrease the average frequency of subbasin memberships in class 1 and class 5 departures to 27 percent (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 32 percent. The 100-year projection for Alternative 3 indicated that the mid-seral lower montane forest, early-seral subalpine forest, and upland woodland communities would deviate the most, in a positive direction, from historical conditions; at least 53 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. Two upland communities, herbland and shrubland, would deviate the most in a negative direction; at least 61 percent of the subbasins

would contain these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 3 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 3 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions; the number of subbasins having this community within its historical mid-range would increase by over 1,000 percent (table 2.39). This increase would largely occur primarily throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great Basin, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. The 100-year projection for Alternative 3 indicated that virtually all subbasins within the Basin would contain the mid-seral lower montane forest community at a level well above its historical mid-range (table 2.39). This community would increase substantially across much of the forested areas of the Upper Columbia River Basin area, within the Upper Klamath ERU, and in adjacent areas of the Eastside EIS area.

Late-seral Lower Montane Forest. Alternative 3 would increase the availability of the late-seral lower montane forest community substantially from its current condition; the number of subbasins having this community within its historical mid-range would increase by over 400 percent (table 2.39). The increased number of subbasins having areas of this community type within its historical mid-range would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs.

Early-seral Montane Forest. The 100-year projection for Alternative 3 indicated that the number of subbasins having the early-seral montane forest within its historical mid-range would increase by 67 percent (table 2.39). However, the trends of this community would vary spatially across the Basin. Alternative 3 would result in a substantial increase of early-seral montane forests within many subbasins of the Northern Glaciated Mountains (especially in the north Idaho and northwestern Montana portions), Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs. However, there would be a substantial decrease of the early-seral montane forests within the Blue Mountains and Central Idaho Mountains ERUs. In addition, the areal extent of the early-seral montane forest community would decrease substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within its southern half.

Mid-seral Montane Forest. Although Alternative 3 would increase the number of subbasins having the mid-seral montane forest community within its historical mid-range by 121 percent, half of the subbasins would still contain areas of this community above its historical mid-range (table 2.39). The increased number of subbasins falling within the historical mid-range would be due predominantly to areal increases in mid-seral forests throughout the Central Idaho Mountains and Upper Klamath ERUs. In addition, we projected areal declines of this community throughout many subbasins within the Northern Glaciated Mountains, Lower Clark Fork, and Upper Clark Fork ERUs, which would also increase the frequency of subbasins having this community within its historical mid-range.

Late-seral Montane Forest. The 100-year projection for Alternative 3 suggested that the number of subbasins having the late-seral montane forest community within its historical mid-range would increase by 411 percent (table 2.39). This increase would occur largely because of areal increases in late-seral montane forests throughout the Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal declines in the late-seral montane forest community within the Southern Cascades and Upper Klamath ERUs would also increase the frequency

of subbasins having this community within its historical mid-range.

The Blue Mountain and Columbia Plateau ERUs would contain some subbasins with upward trends and others with downward trends, which would also increase the frequency of subbasins having the late-seral montane forest within its historical mid-range.

Subalpine Community Departures in Alternative 3 —

Early-seral Subalpine Forest. Alternative 3 would increase the frequency of subbasins having the early-seral subalpine forest community within its historical mid-range by 45 percent, yet the Basin would still be dominated by subbasins where this community would occur well above its historical mid-range (table 2.39). The increased number of subbasins falling within the historical mid-range would predominantly be due to areal declines of early-seral forests throughout the northern portion of the Central Idaho Mountains ERU.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range would increase by 110 percent for the 100-year projection of Alternative 3 (table 2.39). This increase would predominantly be due to increases of mid-seral subalpine forests throughout the Central Idaho Mountains ERU. Areal declines of this community that would occur in several subbasins of the Lower and Upper Clark Fork ERUs would also increase the frequency of subbasins having this community within its historical mid-range.

Late-seral Subalpine Forest. Alternative 3 would increase the proportion of subbasins having the late-seral subalpine forest community within its historical mid-range by 275 percent (table 2.39). This increase would predominantly be due to areal increases of late-seral subalpine forests throughout the Northern Glaciated Mountains, Lower Clark Fork, and Upper Clark Fork ERUs. Areal declines that would occur in several subbasins of the Upper Klamath and Central Idaho Mountains ERUs would also increase the frequency of subbasins having this community within its historical mid-range.

Upland Community Departures in Alternative 3 —

Upland Herbland. The 100-year projection for Alternative 3 indicated that the frequency of subbasins having areas of the upland herbland community within its historical mid-range would increase by 142 percent (table 2.40). This increase would predominantly occur within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. Alternative 3 would decrease the frequency of subbasins having the upland shrubland community within its historical mid-range by approximately 9 percent (table 2.40). This decrease would be attributed primarily to the loss of upland shrubland across subbasins within the Northern Great Basin. However, an increase of class 3 subbasins was projected within the Central Idaho Mountains and Snake Headwater ERUs.

Upland Woodland. The 100-year projection for Alternative 3 indicated that the frequency of subbasins having areas of the upland woodland community within its historical mid-range would increase by 23 percent (table 2.40). However, the Basin would still be dominated by subbasins having this community well above its historical mid-range. The increased number of subbasins falling within the historical mid-range would predominantly be due to areal increases in upland woodland within subbasins of the Central Idaho Mountains ERU.

Alternative 4 Departures

Alternative 4 would decrease the average frequency of subbasin membership in class 1 and class 5 departures to 28 percent (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 33 percent. The

100-year projection for Alternative 4 indicated that the mid-seral lower montane forest, early-seral subalpine forest, and upland woodland communities would deviate the most, in a positive direction, from historical conditions; at least 56 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. The upland herbland and upland shrubland communities would deviate the most in a negative direction; at least 61 percent of the subbasins would contain these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 4 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 4 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions; the number of subbasins having areas of this community within its historical mid-range would increase by over 1,000 percent (table 2.39). This increase would primarily occur throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great Basin, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. This community would occur well above its historical mid-range in virtually all subbasins of the Basin after 100 years of implementing Alternative 4 (table 2.39). The mid-seral lower montane forest would increase substantially across much of the forested areas of the Upper Columbia River Basin area, within the Upper Klamath ERU, and in adjacent areas of the Eastside EIS area.

Late-seral Lower Montane Forest. The 100-year projection for Alternative 4 indicated that the availability of the late-seral lower montane forest community would increase substantially from the current conditions. The number of subbasins having this community within its historical mid-range would increase by approximately 385 percent (table 2.39). This increase would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs.

Early-seral Montane Forest. Alternative 4 would increase the number of subbasins containing the early-seral montane forest community within its historical mid-range by 44 percent. However, spatial variations across the Basin were apparent (table 2.39). Alternative 4 would result in a substantial increase of early-seral montane forests within many subbasins of the Northern Glaciated Mountains (especially in the north Idaho and northwestern Montana portions), Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs. However, there would be a substantial areal decline of the early-seral montane forest community within the Blue Mountains and Central Idaho Mountains ERUs. The early-seral montane forest community would decrease substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within the southern half.

Mid-seral Montane Forest. Alternative 4 would increase the number of subbasins having the mid-seral montane forest community within its historical mid-range by 132 percent (table 2.39). This increase would predominantly be due to increases in mid-seral forest throughout the Central Idaho Mountains and Upper Klamath ERUs. Areal declines of this community were projected throughout many subbasins within the Northern Glaciated Mountains, Lower Clark Fork, and Upper Clark Fork ERUs, which also would increase the frequency of subbasins having this community within its historical mid-range.

Late-seral Montane Forest. The 100-year projection for Alternative 4 suggested that the number of subbasins having the late-seral montane forest community within its historical mid-range would increase by 400 percent (table 2.39). This increase would largely be due to increases in the late-seral montane forest community throughout the Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal

declines of the late-seral montane forest community within the Southern Cascades and Upper Klamath ERUs would also increase the frequency of subbasins having this community at a level within its historical mid-range. The Blue Mountains and Columbia Plateau ERUs would have some subbasins with increases and others with decreases, which would also increase the frequency of subbasins having the late-seral montane forest community within its historical mid-range.

Subalpine Community Departures in Alternative 4 —

Early-seral Subalpine Forest. Alternative 4 would increase the number of subbasins having the early-seral subalpine forest community within its historical mid-range by 30 percent. However, the Basin would still be dominated by subbasins having this community well above its historical mid-range (table 2.39). The increase of those subbasins that had this community within its historical mid-range would predominantly be due to areal declines in the early-seral forest community throughout the northern portion of the Central Idaho Mountains ERU.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range increased by 110 percent for the 100-year projection of Alternative 4 (table 2.39). This increase was largely due to areal increases in mid-seral subalpine forests throughout the Central Idaho ERU. Areal declines in this community that would occur in several subbasins of the Lower Clark Fork and Upper Clark Fork ERUs would also increase the frequency of subbasins having this community at a level within its historical mid-range.

Late-seral Subalpine Forest. The number of subbasins having the mid-seral subalpine forest community within its historical mid-range increased by 283 percent for the 100-year projection of Alternative 4 (table 2.39). This increase was predominantly due to increases in late-seral subalpine forests throughout the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, and Snake Headwaters ERUs. Areal declines of this community that would occur in several subbasins of the Upper Klamath and Central Idaho Mountains ERUs would also increase the frequency of subbasins having this community within its historical mid-range.

Upland Community Departures in Alternative 4 —

Upland Herbland. Alternative 4 would increase the frequency of subbasins having the upland herbland community within its historical mid-range by 117 percent (table 2.40). This increase would largely be due to increases in upland herbland within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. The 100-year projection for Alternative 4 indicated that the frequency of subbasins having areas of the upland herbland community at levels within the historical mid-range would decrease by approximately nine percent (table 2.40). This decrease would be attributed primarily to the loss of upland shrubland across subbasins within the Northern Great Basin ERU. However, the simulations indicated an increase of class 3 subbasins within the Snake Headwater ERU.

Upland Woodland. Alternative 4 would increase the number of subbasins having the upland woodland community within its historical mid-range by 31 percent (table 2.40). However, those subbasins having a substantial component of the upland woodland community would be dominated by class 5 departures. The increase of those subbasins falling within the historical mid-range would predominantly be due to increases in the upland woodland community in subbasins within the Central Idaho Mountains and Upper Klamath ERUs. In addition, areal declines of the upland woodland community in the Blue Mountains and Owyhee Uplands ERUs would also contribute to an increased frequency of class 3 subbasins.

Alternative 5 Departures

Alternative 5 would decrease the average frequency of subbasin memberships in class 1 and 5 departures to 27 percent (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 34 percent. The 100-year projection for Alternative 5 indicated that the mid-seral lower montane forest and upland woodland communities would deviate the most, in a positive direction, from historical conditions; at least 69 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. The upland herbland and upland shrubland communities would deviate the most in a negative direction; at least 61 percent of the subbasins would contain these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 5 —

Early-seral Lower Montane Forest. Alternative 5 would substantially increase the availability of the early-seral lower montane forest community relative to current conditions. The number of subbasins containing levels of this community within its historical mid-range would increase by 950 percent (table 2.39). This increase would occur primarily in the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great Basin, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. The 100-year projection for Alternative 5 indicated that virtually all subbasins within the Basin would contain the mid-seral lower montane forest community at levels well above its historical mid-range (table 2.39). The areal extent of this community would increase across much of the forested areas of the Upper Columbia River Basin EIS area, within the Upper Klamath ERU, and in areas within the Eastside EIS area adjacent to the Upper Klamath ERU.

Late-seral Lower Montane Forest. Under Alternative 5, the availability of the late-seral lower montane forest community would increase substantially from the current conditions. The number of subbasins that contained levels of this community within its historical mid-range would increase by over 400 percent (table 2.39). The increase of this community type would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs.

Early-seral Montane Forest. The 100-year projection for Alternative 5 suggested that the number of subbasins having the early-seral montane community within its historical mid-range would increase by 72 percent. However, trends of the early-seral montane forest community were not consistent throughout the Basin (table 2.39). Alternative 5 would result in substantial increases of early-seral montane forests within many subbasins of the Northern Glaciated Mountains (especially in the north Idaho and northwestern Montana portions), Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs. However, there would be substantial areal declines of the community type in the Blue Mountains and Central Idaho Mountains ERUs. Similarly, the early-seral montane forest community would decrease substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within the southern half.

Mid-seral Montane Forest. Alternative 5 would increase the number of subbasins having the mid-seral montane forest community within its historical mid-range by 121 percent (table 2.39). This increase would predominantly be due to increases in mid-seral forests throughout the Central Idaho Mountains and Upper Klamath ERUs. Conversely, we projected decreases in this community throughout many subbasins within the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, and Snake Headwaters ERUs.

Late-seral Montane Forest. The 100-year projection for Alternative 5 indicated that the number of subbasins having the late-seral montane forest

community within its historical mid-range would increase by 389 percent (table 2.39). Increases where amounts were below HRV would largely occur throughout the Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Decreases in the late-seral montane forest community within the Southern Cascades and Upper Klamath ERUs where amounts were above HRV would also increase the frequency of subbasins having this community within its historical mid-range. The Blue Mountains and Columbia Plateau ERUs would contain some subbasins with increases and others with decreases, which would improve the frequency of subbasins having the late-seral montane forest community within its historical mid-range.

Subalpine Community Departures in Alternative 5 —

Early-seral Subalpine Forest. Alternative 5 would nearly double the number of subbasins having the early-seral subalpine forest community within its historical mid-range (table 2.39). This increase would largely be due to decreases in the early-seral subalpine forest throughout the Central Idaho Mountains ERU. Increases in the early-seral subalpine forest community within the Northern Glaciated Mountains ERU would also increase the frequency of subbasins having this community at a level within its historical mid-range.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range would increase by 130 percent for the 100-year projection of Alternative 5 (table 2.39). This increase would predominantly be due to increases in mid-seral subalpine forests throughout the Central Idaho ERU. Decreases in this community that would occur in several subbasins of the Lower Clark Fork and Upper Clark Fork ERUs would also increase the frequency of subbasins having this community type at a level within its historical mid-range.

Late-seral Subalpine Forest. Alternative 5 would increase the frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range by 292 percent (table 2.39). This increase would mostly be attributed to increases in late-seral subalpine forests throughout the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, and Snake Headwaters ERUs. Decreases in this community, which would occur in several subbasins of the Upper Klamath and Central Idaho Mountains, would also increase the frequency of subbasins having this community at historical mid-range levels.

Upland Community Departures in Alternative 5 —

Upland Herbland. The 100-year projection for Alternative 5 indicated that the number of subbasins having the upland herbland community within its historical mid-range would increase by 150 percent relative to the current period (table 2.40). This increase would primarily be due to areal increases in upland herbland within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. Alternative 5 would not increase the frequency of subbasins having the upland herbland community within its historical mid-range; in fact, the frequency of subbasins would decrease by approximately 9 percent (table 2.40). This decrease would be attributed primarily to the loss of the upland shrubland community within subbasins of the Northern Great Basin ERU.

Upland Woodland. The 100-year projection for Alternative 5 indicated that the frequency of subbasins having areas of the upland woodland community within its historical mid-range would increase by 38 percent (table 2.40). However, subbasins having a substantial component of the upland woodland community would still be dominated by class 5 departures. The increased number of subbasins within the historical mid-range would primarily be attributed to areal increases in the upland woodland community within subbasins of the Central Idaho Mountains and Upper Klamath ERUs. In addition, areal declines of

upland woodland in the Owyhee Uplands ERU would contribute to an increased frequency of class 3 subbasins.

Alternative 6 Departures

Alternative 6 would decrease the average frequency of subbasin membership in classes 1 and 5 departures to 26 percent (table 2.38). Similarly, the average frequency of communities within class 3 departures would increase to 34 percent. The 100-year projection for Alternative 6 indicated that the mid-seral lower montane forest and upland woodland communities would differ the most, in a positive direction, from historical conditions; at least 65 percent of the subbasins would contain these communities at levels well above their historical ranges. The upland herbland and upland shrubland communities would diverge the most in a negative direction; at least 59 percent of the subbasins would contain these communities at levels well below their historical ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 6 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 6 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions; the amount of subbasins having levels of this community within its historical mid-range would increase by 950 percent (table 2.39). This increase would largely occur throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Northern Great Basin, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. The 100-year projection for Alternative 6 indicated that virtually all subbasins within the Basin would contain the mid-seral lower montane forest community at levels well above its historical mid-range (table 2.39). The areal extent of the mid-seral lower montane forest community would increase substantially across much of the forested areas of the Upper Columbia River Basin area, within the Upper Klamath ERU, and in areas within the Eastside EIS area adjacent to the Upper Klamath ERU.

Late-seral Lower Montane Forest. Alternative 6 would substantially increase the availability of the late-seral lower montane forest community relative to the current conditions. The number of subbasins having this community within its historical mid-range would increase by approximately 370 percent (table 2.39). This increase would occur predominantly within the Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs.

Early-seral Montane Forest. Under Alternative 6, the number of subbasins having the early-seral montane community within its historical mid-range would increase by 67 percent. However, this increasing trend would not be consistent across the Basin. Alternative 6 would result in a substantial increase of this community within many subbasins of the Northern Glaciated Mountains (especially in the north Idaho and northwestern Montana portions), Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs. However, there would be a substantial areal decline within the Blue Mountains and Central Idaho Mountains ERUs. In addition, the early-seral montane forest community would decline substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within the southern half.

Mid-seral Montane Forest. Alternative 6 would increase the number of subbasins having the mid-seral montane forest community within its historical mid-range by 121 percent (table 2.39). This increase would largely be attributed to increases in mid-seral montane forests throughout the northern portion of the Central Idaho Mountains and southern portion of the Upper Klamath ERUs. Conversely, we projected decreases in this community throughout many subbasins within the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Blue Mountains, and Snake Headwaters ERUs.

Late-seral Montane Forest. The 100-year projection for Alternative 6 indicated that the frequency of subbasins having the late-seral montane forest community within its 75 percent historical mid-range would increase by 411 percent (table 2.39). This increase would predominantly be due to increases of late-seral montane forests throughout the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal declines of the late-seral montane forest community within the Southern Cascades ERU would also increase the frequency of subbasins having this community within its historical mid-range. The Blue Mountains and Columbia Plateau ERUs would contain some subbasins with increases and others with decreases, which would also improve the frequency of subbasins having the late-seral montane forest community within its historical mid-range.

Subalpine Community Departures in Alternative 6 —

Early-seral Subalpine Forest. Alternative 6 would nearly double the number of subbasins having the early-seral subalpine forest community within its historical mid-range (table 2.39). This increase would largely be due to decreases in early-seral forests throughout the Central Idaho Mountains ERU. Areal increases of the early-seral subalpine forest community within the Northern Glaciated Mountains ERU would also increase the frequency of subbasins having this community within its historical mid-range.

Mid-seral Subalpine Forest. The proportion of subbasins having the mid-seral subalpine forest community within its historical mid-range would increase by 120 percent for the 100-year projection of Alternative 6 (table 2.39). This increase would predominantly be due to increases in mid-seral subalpine forests throughout the Central Idaho Mountains and Snake Headwaters ERUs. Expected decreases in this community in several subbasins of the Lower Clark Fork and Upper Clark Fork ERUs would also increase the frequency of subbasins having this community within its historical mid-range.

Late-seral Subalpine Forest. The number of subbasins having the late-seral subalpine forest community within its historical mid-range would increase by 300 percent for the 100-year projection of Alternative 6 (table 2.39). This increase would predominantly be due to increases in late-seral subalpine forests throughout the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, and Snake Headwaters ERUs. Expected areal decline of this community in several subbasins of the Central Idaho Mountains ERU would also increase the frequency of subbasins having this community at a level within its historical mid-range.

Upland Community Departures in Alternative 6 —

Upland Herbland. The 100-year projection for Alternative 6 indicated that the frequency of subbasins having areas of the upland herbland community within its historical mid-range would increase by 117 percent (table 2.40). This increase would largely be due to areal increases of upland herbland within the Columbia Plateau, Northern Great Basin, and Owyhee Uplands ERUs.

Upland Shrubland. Alternative 6 would not substantially change the frequency of subbasins containing areas of the upland herbland community within its historical mid-range (table 2.40) However, the spatial distribution of class 3 subbasins of the 100-year projection differed substantially from the current period. We observed a loss of class 3 subbasins in the western portion of the Northern Great Basin ERU and across some of the Owyhee Uplands ERU, but an increase of class 3 subbasins within the Central Idaho Mountains ERU.

Upland Woodland. The 100-year projection for Alternative 6 indicated that the frequency of subbasins having areas of the upland woodland community at levels within its historical mid-range would increase 62 percent (table 2.40). However,

those subbasins having a substantial component of the upland woodland community would still be dominated by class 5 departures. The increase in number of subbasins falling within the historical range would predominantly be due to areal increases of the upland woodland community within subbasins of the Central Idaho Mountains and Upper Klamath ERUs. In addition, areal declines of upland woodland in the Owyhee Uplands and Blue Mountains ERUs would contribute to an increased frequency of class 3 subbasins.

Alternative 7 Departures

Alternative 7 would decrease the average frequency of subbasin memberships in classes 1 and 5 departures to 25 and 23 percent, respectively. Similarly, the average frequency of communities within class 3 departures would increase to 41 percent (table 2.38).

The 100-year projection for Alternative 7 indicated that the mid-seral lower montane forest and upland woodland communities would differ the most, in a positive direction, from historical conditions; at least 52 percent of the subbasins would contain these communities at levels well above their historical mid-ranges. Also, the upland herbland and upland shrubland communities would differ the most in a negative direction; at least 56 percent of the subbasins would contain areas of these communities at levels well below their historical mid-ranges (tables 2.39 and 2.40).

Montane Community Departures in Alternative 7 —

Early-seral Lower Montane Forest. The 100-year projection for Alternative 7 indicated that the availability of the early-seral lower montane forest community would increase substantially from the current conditions. The number of subbasins containing areas of this community within its historical mid-range would increase by over 1,000 percent (table 2.39). This increase would largely occur throughout the Northern Glaciated Mountains, Lower Clark Fork, Central Idaho Mountains, Blue Mountains, Southern Cascades, and Columbia Plateau ERUs.

Mid-seral Lower Montane Forest. The 100-year projection for Alternative 7 indicated that virtually all subbasins within the Basin would contain areas of the mid-seral lower montane forest community at levels well above its historical mid-range (table 2.39). The areal extent of the mid-seral lower montane forest community would dramatically increase across much of the forested areas of the Upper Columbia River Basin, as well as within the Upper Klamath ERU and areas of the Eastside EIS area adjacent to the Upper Klamath ERU.

Late-seral Lower Montane Forest. Alternative 7 would substantially increase the areal extent of the late-seral lower montane forest community above the current conditions. The number of subbasins having levels of this community within its historical mid-range would increase by over 400 percent (table 2.39). This increase would occur predominantly within the Northern Cascades, Columbia Plateau, Blue Mountains, Northern Glaciated Mountains, Upper Clark Fork, and Central Idaho Mountains ERUs.

Early-seral Montane Forest. Alternative 7 would increase the number of subbasins having areas of the early-seral montane forest community within its historical mid-range by 89 percent (table 2.39). However, the increasing trend would be spatially variable across the Basin. Alternative 7 would result in a substantial increase of early-seral montane forests within many subbasins of the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Upper Klamath, Upper Snake, and Snake Headwaters ERUs, whereas there would be a substantial decrease within the Blue Mountains and Central Idaho Mountains ERUs (table 2.39). Additionally, the early-seral montane forest community would decrease substantially throughout the northern half of the Northern Cascades ERU, but increase substantially within its southern half.

Mid-seral Montane Forest. The 100-year projection for Alternative 7 indicated that the number of subbasins having the mid-seral montane forest community within its historical mid-range would increase by 142 percent (table 2.39). This increase would predominantly be due to increases in mid-seral forests throughout the Central Idaho Mountains and Upper Klamath ERUs. Conversely, we projected areal declines of this community throughout many subbasins within the Northern Glaciated Mountains and Lower Clark Fork ERUs.

Late-seral Montane Forest. Alternative 7 would increase the number of subbasins having the late-seral montane forest community within its historical mid-range by 433 percent, relative to the current period (table 2.39). This increase would largely be attributed to increases in late-seral montane forests throughout the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs. Areal declines of the late-seral montane forest community within the Southern Cascades ERU would also increase the frequency of subbasins having this community within its historical mid-range. The Northern Cascades, Blue Mountains, and Columbia Plateau ERUs would contain some subbasins with areal increases and others with areal declines, which would increase the frequency of subbasins having the late-seral montane forest community within its historical mid-range.

Subalpine Community Departures in Alternative 7 —

Early-seral Subalpine Forest. The 100-year projection for Alternative 7 indicated that the number of subbasins having the early-seral subalpine forest community within its historical mid-range would increase by 230 percent (table 2.39). This increase would predominantly be due to decreases in early-seral forests throughout the Northern Cascades, Lower Clark Fork, Snake Headwaters, and Central Idaho Mountains ERUs. Expected increases in the early-seral subalpine community within the Northern Glaciated Mountains ERU would also increase the frequency of subbasins having this community within its historical mid-range.

Mid-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range increased by 200 percent for the 100-year projection of Alternative 7 (table 2.39). This increase would predominantly be due to increases in mid-seral subalpine forests throughout the Southern Cascades, Blue Mountains, and Central Idaho Mountains ERUs, and to a lesser extent, the Snake Headwaters ERU. Expected areal declines of this community in several subbasins of the Lower Clark Fork, Upper Clark Fork, and Snake Headwaters ERUs would also increase the proportion of subbasins having an areal extent of this community within its historical mid-range.

Late-seral Subalpine Forest. The frequency of subbasins having the mid-seral subalpine forest community within its historical mid-range increased 292 percent for the 100-year projection of Alternative 7 (table 2.39). This increase would predominantly be due to areal increases of the late-seral subalpine forest community throughout the Northern Cascades, Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Central Idaho Mountains, and Snake Headwaters ERUs.

Upland Community Departures in Alternative 7 —

Upland Herbland. The 100-year projection for Alternative 7 indicated that the frequency of subbasins having the upland herbland community within its historical mid-range would increase by 208 percent (table 2.40). This increase would largely be due to areal increases of upland herbland within the Northern Great Basin, Owyhee Uplands, Central Idaho Mountains ERUs, and the most northern extension of the Blue Mountains ERU. These changes are substantially different from those observed in other alternatives.

Upland Shrubland. The 100-year projection for Alternative 7 did not substantially change the proportion of subbasins that would have the upland herbland community at levels within its historical mid-range (table 2.40). However, the spatial distribution of class 3 subbasins would change substantially. We observed a decline of class 3 subbasins in the western portion of the Northern Great Basin ERU and across some of the Owyhee Uplands ERU, but an increase of class 3 subbasins within the Central Idaho Mountains ERU.

Upland Woodland. Alternative 7 would increase the frequency of subbasins containing areas of the upland woodland community within its historical mid-range by 115 percent (table 2.40). However, those subbasins having a substantial component of the upland woodland community would still be dominated by class 5 departures. The increased number of subbasins falling within the historical mid-range would predominantly be due to areal increases of the upland woodland community in subbasins within the Central Idaho Mountains ERU. In addition, areal declines of upland woodland in the Columbia Plateau and Owyhee Uplands ERUs would also contribute to an increased frequency of class 3 subbasins.

Discussion on Departures of the Alternatives

For most alternatives, a major shift was projected in the frequency distribution of departure classes between the current and 100-year periods, from a class 1 to a class 5 departure or vice versa. This wide fluctuation occurred with the community groups that commonly composed very low proportions of the subbasins. Therefore, when the historical range of a community was relatively small, only minor changes of areal extent were required to cause rather large fluctuations of departure classes.

Even with the major shift in departure classes between the current and 100-year periods, overall there were relatively minor differences between the seven alternative projections in subbasin departure frequency reported at the Basin scale (tables 2.39 and 2.40). However, there are substantial differences between alternatives in the spatial distribution of terrestrial community groups and their associated departures. Spatial arrangement of communities and associated disturbances are discussed in greater detail in the "Vegetation Response and Disturbance Patterns" and "Summary and Synthesis" sections later in this chapter.

With few exceptions, most alternatives are expected to increase the frequency of subbasins having most community groups within their historical mid-range, which is class 3 departure (tables 2.39 and 2.40). Two communities, the lower montane mid-seral forest and the upland shrubland, were exceptions. The frequency of subbasins having the lower montane mid-seral forest community within its historical mid-range remained about the same, or decreased in Alternatives 1, 2, 3, and 5 as did the number of subbasins having the upland shrubland community for all alternative projections.

However, rarely did any alternative projection indicate more than a 50 percent increase in the proportion of subbasins in which any community occurred within its historical mid-range (tables 2.39 and 2.40). Overall, Alternative 7 would have the greatest average frequency of subbasins containing the 12 terrestrial community groups within their historical mid-ranges (table 2.38).

Departure Discussion by Community

Montane Departures

Early-Seral Lower Montane Forest — All alternatives would decrease the number of subbasins having areas of the early-seral lower montane community group at levels well below its historical mid-range, constituting a class 1 departure. Conversely, all alternatives would substantially increase the frequency of subbasins having this community within its historical mid-range. Although this increase would be ten-fold, none of the alternatives were projected to have more than 50 percent of the subbasins in this community within its historical mid-range.

Mid-Seral Lower Montane Forest — All alternatives would decrease the frequency of subbasins having the mid-seral lower montane community at levels well below its historical mid-range, constituting a class 1 departure. However, all alternatives would increase the frequency of subbasins having areas of this community well above its historical mid-range. None of the alternatives would substantially change the frequency of subbasins having this community within its historical mid-range; rather, the alternatives would merely change the sign of the departures, from being below to being above the historical mid-range of conditions.

Late-Seral Lower Montane Forest — All alternatives would decrease the number of subbasins having the late-seral lower montane community at levels well below its historical mid-range, constituting a class 1 departure. Conversely, all alternatives would substantially increase the frequency of subbasins having this community within its historical mid-range. Although all alternatives would increase the frequency of subbasins having this community within its historical mid-range by nearly five-fold, no alternative would result in more than 40 percent of the subbasins having the late-seral lower montane community within its historical mid-range.

Early-Seral Montane Forest — The frequency of subbasins having the early-seral montane forest community at a level within its historical mid-range would increase under all alternatives. However, no alternative was expected to have more than 34 percent of their subbasins with this community within its historical mid-range.

Mid-Seral Montane Forest — All alternatives would increase the frequency of subbasins having the areal extent of the mid-seral montane forest community within its historical mid-range. However, the frequency of subbasins having this community within its historical range would not exceed 46 percent under any alternative. All alternatives would substantially decrease the frequency of subbasins having this community well below its historical mid-range. To a lesser degree, all alternatives would also decrease the frequency of subbasins having this community well above its historical mid-range.

Late-seral Montane Forest — All alternatives would result in at least a four-fold increase in the frequency of subbasins having the late-seral montane forest community at a level within its historical mid-range. However, less than 50 percent of the subbasins would contain areal extents of this community within its historical mid-range as a result of implementing any alternative. All alternatives would substantially decrease the frequency of subbasins having this community well below its historical mid-range; to a lesser degree, all alternatives would also decrease such frequency well above its historical mid-range.

Subalpine Departures

Early-seral Subalpine Forest — All alternatives, except Alternatives 3 and 4, would result in nearly a two-fold increase in the frequency of subbasins having an areal extent of the early-seral subalpine forest community within its historical mid-range. However, only Alternatives 1, 2, and 7 would result in more than 50 percent of the subbasins having the area of this community within its historical mid-range. All alternatives would substantially decrease the frequency of subbasins having this community well below its historical mid-range. Similarly, Alternatives 1, 2, and 7, and to a lesser degree Alternatives 5 and 6, would substantially decrease the frequency of subbasins having this community well above its historical mid-range.

Mid-seral Subalpine Forest — All alternatives would result in at least a two-fold increase in the frequency of subbasins having an areal extent of the mid-seral subalpine forest community within its historical mid-range. However, only in Alternatives 1 and 7 would more than 50 percent of the subbasins have this community within its historical mid-range. All alternatives would substantially decrease the frequency of subbasins having this community well above its historical mid-range. Similarly, Alternatives 1, 2, and 7, and to

a lesser degree Alternatives 3 through 6, would substantially decrease the frequency of subbasins having this community well below its historical mid-range.

Late-seral Subalpine Forest — All alternatives would result in nearly a four-fold increase in the frequency of subbasins having an areal extent of the late-seral subalpine forest community within its historical mid-range. However, only Alternatives 1, 2, and 7 would result in more than 50 percent of the subbasins having this community within its historical mid-range. All alternatives would substantially decrease the frequency of subbasins having this community well below its historical mid-range.

Similarly, Alternatives 1 and 3 through 6, and to a lesser degree Alternative 2, would substantially decrease the frequency of subbasins having this community well above its historical mid-range. Conversely, Alternative 7 would increase the frequency of subbasins having the late-seral subalpine forest well above its historical mid-range.

Upland Departures

Upland Herbland — All alternatives would result in nearly a two- to three-fold increase in the frequency of subbasins having extents of the upland herbland community within its historical mid-range. However, no alternative would result in more than 37 percent of the subbasins having the area of this community within its historical mid-range. Although all alternatives would decrease the frequency of subbasins having this community well below its historical mid-range, and constituting a class 1 departure, these subbasins would still dominate the Basin.

Upland Shrubland — None of the alternatives would substantially change the frequency of subbasins having the areal extent of the upland shrubland community within its historical mid-range. In fact, Alternatives 2 through 5 would actually decrease the proportion of subbasins having this community within its historical mid-range. All alternatives would substantially increase the proportion of subbasins having the upland shrubland community well below its historical mid-range. For all alternatives, the upland shrubland community departure class 5 would dominate the Basin.

Upland Woodland — Alternatives 1, 2, 6, and 7 would substantially increase the proportion of subbasins having the areal extent of the upland woodland community within its historical mid-range. However, no alternative would result in more than 28 percent of the subbasins having the area of this community within its historical mid-range. All alternatives would substantially increase the proportion of subbasins having the upland woodland community well above its historical range. For all alternatives, the upland woodland community departure class 5 would dominate the Basin.

Currently, nearly one-third of the subbasins having a substantial area of the upland woodland community type contain this community at a level well below its historical mid-range. Since all of these subbasins are most closely associated with forest environments, the apparent decline of the upland woodland community is most likely attributed to woodlands converting into forests. For example, mixed-conifer woodlands develop an adequate stocking level of trees to be classified as forest types.

Nine of the subbasins having at least a one percent upland woodland component had previously been classified as the "juniper woodland theme" (Quigley and others 1996). These nine subbasins are dominated by a western juniper component well above the historical mid-range. Alternatives 1, 2, and 7 would substantially increase the proportion of subbasins having juniper woodlands within its historical mid-range, to four out of nine. To a lesser degree, Alternatives 3 through 6 would also increase the proportion of subbasins having juniper woodlands within its historical mid-range, to two out of nine. However, Alternatives 3 through 6 would also increase the proportion of these subbasins having the juniper component below its historical mid-range, to three out of nine.

Summary of Terrestrial Community Departures

We observed a major shift in the frequency distribution of departure classes between the current period and the 100-year projections of most terrestrial community types for most alternatives. With few exceptions, most alternatives would increase the frequency of subbasins having the areal extents of most terrestrial community types within their historical mid-ranges.

While we detected relatively minor differences overall among the subbasin frequency distributions of habitat departures, we did detect substantial spatial differences of subbasin habitat departures among the seven alternatives.

With one exception (100-year projection of the early-seral montane forest community under Alternative 2), regardless of alternative, *the Basin would be dominated by subbasins having the areal extents of the early-seral montane forest, upland herbland, and upland shrubland communities below their historical mid-ranges.* Consequently, none of the alternatives would reduce the risks to persistence for those plant and animal taxa whose fitness is strongly dependent upon the areal extents of these coarse-scale community types.

Relative to the historical period, none of the alternatives would be effective in reducing the apparent over-abundance of the mid-seral lower montane forest, mid-seral montane forest, and upland woodland community types. Therefore, Basin-wide, we would expect a low risk to persistence for taxa whose fitness is closely associated with the areal extents of these coarse-scale communities.

We feel the errors in mapping the management prescriptions in Alternatives 2 and 7 discussed earlier in this section do not result in significant inaccuracies in this departure analysis. The community groups selected and the analytical techniques should substantially dampen the effects of these errors.

We would recommend that any future analysis of broad-scale communities as terrestrial habitats use the physiognomic type groups stratified by potential vegetation group (PVG) or, for a coarser grouping, by forest and rangeland. The changing nature of lower montane, montane, subalpine and non-forest terrestrial communities in relation to existing vegetation cover types with no tie to the biophysical environment is a substantial hindrance to this analysis. Without the tie to the biophysical environment little inference can be made relative to temperature, moisture, soils, terrain, or consistency of the terrestrial communities with the biophysical system and inherent succession and disturbance processes.

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Vegetation Response and Disturbance Patterns

The response of vegetation to the different alternatives is discussed in reference to the terrestrial communities (TC), physiognomic type groups (PTG), potential vegetation groups (PVG), and transition of physiognomic type group by PVG. Figures for the key terrestrial community discussion are included in the text. Figures for transitions and PTG by PVG are provided in appendices 2J and 2K, respectively. For information on definitions and cross-walk relationships of terrestrial communities, we refer the reader to the Landscape Dynamics assessment (Hann and others, in press), appendices 3A-3G.

Successional changes for the potential vegetation groups are generally discussed in reference to transitions of the physiognomic types, which are highly correlated with the terrestrial communities. Spatial differences among alternatives are described using forest and range cluster groups (map 2.22) and Ecological Reporting Units (ERUs) (map 2.24). Additional information about physiognomic types is provided in this chapter in the discussion about management and other disturbances.

We are fairly confident about the predicted response at the EIS area, potential vegetation group, ecological reporting unit, and forest and range cluster group levels. However, the subbasin (map 2.22) predictions should be used with caution, since the simulated prescriptions were not mapped at the subbasin/potential vegetation group level, but instead at the forest or range cluster group and potential vegetation group levels.

Forest Potential Vegetation Groups

The forest potential vegetation groups include the dry forest, moist forest, and cold forest.

In the Eastside EIS area, there are approximately 10.7 million hectares (26.4 million acres) of the forest potential vegetation groups on BLM- and FS-administered lands:

- 5.9 million hectares (14.6 million acres), or 55 percent, in dry forest
- 3.6 million hectares (8.9 million acres), or 34 percent, in moist forest
- 1.2 million hectares (3 million acres), or 11 percent, in cold forest.

In the Upper Columbia River Basin EIS area, there are approximately 10.2 million hectares (26.2 million acres) of the forest potential vegetation groups on BLM- and FS-administered lands:

- 2.4 million hectares (5.9 million acres), or 23 percent, in dry forest
- 4.7 million hectares (11.6 million acres), or 47 percent, in moist forest
- 3.1 million hectares (7.7 million acres), or 30 percent, in cold forest.

The historical to current comparisons depict transitions of different physiognomic types from the circa 1850s historical map to the current map. For each alternative, the depicted transition is from current to the 100-year map (appendix 2J).

There were errors in the management prescription (Rx) mapping for Alternatives 2 and 7 that resulted in problems with simulation of response. The amount of exotic herbland projected in Alternative 2 was too high and was adjusted to be similar to Alternative 1. The first iteration of Rx mapping did not reflect the activity levels in the preliminary draft EIS Chapter 3 or the standards. The actual response would be intermediate between the depicted Alternative 7 response and the Alternative 3 response. This was corrected in the section, "Evaluation of Landscape Disturbances," on disturbance and management activities and in the appendices on transition (2J) and PTG by PVG response (2K), but there was inadequate time to correct the terrestrial community response.

Lower Montane Forest Response

Early-Seral Lower Montane Forest —

Occurrence: Although most terrestrial communities of this type are in the dry forest, some can occur in the moist forest. Early-seral lower montane currently occurs below historical levels in both EIS areas, which was a finding of concern in the landscape assessment (Hann and others, in press)(figs. 2.49 and 2.50).

Response to Alternatives: Figures 2.49 and 2.50 depict the response of the early-seral lower montane forest terrestrial communities. All alternatives would increase the amount of this terrestrial community as a result of ponderosa pine regeneration following harvest, prescribed fire, and wildfire. Alternatives 3 through 6, which emphasize restoration, would provide for the most increase; Alternative 1 would have an intermediate increase; Alternative 2 would have the lowest increase; and Alternative 7 if corrected would be somewhat above that of Alternative 2.

The primary disturbances that would produce the early-seral lower montane are:

- Alternative 1: harvest and wildfire.
- Alternative 2 and 7: wildfire.
- Alternatives 3 through 6: harvest and prescribed fire.

EARLY-SERAL LOWER MONTANE FOREST
Eastside E.I.S. Area

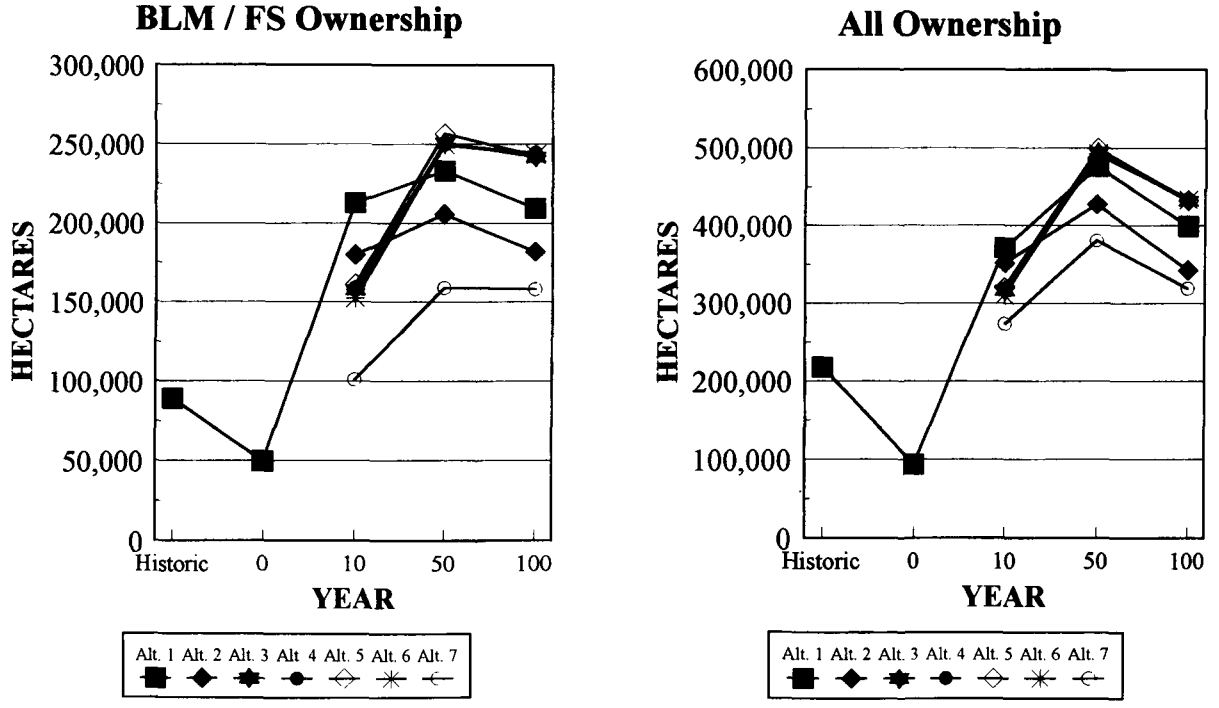


Figure 2.49 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral lower montane forest for the Eastside EIS area.

EARLY-SERAL LOWER MONTANE FOREST
Upper Columbia E.I.S. Area

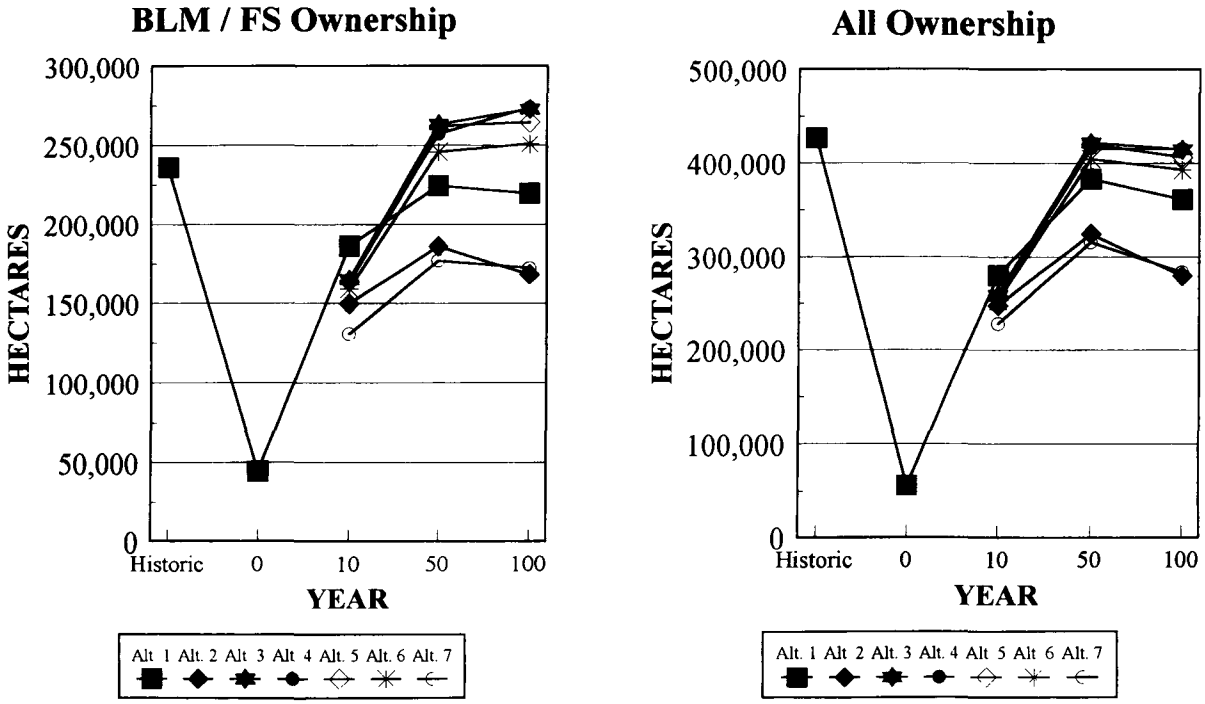


Figure 2.50 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral lower montane forest for the Upper Columbia River Basin EIS area.

Community Transition: There was little early-seral lower montane created from the historical to current, except by succession from upland herb. Although a small amount was created through harvest in late-seral forests, the patch sizes were small and the cutting treatments often maintained an overstory but did not provide for regeneration of shade-intolerant species, including ponderosa pine.

In all alternatives, the projected early-seral lower montane would come primarily from the late-seral, shade-tolerant, multi-layer forest. The model simulations indicate that herb and shrub types would continue to decline in the dry forest potential vegetation group in all alternatives. We note a lack of emphasis in any alternative on management to control exotic plants and noxious weeds in the dry forest potential vegetation group, whereas considerable emphasis would be placed on exotic plant and noxious weed control in the rangeland potential vegetation groups.

Composition and Structure: The structure of the early-seral communities would be closest to the native composition and structure in Alternatives 4 and 6, which have harvest and fire treatments that emphasize mimicking of ecosystem processes. Alternative 1 would produce early-seral communities similar to tree regeneration plantations, with

uniform spacing and size. Alternative 2 would be predominated by areas with small harvest patches, or areas of wildfire that would be salvage-logged and planted. Depending on the local priority and degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas and to wildfire-created structures in the reserve areas.

Fire, Disturbances and Treatment: The current early-seral that was created in the dry forest is typically in the wrong location for the fire regime. Historically, this type occurred on the steeper landforms where climate and topography supported either a relatively frequent fire interval that maintained upland herbland, shrubland, and early-seral communities, or a less frequent crown-fire regime that cycled mid-seral communities. Harvesting patterns have typically created these types on benches and ridges that historically were in a relatively frequent underburning regime, which maintained open (park-like) late-seral single-layer structures.

Harvest units and prescribed fires in Alternatives 1 and 2 would continue the same harvest pattern as current management. Wildfire in Alternative 2 would tend to create early-seral patches consistent with the current fuel patterns. Harvest units and prescribed fires in Alternatives 4 and 6 would result in patterns similar to the native regime, with Alternative 6 transitioning at a slower rate. Alternative 5 would generally not emphasize restoring landscape patterns in this type. Alternative 3 would proceed at a very slow rate given its local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, and to wildfire-created mosaics in the reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that create this type would generally be scattered throughout all the forest and range cluster groups (see table 2.20, map 2.22). In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role by having: some associated harvest treatments in forest and range cluster group H; timber harvest with fuel treatments to reduce risk of wildfire prioritized in group F; a moderate emphasis on fuel and harvest treatments in groups J and L; and low emphasis in group M. The focus of Alternative 3 for harvest and fuel treatments would be in groups J and L. Although Alternative 5 would not focus treatments on early-seral lower montane, this type would be created primarily in groups L and M.

Mid-Seral Lower Montane Forest —

Occurrence: Most of this terrestrial community is in the dry forest, but some can occur in the moist forest. Although its current and historical levels are about the same in the Eastside EIS area within BLM- and FS-administered lands, its current level in the Upper Columbia River Basin EIS area and for All ownerships combined in both EIS areas is much higher than historical levels (figs. 2.51 and 2.52).

Response to Alternatives: Figures 2.51 and 2.52 depict the response of the mid-seral lower montane forest. Alternatives 1 and 2 would show a strong increase in the amount of mid-seral lower montane, primarily due to management on BLM- and FS-administered lands, but partially due to comparable management on other lands. The restoration-emphasis alternatives (3 through 6) generally would maintain amounts of mid-seral lower montane at its historical and current levels as a result of harvest, thinning, and prescribed fire, along with the associated effects of wildfire. Alternative 7 would be similar to the figure response in the reserve areas, and to Alternative 3 on the non-reserve areas.

Community Transition: From the historical to current period, this type primarily changed from upland herbland and shrubland communities, and early-seral and single-layer, late-seral intolerant (primarily lower montane) forests. The net change to a mid-seral community resulted from succession in response to fire exclusion. Although some mid-seral developed in the native regime, it generally cycled to early-seral stages with fire.

MID-SERAL LOWER MONTANE FOREST
Eastside E.I.S. Area

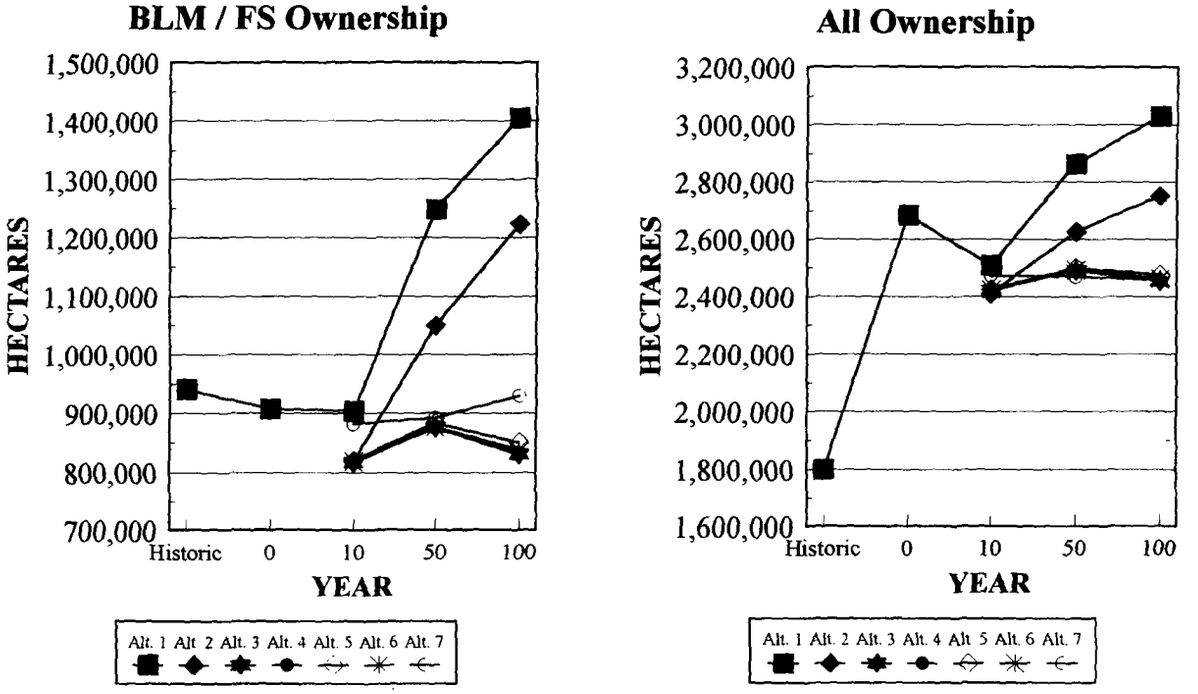


Figure 2.51 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral lower montane forest for the Eastside EIS area.

The transition from late-seral single-layer forests to mid-seral involves loss of the overstory from stress, insect, and disease mortality. These disturbances are associated with a lack of understory and mixed-behavior type fires in the late-seral stage. Without mixed behavior fires that create a thinning effect and accelerate growth of survivor trees, much of the mid-seral stage also stays in the mid-seral stage.

Alternatives 1 and 2 would continue the transition of upland herb, early-seral forest, and late-seral forest to mid-seral forest, and maintain much of the mid-seral forest in the mid-seral stage. The transitions from mid-seral in Alternatives 1 and 2 cycle within the mid-seral stage, or to late-seral multi-layer stages. This change in pattern is associated with high mortality of large and intermediate size trees from stress, insects, disease, and wildfire, along with the associated effects of salvage logging.

Alternatives 3 through 6 would have much lower levels of net transitions to the mid-seral stage and generally to the late-seral single-layer community. Alternative 7 would be similar to the figure response in the reserve areas, and to Alternative 3 in the non-reserve areas. Alternatives 3 through 6 would generally maintain amounts similar to the HRV on BLM- and FS-administered lands in the Eastside EIS area.

MID-SERAL LOWER MONTANE FOREST
Upper Columbia E.I.S. Area

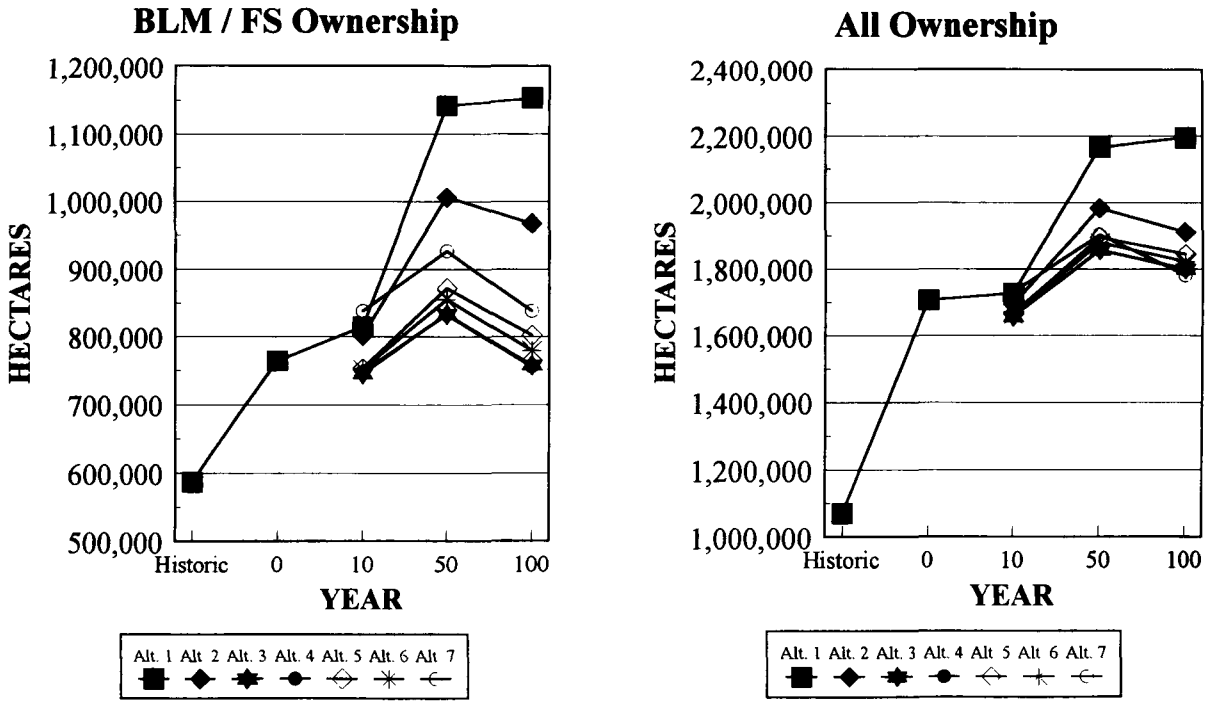


Figure 2.52 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral lower montane forest for the Upper Columbia River Basin EIS area.

Across all ownerships in the Eastside EIS area, the level of mid-seral lower montane maintained would be much higher due to the general pattern of harvesting of the larger trees and leaving of small trees. In the Upper Columbia River Basin area, however, the amount of mid-seral lower montane maintained on BLM- and FS-administered lands in Alternatives 3 through 6 would be similar to current levels, which are substantially above the HRV.

Composition and Structure: In general, the structure of these early-seral communities would be closest to the native regime in Alternatives 4 and 6 due to their emphasis on mimicking ecosystem processes with harvest and prescribed fire treatments. Alternative 1 would produce mid-seral communities with relatively uniform spacing and size. Alternative 2 would produce stands of high density and small, dead-standing and down trees. Depending on local priorities and the degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and similar to Alternative 3 in other areas. Alternative 7 would produce structures similar to Alternative 3 in the non-reserve areas, and to current structures in the reserve areas.

Fire, Disturbances, and Treatments: The current mid-seral stage in the dry forest is typically found in all fire regimes of the dry forest. This type occurred historically on the steeper landforms where climate and topography provided a crown fire regime that cycled mid-seral communities to early-seral communities and accelerated some patches into late-seral single-layer communities. The native fire regime in these areas included relatively frequent underburning fires that maintained open (park-like) late-seral single-layer structures. Historical harvest patterns, that removed large older trees in combination with fire exclusion, accelerated development of these mid-seral types on benches and ridges.

Continuing the traditional harvest and fire exclusion in Alternatives 1 and 2 would increase the amount of mid-seral that is inconsistent with the succession/disturbance regime. The thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would shift patterns to the native regime, with Alternative 6 transitioning at a slower rate. Alternative 5, given its economic priority limitations, would have moderate ability to shift patterns to fit the native regime. Alternative 3 activities would be implemented at varying rates due to local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, and to the current regime in the reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that affect the mid-seral lower montane forest would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with: some associated harvest, thinning, and prescribed fire treatments in subbasin group H; thinning, timber harvest, and fuel treatments to reduce wildfire risk prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments in groups J and L; and low emphasis in group M. In Alternative 3, the focus for these treatments would be in groups J and L. Alternative 5 would have some treatment focus on the mid-seral lower montane forest, but the treatments would be prioritized in groups L and M.

Late-seral Multi-layer Lower Montane Forest —

Occurrence: Although most of this terrestrial community is in the dry forest, some can occur in the moist forest. The current level in the Eastside EIS assessment area is about the same as the historical level on BLM- and FS-administered lands, but lower than historically on All ownerships. In the Upper Columbia River Basin EIS area, the current level of late-seral lower montane is substantially below historical levels within BLM- and FS-administered lands and for All ownerships (figs. 2.53 and 2.54).

Response to Alternatives: Figures 2.53 and 2.54 depict the response of the late-seral multi-layer lower montane forest. In Alternatives 1 and 2, there would be a strong increase in the amount of late-seral lower montane, primarily due to management on BLM- and FS-administered lands, but partially due to similar management on other lands. The restoration emphasis alternatives (3 through 6) would have less of an increase in the Upper Columbia River Basin EIS area; these alternatives would generally maintain the late-seral multi-layer lower montane at its historical and current levels on BLM- and FS-administered lands as a result of harvest, thinning, and prescribed fire, along with the associated affects of wildfire. Alternative 7 would be similar to the figure response in the reserve areas, and to Alternative 3 on the non-reserve areas. There would be a substantial increase in the late-seral multi-layer community on BLM- and FS-administered lands for Alternatives 1, 2, and 7; and across All ownerships for all alternatives.

The increasing trend of this community on All ownerships and in Alternatives 1, 2, and 7 on BLM- and FS-administered ownerships is related to: 1) succession of mid-seral communities to late-seral, 2) traditional harvest treatments, which remove larger commercial trees and leave live and dead standing trees of sufficiently large size to still classify as late-seral, and 3) fire exclusion. How-

ever, due to the loss of old trees, large snags, and diversity of structure and composition, this community does not qualify as old forest. The composition of these structures tends to shift markedly over time as species and individual trees of large size and sound wood are selectively harvested; this practice often results in the loss of genetic diversity. In many respects, these structures are very similar to the dense mid-seral structures discussed above. Their risk of mortality from stress, insects, and disease becomes very high, as does the associated risk of wildfire. Net productivity generally declines.

In modeling disturbance probabilities at this scale, we did not account for a higher wildfire or insect/disease disturbance potential for differences in conditions within the late-seral multi-layer community. Finer-scale modeling would have allowed separate classification of these structures, showing higher probabilities of mortality and fire disturbance that would have converted these structures to either mid- or early-seral.

Community Transition: From the historical to current period, this type primarily transitioned from the mid- or late-seral single-layer communities. Some of this community was present in the native regime on areas with infrequent crown fire regimes. Transition from late-seral single-layer to

LATE-SERAL LOWER MONTANE FOREST MULTI-LAYER
Eastside E.I.S. Area

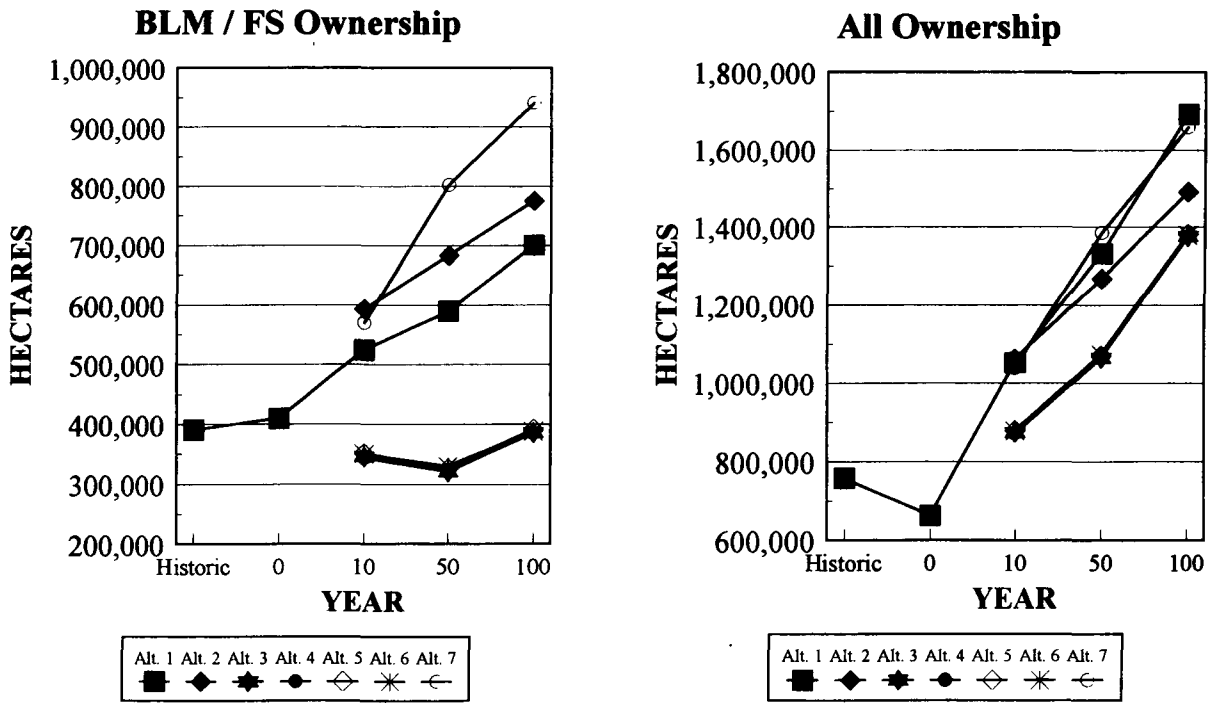


Figure 2.53 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral lower montane forest multi-layer for the Eastside EIS area.

multi-layer involves regeneration and growth of shade-tolerant species into the understory. This transition has typically been a response to fire exclusion in underburning regimes that support late-seral single-layer communities.

Development of these communities from mid-seral stages occurs when given enough time without a crown fire. In this transition, the native fire regime often had mixed type fires that accelerated the communities' development to late-seral multi-layer structures through their thinning effect; then, eventually, these late-seral were either converted to a single-layer by an underburn, or cycled to early-seral with a crown fire.

Alternatives 1 and 2 would continue the mid-seral forest's transition to this late-seral multi-layer stage. Alternatives 3 through 6 would have patterns of change similar to this type's native succession/disturbance regime, with much lower levels of net transitions to the late-seral multi-layer stage, but substantial increases in transitions to the late-seral single-layer community. Alternative 7 would have change patterns similar to Alternative 2 in the reserve areas, and to Alternative 3 in the non-reserve areas. Alternatives 3 through 6 generally would maintain an amount of this type on BLM- and FS-administered lands similar to the HRV. Across all ownerships, the level of the late-seral multi-layer lower montane forest would be much higher.

LATE-SERAL LOWER MONTANE FOREST MULTI-LAYER
Upper Columbia E.I.S. Area

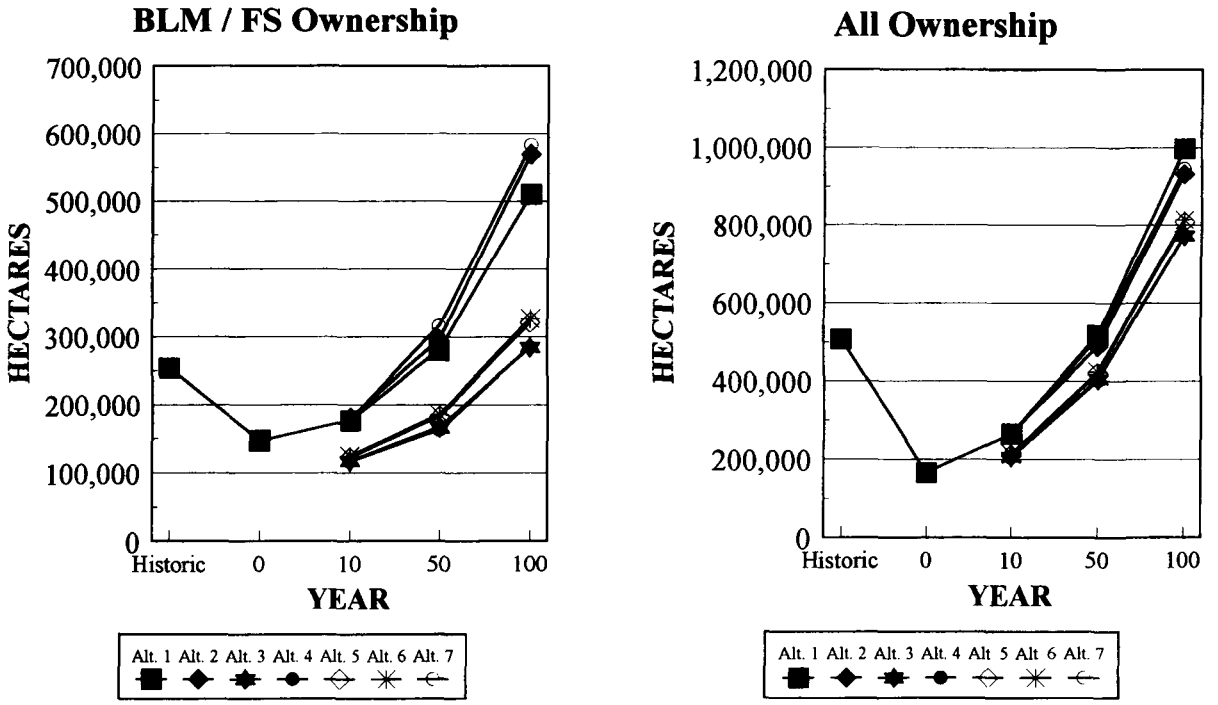


Figure 2.54 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral lower montane forest multi-layer for the Upper Columbia River Basin EIS area.

Composition and Structure: Although the structural stage class at this scale does not change, the effects on composition and structure are dramatically different from the native regime. In general, the structure of the late-seral multi-layer communities would be closest to the native composition and structure in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with harvest, thinning, and prescribed fire treatments. Alternatives 1 and 2 would tend to produce either very dense, multi-layer communities subject to high mortality as a result of fire exclusion, or communities affected by harvest including the removal of large, old trees and large snags. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to current structures in the reserve areas.

Fire, Disturbances, and Treatments: The current late-seral multi-layer community in the dry and moist forest is typically found in all fire regimes of the dry forest. Historically, this type occurred on the more moist landforms where climate and topography provided for a regime that allowed development of late-seral, multi-layer, shade-intolerant-dominated communities. These types ranged in patch size from small to large, depending on the geographic area, terrain, and climate.

The historical harvest patterns, involving selection of large older trees in combination with fire exclusion, resulted in development of multi-layer late-seral communities on steep dry slopes typically subject to a more frequent mixed or crown fire regime, and on benches and ridges historically subject to relatively-frequent underburning.

Continued traditional harvest and fire exclusion in Alternatives 1 and 2 would increase the amount of this structure that is inconsistent with the native succession/disturbance regime. Thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would produce patterns similar to the native regime, except Alternative 6 would transition at a slower rate. Alternative 5 would have moderate ability to shift patterns, given its economic priority limitations; Alternative 3 would proceed at varying rates depending on local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, and would cycle these types with wildfire in the reserves.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that affect this type would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) and limited associated harvest, thinning, and prescribed fire treatments would have emphasis in subbasin group H; thinning, timber harvest, and fuel treatments to reduce risk of wildfire prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments in groups J and L; and low emphasis in group M. In Alternative 3, the focus for thinning, harvest, and fuel treatments would be in groups J and L. In Alternative 5, there would be some focus on this type, but it would be prioritized in groups L and M.

Late-seral Single-layer Lower Montane Forest —

Occurrence: Most of this terrestrial community is in the dry forest, but some can occur in the moist forest. The current level is substantially lower than the historical level within BLM- and FS-administered lands, and for all ownerships (figs. 2.55 and 2.56). The decline of this type was an expressed concern in the landscape assessment (Hann and others, in press).

Response to Alternatives: Figures 2.55 and 2.56 depict the response of the late-seral single-layer lower montane forest. Alternatives 1 and 2 in the EEIS area would continue the decline of late-seral lower montane, essentially to the point of being non-existent in the Eastside EIS area within 50 years. The restoration emphasis alternatives (3 through 6) would increase the amount on BLM- and FS-administered lands to approximately 60

percent of its historical level with thinning and prescribed fire over the 100-year period. The historical level would be achievable, if the average decade's management activities for this type were increased by about 50 percent.

In the Upper Columbia River Basin EIS area, the amount of late-seral single-layer lower montane on BLM- and FS-administered lands would increase close to the historical level over the 100-year period through thinning and prescribed fire. For wilderness and semi-primitive areas where achieving projected levels of this type would be difficult, we assumed fairly active prescribed natural fire (planned and unplanned ignition). Alternative 7 would have a response similar to the figure in the reserve areas, and to Alternative 3 in the non-reserve areas.

Community Transition: From the historical to current period, there was no net transition to the late-seral single-layer type, but rather a high transition from this type to mid- and late-seral multi-layer stages. Historically, there was a high component of this community, mostly on areas subject to frequent underburning that generally occurred on bench and ridge type landforms where the climate, ignition frequencies, and fire behavior maintained open (park-like) stands.

LATE-SERAL LOWER MONTANE FOREST SINGLE-LAYER
Upper Columbia E.I.S. Area

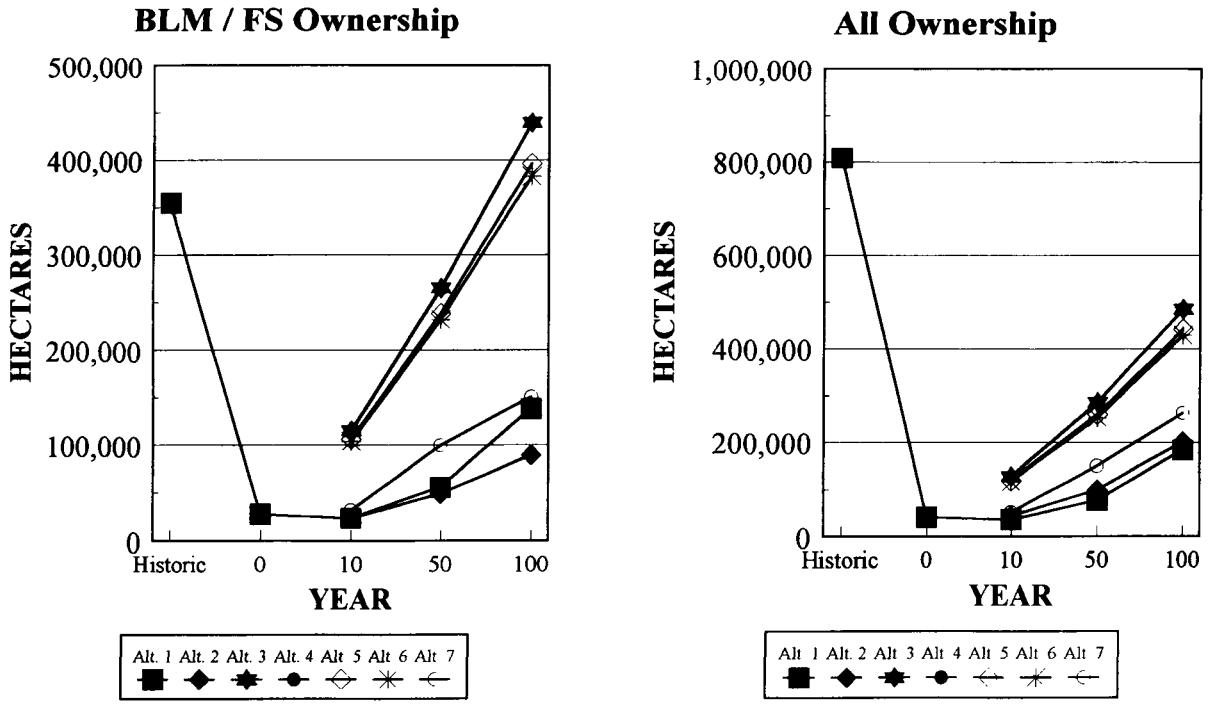


Figure 2.55 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral lower montane forest single-layer for the Eastside EIS area.

LATE-SERAL LOWER MONTANE FOREST SINGLE-LAYER
Upper Columbia E.I.S. Area

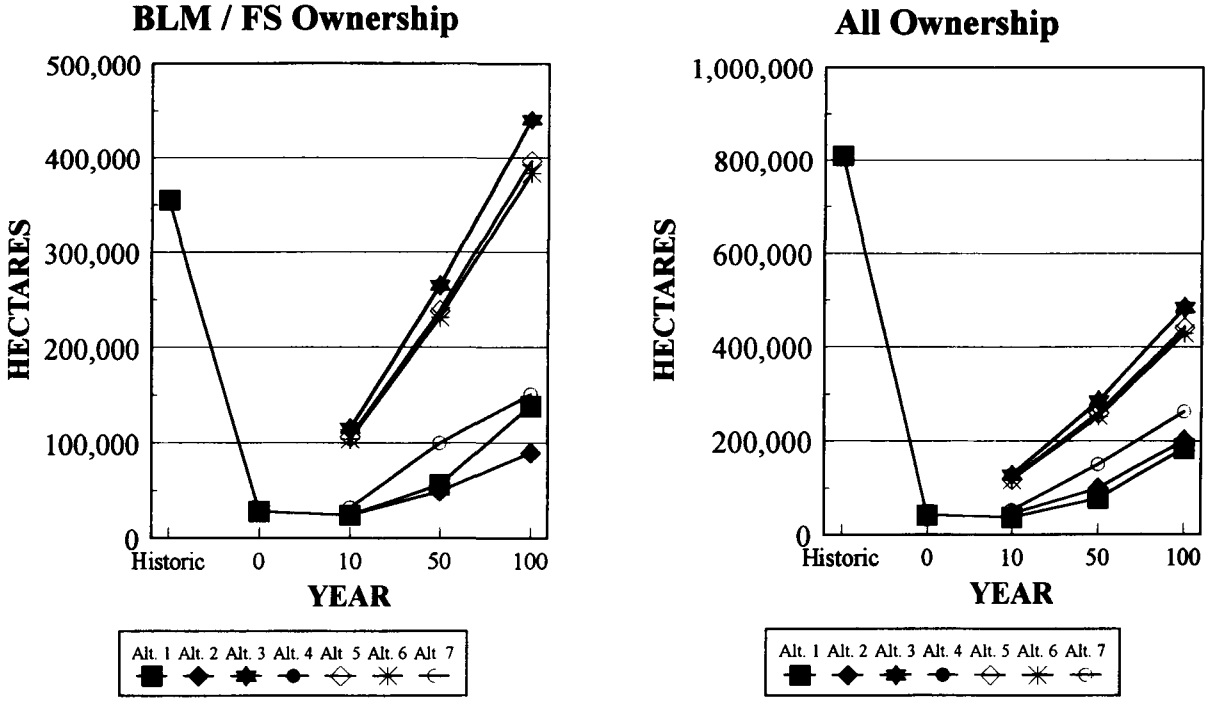


Figure 2.56 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral lower montane forest single-layer for the Upper Columbia River Basin EIS area.

The transition from late-seral single-layer forests to multi-layer forests involves regeneration and growth of shade-tolerant species in the understory; this occurs as a result of fire exclusion in underburning regimes that support late-seral single-layer communities. The transition to mid-seral results from development of understory tree layers, increased stress, consequent loss of overstory trees and retrogression to the mid-seral stage.

Alternatives 1 and 2 would continue transition of this community to multi-layer or mid-seral. This transition would be associated with high mortality of large and intermediate-size trees from stress, insect, disease, and wildfire, along with associated effects of salvage logging. Alternatives 3 through 6 would have relatively high levels of net transitions to the late-seral single-layer stage, with the transition pattern being similar to this type's native regime. Alternative 7 would follow the predicted transition for the reserve area and be similar to Alternative 3 in the non-reserve areas.

Composition and Structure: The structure of the late-seral single-layer communities would be closest to their native composition and structure in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with harvest, thinning, and prescribed fire treatments. Alternatives 1 and 2 would tend to produce multi-layer or

mid-seral communities in place of the late-seral single-layer community. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to current structures in the reserve areas.

Fire, Disturbance, and Treatments: Historical harvest patterns with selection for large older trees, combined with fire exclusion, have shifted the multi-layer late- and mid-seral types to the benches and ridges, which historically were subject to relatively frequent underburning that maintained the late-seral single-layer community.

The traditional harvest and fire exclusion in Alternatives 1 and 2 would result in continued decline of the late-seral single-layer type. Thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would be similar to the native disturbance regime. Alternative 6 would have a slower transition than Alternative 4. Alternative 5 would have a moderate ability to shift patterns of this type, given the limitations related to economic priorities. Alternative 3 would proceed at varying rates, given the local emphasis. Alternative 7 would be similar to Alternative 3 and would not develop substantial amounts in the reserves because of loss to crown fire.

Alternatives 1 and 2 would have no management emphasis for late-seral single-layer communities. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with: some associated harvest, thinning, and prescribed fire treatments in subbasin group H; thinning, timber harvest, and fuel treatments to reduce risk of wildfire would be prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments would occur in groups J and L; and low emphasis in group M. In Alternative 3, the focus for thinning, harvest, and fuel treatments would be in groups J and L. In Alternative 5, there would be some focus on this type, but it would be prioritized in groups L and M.

Montane Forest Response

Early-seral Montane Forest —

Occurrence: Although most of this terrestrial community is in the moist forest, some can occur in the dry forest. Its current level is substantially above the historical level for the Eastside EIS area and substantially below the historical level for the Upper Columbia River Basin EIS area (figs. 2.57 and 2.58). The decline in the UCRB resulted from transition to mid-seral of areas burned in the late 1800s and early 1900s. Although most of the current amount in both areas was created through even-aged timber harvest treatments, some resulted from wildfires in the moist and dry forest zones. Since most treatments were clearcuts or shelterwood cuts at the time of harvest, there was little or no live or dead-standing and down tree structure representing this type's native composition and structure.

Response to Alternatives: Figures 2.57 and 2.58 depict the response of the early-seral montane forest. Under all alternatives, the amount of this terrestrial community would decline due to reduced harvest levels, changes in types of harvest, and succession to mid-seral communities. This decline would be positive for the EEIS area, but is too great in Alternatives 1, 2, and 7 in the UCRB. The restoration emphasis alternatives (3 through 6) would provide for less of a decline than Alternatives 1, 2, and 7. The primary disturbances producing early-seral montane forest would be:

- Alternative 1: harvest and wildfire
- Alternative 2: wildfire with some harvest
- Alternatives 3 through 6: harvest and prescribed fire with some wildfire.
- Alternative 7: wildfire with some prescribed fire and harvest.

Between the historical and current period, most early-seral montane developed subsequent to harvest of late-seral single- and multi-layer forest, and

wildfire in late-seral multi-layer forest. In all action alternatives (3 through 7), the early-seral would be produced primarily from the mid-seral forest, with minor amounts from the late-seral forest, while Alternatives 1 and 2 would continue to harvest mostly late-seral forests.

Composition and Structure: In general, the structure of these early-seral communities would be closest to the native composition and structure in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with harvest and prescribed fire treatments. Composition and structure of this type have changed substantially due to the loss of large, shade-intolerant western white pine from blister rust, selective harvest, and salvage. No other intolerant tree species of the moist forest potential vegetation group can fill the same ecological role in these environments as western white pine did in the native regime. It is unlikely that any of the restoration alternatives have sufficient emphasis on recovery of rust-resistant western white pine to produce large trees even in the long term, but Alternative 4 has the most emphasis.

Alternative 1 would produce early-seral communities similar to tree regeneration plantations, with uniform spacing and size. Alternative 2 would be predominantly small harvest units or areas of wildfire that would be salvage logged and planted.

EARLY-SERAL MONTANE FOREST
Eastside E.I.S. Area

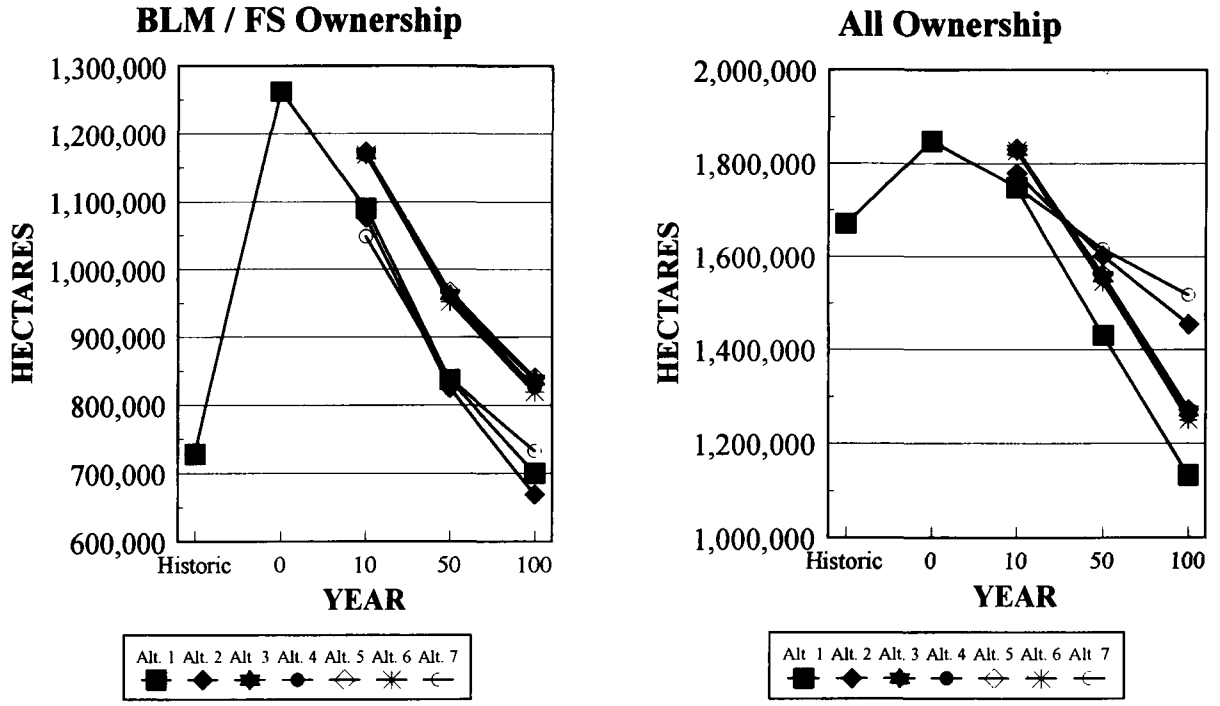


Figure 2.57 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral montane forest for the Eastside EIS area.

Depending on the local priorities and degree of ecological emphasis, Alternative 3 would have structures with moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to wildfire-created structures in the reserve areas.

Fire, Disturbances, and Treatments: The current early-seral that was created in the moist forest is typically in the wrong spatial location for the fire regime. Historically, this type occurred on the steeper landforms where climate and topography supported a crown fire regime that cycled mid-seral communities. Past harvest patterns have typically created early-seral montane forests on terraces and foot slopes where the historical fire regime was a mixed, creeping, spotting type of fire producing late-seral structures; some were also created on benches and ridges historically located in a relatively-frequent underburning regime that maintained open (park-like) late-seral single-layer structures.

Harvest units and prescribed fires in Alternatives 1 and 2 would continue harvest in the same pattern as the current. Wildfire in Alternative 2 would tend to create this type in the wrong topo-

EARLY-SERAL MONTANE FOREST
Upper Columbia E.I.S. Area

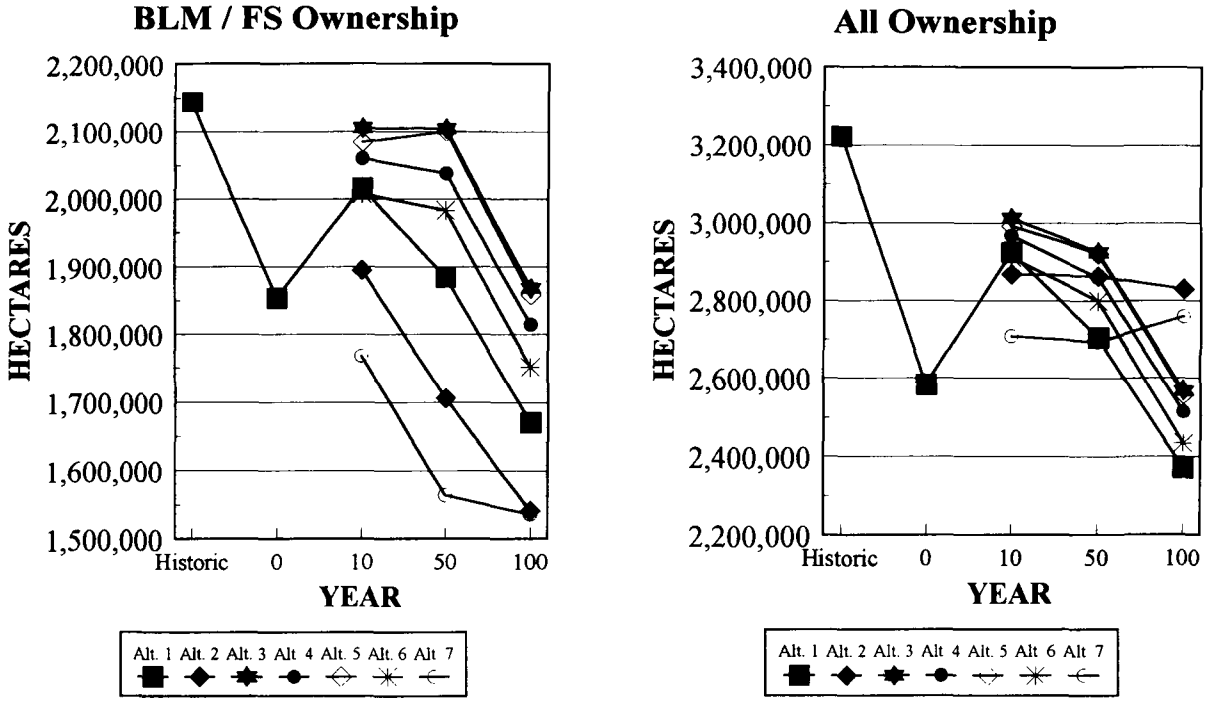


Figure 2.58 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral montane forest for the Upper Columbia River Basin EIS area.

graphic position, due to fuel accumulation on benches and ridges. Harvest units and prescribed fires in Alternatives 4 and 6 shift patterns to the native regime, except that Alternative 6 would transition at a slower rate. Alternative 5 would provide some emphasis for shifting patterns of this type, because of its emphasis on managing for economic efficiency in the more productive moist forest. Alternative 3 would proceed at a variable rate depending on the local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, and to wildfire-created structures in the reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that create this type would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with associated restoration, harvest, and thinning treatments in subbasin group H; timber harvest and thinning with fuel treatments to reduce risk of wildfire prioritized in group F; moderate emphasis on fuel and harvest and thinning treatments in groups J and L; and low emphasis in group M. In Alternative 3, harvest thinning and fuel treatments would be focused on groups J and L. Alternative 5 would not have focus on this type, but it would be created primarily in groups L and M.

Mid-seral Montane Forest —

Occurrence: Much of this terrestrial community is in the moist forest, but substantial amounts occur also in the dry forest. The current level is much higher than historical levels on BLM- and FS-administered lands and all ownerships in both EIS areas (figs. 2.59 and 2.60).

Response to Alternatives: Figures 2.59 and 2.60 depict the response of this terrestrial community. For all alternatives, the response pattern would be a general increase for about 50 years, then a slight decline to levels substantially greater than current amounts by year 100 in the Eastside EIS area. In the Upper Basin, the decline would occur to year 50 and then level at about the historical amount to year 100. This decline is only partially related to our harvest management activities; the primary factor is succession from this stage to the late-seral multi-layer stage in both the dry and moist forests.

Community Transition: From the historical to current period, this type primarily transitioned from the early-seral and the late-seral forests. The net change from early-seral forests to mid-seral is part of normal succession, whereas the net change from late-seral forests to mid-seral is primarily a response to fire exclusion, insect and disease maintaining the mid-seral, and retrogression from the late-seral forests.

As a result of fire exclusion, the late-seral forests convert gradually to mid-seral typically through loss of the large overstory trees from stress, insect, and disease mortality. This conversion is associated with a lack of understory- and mixed-behavior fires in the late-seral stage. Much of the mid-seral stage also stays in the mid-seral stage when there are no mixed-behavior fires to create a thinning effect and accelerate growth of survivor trees. Traditional harvest of large trees, leaving the smaller trees, also causes this same sort of retrogression.

We note the trend in mid-seral that first declines, and then levels out between the 50- to 100-year period, in the Upper Columbia River Basin EIS area. Unless wildfires consume the late-seral, this shift would occur as large amounts of late-seral multi-layer communities retrogress to mid-seral. In the Eastside EIS area, the trend of increasing mid-seral does not start to decline till after 50 years. In contrast, the Upper Columbia River Basin EIS area is currently declining and continues to decline until the 50-year period and then levels out. Much of the UCRB EIS area was in an early-seral condition at the turn of the century, fires were not excluded until a later period, and harvest has not been as extensive, in comparison with the EEIS area. Consequently, the same trends are occurring in both areas, but at very different times.

None of the alternatives would differ substantially in the first 50 years, but by 100 years the restoration alternatives (3 through 6) would result in

lower amounts of this type than Alternatives 1 and 2. The transitions from mid-seral in Alternatives 1 and 2 would generally cycle within the community, or to late-seral multi-layer stages. This pattern of change would be associated with high mortality of large and intermediate-size trees from stress, insects, disease, and wildfire, along with the associated effects of salvage logging. Alternatives 3 through 6 would have much lower levels of net transitions to the mid- and late-seral multi-layer stages, with increased transition to early-seral stages. Alternative 7 would be similar to Alternative 3 in the non-reserve areas. In Alternative 7 reserve areas, wildfire would convert some mid-seral to early-seral communities, resulting in less mid-seral than in Alternatives 3 through 6. None of the alternatives would reduce the amount of total mid-seral below the current level, or even approximate a trend toward the historical level in the Eastside EIS area. In the Upper Columbia River Basin EIS area, no alternative would reduce the amount of total mid-seral substantially below the historical level.

Fairly rapid growth rates in the moist forest, along with rapid regeneration, cause dynamic shifts in mid-seral communities through time. The pattern on all ownerships in the Eastside EIS area would not shift substantially from the current amount, due to the fairly high harvest levels in this stage.

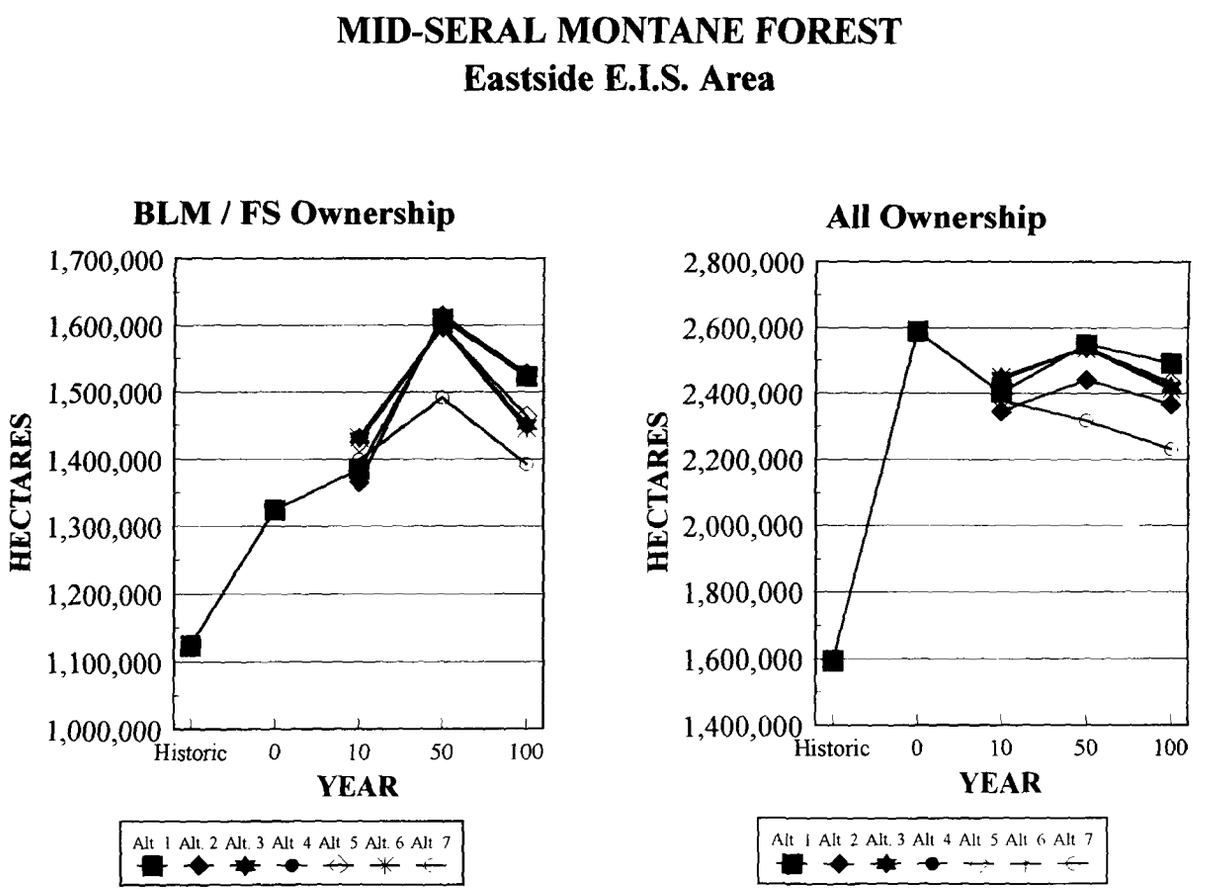


Figure 2.59 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral montane forest for the Eastside EIS area.

MID-SERAL MONTANE FOREST
Upper Columbia E.I.S. Area

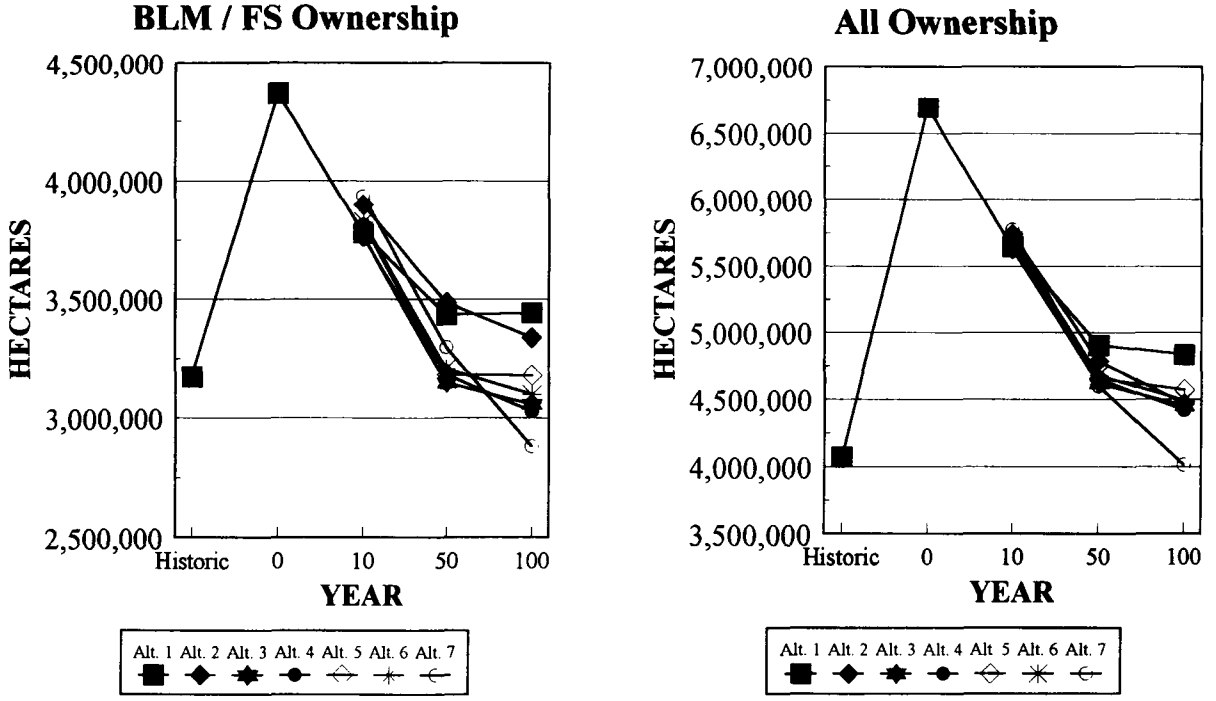


Figure 2.60 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral montane forest for the Upper Columbia River Basin EIS area.

Composition and Structure: The large amount of mid-seral forest in both the moist and dry forest potential vegetation groups is of considerable concern relative to ecological process, composition, and structure. This condition appears to be a cumulative effect of several conditions:

- There are large amounts of early-seral in roaded areas in the Eastside EIS area and moderate amounts in the Upper Columbia River Basin EIS area that are transitioning to mid-seral in areas previously harvested or burned with wildfire.
- There is a large component of mid-seral, typically in roadless areas; it transitioned from early-seral which developed in the late 1800s and early 1900s as a result of large wildfires. Currently, the mid-seral is stagnated due to the lack of thinning-type fires.
- The Eastside EIS area has a large component of late-seral, typically in roadless areas or often associated with riparian environments; this late-seral is transitioning to mid-seral due to stress, insect, and disease mortality of the large overstory trees from lack of thinning and mixed severity fires.
- The Upper Columbia River Basin EIS area has a large component of mid-seral in roaded areas, which transitioned from late-seral single-layer

due to selective harvest of the large trees and development of residual understory trees.

- There is also a large component of mid-seral in roadless areas; the transition in these areas was from late-seral single-layer, then into multi-layer with fire exclusion, and finally into mid-seral due to retrogressive loss of the large overstory trees from stress, insect, and disease mortality.

It is apparent that none of the emphasis strategies for the restoration alternatives (3 through 6) would provide the level of activity to reverse these trends, spatially or temporally, within the next 50 years. Since much of the area in this stage is also present in large contiguous patches, the effects of contagion from insect/disease mortality and wildfire would likely result in large crown fire events and insect epidemics throughout all alternatives. Although the extent of this effect was not predicted with our scale modeling, the result may reduce the mid-seral stage due to production of large areas of early-seral. This could have the undesirable result of losing remaining residual large overstory trees and late-seral patches contained within the mid-seral matrix, the resulting effect being a series of large shifts from high to low levels of mid- and early-seral stages, with few other stages.

Composition and Structure: At a large scale, the overall effect on the community structure and composition is simplification related to the loss of fire-related processes and departure from the inherent succession/disturbance regime. The future of the mid-seral montane community as a whole is very unpredictable. Since much exists in roadless areas that are strongholds for native fish populations, and/or in watersheds with high sensitivity to roads and harvest activities, a design for restoration of these landscapes would require hierarchical risk analysis.

In general, the structure of the mid-seral communities would be closest to the native composition and structure in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with harvest and prescribed fire treatments. Alternative 1 would produce mid-seral communities with uniform spacing and size. Alternative 2 would produce many stands of high density and small dead-standing and down trees. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would have structures similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to current structures in the reserve areas.

Fire, Disturbances, and Treatments: The current mid-seral stage in the moist forest is typically found in all fire regimes of the moist forests. Historically, this type occurred on the steeper landforms where climate and topography provided for a crown fire regime that cycled mid-seral communities to early-seral communities and accelerated some patches into late-seral communities. Most historical mid-seral structures had a scattered component of large residual trees. Historical harvest and fire exclusion have produced structures that are often very dense and have lost the scattered large residual trees.

Continued traditional harvest and fire exclusion in Alternatives 1 and 2 would increase the amount of mid-seral that is inconsistent with the native succession/disturbance regime. Thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would shift patterns closer to the native regime but Alternative 6 would transition at a slower rate. Alternative 5 would have moderate ability to emphasize a shift in patterns for this type, due to its economic priority limitations. Alternative 3 would proceed at varying rates, given its emphasis at a local level. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, and be highly dynamic and variable in response to wildfire in the reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that affect this type would generally be scattered throughout all the subbasin groups. Alternatives 4 and 6 would emphasize the prescribed natural fire program

(both planned and unplanned ignition), with: some associated harvest, thinning, and prescribed fire treatments in subbasin group H; thinning, timber harvest, and fuel treatments to reduce risk of wildfire prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments in groups J and L; and low emphasis in group M. In Alternative 3, the focus for thinning, harvest, and fuel treatments would be in groups J and L. Alternative 5 would have some focus on mid-seral communities, but it would be prioritized in groups L and M. Alternative 7 would be similar to Alternative 3 in non-reserve areas and have few activities in reserves.

The most substantial risks would develop where mid-seral montane forests are on the moist end of the dry forest; on the dry end of the moist forest; and in steep, rugged terrain in subbasin groups L, F, and J.

Late-seral Multi-layer Montane Forest —

Occurrence: Much of this terrestrial community is in the moist forest, but a substantial amount is also in the dry forest. The current level is much higher than the historical levels within BLM- and FS-administered lands and all ownerships for the EEIS area, but much lower for the UCRB (figs. 2.61 and 2.62). Most of the current late-seral montane forest that is in roaded BLM- and FS-administered areas do not have old-forest attributes. A substantial amount of late-seral has been harvested with selective cuts for large trees, leaving a structure that meets the definition of late-seral multi-layer but with very different characteristics than the native structures. Some of the current spatial placement of this type is in roadless BLM- and FS-administered areas; structures here have old-forest characteristics, but typically have much higher density due to the exclusion of underburning, mixed severity fires, and the lack of ecological harvest and thinning activities.

Large amounts of the late-seral multi-layer community have been historically and selectively logged in a contiguous band from the Upper Klamath to the Blue Mountains ERUs. This band follows a general foothill and mountainous forest terrain belt that is closely aligned with a high lightning fire ignition probability. A similar band occurs along the foothills of the Northern and Southern Cascades ERUs where the mountains meet with the breaklands of the Columbia River. Similar bands occur along the wildland interface areas of many subbasins in the Rocky Mountains in the UCRB area. The subbasins in these areas have many sensitive issues, including:

- High potential for crown fire and high severity fires.
- Moderate to high amounts of urban/wildland interface.
- High concern for maintenance of visual green tree cover.
- Strong public sentiments against prescribed fire and logging.
- Watersheds important for aquatic species.
- Various critical habitats for terrestrial species.
- Areas that are important as security/hiding cover for big game.

Response to Alternatives: Figures 2.61 and 2.62 indicate the response of the late-seral montane multi-layer community. In the EEIS area on BLM- and FS-administered lands, all alternatives follow a similar pattern of decline to year 50 and then a leveling-off or slight increase. This is in response to retrogressive mortality from traditional harvest and insect, disease, and stress in Alternatives 1 and 2, wildfire in Alternative 7, and restoration, harvest, thinning, and prescribed fire in Alternatives 3 through 6. In contrast, the trend in the UCRB is a steep increase in response to succession of mid-seral to late-seral in all alternatives with varying levels of dampening effects.

In the Eastside EIS area, Alternative 1 would show the strongest decrease in the amount of late-seral multi-layer montane forest over the 100-year period, primarily in response to timber harvest, with some wildfire. In the Upper Columbia River Basin, Alternative 1 would show the least increase.

LATE-SERAL MONTANE FOREST MULTI-LAYER
Eastside E.I.S. Area

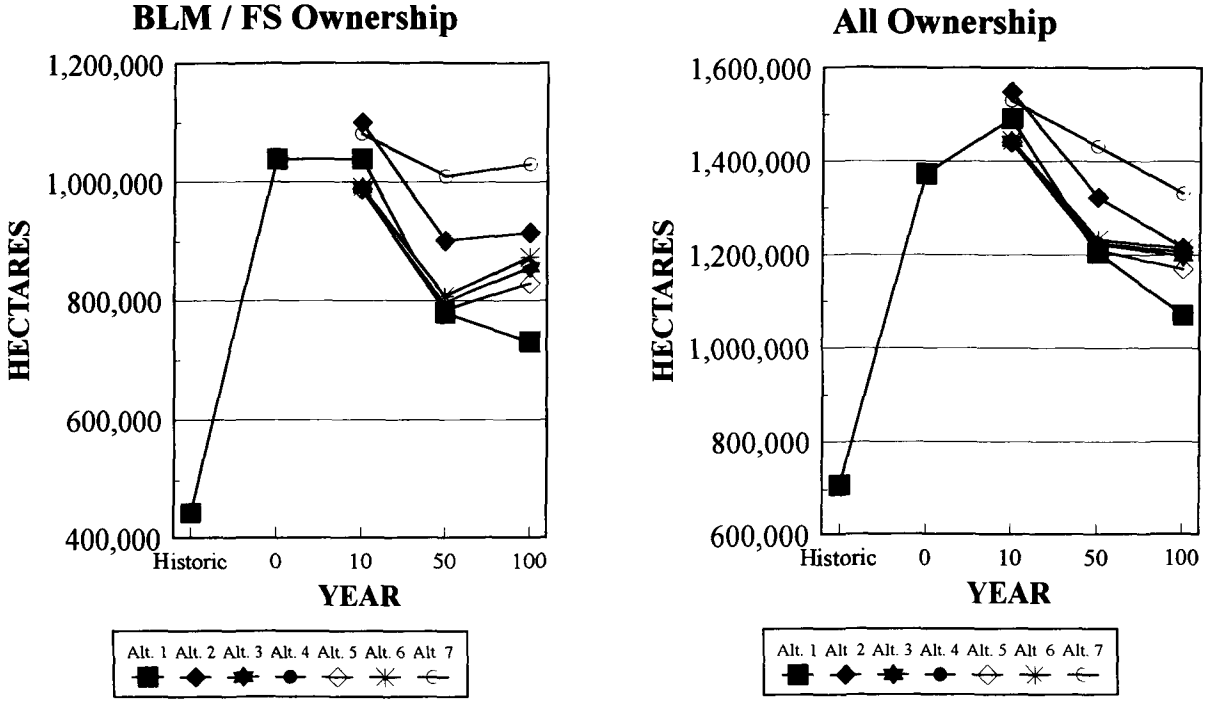


Figure 2.61 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral montane forest multi-layer for the Eastside EIS area.

The restoration emphasis alternatives (3 through 6) would result in a decline through the 50-year period, reversing to an increasing trend between 50 and 100 years. This response would occur as a result of harvest, thinning, and prescribed fire, along with the associated affects of wildfire. The shift in trend between 50 and 100 years would be due to much of the current mid-seral stages in roadless areas and early-seral stages in roaded areas changing into late-seral stages. Alternative 2 would have much less reduction than those alternatives. Alternative 7 would have a similar transition curve to Alternative 3 in the non-reserve areas, affected primarily by harvest, thinning, and prescribed fire; there would be a steep decline in the reserve areas under Alternative 7, primarily due to wildfire.

Community Transition: The historical to current transition to late-seral multi-layer montane forest in roaded areas was caused by fire exclusion and historical harvest. Traditional harvest treatment, which includes the selective cutting of commercial trees, typically leaves live and dead standing trees of sufficiently large size that the community is still classified as late-seral. However, such structures are not similar to native structures and usually do not qualify as old forests in terms of age and structural diversity.

The composition of these structures tends to shift markedly over time in response to selective harvesting of both the species and individuals having large size and sound wood. This harvest practice also often results in the loss of genetic diversity. These structures are very similar in many respects to the dense mid-seral structures discussed previously. Both structures have high risk of mortality from stress, insect, and disease, along with the associated risk of wildfire. Net productivity generally declines. In our modeling of disturbance probabilities at this scale, we were unable to account for a higher probability of disturbance in these types compared to nonharvested patches.

Between the historical and current period, this type primarily transitioned from the early-seral, mid-seral, or late-seral single-layer communities. Some of this community was present historically on areas with mixed fire regimes, typically on moist foot slopes; or within areas that had infrequent, creeping, spotting type fires, typically in riparian areas. The transition from late-seral, single-layer forests involves regeneration and growth of shade-tolerant species into the understory. Such conversion occurs gradually as a result of either fire exclusion in underburning, or mixed fire regimes that support late-seral single-layer communities. Late-seral multi-layer communities

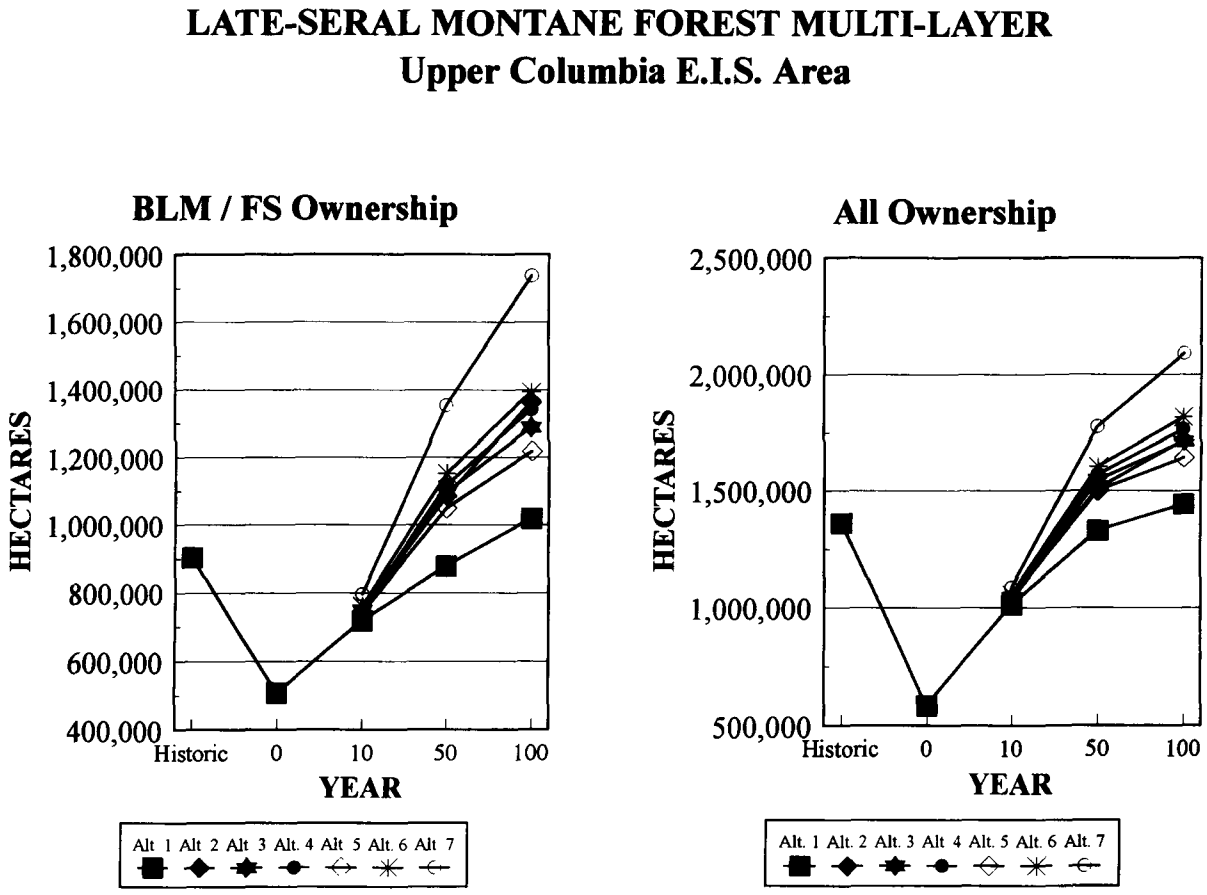


Figure 2.62 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral montane forest multi-layer for the Upper Columbia River Basin EIS area.

also develop from mid-seral stages, given enough time without a crown fire. Historically, mixed-type fires occurred often in the mid-seral stages; through thinning, these fires accelerated their structural development to late-seral multi-layer, that was eventually converted to a single-layer with an underburn or a cycled to early-seral with a crown fire.

Alternative 1 would reduce the transition to late-seral multi-layer the most across all alternatives, but would continue to create structures that are inconsistent with the disturbance regime. Alternative 2 would produce a slight decline in the transition to late-seral multi-layer. Although Alternatives 3 through 6 would slow the current trend, between year 50 and 100 an overwhelmingly large component of early- and mid-seral would shift into late-seral; these restoration alternatives would not treat sufficient area to substantially change this trend.

The overall future pattern for Alternatives 1 and 2 on the dry end of the moist forest, as well as the moist end of the dry forest, would incur high mortality of large and intermediate-size trees from stress, insect, disease, and wildfire, along with the associated effects of salvage logging. Alternatives 3 through 6 would have lower levels of net transitions to the late-seral multi-layer stage, and substantial increases in the transitions to the late-seral single-layer community. This pattern would be similar to the native regime. Alternative 7 would be similar to Alternative 3 in the non-reserve areas; in the reserve areas under Alternative 7, the response would be highly unpredictable due to the underestimated probabilities for large contiguous wildfires and insect epidemics in those areas.

In the future and for all alternatives, the increase in the late-seral multi-layer structure would be distributed through the same ecological reporting units, and also into the Northern Glaciated Mountains ERU in the Eastside EIS area, and through most ERUs having high forest components in the Upper Columbia River Basin. Surrounding the current core of subbasins with this late-seral type, many more subbasins would develop similar conditions as this type increases.

Composition and Structure: In general, the composition and structure of the late-seral multi-layer communities would be closest to the native regime in Alternatives 4 and 6, because they emphasize mimicking ecosystem processes with harvest and prescribed fire treatments. Alternatives 1 and 2 would tend to produce very dense, multi-layer communities subject to high mortality from fire exclusion, or communities where effects of harvest remove the large, old trees. Depending on local priorities and degree of ecological emphasis, Alternative 3 would result in structures having moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to current structures in the reserve areas.

Fire, Disturbances, and Treatment: The current late-seral multi-layer community in the dry and moist forest is typically found in all dry forest fire regimes. Historically, this type occurred on the moister landforms where the climate and topography provided for a succession/disturbance regime that allowed development of late-seral, multi-layer shade-intolerant-dominated communities. This type ranged in patch size from large to small, depending on the geographic area, terrain, and climate. Historical harvesting, which involved selection of the large older trees in combination with fire exclusion, produced multi-layer late-seral types on steep dry slopes typically subject to cycling disturbances, and on benches and ridges where the disturbance regime maintained late-seral, single-layer structures.

Continued traditional harvest and fire exclusion in Alternatives 1 and 2 would increase the amount of this structure that is out of proportion with the native disturbance regime. Thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would shift patterns to the native disturbance regime, but Alternative 6 would proceed at a slower rate. Alternative 5, given its economic priority limitations, would have moderate ability to emphasize patterns. Alternative 3 would proceed at varying rates due to local emphasis. Alternative 7 would be

similar to Alternative 3 in non-reserve areas, and similar to current conditions in the reserves.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments affecting the late-seral multi-layer montane forest would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with: some associated harvest, thinning, and prescribed fire treatments in subbasin group H; thinning, timber harvest, and fuel treatments to reduce risk of wildfire prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments in groups J and L; and low emphasis in group M. In Alternative 3, the focus for thinning, harvest, and fuel treatments would be in groups L and J. Alternative 5 would have some focus on this type, but it would be prioritized in groups L and M.

Late-seral Single-layer Montane Forest —

Occurrence: Most of this terrestrial community is in the dry end of the moist forest, or in the moist end of the dry forest. The current level is substantially lower in the EEIS area and higher in the UCRB than the historical level within BLM- and FS-administered lands, and for All ownerships (figs. 2.63 and 2.64). Historically, most land now supporting this type supported the late-seral

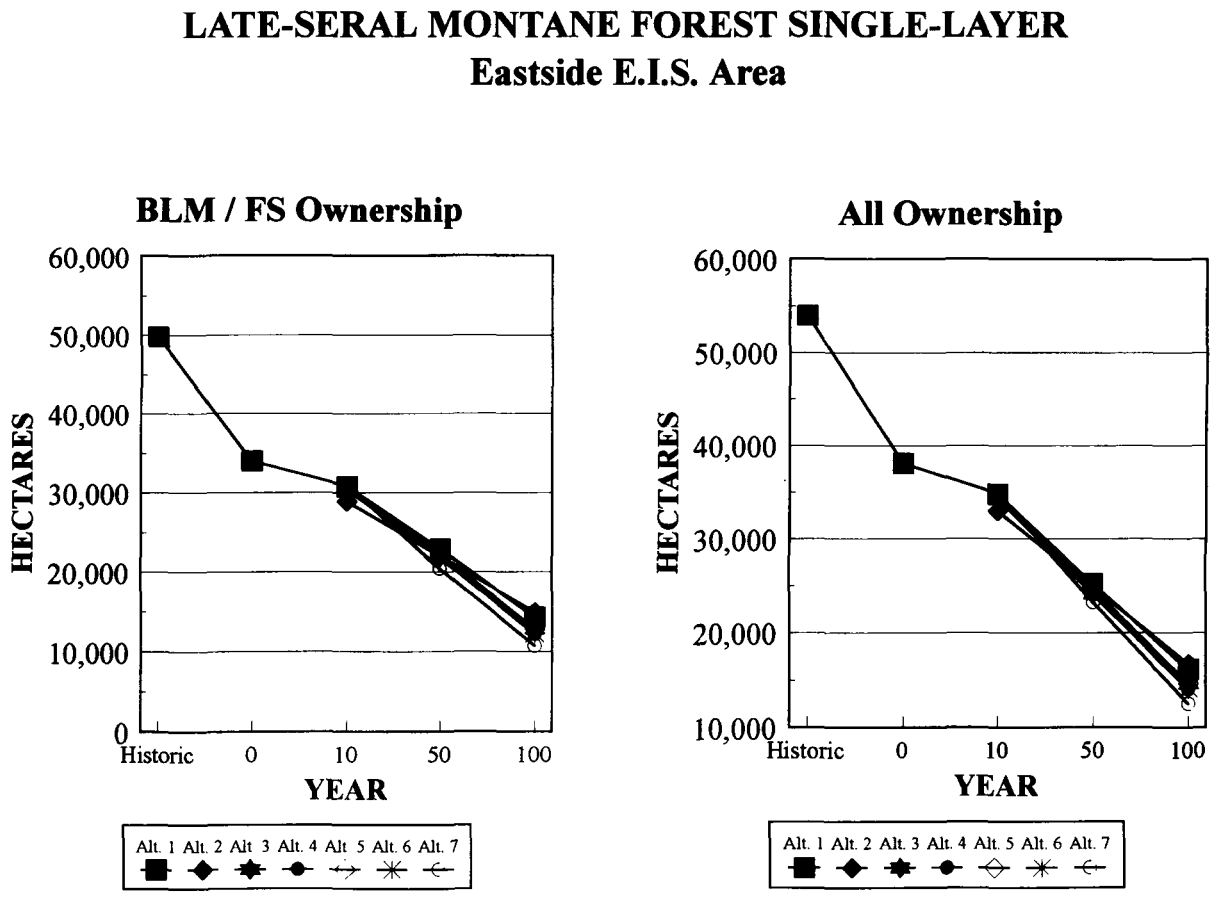


Figure 2.63 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral montane forest single-layer for the Eastside EIS area.

single-layer lower montane; in the moister environments, however, it supported western white pine or western larch. In cooler environments, lodgepole pine played an important role in this community. Selective harvest of the large ponderosa pine, western larch, and western white pine, in combination with fire exclusion, has resulted in the current condition for the EEIS area. The increase in the UCRB is primarily a result of fire exclusion. The current structure is interim to the mid-seral structures in both areas due to projected mortality of the remaining overstory trees from stress, insect, or disease or is interim to multi-layer structures as a result of regeneration of shade-tolerant species in the understory.

Response to Alternatives: Figures 2.63 and 2.64 depict the response of this terrestrial community. In the Eastside EIS area, Alternatives 1 and 2 would continue the steep decline in late-seral single-layer montane forest from the current level, to well below its historical level by year 100. In the Upper Columbia River Basin EIS area, all alternatives would result in a similar steep decline of this type. The restoration emphasis alternatives (3 through 6) would reduce this type's decline, but would not have sufficient emphasis to stabilize its decline at the historical level.

Achieving the historical level would be possible, if the average decade's management activities for

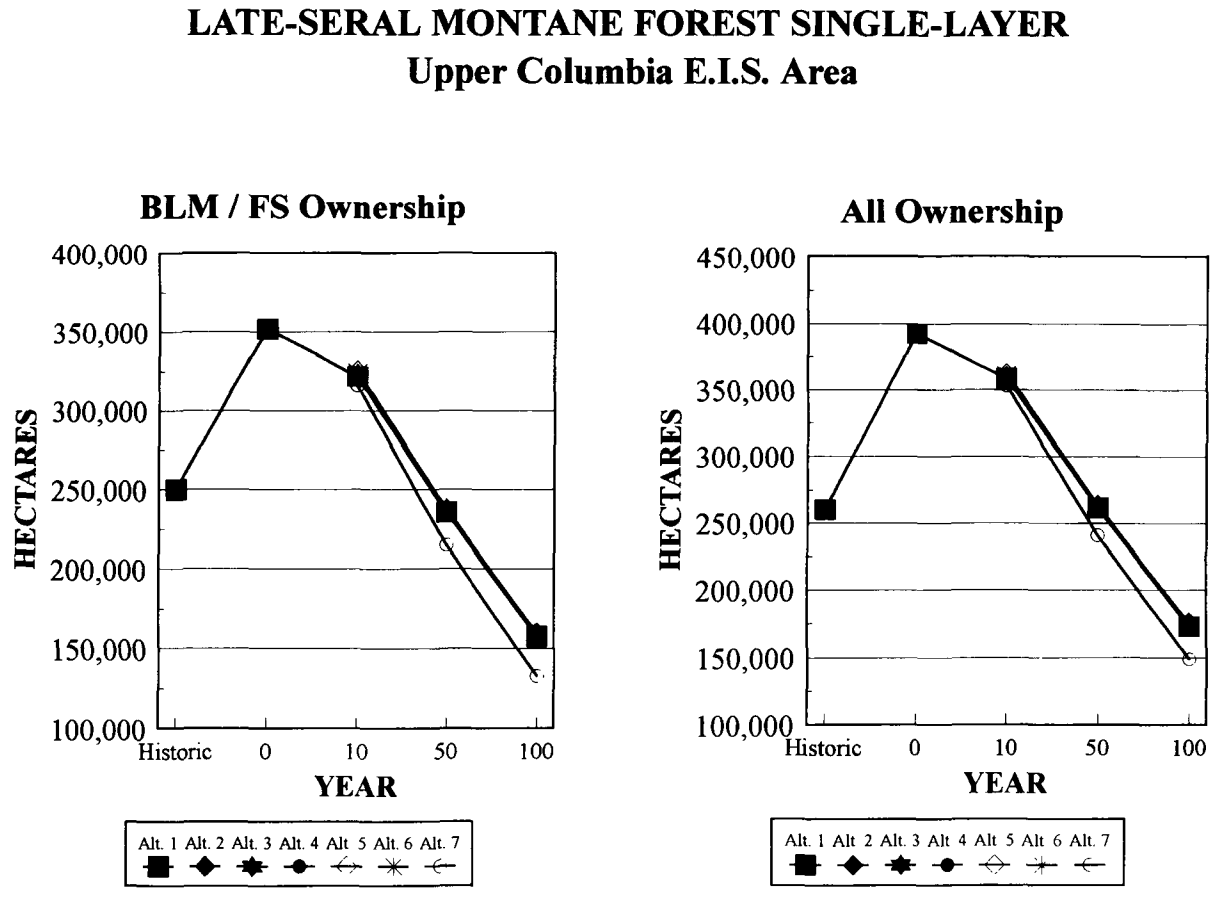


Figure 2.64 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7. for the late-seral montane forest single-layer for the Upper Columbia River Basin EIS area.

late-seral single-layer montane were increased by about 50 percent, and if substantial emphasis were placed on managing for western white pine in the moister environments. It would be particularly difficult to achieve an increase in wilderness and semi-primitive areas. Alternatives 4 and 6 would be most effective in recovery of the dominant shade-intolerant tree species (western white pine, western larch, ponderosa pine, lodgepole pine).

Alternative 3 would have a moderate response. Alternative 7 would be similar to Alternative 3 in the non-reserve areas; in the reserve areas of Alternative 7, the transition would continue to late-seral multi-layer, except where wildfire would shift many to early-seral communities.

Community Transition: In the Eastside EIS area, between the historical and current period, there was a transition to the late-seral single-layer montane forest, primarily from the mid-seral forest, but also from the late-seral single-layer lower montane forest. For the Eastside EIS area the primary decrease in Alternatives 1 and 2 would be to mid-seral stages. This pattern of change would be associated with high mortality of large and intermediate-size trees from stress, insect, disease, and wildfire, along with the associated effects of salvage logging. Alternatives 3 through 6 would produce less decline than Alternatives 1 and 2 in this type, but the declines would also be associated primarily with transitions to the mid-seral stages. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, but would result in a steeper decline than Alternative 3 in the reserve areas.

In the Upper Columbia River Basin EIS area, this stage increased from historical to current as a result of transition from mid- and early-seral. Future trends indicate transition via retrogression to mid-seral stages. The transition to mid-seral stages is associated with high mortality of large and intermediate-size trees from stress, insect, disease, and wildfire, along with the associated effects of salvage logging. Alternatives 3 through 6 would slow the decline with some fluctuation. Alternatives 1 and 2 would have a similar pattern to Alternatives 3 through 6, but with steeper declines. Alternative 7 would be similar to Alternative 3 in the non-reserve areas, but steeper decline than Alternative 3 in the reserve areas.

Composition and Structure: In general, the composition and structure of the late-seral single-layer communities would be closest to the native regime for Alternatives 4 and 6. This similarity of structure would result from the emphasis of these two alternatives on mimicking ecosystem processes with harvest and prescribed fire treatments; and also on regenerating species, such as western white pine, western larch, ponderosa pine, and lodgepole pine, which are shade-intolerant and somewhat more insect-, disease-, and fire-resistant than shade tolerant species. Alternatives 1 and 2 would tend to increase the transition to mid- and late-seral multi-layer stages, which are currently well above the historical levels. Depending on the local priority and degree of ecological emphasis, Alternative 3 would produce structures moderately similar to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. The non-reserve areas of Alternative 7 would have structures similar to Alternative 3, and the reserves would have structures similar to the current condition.

Fire, Disturbances, and Treatments: The combination of fire exclusion, blister rust, and historical harvest patterns has caused the decline of shade-intolerant, large, older trees; this has resulted in a predominance of shade-tolerant species in the overstory that are much more susceptible to insects, disease, and crown fire. Alternatives 4 and 6 most closely represent the native succession/disturbance regime. Moderate similarity is achieved by Alternative 3, with less similarity for 7, 5, 2, and 1, respectively.

Spatial Distribution of Activities: None of the alternatives would substantially address the overall problem concerning the amounts and rates of change in the montane forests. In general, the restoration Alternatives 3 through 6 would be more proactive than Alternatives 1 and 2. Neither

Alternative 1 or 2 would have management emphasis for this type. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role with: some associated harvest, thinning, and prescribed fire treatments in subbasin group H; thinning, timber harvest, and fuel treatments to reduce risk of wildfire prioritized in group F; moderate emphasis on thinning, harvest, and fuel treatments in groups J and L; and low emphasis in group M. In Alternative 3, the focus for thinning, harvest, and fuel treatments would be in groups J and L. In Alternative 5, there would be some focus on this type, but it would be prioritized in groups L and M.

Subalpine Forest Response

Early-Seral Subalpine Forest —

Occurrence: Most of this terrestrial community is in the cold forest, but some can occur in the moist forest. Also, most of the early-seral subalpine forest is located on BLM- and FS-administered lands. Its current level is substantially above the historical level for both EIS areas (figs. 2.65 and 2.66). Most of the current amount developed as a result of harvest in spruce cover types, blister rust mortality in whitebark pine cover types, and wildfire.

EARLY-SERAL SUBALPINE FOREST
Eastside E.I.S. Area

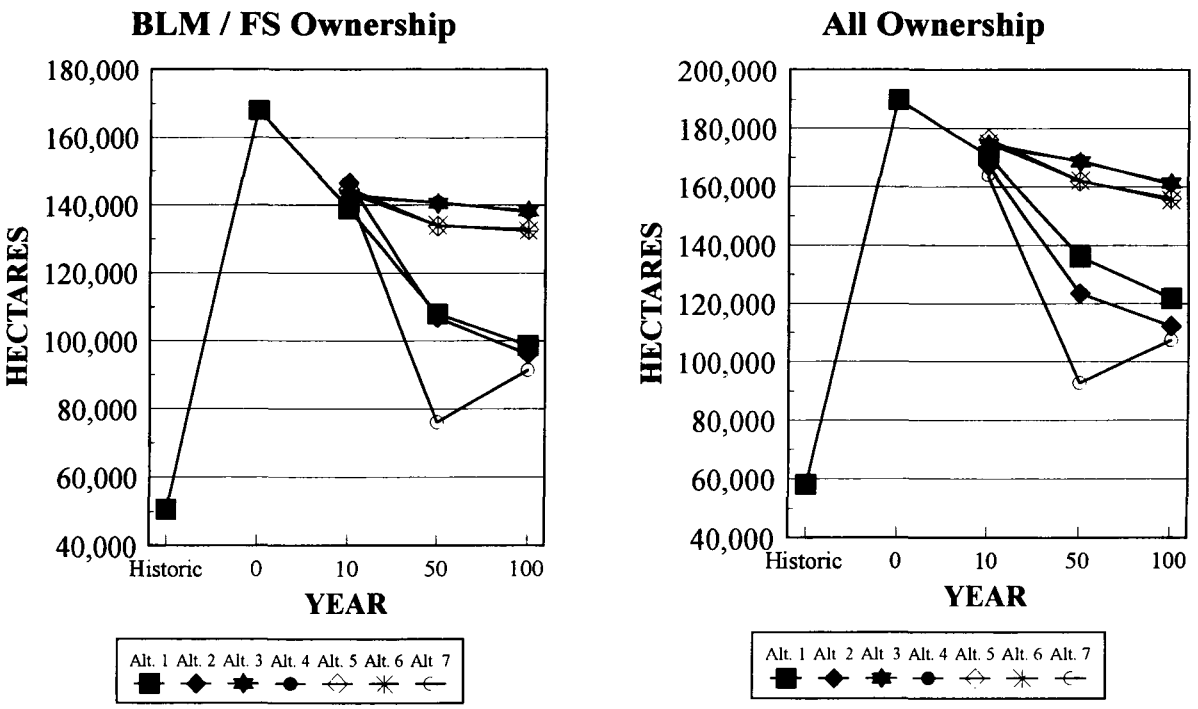


Figure 2.65 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral subalpine forest for the Eastside EIS area.

EARLY-SERAL SUBALPINE FOREST
Upper Columbia E.I.S. Area

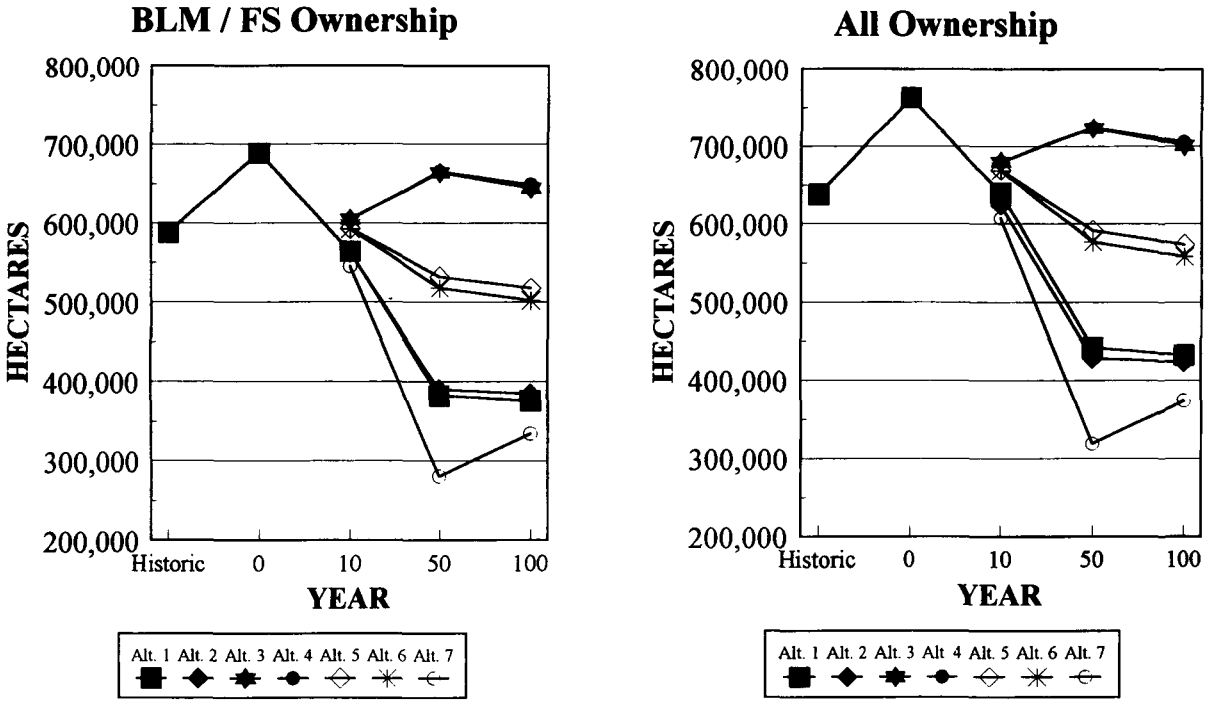


Figure 2.66 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the early-seral subalpine forest for the Upper Columbia River Basin EIS area.

Response to Alternatives: Figures 2.65 and 2.66 depict the response of this terrestrial community. All alternatives would reduce the amount of this terrestrial community due to reduced fire and harvest levels and the succession of the early-seral subalpine to mid-seral communities. The specific emphasis on recovery of whitebark pine in Alternatives 3, 4 and 6 should produce a more positive result than Alternatives 1 and 2. Alternatives 3 through 6 would not reduce the amount of this type as much as Alternatives 1, 2, and 7. The primary disturbances producing early seral subalpine would be:

- Alternative 1: harvest and wildfire.
- Alternative 2: wildfire with minor harvest.
- Alternatives 3 through 6: harvest and prescribed fire, with minor wildfire.
- Alternative 7: wildfire with minor harvest.

Composition and Structure: The ecological composition of early-seral subalpine forests has changed substantially with fire exclusion, which does not provide ash bed regeneration sites for the shade-intolerant species. The composition of trees regenerated in the early-seral stage are also substantially impacted by the decline in whitebark pine related to blister rust. The concern for these communities is that none of the other shade-

intolerant tree species of the cold forest potential vegetation group can fill the same ecological role as whitebark pine in these environments. None of the restoration alternatives (3 through 6) would have enough emphasis on prescribed fire relative to regeneration of rust-resistant whitebark pine to carry whitebark pine through to dominance in the mid- and late-seral stages.

In general, the composition and structure of these early-seral communities would be closest to the native regime in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with harvest and prescribed fire treatments. Alternative 1 would produce early-seral communities with uniform spacing and size. Alternative 2 would be predominantly small harvest units or areas of wildfire that would be salvage-logged and planted. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would result in patterns with moderate similarity to the native regime. Alternative 5 would be more similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to wildfire-created structures in the reserve areas.

Fire, Disturbances, and Treatment: The current early-seral that was created in the cold forest is often in the wrong spatial location for the fire regime. Historically, this type occurred on the steeper landforms where climate and topography supported a crown fire regime that cycled mid-seral communities. Past wildfire and harvesting patterns have typically created these types on foot slopes, benches, ridge tops, or in riparian areas where the historical fire regime was an underburning or mixed fire regime that maintained late-seral stages.

Harvest units and prescribed fires in Alternatives 1 and 2 would continue harvest in the same pattern as current management. Wildfire in Alternatives 1 and 2 would tend to continue to create this type in the wrong pattern, due to fuel accumulation areas affected by fire exclusion. Harvest units and prescribed fires in Alternatives 4 and 6 would shift patterns to the native regime, except that Alternative 6 would proceed at a slower rate. Alternative 5 would provide little emphasis for shifting patterns of this type due to low economic returns. Alternative 3 would proceed at a very slow rate due to the low local priority typically given to subalpine forests. Alternative 7 would be similar to Alternative 3 in the non-reserve areas; but in the reserves have a highly unpredictable response, due to the dynamic nature of wildfires occurring during drought years in the cold forest zone.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that create this type would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with some associated harvest treatments in subbasin group H. The emphasis on this type in the other subbasin groups would not be substantial due to their relatively low compositions of cold forest and also the higher priorities on improving conditions in the dry and moist forest potential vegetation groups.

Mid-seral Subalpine Forest —

Occurrence: Most of this terrestrial community occurs in the cold forest, but some is in the moist forest. Most of this type occurs on BLM- and FS-administered lands. The current level is substantially less than the historical level in the Eastside EIS area, but substantially more than the historical level in the Upper Columbia River Basin EIS area (figs. 2.67 and 2.68).

Response to Alternatives: Figures 2.67 and 2.68 depict the response of this terrestrial community. In the EIS areas, Alternatives 1 and 2 would have moderate increases and then level out between 50 and 100 years, and Alternatives 3 through 6 would have small increases over the 100-year period for the Eastside EIS area.

In the Upper Columbia River Basin EIS area, Alternatives 1 and 2 would have moderate increases, then decline between 50 and 100 years to slightly below the historical level. Alternatives 3

through 6 would have strong declines to well below the historical level by the 100-year period.

In both EIS areas, Alternative 7 would be similar to Alternative 3 on the non-reserve areas. Wildfire would be the primary disturbance on this type in Alternative 7, where the response in the reserve areas would be fairly unpredictable given the dynamic nature of large wildfires in the cold forest.

Community Transition: From the historical to the current period, this type primarily transitioned to: 1) early-seral forests as a result of harvest in spruce and the mortality of whitebark pine from blister rust; 2) dominance by shade-tolerant, montane, mid-seral trees; and 3) mid-seral subalpine forests dominated by more shade-tolerant species, such as subalpine fir and mountain hemlock. There was little net change from these mid-seral forests to late-seral forests.

This stage is generally found on the steeper slopes; these areas usually cycle with a crown fire. The cold forest's mid-seral stage typically remains in that structure if fire does not occur, but becomes more dense. Stress, insects, disease, or fire eventually produce mortality of the overstory and cycle the structure to early-seral.

MID-SERAL SUBALPINE FOREST
Eastside E.I.S. Area

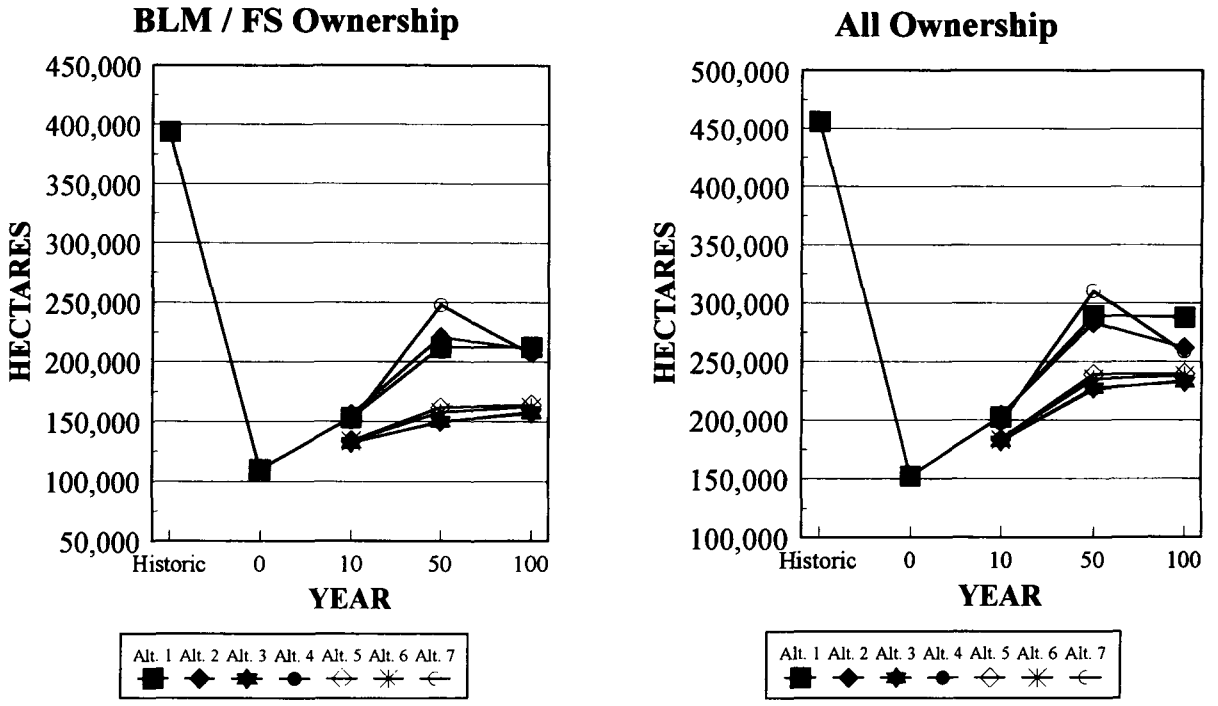


Figure 2.67 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral subalpine forest for the Eastside EIS area.

MID-SERAL SUBALPINE FOREST
Upper Columbia E.I.S. Area

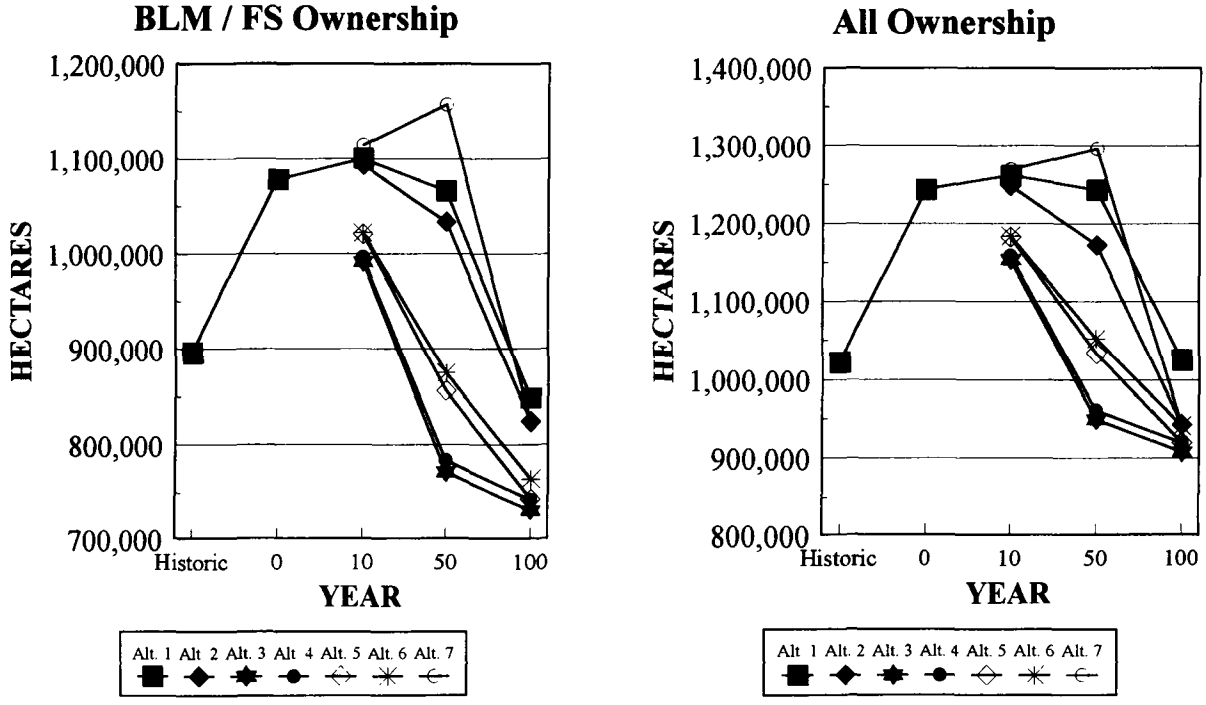


Figure 2.68 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the mid-seral subalpine forest for the Upper Columbia River Basin EIS area.

Alternatives 1 and 2 would continue the transition of early- and late-seral forest to mid-seral forest, while also maintaining much of the mid-seral forest in the mid-seral stage. Although there would not be a substantial difference in response between alternatives, Alternatives 1, 2, and 7 would generally produce higher overall amounts of this stage than Alternatives 3 through 6.

Composition and Structure: The composition and structure of these mid-seral communities would be closest to the native regime in Alternatives 4 and 6 because they emphasize mimicking ecosystem processes. Alternative 1 would produce relatively uniform patch patterns. Alternative 2 would produce stands of high density and small dead-standing and down trees. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would produce structures having moderate similarity to the native regime. Alternative 5 would have little emphasis in the cold forest zone. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas. Although the response in the reserve areas under Alternative 7 over the long term may tend to be similar to historical structures, the dynamic nature of wildfire in the cold forest zone may preclude development of native patterns.

Fire, Disturbances, and Treatment: Continued traditional harvest and fire exclusion in Alternatives 1 and 2 would increase the amount of this structure that is out of proportion with its native disturbance regime. Thinning, harvesting, and prescribed fire in Alternatives 4 and 6 would shift patterns to the native succession/disturbance regime, although Alternative 6 would proceed at a slower rate. Alternative 5 would have little emphasis on shifting patterns of this type, given its economic priority limitations. Alternative 3 would proceed at varying rates due to its local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas; in the reserve areas, the patterns are expected to eventually stabilize, but not within the 100-year period.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that affect this type would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with some associated harvest, thinning, and prescribed fire treatments in subbasin group H. No substantial emphasis would be placed on this type in the other subbasin groups due to priorities for improving conditions in the dry and moist forest potential vegetation groups.

Late-seral Multi-layer Subalpine Forest —

Occurrence: Most of this terrestrial community is in the cold forest, although some can occur in the moist forest. Also, most of this type occurs on BLM- and FS-administered lands. Its current level is substantially below its historical level (figs. 2.69 and 2.70).

Response to Alternatives: Figures 2.69 and 2.70 depict the response of this terrestrial community. All alternatives would show an increase of this community to its historical level within 50 years of implementation due primarily to successional development of mid-seral communities. Alternatives 1 and 2 would continue with a steady increase above the historical level by year 100. For the EEIS area, Alternatives 3 through 6 would increase to the historical level by year 50 and level out at that level through year 100. For the UCRB the amounts would continue to increase. Alternative 7 would be similar to Alternative 3 on the non-reserve areas. Wildfire would be the primary effect on late-seral subalpine in Alternative 7, where the response in the reserve areas would be fairly unpredictable given the dynamic nature of large wildfires in the cold forest potential vegetation group.

Community Transition: From the historical to current period, this type primarily transitioned from early-seral forests to dominance by shade-tolerant montane mid-seral or late-seral trees. This transition was a result of fire, harvest in spruce, and mortality of whitebark pine from blister rust. In the native regime, the late-seral multi-layer stage is generally found on the foot slopes, riparian areas, and benches, with a mixed or creeping/spotting type of fire regime. If disturbance does not occur, the late-seral multi-layer stage of the cold forest typically stays in that structure but becomes more dense. In the native regime, mixed or creeping/spotting type fires thinned the stands and selected against shade-tolerant species. Without these kinds of disturbances, however, stress, insects, disease, or crown fire eventually produce mortality of the overstory and cycle the structure to mid- or early-seral. Much of the cold forest's current late-seral multi-layer is found on the steeper slopes where there is high risk for crown fires.

Fire, Disturbance, and Treatments: Traditional harvest and fire exclusion patterns in Alternatives 1 and 2 would increase the amount of this structure that is out of balance with its basic disturbance regime, particularly in the 50- to 100-year period. Thinning, harvest units, and prescribed fires in Alternatives 4 and 6 would shift patterns to the native succession/disturbance regime, but Alternative 6 would proceed at a slower rate. Alternative 5 would have little emphasis on shifting patterns of late-seral multi-layer subalpine, given its economic priorities. Alternative 3 would proceed at a moderate level, due to its local emphasis. Alternative 7 would be similar to Alternative 3 in the non-reserve areas; the patterns in the reserves are expected to eventually stabilize, but not within the 100-year period.

LATE-SERAL SUBALPINE FOREST MULTI-LAYER
Eastside E.I.S. Area

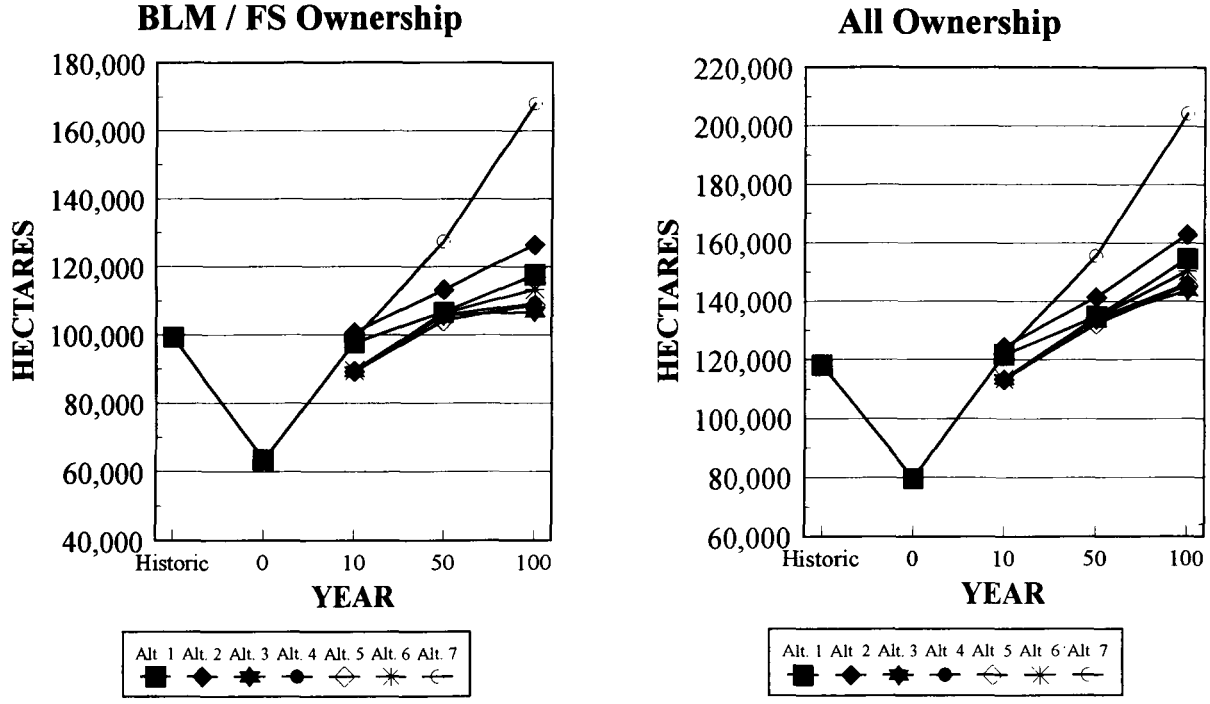


Figure 2.69 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral subalpine forest multi-layer for the Eastside EIS area.

Composition and Structure: In general, the composition and structure of these late-seral multi-layer communities would be closest to the native regime in Alternatives 4 and 6, because they emphasize mimicking ecosystem processes. Alternative 1 would produce relatively uniform patterns. Alternative 2 would produce stands of higher densities and more small dead standing and down trees. Depending on local priorities and degree of ecological emphasis, Alternative 3 would have moderate similarity to the native regime. Alternative 5 would have little emphasis in this zone. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas; the response of structures in the reserve areas would tend to be similar to current structures. However, the potential dynamics of wildfire in Alternative 7 may preclude development of mid-seral structures.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments affecting the subalpine forests would generally be scattered throughout all subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with some associated harvest, thinning, and prescribed fire treatments in subbasin group H. Emphasis on this type in other subbasin groups would not be substantial due to priorities for improving conditions in other potential vegetation groups.

LATE-SERAL SUBALPINE FOREST MULTI-LAYER
Upper Columbia E.I.S. Area

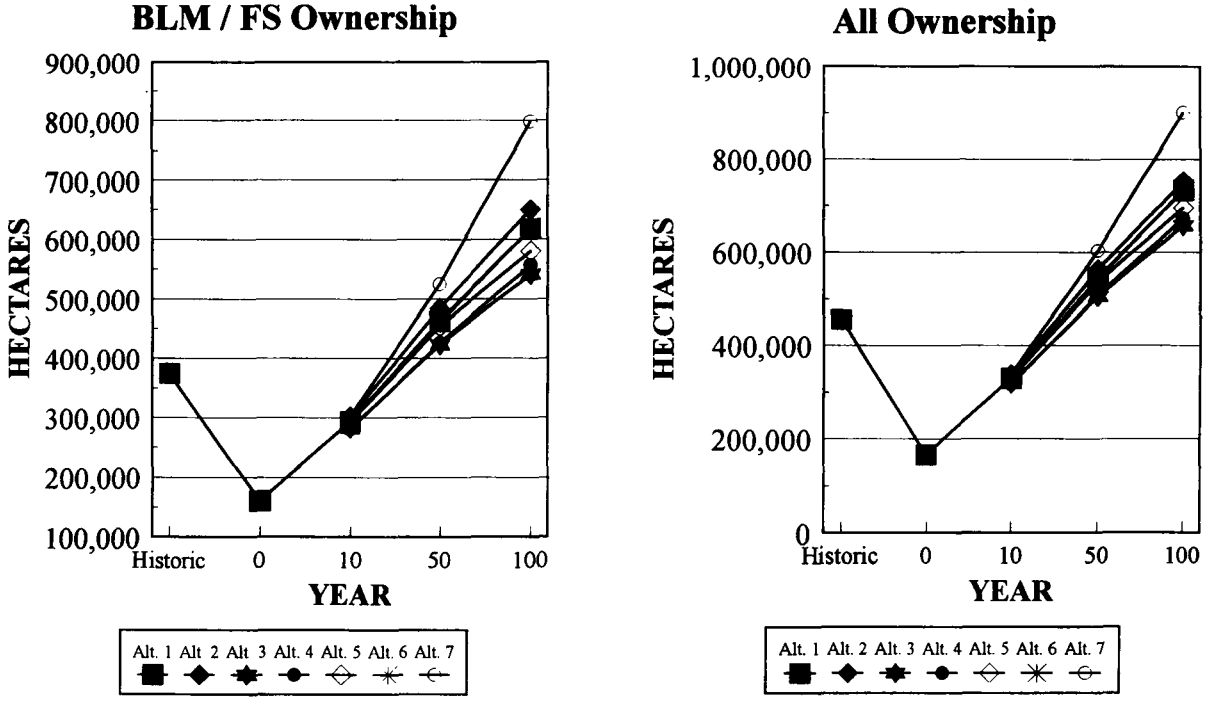


Figure 2.70 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral subalpine forest multi-layer for the Upper Columbia River Basin EIS area.

Late-seral Single-layer Subalpine Forest —

Occurrence: Most of this terrestrial community is in the cold forest, although some can occur in the moist forest. Also, most of this type occurs on BLM- and FS-administered lands. Its current level is below the historical level for the Eastside EIS area and above for the Upper Columbia River Basin EIS area (figs. 2.71 and 2.72).

Response to Alternatives: Figures 2.71 and 2.72 depict the response of this community. All alternatives would have a continued, steep decline from the current level due to a lack of technology to restore whitebark pine and provide for underburning and mixed regime fires that would maintain this type.

The ecological placement of this type is typically on ridges and benches in the cold forest at high elevations, mostly in wilderness and semi-primitive areas. The predominance of prescribed natural fire and unplanned ignition in areas that now have high fuel loading would preclude this type of fire behavior in most fire years. No alternatives would successfully address this situation. Alternative 6, which has higher potential than the other alternatives for technology development may result in higher levels of prescribed natural fire and planned ignition in these ecosystems.

Community Transition: From the historical to current period, this type primarily transitioned to:

1) early-seral forests, as a result of fire, harvest in spruce, and mortality of whitebark pine from blister rust; and 2) dominance by shade-tolerant, mid-seral montane trees, such as lodgepole pine. This stage is generally found on ridge tops and benches, which historically had underburning or mixed type fire regime. These types of fire thinned the stands, selected against shade-tolerant species, and maintained herb- and shrub-dominated understories. The late-seral stage typically loses its overstory due to stress, insects, disease, or crown fire. Most of the cold forest's current late-seral single-layer community still remains in its ecologically appropriate landform.

Fire, Disturbances, and Treatments: Fire exclusion and traditional harvest patterns in Alternatives 1 and 2 would increase the amount of this structure that is inconsistent with the biophysical regime. The restoration alternatives (3 through 6) do not appear to take substantial action for planned ignitions of prescribed natural fires during conducive weather conditions to provide for the native succession/disturbance regime. The non-reserve areas of Alternative 7 would be similar to Alternative 3; reserve areas would have highly unpredictable patterns due to wildfire's dynamic nature in the cold forest zone.

LATE-SERAL SUBALPINE FOREST SINGLE-LAYER
Eastside E.I.S. Area

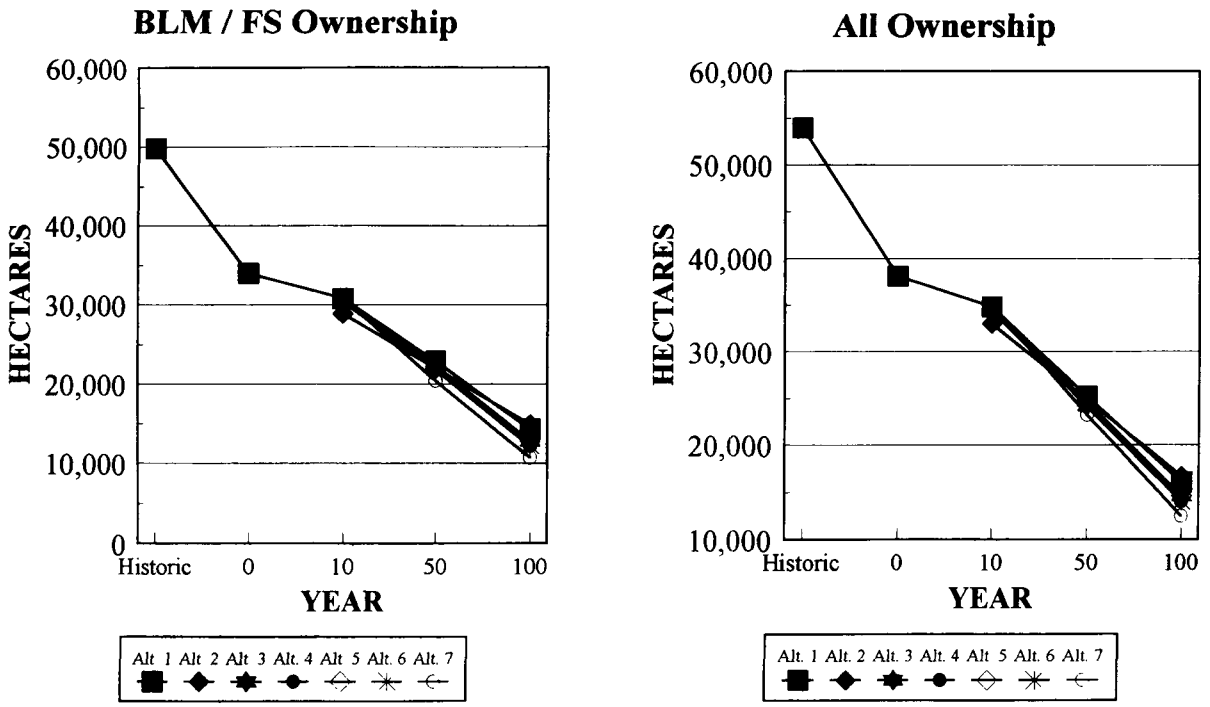


Figure 2.71 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral subalpine forest single-layer for the Eastside EIS area.

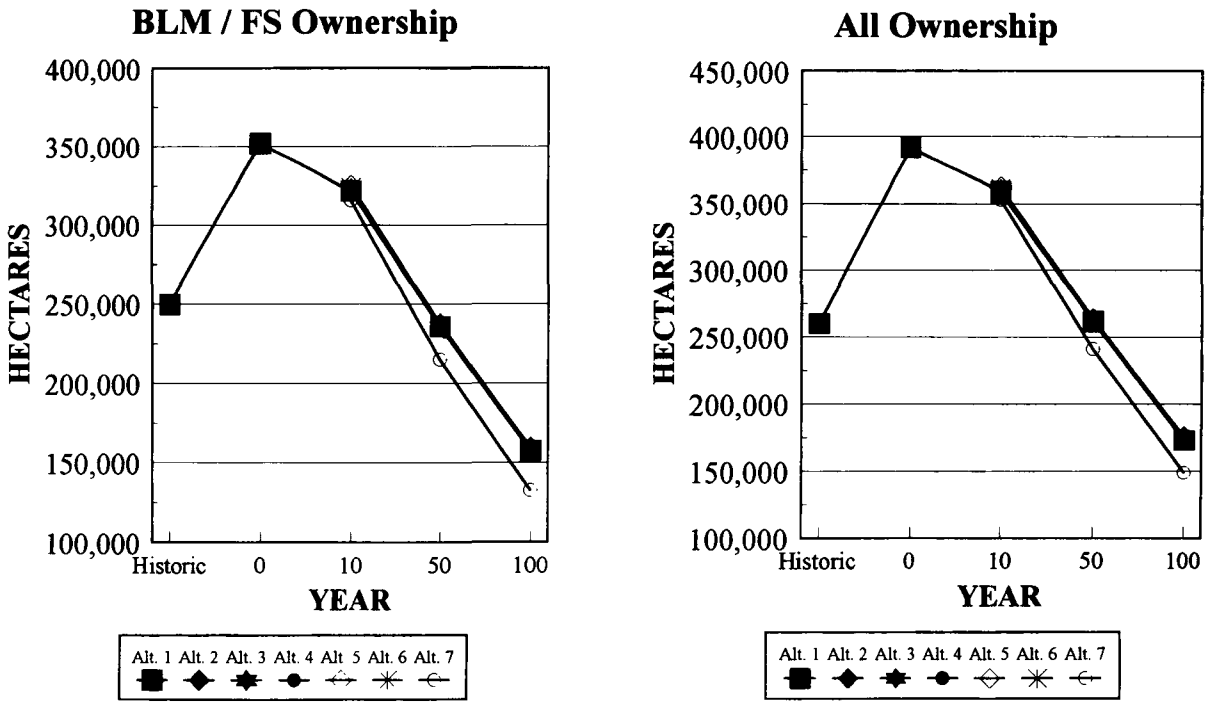


Figure 2.72 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the late-seral subalpine forest single-layer for the Upper Columbia River Basin EIS area.

Community Structure: In general, if there were aggressive management actions, the composition and structure of these late-seral single-layer communities would be closest to the native regime in Alternatives 4 and 6, which place emphasis on mimicking ecosystem processes. Other alternatives would generally affect the structure and pattern of this type negatively, due to inappropriate ecological treatments in Alternatives 1 and 2, and the lack of ecological emphasis in Alternatives 3, 5, and 7.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments affecting late-seral single-layer subalpine forest would generally be scattered throughout all subbasins. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) may play a role, with some associated harvest, thinning, and prescribed fire treatments in subbasin group H. The other subbasin groups would not emphasize this type, due to their low priority for the zone.

Rangeland Potential Vegetation Groups

The rangeland potential vegetation groups include:

- Dry shrub
- Dry grass
- Cool shrub
- Woodland

In the Eastside EIS area, there are 11,768,500 hectares (29,080,600 acres) of the rangeland potential vegetation groups on BLM- and FS-administered lands:

4,348,700 hectares (10,745,873 acres), or 37.0 percent, in dry shrub

319,300 hectares (789,008 acres), or 2.7 percent, in dry grass

899,200 hectares (2,221,972 acres), or 7.6 percent, in cool shrub

62,300 hectares (153,947 acres), or 0.5 percent, in woodland

In the Upper Columbia River Basin EIS area, there are 18,492,800 hectares (45,696,709 acres) of the rangeland potential vegetation groups in BLM- and FS-administered lands:[1]

3,737,500 hectares (9,235,565 acres), or 20.2 percent, in dry shrub

666,300 hectares (1,646,463 acres), or 3.6 percent, in dry grass

[1]Note: the GYE is incorporated in the UCRB EIS area numbers.

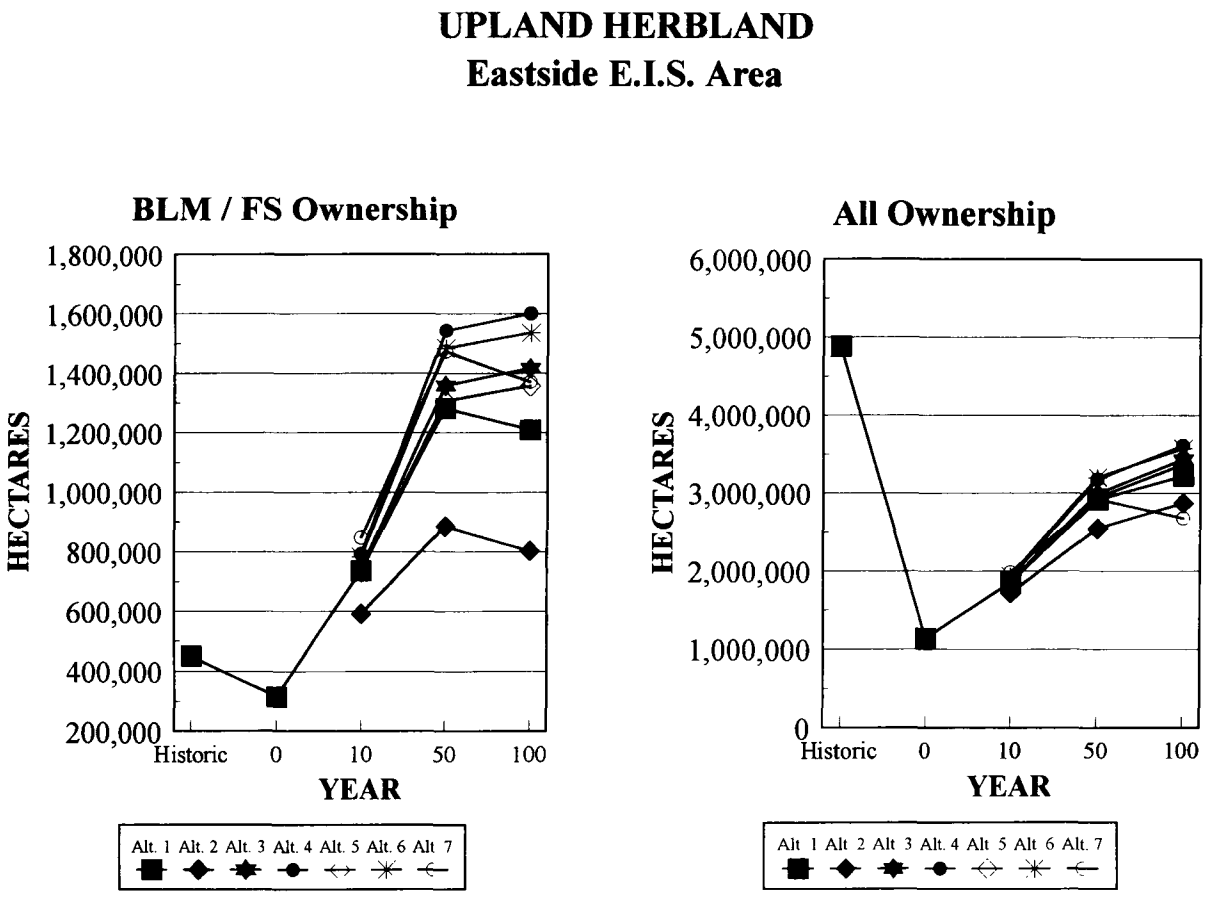


Figure 2.73 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland herbland for the Eastside EIS area.

1,973,300 hectares (4,876,131 acres), or 10.7 percent, in cool shrub

97,100 hectares (239,939 acres), or 0.5 percent, in woodland

Upland Herbland —

Occurrence: This terrestrial community is common in all rangeland potential vegetation groups and also in the dry forest potential vegetation group. A shortage of upland herbland was identified as a finding of concern in the landscape assessment (Hann and others, in press). The current level is only about half the historical level for both EIS areas (figs. 2.73 and 2.74). From the historical to current period, there was little upland herbland created, except where minor fire and seeding disturbance occurred in the upland shrublands and woodlands, and in the dry forest.

Response to Alternatives: Figures 2.73 and 2.74 depict the response of the upland herb community. All alternatives would increase the amount of upland herbland as a result of fire and restoration. The trend would be a steep increase in the first 50 years, then a leveling or decline due to succession.

The restoration alternatives (3 through 6) would provide for the most increase of upland herb in the Eastside EIS area; Alternative 1 would have an intermediate increase; and Alternative 2 would have the lowest increase. Alternative 7 is less than

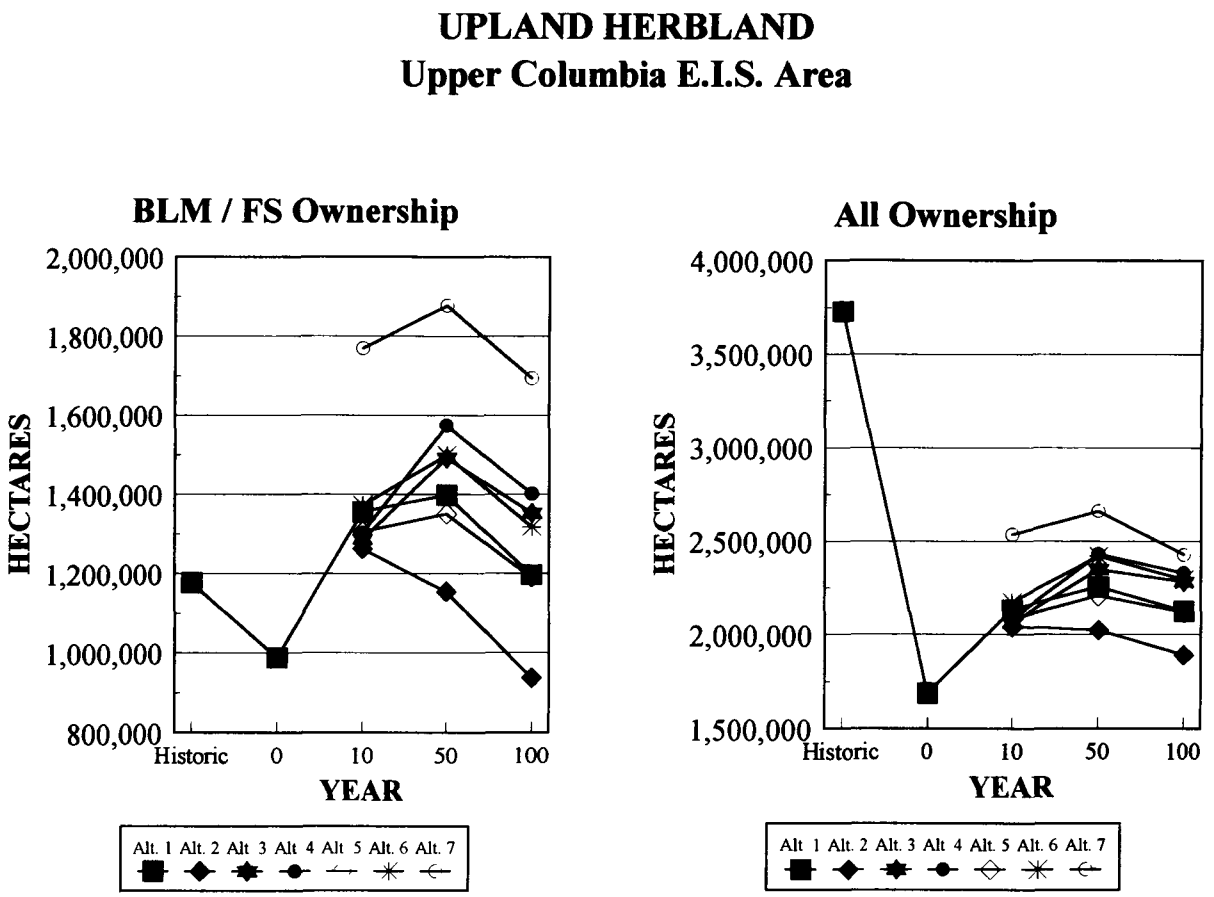


Figure 2.74 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland herbland for the Upper Columbia River Basin EIS area.

Alternative 6 and greater than Alternative 3. However, fires may burn with a high severity that increases risk of exotic herb invasion in Alternative 7. Alternative 7 would have the largest increase in the UCRB due to wildfire. Other trends are similar to the Eastside EIS area.

Fire, Disturbances, and Treatments: Much of the historical upland herbland developed into upland shrubland, upland woodland, or early/mid-seral forest as a result of fire exclusion.

Community Composition and Structure: In general, the upland herbland communities would be closest to the native composition and structure in Alternatives 4 and 6, due to their emphasis on mimicking ecosystem processes with prescribed fire, grazing, and restoration treatments. Alternative 1, and the upland areas of Alternative 2, would produce structures trending toward simplification and monocultures. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would produce structures with moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas, and to wildfire-created structures in the reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments affecting this

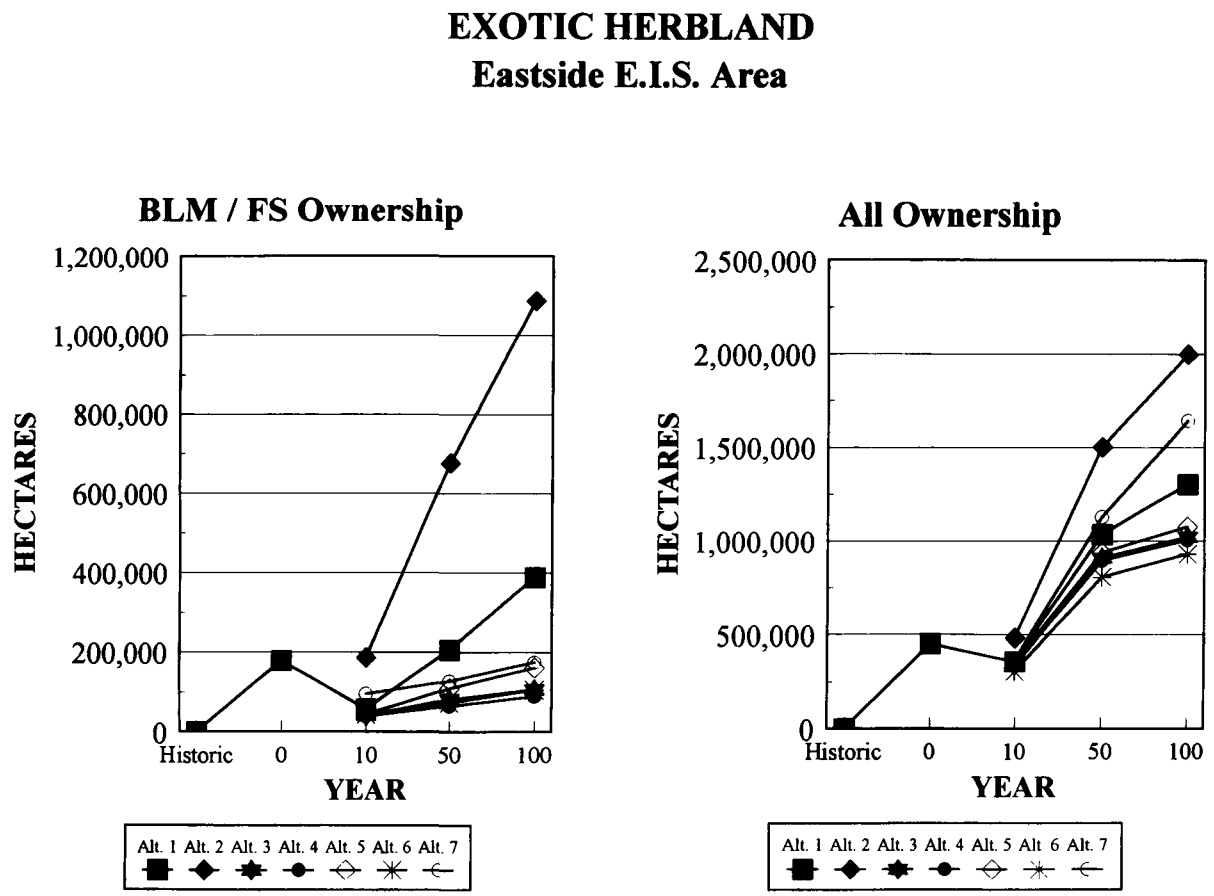


Figure 2.75 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the exotic herbland for the Eastside EIS area.

type would generally be scattered throughout all the subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with some associated restoration treatments in subbasin group H; moderate emphasis on prescribed fire and restoration treatments prioritized in group F; moderate emphasis on prescribed fire and restoration treatments in groups J and L; and a moderate emphasis in group M. In Alternative 3, the focus for prescribed fire and restoration treatments would be in groups L and M. In Alternative 5, the focus would be in groups L and M.

Exotic Herbland —

Occurrence: The exotic herbland community is common in all rangeland potential vegetation groups and in the dry forest. Ecological concerns about exotic plants were discussed in the Landscape Dynamics assessment (Hann and others, in press). The current level of exotic plant introduction and spread is substantially above historical levels (figs. 2.75 and 2.76).

Response to Alternatives: Figures 2.75 and 2.76 depict the response of this terrestrial community. In these two figures, the current level is higher than the 10-year level because a different version

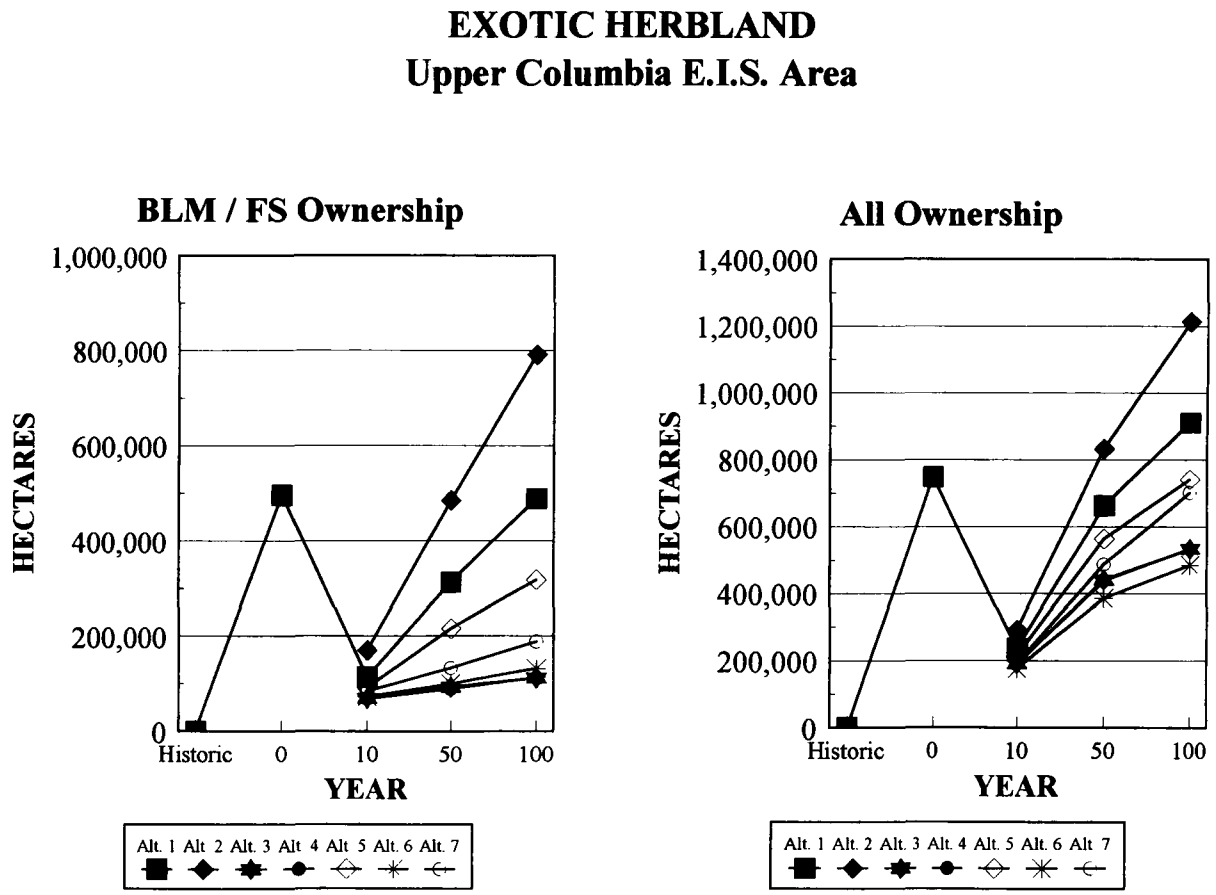


Figure 2.76 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the exotic herbland for the Upper Columbia River Basin EIS area.

of the broad-scale vegetation cover type map was used, which showed less exotic herblands in the current condition.

Due to these mapping difficulties with exotic herblands, we are uncertain about their predicted responses at the EIS assessment area, potential vegetation group, ecological reporting unit, and subbasin group levels. In general, because of coarse-scale mapping and prescription models being mapped at the forest and range cluster level, rather than the subbasin or potential vegetation group level, the current amounts of exotic herbs and their potential rates of spread may be underestimated. The projected integrated weed management programs may not be aggressive enough to achieve the desired futures. Therefore, the predictions should be used only as an index. The trends and relative differences discussed between alternatives, however, have moderately high confidence.

Alternative 1 would have the greatest increase in exotic herbland because the forest and resource plans have high levels of disturbance and little emphasis on weed management. This increase in exotic herbland communities in Alternative 1 would result in ecological simplification and monocultures. Alternative 2 would be similar to Alternative 1 for upland areas, but overall would

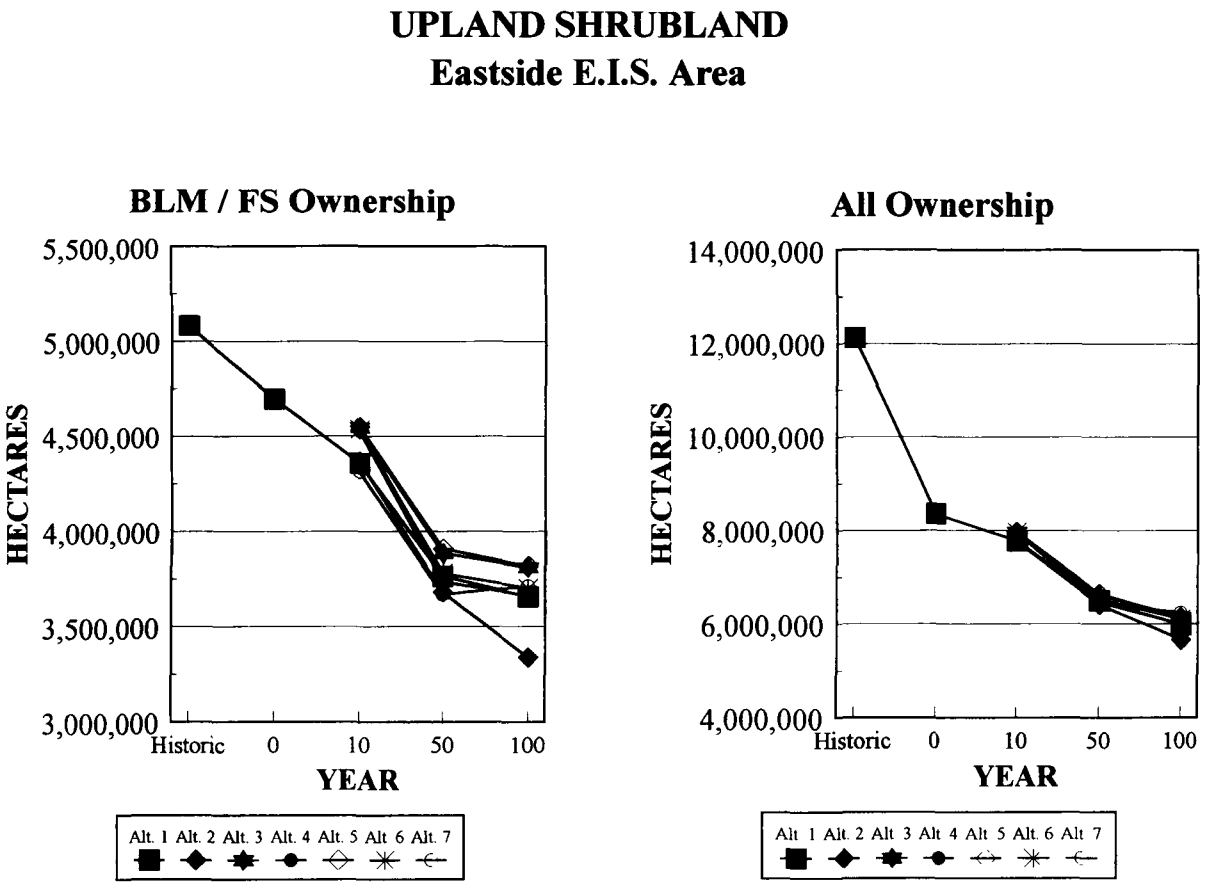


Figure 2.77 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland shrubland for the Eastside EIS area.

have reduced amounts of exotic herbs due to lower levels of disturbance. The more aggressive integrated weed management efforts on containment and control in Alternatives 3 through 6 would maintain exotic herblands at their present level. Of these, Alternative 3 would have an emphasis level resulting in a more fragmented approach, and Alternative 5 would tend to emphasize areas where weed management resulted in economic efficiency. The response of exotic herblands in Alternative 7 would be similar to Alternative 3 in the non-reserve areas, but relatively unpredictable in the reserve areas.

Community Transition: From the historical to current period, the introduction and spread of exotic herbs have been substantial, particularly in dry forest, dry shrub, and dry grassland communities; and along roadsides and stream/river corridors. The composition and structure of most exotic herbland communities is not similar to native communities.

Upland Shrubland —

Occurrence: Although upland shrub is common in all rangeland potential vegetation groups and also in the dry forest, its current amount is below its historical level (figs. 2.77 and 2.78). The shortage of upland shrubland was a finding of concern in the Landscape Dynamics assessment (Hann and others, in press).

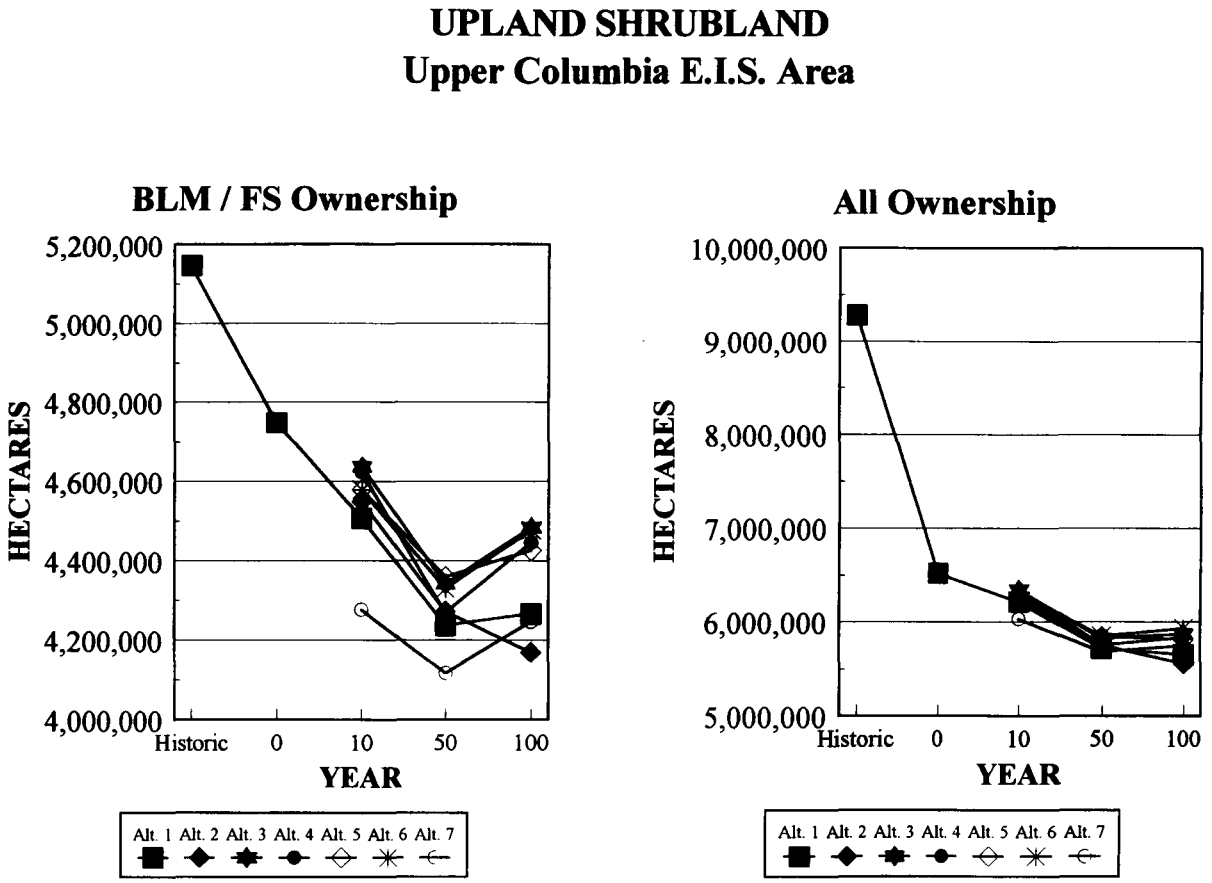


Figure 2.78 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland shrubland for the Upper Columbia River Basin EIS area.

Response to Alternatives: Figures 2.77 and 2.78 depict the response of the upland shrub community. All alternatives would result in the continued decline of this type due to succession to woodland and conifer encroachment, exotic herb invasion, fire exclusion in some areas, and increased fire in other areas.

The restoration emphasis alternatives (3 through 6) would provide for a leveling of the decline at about year 50. Alternatives 1 and 2 would have a continued decline through year 100. Although not graphed, Alternative 7 would be between Alternatives 3 and 2.

Composition and Structure: In general, the composition and structure of the upland shrubland communities would be closest to the native regime in Alternatives 4 and 6, which emphasize mimicking ecosystem processes with prescribed fire, grazing, and restoration treatments. Alternative 1 would produce dense, uniform upland shrubland or woodland/forest encroachment communities, or conversion to exotic herbland; Alternative 2 would be similar to Alternative 1. Depending on the local priority and degree of emphasis, Alternative 3 would result in structures with moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserves and relatively unpredictable patterns in the reserves as a result of wildfire.

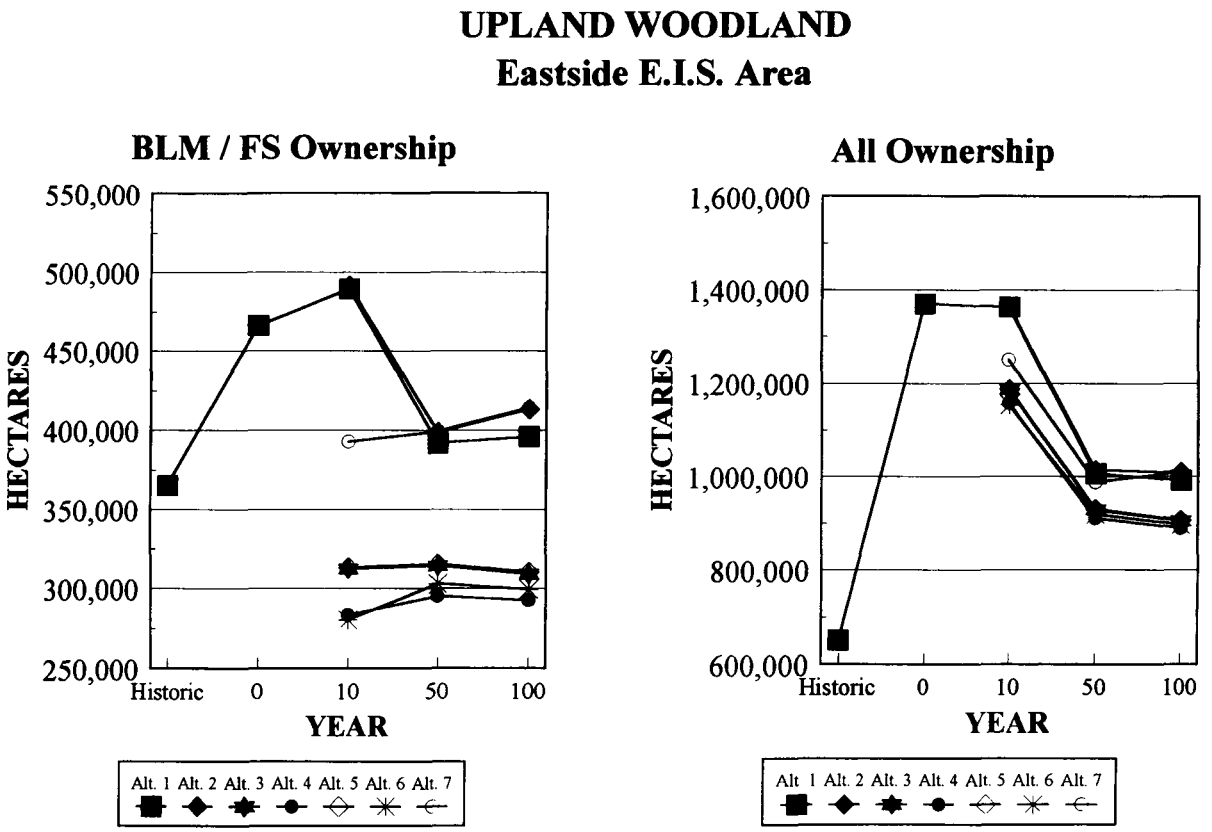


Figure 2.79 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland woodland for the Eastside EIS area.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that produce this type through succession from upland herbland would generally be scattered throughout all the subbasin groups. In Alternatives 4 and 6, the prescribed natural fire program (both planned and unplanned ignition) would play a primary role, with some associated restoration treatments in subbasin group H. Prescribed fire and restoration treatments would have moderate emphasis in group F, J, L, and M. In Alternatives 3 and 5, the focus for prescribed fire and restoration treatments would be in groups L and M.

Upland Woodland —

Occurrence: This terrestrial community is common in all rangeland potential vegetation groups. The high amount of upland woodland communities compared to historical conditions in the Eastside EIS area was a finding of concern in the Landscape Dynamics assessment (Hann and others, in press). Its current amount is substantially above the historical level in the Eastside EIS area, but substantially below the historical level in the Upper Columbia River Basin EIS area.

Response to Alternatives: Figures 2.79 and 2.80 depict the response of this terrestrial community. In the Eastside EIS area, all alternatives would reduce the upland woodland. Alternatives 1 and 2 would generally level out from the 50- to 100-year period at the historical level. The restoration emphasis Alternatives (3 through 6) would provide for a leveling at about year 50. Alternatives 1

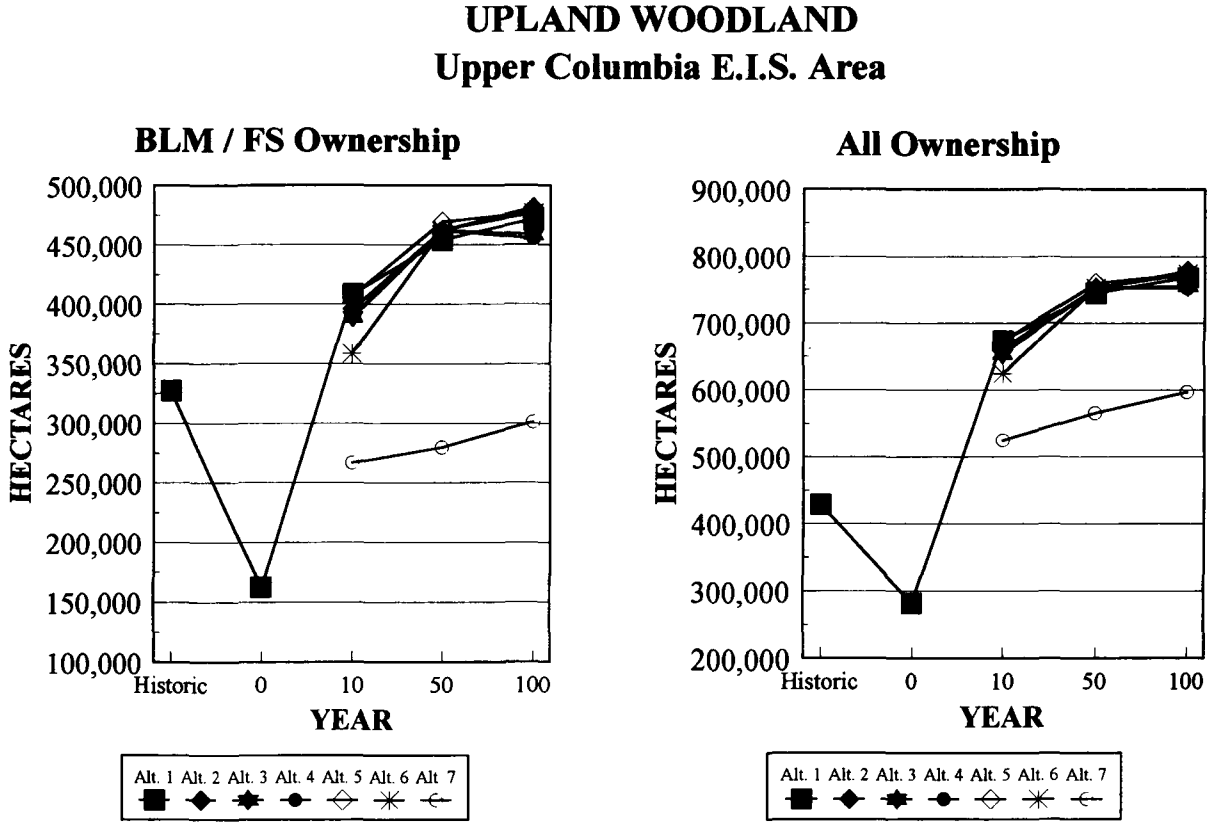


Figure 2.80 — Trends from historic to current and future (100 year) projections for preliminary draft EIS alternatives 1 through 7 for the upland woodland for the Upper Columbia River Basin EIS area.

and 2 would generally show a reduction to below the historical level. Alternative 7 would result in amounts between Alternatives 2 and 3. In the Upper Columbia River Basin EIS area, all alternatives would result in increases well above the community's historical levels except for Alternative 7.

Composition and Structure: In general, the composition and structure of the upland woodland communities would be closest to the native regime in Alternatives 4 and 6, because of their emphasis on mimicking ecosystem processes with prescribed fire, grazing, and restoration treatments. Alternatives 1 and 2 would produce similar upland woodland communities which would tend to be dense and uniform. Depending on the local priorities and degree of ecological emphasis, Alternative 3 would have structures with moderate similarity to the native regime. Alternative 5 would be similar to Alternative 1 in the higher production areas, and to Alternative 3 in other areas. Alternative 7 would have structures similar to Alternative 3 in the non-reserve areas and similar to current structures in reserve areas.

Spatial Distribution of Activities: In Alternatives 1 and 2, disturbances and treatments that produce the upland woodland through succession from upland herbland would generally be scattered throughout all subbasin groups. In Alternatives 3 through 6, the general emphasis for management of upland woodlands would be in subbasin group L; and in Alternative 7, it would be in the non-reserve portions of group L.

Rangeland Riparian —

Occurrence: In the prescription mapping process, Alternatives were mapped at the upland forest and rangeland potential vegetation group level, not at the riparian level. Current broad-scale mapping of riparian areas generally overemphasize the large polygons of riparian and underemphasize the narrow riparian areas. Because of this mapping, the modeled projections were not specific to riparian. The predictions should be used with caution and only to indicate trends.

Alpine —

Occurrence: The alpine potential vegetation group is very important as a sensitive ecological environment.

Response to Alternatives: All alternatives place emphasis on restoration in the alpine potential vegetation group.

Fire, Disturbances, and Treatments: Activities such as mining, roading, livestock grazing, and recreational activities have caused declining ecological conditions in alpine communities. Also, the alpine community is the most sensitive of all potential vegetation groups to toxic air pollutants.

Composition and Structure: Because of the relatively-broad classification used in our modeling, none of the alternatives showed any structural or composition changes in this potential vegetation group.

There is little guidance provided in the preliminary draft EIS Chapter 3 relative to management or restoration of the alpine system. However, based on the themes and DFCs, we assume the emphasis for restoration would be high in Alternative 4 and 6 because of their emphases. Given the sensitive nature of these environments, their future trend would likely decline in other alternatives. The decline would be somewhat less in Alternatives 3, 5, and 7, than in Alternatives 1 and 2.

Summary

We would recommend that any future analysis of broad-scale communities as terrestrial habitats use the physiognomic type groups (PVTs) stratified by potential vegetation group (PVG) or, for a coarser grouping, by forest and rangeland. The changing nature of lower montane, montane, subalpine and non-forest terrestrial communities in relation to existing vegetation cover types with no tie to the biophysical environment is a substantial hindrance to this analysis. Without the tie to the biophysical environment little inference can be made relative to temperature, moisture, soils, terrain, or consistency of the terrestrial communities with the biophysical system and inherent succession and disturbance processes.

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Effects of Alternatives on Selected Noxious Weeds and Cheatgrass on Rangeland

Invasions of exotic plants have been numerous in the Basin in the last 100 years (Young and others 1972, Franklin and Dryness 1973, Yensen 1981, in: Mack 1986). On the Basin's rangeland, exotic plants, especially the legally declared "noxious" weeds, and cheatgrass are spreading rapidly and in some cases exponentially. Their establishment and spread is aided by disturbance to the soil surface in combination with their opportunistic life cycle strategies.

The establishment and spread of noxious weeds and cheatgrass is of concern because of their adverse effects on rangeland health, which include:

- Reduction of the diversity and abundance of native vegetation.
- Reduction of forage for livestock and wildlife.
- Reduction in the diversity and quality of wildlife habitat.
- Increase in erosion and subsequent decrease in water quality and soil productivity.

Although noxious weed establishment and spread is facilitated by soil surface disturbance, some noxious weed species (such as spotted knapweed, yellow starthistle, and leafy spurge) are invading relatively undisturbed sites, including wilderness areas and National Parks (Asher 1994; Tyser and Key 1988).[1]

The extent and effects of noxious weeds and cheatgrass on rangeland health are an issue of critical concern in the Basin, and for this reason are addressed in the preliminary draft EISs and also included in this evaluation of alternatives.

Scientific names of weed species discussed in this evaluation are listed in table 2.41.

Methods Used in Evaluating the Effects of Alternatives on Noxious Weeds and Cheatgrass

The following steps formed the foundation for evaluating the effects of the alternatives on selected noxious weeds and cheatgrass:

- First, the noxious weeds and cheatgrass analyzed in Karl and others (1995) were categorized by range cluster, giving current location within the cluster and any current acreage data, where available (appendix 2L, tables 2L.1 through 2L.6). A list was made of potential vegetation types (PVTs) that had either high or moderate susceptibility to these weeds within the dry grass, dry shrub, and cool shrub potential vegetation groups (PVGs)(appendix 2M, tables 2M.1 through 2M.10).

  A high-susceptibility potential vegetation type is defined as a type where a weed species can invade successfully and become dominant or codominant, even in the absence of intense or frequent disturbance. A moderate-susceptibility potential vegetation type is defined as a type where a weed species can invade successfully because intense or frequent disturbance impacts the soil surface or removes the normal canopy cover.

  See Karl and others (1995) for a table listing the susceptibility ratings for each rangeland potential vegetation type in the Basin to each noxious weed and cheatgrass. Susceptibility ratings of rangeland potential vegetation types were com-

[1]Personal observation. 1996. M.G. Karl. Rangeland Management Specialist - Ecologist. U.S. Department of Agriculture, Forest Service. Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington.

piled from B. Anderson,[2] Asher (1991, 1993a, 1993b),[3] Brandt and Rickard (1994), Karl and others (1995), Pellant and Hall (1994), Piper and Coombs (1996), Rice and others (1994), Roche (1991, 1994), and USDI (1996). These susceptibility ratings, along with the weed species most prevalent within a PVG and range cluster (appendix 2L, tables 2L.1 through 2L.6) were used to make determinations of the weed species that would be the target of weed control activities. It should be noted that the acreages in appendix 2L are not specific in all cases to BLM- and FS-administered lands, and that the estimate areas in most cases are general. Further refinement may occur after more accurate data is compiled from the various BLM districts and resource areas and the forests and ranger districts in the EIS implementation process.

- Second, the rangeland potential vegetation types in each subbasin (4th-field HUC) within the Basin were summed by range cluster for the BLM- and FS-administered lands and for Other lands (non BLM/FS; incomplete information not presented for all clusters)(appendix 2M, tables 2M.1 through 2M.10). These data were used as background material in determining the extent of moderate and high susceptibility potential vegetation types within each cluster.
- Third, the management activity tables in the preliminary draft EISs for the Eastside and the Upper Columbia River Basin areas were used to provide estimates of acres on which weed control, livestock management, and prescribed burning activities would be implemented for each alternative. Acreage for weed control and livestock management was specified by dry grass, dry shrub, and cool shrub potential vegetation groups for each target range cluster for each alternative (appendix 2N, tables 2N.1 through 2N.6). Tables in appendix 2N also include the steps of Integrated Weed Management (IWM) and affected PVTs. Chapter 3 of the preliminary draft EISs was the origin of the IWM emphasis.
- Fourth, the alternatives described in Chapter 3 of the preliminary draft EISs, including their Integrated Weed Management (IWM) emphasis, were the basis for this evaluation of effects of the alternatives on noxious weeds and cheatgrass. The steps of integrated weed management emphasized in the EISs vary by range cluster, according to the different objectives or emphasis of each alternative. These objectives are either restore, produce, conserve, or various combinations.

The alternatives were ranked for their effectiveness in preventing the spread of noxious weeds and cheatgrass in the dry grass, dry shrub, and cool shrub PVGs. Ranks of effectiveness are presented in tables in the following text. This ranking was done by potential vegetation group and EIS planning area; finer-scale information such as the susceptibility of each weed species to chemical, biological, manual, and mechanical control techniques (Karl and others 1995); and the assumptions listed below.

The overall numerical rank assigned to each alternative for a discussion of effects was computed as the average of the range clusters' ranks.

Assumptions for Rangelands

Rangeland Assumption 1: The basis for the noxious weed and cheatgrass evaluation was the dry grass, dry shrub, and cool shrub potential vegetation groups described in management activity table 3-7 of the preliminary draft EISs. No other potential vegetation groups were included in this evaluation. Although the forest and riparian PVGs were not analyzed, due to lack of time, the information for the cool shrub PVG is somewhat useful as a proxy.

[2]Personal communication. 1995. Bruce Anderson, U.S. Department of Agriculture, Forest Service, Nez Perce National Forest, Salmon River/Slate Creek Ranger District, Whitebird, Idaho.

[3]Also personal communication. 1996. Jerry Asher, Natural Resource Specialist, U.S. Department of Interior, Bureau of Land Management, Oregon State Office, Portland, Oregon.

Table 2.41 — Scientific names of weed species referenced in the evaluation of alternatives.

Weed Species	Scientific Name
Cheatgrass	*Bromus tectorum*
Whitetop	*Cardaria spp.*
Musk thistle	*Carduus nutans*
Purple starthistle	*Centaurea calcitrapa*
Diffuse knapweed	*Centaurea diffusa*
Iberian starthistle	*Centaurea iberica*
Spotted knapweed	*Centaurea maculosa*
Russian knapweed	*Centaurea repens*
Yellow starthistle	*Centaurea solstitialis*
Squarrose knapweed	*Centaurea virgata*
Rush skeletonweed	*Chondrilla juncea*
Canada thistle	*Cirsium arvense*
Common crupina	*Crupina vulgaris*
Leafy spurge	*Euphorbia esula*
Halogeton	*Halogeton glomeratus*
Spiny cocklebur	*Xanthium spinosum*
Orange hawkweed	*Hieracium aurantiacum*
Yellow hawkweed	*Hieracium pratense*
St. Johnswort	*Hypericum perforatum*
Dyers woad	*Isatis tinctoria*
Perennial pepperweed	*Lepidium latifolium*
Dalmatian toadflax	*Linaria dalmatica*
Purple loosestrife	*Lythrum salicaria*
Matgrass	*Nardus stricta*
Scotch thistle	*Onopordum acanthium*
African rue	*Peganum harmala*
Sulfur cinquefoil	*Potentilla recta*
Mediterranean sage	*Salvia aethiopis*
Tansy ragwort	*Senecio jacobaea*
Medusahead	*Taeniatherum caput-medusae*
Saltcedar	*Tamarix ramosissima*
Syrian bean-caper	*Zygophyllum fabago*

Sources of nomenclature: Hitchcock and Cronquist (1976) and Whitson and others (1991).

A potential vegetation group (PVG) is defined as potential vegetation types (PVTs) that are grouped on the basis of similar successional response to disturbance. A potential vegetation type is defined by the dominant vegetation that will potentially grow on a site in the absence of disturbance.

Exotic weed invasion was assumed to be a disturbance that potentially would prevent attainment of a potential vegetation type on a site. Exotic weed invasion can disrupt vegetation succession on a site by displacing native vegetation and either reducing or eliminating the seed bank of native species, thus preventing succession from proceeding to the potential vegetation type.

Rangeland Assumption 2: A rank is a numerical prediction of the effectiveness of an alternative to prevent further infestation of a potential vegetation group by noxious weeds and cheatgrass in the next 100 years. Ranks ranged from 0 to 3, with their effectiveness being as follows:

Ranks of 0 to 1: Low effectiveness

Ranks of greater-than-1 to 2: Moderate effectiveness

Ranks of greater-than-2 to 3: High effectiveness

A high rank represents a prediction for prevention of further infestation and some decline in the areal extent of noxious weeds and cheatgrass within a PVG. The decline in areal extent of noxious weeds and cheatgrass increases as the rank approaches 3. Ranks of 2 or less represent predictions of further infestation of the potential vegetation group. As the rank decreases toward 0, more of the potential vegetation group is at risk of invasion by weeds.

Rangeland Assumption 3: For noxious weed control efforts to be of some benefit to biodiversity and productivity of native rangeland plant communities, some of the acreage proposed for "Livestock Management" activity in table 3-7 in the preliminary draft EISs is assumed to be directed to the same land base as the acreage proposed for noxious weed control in the "Improve Rangelands" activity. Attention to proper livestock management post-weed control can aid in preventing or slowing reinvasion by noxious weeds and cheatgrass.

Rangeland Assumption 4: Some acreage included in the Prescribed Burning activity in table 3-7 in the preliminary draft EISs is assumed to apply to weed control, either directly or indirectly, depending on the weed species within the range clusters. For example, prescribed burning can be used to control medusahead and cheatgrass if the treatment is implemented at the vulnerable phenological stage of the weed. Prescribed burning for control of woody species can either benefit weed control or enhance weed spread, depending on timing of the burn.

Rangeland Assumption 5: For purposes of this document, the weed species assessed by Karl and others (1995) that are presented in appendix 2L, tables 2L.1 through 2L.6, and discussed in this evaluation, are considered the primary weeds to be targeted for weed control. However, other noxious weeds that are present and located in the project area would also be assumed to be a priority for IWM.

Further, although cheatgrass is not legally declared noxious in the Basin, the alternatives and the IWM strategy are assumed to address cheatgrass as an undesirable weed. Acreages proposed for control efforts in the "Improve Rangelands" activity in table 3-7 in the preliminary draft EISs are assumed to include cheatgrass.

Rangeland Assumption 6: The midpoint of the range of acres in the activities specific to "Improve Rangelands," "Livestock Management," and "Prescribed Burning" in table 3-7 of the preliminary draft EISs are assumed to be the maximum areas directed toward weed control.

There are some inconsistencies between the Effectiveness of Alternatives discussions in the following text and those listed in appendix 2N, tables 2N.1 through 2N.6. Acres referenced in this evaluation were compiled from the February 1996 version of DEIS, whereas acres in appendix 2N present modified acreage figures from later DEIS analysis. These modified acreage figures were not available when rankings were made. Inconsistencies are most noticeable for range clusters 2, 3, and 4, and are noted in the text.

Rangeland Assumption 7: All alternatives direct IWM efforts first to high disturbance areas, which typically include roads, waterways, campgrounds, and trails.

Rangeland Assumption 8: Any noxious weeds already present in proposed reserves in Alternative 7 are assumed to continue to spread, but at a slower rate than uncontrolled spread outside reserves. Reserves, especially in range cluster 4, are typically areas that are fragmented, of relatively small size, and often surrounded by private land, including some used for agricultural purposes. The agricultural land, in particular, can be a source of noxious weed invasion on rangeland. There is a greater likelihood for noxious weeds to continue invading and spreading into reserves on these fragmented areas, compared with less fragmented, more contiguous blocks of land within reserves.

Rangeland Assumption 9: Assumptions were made about the steps of IWM applicable to each range cluster, according to the cluster's specific objective or emphasis (table 2.42).

Discussions on Effectiveness of Alternatives in Integrated Weed Management

The following discussion focuses on the ranks used in evaluating the effectiveness of alternatives to prevent further weed infestation. The evaluation is specific to the dry grass, dry shrub, and cool shrub potential vegetation groups in the six range clusters within the Eastside and Upper Columbia River Basin EIS areas. Information is organized by the three potential vegetation groups (dry grass, dry shrub, and cool shrub), then within each of these PVGs by alternatives, EIS area, and range cluster. Each potential vegetation group discussion also includes a table presenting the ranks of effectiveness (tables 2.43-2.48).

Dry Grass Potential Vegetation Group, EEIS

Each alternative's effectiveness in preventing further infestations of the dry grass potential vegetation group in the Eastside EIS area is ranked by range cluster and alternative in table 2.43.

Alternatives 1, 2, and 5 Effectiveness (Dry Grass, EEIS)

Overall rank: 0.17, at the low end of Low effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range cluster 4: Limited

Other range clusters: Poor

Acreages projected for weed control in Alternatives 1, 2, and 5 would be inadequate to prevent the spread of noxious weeds and their further infestation in the dry grass PVG.

Alternative 3 Effectiveness (Dry Grass, EEIS)

Overall rank: 1.21, near the lower end of Moderate effectiveness; slightly lower than Alternative 4.

Effectiveness in preventing further infestation of dry grass:

Range clusters 5 and 6: High; similar to Alternative 4.

Range clusters 1 through 4: Relatively poor.

Cluster 1 — *Prediction: Further infestation of dry grass.* The level of further infestation would be about the same as Alternative 4. Compared with Alternative 4, the weed control emphasis in Alternative 3 would not be as strong, because only yellow starthistle and dalmatian toadflax would receive focus for weed control efforts. However, since the acreages scheduled for weed control are the same in both alternatives, their level of weed control would be about the same. In this cluster, as in Alternative 4, existing infestations would not likely be reduced in size.

Cluster 2 — *Prediction: Further infestation of this cluster's dry grass, attributable to continued spread of diffuse knapweed.* This prediction was made because the acreage projected for weed control in this cluster would be almost negligible (inconsistency; see rangeland assumption 6). Dry grass currently totals approximately 72,000 acres (29,150 ha) on BLM- and FS-administered lands, 95 percent of which is the fescue grassland with conifer PVT, a PVT that is of high susceptibility to invasion by diffuse knapweed.

Cluster 3 — *Prediction: Further infestation of dry grass.* Weed species expected to be the focus of IWM efforts in this cluster include spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil, all of which are highly invasive on dry grass. The acreage scheduled for weed control in this cluster is almost negligible (inconsistency; see rangeland assumption 6); this would lead to continued spread of noxious weeds and infestation of dry grass, especially the fescue grassland PVTs, at about the same rate as in Alternative 4.

Table 2.42 — Assumptions about the seven steps of integrated weed management relative to alternative objectives/emphasis. The IWM strategy was adapted from Sheley (1994) and used as the foundation for weed management in the preliminary draft EISs.

	Description and Use of Seven Steps of Integrated Weed Management						
Emphasis of Alternative	Step 1 Inventory and Map	Step 2 Prevent Weed Encroachment	Step 3 Detect and Eradicate New Introductions	Step 4 Contain Large-Scale Infestations	Step 5 Control Large-Scale Infestations	Step 6 Revegetate	Step 7 Proper Range Management
Restore	X	X	X	X	X	X[1]	X
Conserve	X	X	X	X	[2]	[2]	[2]
Produce	X	X	X	X	X	X[3]	X
Restore-Produce	X	X	X	X	X	X[4]	X[5]
Conserve-Restore	X	X	X	X	X[6]	X[6]	X[6]
Produce-Conserve[7]	X	X	X	X	X	X	X

[1]Revegetation with native species is assumed to be priority, in comparison with the produce emphasis, where revegetation with exotic perennial species (primarily grasses) may be of greater priority. The rationale for using native species is to permit enhancement of floral diversity and also biodiversity. Use of desirable exotic perennial species is an option where native species are not competitive or not available.

[2]These steps could be implemented, but are not priority for this objective. The rationale is that Steps 5 - 7 focus on reducing the size and extent of current infestations with the intent of reclaiming native plant communities, rather than preventing further infestation onto lands not currently infested as is the focus of Steps 1 - 4. The focus of Steps 1 - 4 is more appropriate for a "conserve" objective.

[3]Revegetation with exotic perennial species (primarily grasses) may be of greater priority, in comparison with the restore emphasis where revegetation with native species will be the priority. The rationale for using exotic, perennial species (primarily grasses) is to enhance forage production for livestock and provide aggressive competition with weeds. Use of native species is expected if objectives can be met.

[4]Revegetation with native species is assumed to be greater priority, in comparison with exotic, perennial species.

[5]Proper Range Management is assumed to occur within this emphasis as part of produce. Livestock management practices are assumed to be implemented at a moderate level. There is less assumed chance of loss of native or exotic revegetated species within this emphasis, compared with the produce emphasis, and consequently also less frequent need to revegetate repeatedly to prevent weed reinvasion.

[6]Steps 5 through 7 of Integrated Weed Management are assumed to be applied for the restore portion of this emphasis.

[7]In this emphasis, Steps 1 through 4 of Integrated Weed Management are implemented to conserve. For the produce portion, Steps 5 through 7 are assumed to occur to reclaim noxious weed-infested sites and permit vegetation production that will sustain livestock.

Table 2.43 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the dry grass potential vegetation group (Eastside EIS).[1]

	Rank of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
1	0	0	0.75	0.75	0	0.75	0.5
2	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0
4	1	1	1	1	1	1.5	1
5	0	0	2.5	3	0	0.75	1.5
6	0	0	3	3	0	3	2.5
Overall Rank	0.17	0.17	1.21	1.29	0.17	1	1.25

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

Cluster 4 — *Prediction: Slow invasion of dry grass in extent at about the same rate as in Alternative 4.* This prediction is due to both alternatives having no acreages scheduled for weed control. Weed species of IWM emphasis in this cluster would be: leafy spurge, yellow starthistle, and dalmatian toadflax, all of which are highly invasive on dry grass. The level of weed control for this cluster for the entire EEIS area, none under Alternative 3, is less than that currently being implemented on the BLM's Spokane District alone.

Cluster 5 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* Weed species that would be a focus of IWM efforts are yellow starthistle, Mediterranean sage, and dalmatian toadflax. Of the species listed as problematic on dry grass in this cluster (appendix 2L, table 2L.5), yellow starthistle would be the probable target of most acreage scheduled for weed control. Although Alternative 3 would be effective in preventing further infestation of dry grass by yellow starthistle, Mediterranean sage, and dalmatian toadflax, some further infestation by other species such as medusahead would likely continue. The lesser level of livestock management under this alternative, compared with Alternative 4, would present increased risk for reinvasion of noxious weeds, such as yellow starthistle, after treatment.

Cluster 6 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* Although the weed control emphasis under Alternative 3 is not as strong as in Alternative 4, the acreages scheduled for weed control treatment under Alternative 3 should be adequate to curtail the spread of problematic noxious weed species in dry grass and to reclaim some of the dry grass that has been infested.

Alternative 4 Effectiveness (Dry Grass, EEIS)

Overall rank: 1.29, near the low end of Moderate effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range clusters 5 and 6: High

Range clusters 1 through 4: Relatively poor

Cluster 1 — *Prediction: Further infestation of dry grass.* Weed species in this cluster receiving IWM emphasis would be yellow starthistle, dalmatian toadflax, diffuse knapweed, rush skeletonweed, medusahead, and whitetop. The IWM emphasis of Alternative 4 would be to accommodate control (reduction in size) of infestations of these species and rehabilitation of dry grass. However, because of this cluster's infestation extent and

highly roaded nature, the acreages scheduled for weed control would only accommodate control of these species in high-disturbance areas such as along roads. Spread of existing infestations would continue.

Cluster 2 — *Prediction: Further infestation of dry grass.* Weed species in this cluster receiving IWM emphasis would include crupina, diffuse knapweed, and tansy ragwort. However, no acreage would be scheduled for weed control under this alternative. Of the three species mentioned, diffuse knapweed in particular would continue to spread and result in further infestation of the already limited dry grass in this cluster.

Cluster 3 — *Prediction: Further infestation of dry grass.* Weed species in this cluster receiving IWM emphasis would be: whitetop, diffuse knapweed, spotted knapweed, yellow starthistle, orange and yellow hawkweeds, leafy spurge, matgrass, sulfur cinquefoil, tansy ragwort, and rush skeletonweed. Since Alternative 4 does not schedule acreage in this cluster for weed control, these species would continue to spread and infest dry grass, particularly the fescue grassland PVTs.

Cluster 4 — *Prediction: Slow invasion of dry grass.* This prediction is due to no acreage being scheduled for weed control under this alternative. Weed species that would be emphasized by IWM in this cluster would be whitetop, diffuse knapweed, leafy spurge, yellow starthistle, rush skeletonweed, and dalmatian toadflax. The level of weed control projected for this cluster and alternative for the entire EEIS area, which is none, would be less than weed control that is currently implemented for this cluster on the BLM's Spokane District alone.

Clusters 5 and 6 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* The acreage scheduled under the "Improve Rangelands" activity in these clusters is quite high, and should be adequate to curtail further spread of the weed species proposed as problematic in dry grass (appendix 2L, tables 2L.5 and 2L.6). Further infestation of wheatgrass grassland, fescue grassland, and fescue grassland with conifer PVTs will be prevented.

Alternative 6 Effectiveness (Dry Grass, EEIS)

Overall rank: 1, at high end of low effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range cluster 6: High

Range cluster 4: Moderate

Range clusters 1, 2, 3 and 5: Relatively poor

Clusters 1, 2, and 3 — See discussion for these clusters under Alternative 4.

Cluster 4 — *Prediction: Further infestation of dry grass in this cluster, but to a lesser extent than in Alternative 4.* The IWM emphases of Alternatives 6 and 4 are identical, except there would be more acreage scheduled for weed control in Alternative 6 (inconsistency; see rangeland assumption 6). Even with the greater acreage for weed control, there would be some further infestation of dry grass.

Cluster 5 — *Prediction: Further infestation of dry grass.* The infestations would be attributable to the relatively low acreage scheduled for weed control, compared with Alternative 4. Sources of infestation would be diffuse knapweed, yellow starthistle, rush skeletonweed, medusahead, dalmatian toadflax, and whitetop. Although Alternative 6 would place more emphasis than Alternative 4 on eradicating new infestations and preventing spread of species, the acreage scheduled for weed control under Alternative 6 would not likely prevent further infestation of dry grass.

Cluster 6 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* Weed species that would receive IWM emphasis include yellow starthistle, Mediterranean sage, diffuse knapweed, spotted knapweed, dalmatian toadflax, and cheatgrass. The acreage scheduled for weed control is believed to be relatively high compared with the acreage of current infestations on dry grass. The acreage scheduled will permit retreatment of infestations.

Alternative 7 Effectiveness (Dry Grass, EEIS)

Overall rank: 1.25, at the low end of Moderate effectiveness; essentially the same as Alternatives 3 and 4.

Effectiveness in preventing further infestation of dry grass:

Range cluster 6: High

Range clusters 2 and 5: Moderate

Range clusters 1, 3, and 4: Relatively Poor

Cluster 1 — *Prediction: Further infestation of dry grass, slightly more than in Alternative 3.* There are approximately 113,000 acres (45,749 ha) of dry grass on BLM- and FS-administered lands in this cluster, of which 16 percent or some 18,000 acres (7,288 ha) is in reserves. The reserves are mostly in the Lost and Goose Lake subbasins near Lakeview, Oregon.

Yellow starthistle, medusahead, and possibly leafy spurge are species that threaten this dry grass in reserves. Most dry grass on BLM- and FS-administered lands is outside reserves; also, the weed control scheduled in this cluster and with this alternative's emphasis is less than in Alternative 3.

Cluster 2 — *Prediction: Minor further infestation of dry grass.* There are approximately 200,000 acres (80,972 ha) of dry grass on BLM- and FS-administered lands in this cluster as a whole, of which 93 percent or approximately 186,000 acres (75,304 ha) is in reserves. Almost all of the dry grass on BLM- and FS-administered lands in this cluster for both EIS areas is in reserves.

Presently, there is only a minor problem with noxious weeds in dry grass in this cluster; allocating most of the dry grass acreage to reserves should help prevent spread of noxious weeds, even without any acreage being scheduled for weed control under this alternative and cluster.

Cluster 3 — *Prediction: Further infestation of dry grass of about the same magnitude as other alternatives.* There are approximately 377,600 acres (152,875 ha) of dry grass on BLM- and FS-administered lands in this cluster as a whole, of which 46 percent or approximately 175,200 acres (70,931 ha) is in reserves. Most reserves within the EEIS area are in the North Fork John Day and Powder subbasins. The following species are predicted to be in those reserves, if not there already: whitetop, yellow starthistle, and Mediterranean sage.

Almost 95 percent of the dry grass in the Eastside EIS area of this cluster is either the fescue grassland or fescue grassland with conifer PVT. Although current acreage infestations of diffuse knapweed, yellow starthistle, whitetop, leafy spurge, and sulfur cinquefoil are not yet extensive, these weeds are quite invasive in these grass types. The acreage scheduled for weed control under Alternative 7, which is zero, would not slow their spread.

Cluster 4 — *Prediction: Further infestation of dry grass at about the same level as in Alternative 3.* There are approximately 71,000 acres (28,745 ha) of dry grass in this cluster on BLM- and FS-administered lands, of which 21 percent or approximately 15,100 acres (6,113 ha) are in reserves. This acreage in reserves is predicted to remain susceptible to weed invasion, even in the relative absence of disturbance under Alternative 7. The acreage scheduled for weed control is predicted to result in about the same level of weed control and suppression as in Alternative 3 (inconsistency; see rangeland assumption 6). Weed species that will further infest dry grass are diffuse knapweed, whitetop, yellow starthistle, rush skeletonweed, and dalmatian toadflax.

Cluster 5 — *Prediction: Further infestation of dry grass, but less further infestation than Alternative 6.* The acreage scheduled for weed control is greater than in Alternative 6. There are approximately 472,000 acres (191,093 ha) of dry grass in reserves in cluster 5 as a whole, less than half of which appears to be in the Eastside EIS area (map 2.25). Most dry grass in the EEIS area is located in the Imnaha subbasin, which has approximately 21,000 acres (8,502 ha) of the wheatgrass grassland PVT, and 86,000 acres (34,818 ha) of the

fescue grassland with conifer PVT. There are only about 192,000 acres (77,733 ha) of dry grass on BLM-and FS-administered lands in the EEIS area of this cluster, which includes 106,000 acres (42,915 ha) in the Imnaha subbasin, mostly in reserves. BLM- and FS-administered lands outside reserves have very little dry grass.

The effectiveness rank of Alternative 7 for this range cluster should be high, at least outside the reserves, due to the very low level of dry grass there and the sufficient acreage scheduled for weed control outside reserves. In the reserves, however, there could be a problem with yellow starthistle. This weed is a problem species in the dry grass PVG and has known likelihood for spreading in the wheatgrass grassland PVT, even without much disturbance.

Cluster 6 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* There are approximately 165,100 acres (66,842 ha) of dry grass in reserves in cluster 6 for both EIS areas, very little of which appears to be in the Eastside EIS area. This means that the acreage scheduled for weed control must be directed essentially to the same land mass as in Alternative 3. However, Alternative 7 would have substantially less acreage scheduled for weed control than Alternatives 3, 4, and 6, and therefore less reclaiming of dry grass from weeds compared with those three alternatives.

Dry Grass Potential Vegetation Group (UCRB)

The effectiveness of the alternatives to prevent further infestations of the dry grass potential vegetation group in the Upper Columbia River Basin EIS area is ranked by range cluster and alternative on table 2.44.

Alternatives 1 and 2 Effectiveness (Dry Grass, UCRB)

Overall rank: 0, which is low effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range clusters 2, 3, 5, and 6: Poor

The fragmented manner in which noxious weeds are controlled in these alternatives at present does not permit prevention of further infestation of dry grass by noxious weeds. A point needing resolution is that the substantive acreages scheduled per decade for weed control in clusters 5 [30,000 acres (12,146 ha)] and 6 [17,500 acres (7,085 ha)] in Alternative 2 may be greater than that actually being implemented on the ground.

Alternative 3 Effectiveness (Dry Grass, UCRB)

Overall rank: 1.5, the same as Alternative 4, which would be Moderate effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range clusters 5 and 6: High

Range clusters 2 and 3: Poor

Cluster 2 — *Prediction: Further infestation of dry grass by year 100.* Although noxious weeds are not a major problem on dry grass in this cluster, there would be some infestations attributable to leafy spurge, spotted knapweed, and yellow starthistle. The IWM emphasis is not as strong in Alternative 3 compared with Alternative 4, and the acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Due to these two factors, weed control efforts under Alternative 3 in this cluster would not stop the spread of noxious weeds to non-infested areas, nor reclaim dry grass that is currently infested.

Cluster 3 — *Prediction: Further infestation of dry grass.* This would be attributable particularly to spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil. The IWM emphasis is not as strong in Alternative 3 as in Alternative 4, and the acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Weed control efforts would not stop the spread of noxious weeds to uninfested areas, nor would they reclaim dry grass that is currently infested.

Map 2.25 – Location of Alternative 7 proposed reserve areas on BLM- and FS-administered lands. Selection of proposed reserve areas was based on roadless areas greater than 400 ha (1,000 acres) that were distributed across a range of environments.

Table 2.44 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the dry grass potential vegetation group by range cluster and alternative (Upper Columbia River Basin).[1]

	Rank of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
5	0	0	3	3	0	1.5	2.5
6	0	0	3	3	1	3	2.5
Overall rank	0	0	1.5	1.5	0.25	1.12	1.25

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

Acreages proposed for weed control in this cluster for all alternatives in dry grass are below that currently being implemented on National Forests in the UCRB area,[4] which points to a flaw in the activity tables that needs to be resolved.

Cluster 5 — *Prediction: Prevention of further infestation of dry grass and, by year 100, some reclaiming of dry grass that is currently infested with noxious weeds.* Problem species of major concern in this cluster on dry grass are yellow starthistle, rush skeletonweed, medusahead, leafy spurge, cheatgrass, and possibly spotted knapweed. Although Alternative 3 has a weaker IWM emphasis than Alternative 4, its acreages scheduled for weed control should be adequate to prevent further spread of noxious weeds, particularly yellow starthistle and rush skeletonweed. These acreages also should accommodate reseeding efforts in dry grass areas that are currently infested with medusahead and cheatgrass to the point that native species have been displaced.

Acreages scheduled for livestock management, although less than Alternative 4, should be adequate to help prevent the spread of noxious weeds and prevent reinvasion of sites by noxious weeds after initial weed control.

Cluster 6 — *Prediction: Prevention of further infestation of dry grass and some reclaiming of dry grass by year 100 that is currently infested with noxious weeds.* Problem species of major concern in this cluster on dry grass are Dyers woad and leafy spurge. Although the IWM emphasis of Alternative 3 is weaker compared with Alternative 4, acreages scheduled for weed control should be adequate to prevent further spread of noxious weeds. These acreages also should be suitable to reseed in the dry grass areas that are currently so infested with medusahead and cheatgrass that native species have been displaced. The extent of dry grass having medusahead and cheatgrass infestations in this cluster is thought to be minor because there is very little dry grass in the western portion of the UCRB, where medusahead and cheatgrass are most prevalent. Further, acreages scheduled for livestock management should be adequate to help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

Alternative 4 Effectiveness (Dry Grass, UCRB)

Overall rank: 1.5, which is Moderate effectiveness.

[4]Personal communication. 1996. Peter M. Rice, Research Associate, Division of Biological Sciences, University of Montana, Missoula, Montana.

Effectiveness in preventing further infestation of dry grass:

Range clusters 5 and 6: High

Range clusters 2 and 3: Poor

Cluster 2 — *Prediction: Further infestation of dry grass by year 100.* Although prevalence of noxious weeds on dry grass in this cluster is relatively minor, there would be continued infestation by leafy spurge, spotted knapweed, and yellow starthistle. Although this alternative would have a strong IWM emphasis, its acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Weed control efforts undertaken in Alternative 4 would not stop the spread of noxious weeds to non-infested areas, nor reclaim dry grass that is currently infested in this cluster.

Cluster 3 — *Prediction: Further infestation of dry grass.* These infestations would particularly be attributable to spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil. Although Alternative 4 would have a strong IWM emphasis, its acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Its weed control efforts would not be adequate to stop the spread of noxious weeds to non-infested areas, or to reclaim dry grass that is currently infested.

Cluster 5 — *Prediction: Prevention of further infestation of dry grass and, by year 100, some reclaiming of dry grass that is currently infested with noxious weeds.* Problem species of major concern in this cluster on dry grass are yellow starthistle, rush skeletonweed, medusahead, leafy spurge, cheatgrass, and possibly spotted knapweed. This alternative would have a strong IWM emphasis and acreage scheduled for weed control should be adequate to prevent further spread of noxious weeds, particularly yellow starthistle and rush skeletonweed. In addition, the acreage would be adequate to do reseeding in dry grass areas currently so infested with medusahead and cheatgrass that native species have been displaced. Acreages scheduled for livestock management under Alternative 4 should be adequate to help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

Cluster 6 — *Prediction: Prevention of further infestation of dry grass and, by year 100, some reclaiming of dry grass that is currently infested with noxious weeds.* Problem species of major concern in this cluster on dry grass are Dyers woad and leafy spurge. The IWM emphasis of Alternative 4 is strong, and further, the acreages scheduled for weed control should be adequate to prevent further spread of noxious weeds. These acreages of weed control also should accommodate reseeding efforts in dry grass areas currently so infested with medusahead and cheatgrass that native species have been displaced. The extent of dry grass having medusahead and cheatgrass infestations in this cluster is thought to be minor because there is very little dry grass in the western portion of the UCRB EIS area, where medusahead and cheatgrass are most prevalent. Acreages scheduled for livestock management in Alternative 4 should be adequate to help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

Alternative 5 Effectiveness (Dry Grass, UCRB)

Overall rank: 0.25, which is Low effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range clusters 2, 3, 5, and 6: Poor

Cluster 2 — *Prediction: Further infestation of dry grass by year 100.* Although prevalence of noxious weeds on dry grass in this cluster is relatively minor, there would be continued infestation by leafy spurge, spotted knapweed, and yellow starthistle. The IWM emphasis of Alternative 5 would be the same as Alternative 3, but the acreages scheduled for weed control and livestock management would be even less than Alternative 3 (inconsistency; see rangeland assumption 6). Weed control efforts would not stop the spread of noxious weeds to non-infested areas, nor reclaim dry grass that is currently infested.

Cluster 3 — *Prediction: Further infestation of dry grass.* Further infestation would be particularly attributable to spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil. Alternatives 5 and 3 would have the same level of IWM emphasis, except the acreages scheduled for weed control and livestock management would be less for Alternative 5 (inconsistency; see rangeland assumption 6). This level of emphasis would not stop the spread of noxious weeds to non-infested areas, nor reclaim dry grass that is currently infested.

Cluster 5 — *Prediction: Further infestation of dry grass.* Noxious weed species in this cluster that are prevalent on dry grass include yellow starthistle, rush skeletonweed, medusahead, leafy spurge, cheatgrass, and possibly spotted knapweed. Although this alternative's IWM emphasis is stronger than Alternative 3 for this cluster, the acreages projected for weed control would be inadequate to prevent spread of noxious weeds. Compared with Alternative 3, the acreages scheduled for livestock management under Alternative 5 would be much lower, which would offer only limited effectiveness in preventing the spread of noxious weeds and preventing reinvasion of sites by noxious weeds after initial weed control.

Cluster 6 — *Prediction: Further infestation of dry grass not currently infested with noxious weeds.* Noxious weed species in this cluster that are prevalent on dry grass are Dyers woad and leafy spurge. Although this alternative's IWM emphasis is the same as Alternative 3, the acreages scheduled for weed control and livestock management under Alternative 5 would permit further infestation of dry grass. The acreage also would not be sufficient to permit reseeding of areas having dry grass dominated by cheatgrass and medusahead.

Alternative 6 Effectiveness (Dry Grass, UCRB)

Overall rank: 1.12, which is at the low end of Moderate effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range cluster 6: High

Range cluster 5: Moderate

Range clusters 2 and 3: Poor

Cluster 2 — *Prediction: Further infestation of dry grass is predicted by year 100.* Although the prevalence of noxious weeds on dry grass in this cluster is relatively minor, there would be continued infestations attributable to leafy spurge, spotted knapweed, and yellow starthistle. Although Alternative 6 places a strong emphasis on weed management at essentially the same level as Alternative 4, its acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). The weed control efforts of Alternative 6 would not stop the spread of noxious weeds to non-infested areas, nor reclaim dry grass that is currently infested in this cluster.

Cluster 3 — *Prediction: Further infestation of dry grass.* Further infestation would be attributable particularly to spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil. Although this alternative would have stronger IWM emphasis in this cluster than Alternative 4, its acreages scheduled for weed control and livestock management are nearly negligible. Weed control efforts would not stop the spread of noxious weeds to non-infested areas nor reclaim dry grass that is currently infested.

Cluster 5 — *Prediction: Further infestation of dry grass.* Further infestation would be attributable particularly to yellow starthistle, rush skeletonweed, medusahead, leafy spurge, cheatgrass, and possibly spotted knapweed. Although the Alternative 6 IWM emphasis in this cluster actually would be stronger than in Alternative 4, its acreage scheduled for weed control would be one-third that of Alternative 4. This acreage would still permit some further spread of noxious weeds into previously non-infested dry grass. The acreages scheduled for livestock management, which would be the same as in Alternative 4, should help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

Cluster 6 — *Prediction: Prevention of further infestation of dry grass and, by year 100, some reclaiming of dry grass that is currently infested with noxious weeds.* Noxious weed species that are particularly prevalent in this cluster on dry grass are Dyers woad and leafy spurge. The IWM emphasis of Alternative 6 in this cluster would be just as strong as that of Alternative 4. Although acreages scheduled for weed control in Alternative 6 would be lower, they would still be adequate to prevent further spread of noxious weeds. This acreage should also accommodate reseeding efforts in dry grass areas currently so infested with medusahead and cheatgrass that native species have been displaced. The extent of dry grass having medusahead and cheatgrass infestations in this cluster is thought to be minor because there is very little dry grass in this cluster in the western portion of the UCRB EIS area, where medusahead and cheatgrass are most prevalent.

The acreages scheduled for livestock management under Alternative 6 should be adequate to help prevent the spread of noxious weeds and prevent reinvasion of sites by noxious weeds after initial weed control.

Alternative 7 Effectiveness (Dry Grass, UCRB)

Overall rank: 1.25, at the low end of Moderate effectiveness.

Effectiveness in preventing further infestation of dry grass:

Range clusters 5 and 6: High

Range clusters 2 and 3: Poor

Cluster 2 — *Prediction: Further infestation of dry grass by year 100.* Although prevalence of noxious weeds on dry grass in this cluster is relatively minor, there would be continued infestation by leafy spurge, spotted knapweed, and yellow starthistle. The IWM emphasis of this alternative would be less than Alternative 4, and acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Weed control efforts in this cluster under Alternative 7 would not stop the spread of noxious weeds to non-infested areas nor reclaim dry grass that is currently infested.

Cluster 3 — *Prediction: Further infestation of dry grass.* Further infestation would be attributable particularly to spotted knapweed, yellow starthistle, leafy spurge, and sulfur cinquefoil. The IWM emphasis of Alternative 7 in this cluster is not as strong as Alternative 4, and the acreages scheduled for weed control and livestock management are nearly negligible (inconsistency; see rangeland assumption 6). Weed control efforts would not stop the spread of noxious weeds to non-infested areas nor reclaim dry grass currently infested.

Cluster 5 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* The IWM emphasis of Alternative 7 would be the same as Alternative 3, but its acreages scheduled for weed control would be lower. With this emphasis and acreage level, further infestation of dry grass would be prevented outside reserves, but minor further infestation of dry grass would occur within reserves. Further, although acreages scheduled for livestock management would be lower than for Alternative 3, they should be adequate to help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

Cluster 6 — *Prediction: Some reclaiming of dry grass from weeds by year 100.* Because areas outside of reserves have the same IWM emphasis as Alternative 3, comparing these two alternatives is useful. The acreages scheduled for weed control will not accommodate reseeding efforts in dry grass and for this reason there will be less net gain in dry grass compared with Alternative 3. Acreages scheduled for livestock management should be adequate to help prevent the spread of noxious weeds and prevent the reinvasion of sites by noxious weeds after initial weed control.

There is concern, however, that the lack of control efforts in reserves would permit the establishment and spread of leafy spurge and Dyers woad, and perhaps other noxious weeds such as spotted knapweed, in the dry grass PVG (comprised

mostly of the fescue grassland with conifer PVT in the Big Wood subbasin).

Dry Shrub Potential Vegetation Group (EEIS)

The effectiveness of the alternatives to prevent further infestations of the dry shrub potential vegetation group in the Eastside EIS area is ranked by range cluster and alternative in table 2.45.

Alternatives 1 and 2 Effectiveness (Dry Shrub, EEIS)

Overall rank: 0.25, which is Low.

Effectiveness in preventing further infestation of dry shrub:

Range cluster 4: Moderate

Range clusters 1-3, 5, and 6: Poor

A continuation of the present fragmented manner of noxious weed control in these alternatives would not permit prevention of further infestation of dry shrub by noxious weeds. A point needing resolution is that the substantive areas scheduled per decade for weed control in clusters 5 [45,000 acres (18,219 ha)] and 6 [112,500 acres (45,547 ha)] in Alternative 2 may exceed that actually being implemented by the BLM and FS currently.

Cluster 4 — *Prediction: Some further infestation of dry shrub, but at a slower rate than other clusters.* The amounts scheduled for weed control in this cluster under Alternatives 1 and 2 would be similar to current implementation levels on the BLM's Spokane District in Washington, where weed spread is not rampant at this time. In this cluster, there would be concern with the prevalence of cheatgrass in the understory of dry shrub and its strong propensity to dominate after wildfires.

Alternative 3 Effectiveness (Dry Shrub, EEIS)

Overall rank: 1.83, at the upper end of Moderate.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 5 and 6: High

Range clusters 1, 2, and 4: Moderate

Range cluster 3: Poor

Cluster 1 — *Prediction: Minor further infestation of dry shrub.* Noxious weeds with prevalence on dry shrub in this cluster are diffuse knapweed, medusahead, and dalmatian toadflax. Weeds of lesser extent are yellow starthistle, whitetop, halogeton, and rush skeletonweed. The IWM emphasis of this alternative would not be as strong in this cluster as in Alternatives 4 and 6.

Table 2.45 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the dry shrub potential vegetation group by range cluster and alternative (Eastside EIS).[1]

	Rank of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
1	0	0	2	2.25	0.75	2.25	0.5
2	0	0	2	2.75	2	2	1.5
3	0	0	0	0.5	0.5	0.5	0
4	1.5	1.5	2	2	2	2	1
5	0	0	2.5	2.75	1.5	2	1.5
6	0	0	2.5	3	2.5	2.75	1
Overall rank	0.25	0.25	1.83	2.21	1.54	1.92	0.92

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

The acreage scheduled for weed control would be targeted specifically to diffuse knapweed and halogeton, because dry shrub is of high susceptibility to invasion by these species. The amount of acreage should be adequate to control (reduce infestation size) diffuse knapweed and halogeton, and permit some control of the other species. Alternative 3 would not, however, emphasize containment and prevention of spread of noxious weeds in this cluster.

Cluster 2 — *Prediction: Minor further infestation of dry shrub.* Of the dry shrub in this cluster on BLM- and FS-administered lands, 92 percent is the antelope bitterbrush PVT. The antelope bitterbrush PVT is of high susceptibility to invasion by diffuse knapweed, the major noxious weed in this cluster that threatens dry shrub. The IWM emphasis of this alternative in this cluster would be less than Alternative 4. The limited acreage scheduled for weed control (inconsistency; see rangeland assumption 6) would specifically target diffuse knapweed but would likely be inadequate to totally prevent spread of this species and further infestation.

Cluster 3 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are whitetop and possibly yellow starthistle. Others, such as diffuse knapweed, squarrose knapweed, and rush skeletonweed, are less extensive at present; in the future, however, they could become prevalent weeds in dry shrub in this cluster. The IWM emphasis of this alternative would be less than Alternatives 4 and 6, attributable in part to less acreage being scheduled for weed control. The level of weed control would not be adequate to prevent further spread of noxious weeds into dry shrub, especially whitetop. Although diffuse knapweed is quite extensive in this cluster, its distribution overlaps very little with the distribution of dry shrub within the cluster.

Cluster 4 — *Prediction: Minor further infestation of dry shrub, at about the same level as in Alternative 4.* Noxious weeds within dry shrub in this cluster are diffuse knapweed, Russian knapweed, dalmatian toadflax, cheatgrass, and potentially yellow starthistle. The IWM emphasis of Alternative 3 would not be as strong in this cluster as in Alternatives 4 and 6. Of the weeds listed, cheatgrass would be the major target of IWM efforts because dry shrub is of high susceptibility to invasion by cheatgrass. The acreage scheduled for weed control would be applied to the other weeds listed with somewhat lesser priority.

The acreage scheduled for weed control in Alternative 3 would be the same as in Alternatives 4 and 6, and even with this level of weed management, further infestation of dry shrub is predicted, particularly by diffuse knapweed.

Cluster 5 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster include diffuse knapweed, medusahead, halogeton, cheatgrass, and possibly rush skeletonweed. Of these, halogeton and cheatgrass likely infest the most land in dry shrub, with halogeton now being especially prevalent in the Alvord Lake subbasin. The IWM emphasis of this alternative would not be as strong in this cluster compared with Alternatives 4 and 6. Further, of the five species mentioned as problematic in this cluster, only halogeton and cheatgrass would actually be the target of weed control efforts. However, the acreage scheduled is great enough to permit weed control efforts to be directed to the other species as well. There would be concern about the extensive acreages on Other (non-BLM/FS) lands that are currently infested with diffuse knapweed in the central Washington portion of this cluster. We assume control of diffuse knapweed would be undertaken on these lands, and weed control efforts would be coordinated so that diffuse knapweed invasion and spread on BLM- and FS-administered lands can be prevented or slowed.

Cluster 6 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster include halogeton, medusahead, Mediterranean sage,

cheatgrass, and possibly dalmatian toadflax and rush skeletonweed. Cheatgrass, medusahead, and Mediterranean sage are assumed to contribute the majority of weed acreage in dry shrub.

The IWM control emphasis of Alternative 3 would not be as strong as that in Alternatives 4 or 6. Of the six problematic species, cheatgrass, Mediterranean sage, and halogeton would be a priority for weed control. Although acreages scheduled for weed control in this cluster would be suitable to effectively prevent spread of the priority species and to control their infestation size as well, species such as medusahead could continue to spread. No acreage would be scheduled for prescribed fire activity in Alternative 3, which would aid in preventing further spread of these weed species.

Alternative 4 Effectiveness (Dry Shrub, EEIS)

Overall rank: 2.21, at the low end of High effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 1, 2, 5 and 6: High

Range cluster 4: Moderate

Range cluster 3: Poor

Cluster 1 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence on dry shrub in this cluster are diffuse knapweed, medusahead, and dalmatian toadflax. Weeds of lesser extent are yellow starthistle, whitetop, halogeton, and rush skeletonweed. The IWM emphasis under this alternative would be strong in this cluster, with the acreage scheduled for weed control being directed mostly to control (reduction in infestation size) and rehabilitation of infested areas after initial weed control.

Cluster 2 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Of the dry shrub in this cluster on BLM- and FS-administered lands, 92 percent is the antelope bitterbrush PVT. The antelope bitterbrush PVT is of high susceptibility to invasion by diffuse knapweed, the major noxious weed in this cluster that threatens dry shrub. Considering the strong IWM emphasis of Alternative 4 and the acreage scheduled for weed control, some control of diffuse knapweed in this cluster would be predicted.

Cluster 3 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are whitetop and possibly yellow starthistle. Others, such as diffuse knapweed, squarrose knapweed, and rush skeletonweed, are less extensive at present but could be prevalent weeds in dry shrub in this cluster in the future. Although the emphasis of this alternative would be strong in regard to IWM, the acreage scheduled for weed control would not be adequate to prevent further spread of noxious weeds onto dry shrub, particularly whitetop. Although diffuse knapweed is quite extensive in this cluster, its distribution overlaps very little with the distribution of dry shrub within the cluster.

Cluster 4 — *Prediction: Minor further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are diffuse knapweed, Russian knapweed, dalmatian toadflax, cheatgrass, and potentially yellow starthistle. The IWM emphasis of this alternative would be strong in this cluster, with all five problem weeds being the target of weed control efforts. However, the acreage scheduled for weed control would not prevent further infestation of dry shrub, particularly by diffuse knapweed.

Cluster 5 — *Prediction: Prevention of further infestation of dry shrub, some reclaiming of dry shrub from weed by year 100.* Noxious weeds with prevalence in dry shrub in this cluster include diffuse knapweed, medusahead, halogeton, cheatgrass, and possibly rush skeletonweed. Of these five, halogeton and cheatgrass likely infest the most extensive land area in dry shrub, with halogeton particularly being a problem in the Alvord Lake subbasin. The IWM emphasis of

Alternative 4 would be strong in this cluster, with all species mentioned above being prioritized for weed control efforts. Of concern would be the extensive acreages of dry shrub on Other lands that are currently infested with diffuse knapweed in the central Washington portion of this cluster. We assume control of diffuse knapweed would be undertaken on Other lands and efforts would be coordinated to prevent or slow the invasion and spread of diffuse knapweed onto BLM- and FS-administered lands.

Cluster 6 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster include halogeton, medusahead, Mediterranean sage, cheatgrass, and possibly dalmatian toadflax and rush skeletonweed. The majority of weed acreage in dry shrub is contributed by three of these six species: cheatgrass, medusahead, and Mediterranean sage. Alternative 4 has a strong IWM emphasis in this cluster. The acreages scheduled for weed control will prevent further infestation of dry shrub and also permit reseeding efforts, with emphasis on native species, on lands dominated by these noxious weeds. There would be no prescribed fire, which would aid in preventing further spread of these weed species, scheduled.

Alternative 5 Effectiveness (Dry Shrub, EEIS)

Overall rank: 1.54, which is Moderate.

Effectiveness in preventing further infestation of dry shrub:

Range cluster 6: High

Range clusters 2, 4, and 5: Moderate

Range clusters 1 and 3: Poor

Cluster 1 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence on dry shrub in this cluster are diffuse knapweed, medusahead, and dalmatian toadflax; weeds of lesser extent are yellow starthistle, whitetop, halogeton, and rush skeletonweed. The IWM emphasis in Alternatives 5 and 3 would be the same, but Alternative 5 would schedule much less acreage. The acreage would specifically target diffuse knapweed and halogeton.

Cluster 2 — See discussion for this cluster under Alternative 3.

Cluster 3 — *Prediction: Further infestation of dry shrub, at the same level as in Alternative 4.* Noxious weeds with prevalence in dry shrub in this cluster are whitetop and, possibly, yellow starthistle. Others, such as diffuse knapweed, squarrose knapweed, and rush skeletonweed, are less extensive at present but could become prevalent on dry shrub in this cluster in the future. Although diffuse knapweed is quite extensive in this cluster, its distribution overlaps very little with dry shrub within the cluster.

Although the acreage scheduled for control would be the same as Alternative 4, the IWM emphasis of Alternative 5 would not be as strong. This level of control would not be adequate to prevent further spread of noxious weeds into dry shrub, particularly by whitetop.

Cluster 4 — See discussion for this cluster under Alternative 3.

Cluster 5 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence on dry shrub in this cluster include diffuse knapweed, medusahead, halogeton (particularly in the Alvord Lake subbasin), cheatgrass, and possibly rush skeletonweed. Of these, halogeton and cheatgrass are proposed to cover the most extensive land in dry shrub. Although the IWM emphasis of Alternative 5 in this cluster would be stronger than under Alternative 3, the acreage scheduled would be much less and would actually target only halogeton. The acreage scheduled, however, is great enough that some weed control efforts would be directed to the other species as well, but not to the extent of Alternative 3.

There would be concern with the extensive acreages of dry shrub on Other lands that are currently infested with diffuse knapweed in the cen-

tral Washington portion of this cluster. We assume control of diffuse knapweed would be done on Other lands and coordinated to prevent diffuse knapweed from invading and spreading onto BLM- and FS-administered lands.

Cluster 6 — *Prediction: Nearly the same as for this cluster in Alternative 3, except for the slight difference that very minor acreage would be scheduled under Alternative 5 for prescribed burning.*

Alternative 6 Effectiveness (Dry Shrub, EEIS)

Overall rank: 1.92, at the high end of Moderate effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 1 and 6: High

Range clusters 2, 4, and 5: Moderate

Range cluster 3: Poor

Cluster 1 — See discussion for this cluster under Alternative 4.

Cluster 2 — *Prediction: Minor further infestation of dry shrub.* Of dry shrub in this cluster on BLM- and FS-administered lands, 92 percent is the antelope bitterbrush PVT. The antelope bitterbrush PVT is of high susceptibility to invasion by diffuse knapweed, the major noxious weed in this cluster that threatens dry shrub. Alternative 6 in this cluster would have the same IWM emphasis as Alternative 4, but only half the acreage (inconsistency; see rangeland assumption 6).

Cluster 3 — *Prediction: Further infestation of dry shrub, at the same level as Alternative 4.* Noxious weeds with prevalence in dry shrub in this cluster are whitetop and, possibly, yellow starthistle. Others, such as diffuse knapweed, squarrose knapweed, and rush skeletonweed, are less extensive at present but could be prevalent in dry shrub in the future. Diffuse knapweed is quite extensive in this cluster, but its distribution overlaps very little with the distribution of dry shrub within the cluster.

Although Alternative 6 would have a stronger IWM emphasis than Alternative 4 and the same acreage scheduled, Alternative 6 would not be adequate to prevent further spread of noxious weeds into dry shrub, particularly by whitetop.

Cluster 4 — See discussion for this cluster under Alternative 4.

Cluster 5 — *Prediction: Minor further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster include diffuse knapweed, medusahead, halogeton (particularly in the Alvord Lake subbasin), cheatgrass, and possibly rush skeletonweed. Of these, halogeton and cheatgrass are proposed to cover the most extensive land in dry shrub.

The IWM emphasis of this alternative would actually be stronger in this cluster compared with Alternative 4, and all weeds mentioned above would be prioritized for weed control efforts. Under Alternative 6, however, only one-third of the acreage as Alternative 4 would be scheduled for weed control. There would also be concern with the extensive acreages of dry shrub on Other lands that are currently infested with diffuse knapweed in the central Washington portion of this cluster. We assume control of diffuse knapweed would be undertaken on Other lands and efforts be coordinated to prevent invasion and spread of diffuse knapweed onto BLM- and FS-administered lands.

Cluster 6 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster include halogeton, medusahead, Mediterranean sage, cheatgrass, and possibly dalmatian toadflax and rush skeletonweed. The majority of weed acreage in dry shrub is contributed by three of these species: cheatgrass, medusahead, and Mediterranean sage.

The IWM emphasis of Alternative 6 in this cluster would be strong, the same as Alternative 4. The acreages scheduled for weed control under Alternative 6 should be adequate to prevent further infestation of dry shrub, and to permit

reseeding efforts, giving emphasis to native species, on lands dominated by these noxious weeds. Further, no acreage would be scheduled for prescribed fire, which would aid in preventing further spread of these weed species.

Alternative 7 Effectiveness (Dry Shrub, EEIS)

Overall rank: 0.92, at the high end of Low effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 2 and 5: Moderate

Range clusters 1, 3, 4, and 6: Poor

Cluster 1 — *Prediction: Further infestation of dry shrub, in reserves and outside reserves.* There are only approximately 41,000 acres (16,599 ha) of dry shrub in this cluster within reserves, with most of it located in the Lost and Goose Lake subbasins within BLM's Lakeview District in southeast Oregon. Medusahead and yellow starthistle are prevalent in these subbasins (4th-field HUCs) and are predicted to continue spreading into dry shrub in reserves. This continued spread would not be attributable to livestock grazing, but perhaps to fire opening up microsites for establishment. The acreage scheduled for weed control outside reserves would not be adequate to prevent spread of diffuse knapweed and other noxious weeds.

Cluster 2 — *Prediction: Some further infestation of dry shrub.* Of dry shrub in this cluster on BLM- and FS-administered lands, 92 percent is the antelope bitterbrush PVT. The antelope bitterbrush PVT is of high susceptibility to invasion by diffuse knapweed, the major noxious weed in this cluster that threatens dry shrub. The IWM emphasis of this alternative outside of the reserves would be the same as Alternative 3; however, within reserves in north-central Washington, where some dry shrub appears to be located, diffuse knapweed would invade and would not be controlled.

Cluster 3 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are whitetop and possibly yellow starthistle. Others, such as diffuse knapweed, squarrose knapweed, and rush skeletonweed, are less extensive at present but could become prevalent in dry shrub in the future. The IWM emphasis of this alternative outside of the reserves would be the same as Alternative 3. Because Alternative 7 would not schedule weed control in reserves, there would be concern in the Powder subbasin. Most of the dry shrub in reserves is located in the Powder subbasin (4th-field HUC), where whitetop is present currently and is possibly already infesting dry shrub. The acreage scheduled for weed control will not prevent the spread of noxious weeds. Diffuse knapweed is quite extensive in this cluster, but its distribution in the cluster overlaps very little with the distribution of the dry shrub.

Cluster 4 — *Prediction: Further infestation of dry shrub, particularly in dry shrub in reserves.* Noxious weeds with prevalence in dry shrub in this cluster are diffuse knapweed, Russian knapweed, dalmatian toadflax, cheatgrass, and potentially yellow starthistle. The IWM emphasis of this alternative outside reserves would be the same as Alternative 3. Of the weeds listed, cheatgrass would be the major target of IWM efforts because dry shrub is of high susceptibility to invasion by cheatgrass. The acreage scheduled for weed control, which is the same as for Alternatives 4 and 6, would be directed to the other weeds listed too, but in somewhat lesser priority compared with cheatgrass.

Outside reserves, it is predicted that further infestation of dry shrub by these weeds would be prevented. In reserves in this cluster, however, where 50 percent of the dry shrub on BLM- and FS-administered lands is located, further infestation of dry shrub is predicted. This prediction is based on the reserves being so fragmented and often surrounded by Other lands.

Cluster 5 — *Prediction: Further infestation of dry shrub, at about the same level as Alternative 5.* Noxious weeds with prevalence in dry shrub in

this cluster include diffuse knapweed, medusahead, halogeton (particularly in the Alvord Lake subbasin), cheatgrass, and possibly rush skeletonweed. Of these, halogeton and cheatgrass are proposed to be the most extensive in land coverage in dry shrub. The IWM emphasis of this alternative outside of reserves would be the same as Alternative 3; however, of the species mentioned, only halogeton would actually be targeted outside reserves. The dry shrub within reserves is mostly found within the Upper Quinn, Middle Owyhee, and East Little Owyhee subbasins, where currently noxious weeds are not prevalent and cheatgrass is not dominant.

The acreage scheduled for weed control would permit further infestation of dry shrub by diffuse knapweed and medusahead. This prediction is of concern in the central Washington portion of this cluster, where extensive acreages of dry shrub on Other lands are currently infested with diffuse knapweed. We assume control of diffuse knapweed would be undertaken on Other lands, but diffuse knapweed from Other lands is still predicted to spread into dry shrub in the vicinity, of which some is in reserves.

Cluster 6 — *Prediction: Further infestation of dry shrub.* Comparing dry shrub in and outside reserves, the prediction is for relatively more rapid infestation of dry shrub in reserves. Noxious weeds with prevalence in dry shrub in this cluster include halogeton, medusahead, Mediterranean sage, cheatgrass, and possibly dalmatian toadflax and rush skeletonweed. It is assumed that the majority of weed acreage in dry shrub is contributed by cheatgrass, medusahead, and Mediterranean sage. The IWM emphasis of this alternative would be the same as Alternative 3, but only outside reserves. Additionally, only half of the problem species listed above would be targeted by IWM; these would include cheatgrass, Mediterranean sage, and halogeton.

In this cluster, there would be concern that the acreages scheduled for weed control would be inadequate to effectively prevent spread of the targeted species, or to control their infestation size.

The dry shrub in reserves is located mostly in the Warner Lakes and Guano subbasins, which already have weed infestations, particularly Mediterranean sage and medusahead. These species are predicted to continue spreading in reserves.

Dry Shrub Potential Vegetation Group (UCRB)

The effectiveness of the alternatives to prevent further infestations of the dry shrub potential vegetation group in the Upper Columbia River Basin EIS area is ranked by range cluster and alternative in table 2.46.

Alternatives 1 and 2 Effectiveness (Dry Shrub, UCRB)

Overall rank: 1.5, which is Moderate.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 2 and 3: High

Range clusters 5 and 6: Poor

The high effectiveness in clusters 2 and 3 was based on the assumption that the acreage scheduled for weed control for these alternatives would be implemented, and also on the presence of very little dry shrub in these two clusters.

The poor rating in clusters 5 and 6 is primarily related to the fragmented manner of noxious weed control proposed in these alternatives which would not prevent further infestation. In particular to Alternative 2, a point needing resolution is the substantive acreages scheduled per decade for weed control in these two clusters; the 130,000 acres (52,632 ha) in cluster 5 and 77,500 acres (31,377 ha) in cluster 6 may exceed actual acreages being implemented on the ground.

Alternative 3 Effectiveness (Dry Shrub, UCRB)

Overall rank: 2.5, which is High.

Effectiveness in preventing further infestation of dry shrub:

Table 2.46 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the dry shrub potential vegetation group by range cluster and alternative (Upper Columbia River Basin).[1]

	Range of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
2	3	3	3	3	3	3	2
3	3	3	3	3	3	3	3
5	0	0	2.5	3	1	1.5	0.5
6	0	0	1.5	2	0.75	1.25	1
Overall rank	1.5	1.5	2.5	2.75	1.94	2.19	1.62

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

Range clusters 2, 3, and 5: High

Range cluster 6: Moderate

Clusters 2 and 3 — See discussion for these clusters under Alternative 4.

Cluster 5 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster are yellow starthistle, rush skeletonweed, medusahead, halogeton, and cheatgrass. Compared with Alternative 4, the IWM emphasis of this alternative would not be as strong. Cheatgrass and halogeton will be the species targeted for IWM efforts. However, the acreage scheduled for weed control is predicted to be adequate to permit some weed control of the other species as well. Further, weed control efforts will result in reseeding and rehabilitation of some areas currently dominated by cheatgrass and/or medusahead and other noxious weeds. The emphasis of Alternative 3 in this cluster would be on control (reduction in infestation size), and rehabilitation. The acreage scheduled for "Livestock Management" would be about half that of Alternative 4, which could result in a relatively greater failure rate for seedings and a relatively greater risk of spreading weeds into currently uninfested areas.

Cluster 6 — *Prediction: Some further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are Dyers woad, diffuse knapweed, yellow starthistle, medusahead, rush skeletonweed, and cheatgrass. The IWM emphasis of this alternative would not be as strong in this cluster as in Alternative 4. Also, weed control efforts would specifically target cheatgrass and Dyers woad, resulting in some further infestation of dry shrub by other species. Not emphasizing steps 1 through 4 of IWM would result in lower emphasis on greenstripping, a technique used to prevent further spread of annual grasses into native shrub-steppe vegetation (dry shrub). However, there would be focus in this cluster on reseeding of burned areas that are either presently dominated, or expected to be dominated, by cheatgrass and/or medusahead.

Alternative 4 Effectiveness (Dry Shrub, UCRB)

Overall rank: 2.75, at the high end of High effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 2, 3, and 5: High

Range cluster 6: Moderate

Cluster 2 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds of some

extent in dry shrub are possibly Mediterranean sage. Within this cluster, there are only approximately 10,000 acres (4,049 ha) of dry shrub on BLM- and FS-administered lands, all of which is the big sagebrush-cool PVT. The acreage scheduled for weed control under Alternative 4 (inconsistency; see rangeland assumption 6) would accommodate control of the weed acreage currently present on this dry shrub.

Cluster 3 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds of some extent in dry shrub are possibly Mediterranean sage and leafy spurge. Within this cluster, there are only approximately 3,500 acres (1,417 ha) of dry shrub on BLM- and FS-administered lands, of which 93 percent is the big sagebrush-cool PVT. The acreage scheduled for weed control (inconsistency in cluster 3 for Alternatives 3 and 6; see rangeland assumption 6) would accommodate control of the weed acreage currently present on this dry shrub.

Cluster 5 — *Prediction: Prevention of further infestation of dry shrub and some reclaiming of dry shrub from weeds by year 100.* Noxious weeds with prevalence in dry shrub in this cluster are yellow starthistle, rush skeletonweed, medusahead, halogeton, and cheatgrass. The IWM emphasis of Alternative 4 would be strong, targeting all weed species mentioned. Also, acreage scheduled for weed control would be adequate to reclaim some dry shrub that is currently dominated by cheatgrass, medusahead, or other noxious weeds. The emphasis would be on control (reduction in infestation size) and rehabilitation. The high acreage scheduled for livestock management should help prevent reinvasion of weed-controlled areas.

Cluster 6 — *Prediction: Minor further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are Dyers woad, diffuse knapweed, yellow starthistle, medusahead, rush skeletonweed, and cheatgrass. The IWM emphasis of Alternative 4 would be strong in this cluster, but would emphasize control (reduction in infestation size) rather than prevention of spread and eradication. Cheatgrass and medusahead would be the primary target of weed control efforts because of their prevalence. However, IWM steps 1 through 4 (table 2.42) would not be emphasized under Alternative 4, which would result in low emphasis on greenstripping. This is a technique for preventing further spread of annual grasses into native shrub-steppe vegetation (dry shrub). Reseeding of burned areas that are now dominated by cheatgrass and/or medusahead, or are expected to be dominated by them, would be a focus of weed control acreage in this cluster.

Alternative 5 Effectiveness (Dry Shrub, UCRB)

Overall rank: 1.94, at the high end of Moderate effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 2 and 3: High

Range clusters 5 and 6: Poor

Clusters 2 and 3 — See discussion for these clusters under Alternative 4.

Cluster 5 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are yellow starthistle, rush skeletonweed, medusahead, halogeton, and cheatgrass. The IWM emphasis of this alternative in this cluster is stronger than Alternative 3 but the weed control acreage scheduled is much less than in Alternative 3. In addition to having less areas in weed control, this alternative would only target cheatgrass and halogeton. Thus, little weed control would be directed to the other noxious weeds and their spread would continue. Weed control efforts should, however, result in some reseeding and rehabilitation of areas currently dominated by cheatgrass (and medusahead, if present in association with cheatgrass) and halogeton. Some greenstripping will be implemented, with the same emphasis as reseeding and rehabilitation, which will help prevent the spread of annual grasses. Even with these efforts, further spread of noxious weeds into dry shrub would be expected.

Cluster 6 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are Dyers woad, diffuse knapweed, yellow starthistle, medusahead, rush skeletonweed, and cheatgrass. The IWM emphasis of Alternative 5 would not be as strong in this cluster as Alternative 4. Cheatgrass and Dyers woad would be the target of weed control efforts, which would result in some further infestation of dry shrub by the other species. Without an emphases on IWM steps 1 through 4 (table 2.42), there would not be great emphasis on greenstripping. This is a technique for preventing further spread of annual grasses into native shrub-steppe vegetation (dry shrub). Reseeding of burned areas that are now dominated by cheatgrass and/or medusahead, or are expected to be dominated by them, would be a focus of weed control acreage in this cluster.

Alternative 6 Effectiveness (Dry Shrub, UCRB)

Overall rank: 2.19, at the low end of High effectiveness.

Effectiveness in preventing further infestation of dry shrub:

Range clusters 2 and 3: High

Range clusters 5 and 6: Moderate

Clusters 2 and 3 — See discussion for these clusters under Alternative 4.

Cluster 5 — *Prediction: Further infestation of dry shrub.* Noxious weeds with prevalence in dry shrub in this cluster are yellow starthistle, rush skeletonweed, medusahead, halogeton, and cheatgrass. Although the IWM emphasis of this alternative in this cluster would be stronger than Alternative 4, and all weed species mentioned would be targeted, the acreage scheduled for weed control would be one-third that of Alternative 4. The predicted result is that weed management, which in Alternative 6 focuses on control (through reduction in infestation size) and reseeding, would be directed more toward areas where rehabilitation success is judged high. This means that areas in lower precipitation zones would undoubtedly not receive control efforts because rehabilitation success would be less there. The high acreage scheduled for livestock management under Alternative 6, however, should help prevent reinvasion of weed-controlled areas.

Cluster 6 — *Prediction: Some further infestation of dry shrub.* Further infestation would be at a greater level than under Alternative 4. Noxious weeds with prevalence in dry shrub in this cluster are Dyers woad, diffuse knapweed, yellow starthistle, medusahead, rush skeletonweed, and cheatgrass. The IWM emphasis of this alternative would be strong in this cluster, but would emphasize control (through reduction in infestation size) rather than prevention of spread and eradication. The acreage scheduled for weed control, which would be less than Alternative 4, would not prevent further spread of cheatgrass and noxious weeds. Cheatgrass, medusahead, and noxious weeds growing in association with these two species would be targets of weed control efforts. Without emphasis on IWM steps 1 through 4, there would not be high emphasis on greenstripping; this is a technique for preventing further spread of annual grasses into native shrub-steppe vegetation (dry shrub). Reseeding of burned areas that are now dominated by cheatgrass and/or medusahead, or are expected to be dominated by them, would be a focus of weed control acreage in this cluster.

Alternative 7 Effectiveness (Dry Shrub, UCRB)

Overall rank: 1.62, which is Moderate.

Effectiveness in preventing further infestation of dry shrub:

Range cluster 3: High

Range cluster 2: Moderate

Range clusters 5 and 6: Poor

Cluster 2 — *Prediction: Minor further infestation of dry shrub by year 100.* Of the approximately 22,000 acres (8,907 ha) of dry shrub on BLM- and

FS-administered lands in this cluster as a whole, 88 percent is in reserves. Since there is no weed control acreage proposed under this alternative in this cluster, if noxious weeds invade the dry shrub in reserves, eradicating them will be difficult.

Cluster 3 — *Prediction: Prevention of further infestation of dry shrub and, by year 100, some reclaiming of dry shrub.* There are approximately 3,500 acres (1,417 ha) of dry shrub in this cluster. The portion in reserves appears to be in the Lower Salmon subbasin, and is in the big sagebrush-cool PVT; noxious weeds are not prevalent here.

Cluster 5 — *Prediction: Further infestation of dry shrub, particularly in reserves.* Noxious weeds with prevalence in dry shrub in this cluster are yellow starthistle, rush skeletonweed, medusahead, halogeton, and cheatgrass. The IWM emphasis of Alternative 7 would not be as strong in this cluster as in Alternative 4. Cheatgrass and halogeton would be the only species targeted for weed control. These two species are already present in the dry shrub in reserves, a substantive portion of which is located in the Upper Owyhee, Bruneau, and Salmon Falls subbasins. There would be concern in dry shrub in these subbasins regarding the substantial areal extent of clay soils, which make the area susceptible to medusahead invasion and dominance. Outside reserves, the prediction is that the acreage scheduled for weed control will permit minor further infestation of dry shrub. Outside reserves, weed control efforts of Alternative 7 will result in reseeding and rehabilitation of areas currently dominated by cheatgrass and/or medusahead (if growing in association with cheatgrass). The acreage scheduled for livestock management outside reserves would be adequate to reduce the risk of seeding failures and also reduce the risk of new infestations.

Cluster 6 — *Prediction: Further infestation of dry shrub, particularly in reserves.* The effects of noxious weeds and cheatgrass in this cluster differ, depending largely on whether they lie inside reserves or outside reserves. On reserves, the dry shrub exists primarily in the Lake Walcott and American Falls subbasins, which already have a cheatgrass component that is predicted to remain and spread. Outside reserves, cheatgrass, medusahead, and the other noxious weeds would be controlled somewhat through reductions in infestation size; however, prevention of spread and eradication of small infestations would not be an emphasis of IWM in this alternative.

Cool Shrub Potential Vegetation Group (EEIS)

The effectiveness of the alternatives to prevent further infestations of the cool shrub potential vegetation group in the Eastside EIS area is ranked by range cluster and alternative in table 2.47.

Table 2.47 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the cool shrub potential vegetation group by range cluster and alternative (Eastside EIS).[1]

	Rank of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
1	0	0	0.75	1.5	0	1.5	0
2	2	2	2	2	2	2	3
3	1.75	1.75	1.75	1.75	2	1.75	2
4	2.5	2.5	2.75	2.75	2.5	2	2.75
5	0.75	0.75	3	2.5	1.75	1.5	2.5
6	0.5	0.5	3	3	3	2.5	2
Overall rank	1.25	1.25	2.21	2.25	1.87	1.87	2.04

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

Alternatives 1 and 2 Effectiveness (Cool Shrub, EEIS)

Overall rank: 1.25, at the low end of Moderate effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range cluster 4: High

Range clusters 2 and 3: Moderate

Range clusters 1, 5, and 6: Poor

In clusters 1, 5, and 6, noxious weed control under these alternatives would be continuation of the present approach. This approach is fragmented and does not prevent further infestation of cool shrub by noxious weeds. Although acreage scheduled for weed control would be minor in cluster 4, this cluster has a minor amount of cool shrub and a negligible noxious weed problem that warrants a high rank of effectiveness.

Although clusters 2 and 3 do not have an extensive noxious weed problem in cool shrub, both clusters could be further infested (attributable to no acreage being scheduled for weed control).

Alternative 3 Effectiveness (Cool Shrub, EEIS)

Overall rank: 2.21, at the low end of High effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 4, 5, and 6: High

Range clusters 2 and 3: Moderate

Range cluster 1: Poor

Cluster 1 — *Prediction: Further infestation of cool shrub.* The extent of the additional infestation in this cluster would be more than in Alternative 4. In the Eastside EIS area, cluster 1 has arguably the most extensive noxious weed problem within the cool shrub PVG. Noxious weeds with prevalence in cool shrub are diffuse knapweed, yellow starthistle, leafy spurge, and medusahead. The IWM emphasis of Alternative 3, however, would not be directed to any of these species for weed control efforts because PVTs within the cool shrub PVG are not of high susceptibility to invasion by these species. However, the assumption is that the acreage scheduled for weed control would be directed first to the high disturbance areas such as roads near cool shrub, probably to yellow starthistle and diffuse knapweed, and second to control of medusahead and leafy spurge. Given the rapid spread rates of diffuse knapweed and yellow starthistle particularly, and the relatively large acreage of medusahead in this cluster on BLM- and FS-administered lands, the acreage scheduled for weed control would not prevent these species from spreading.

Medusahead is often located in the understory of western juniper woodlands in this cluster. Western juniper woodlands in this cluster are a priority for treatment particularly by burning. Much of the approximately 67,500 acres (27,328 ha) of prescribed burning proposed per decade for this alternative in this cluster is assumed to be prioritized to western juniper; this level would be less than in Alternative 4. There is some expectation that prescribed burning of western juniper woodlands would mostly be undertaken on areas where medusahead does not dominate the understory. Prescribed burning of western juniper woodlands where medusahead is present could result in either: (1) a decline in medusahead density, at least temporarily, if burning were implemented at medusahead's vulnerable phenological stage; or (2) an opening of new areas to potential invasion by medusahead and perhaps the other noxious weed species. It is assumed, however, that prescribed burning would be applied judiciously so that medusahead spread would not be promoted.

Clusters 2 and 4 — See discussion for these clusters under Alternative 4.

Cluster 3 — See discussion for cluster 3 under Alternative 4. The only difference here is that this alternative would schedule a very minor acreage for weed control (inconsistency; see rangeland assumption 6).

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and, by year 100, some reclaiming of cool shrub.* Noxious weeds with prevalence in the cool shrub in this cluster are medusahead, and possibly rush skeletonweed, tansy ragwort, and diffuse knapweed. Leafy spurge is not yet a problem in cool shrub in this cluster, but is predicted to be in the future and would require control efforts.

Although the thrust of this alternative in regard to IWM is not as strong as in alternative 4, the acreage scheduled for weed control is greater than alternative 4. Because no PVTs in the cool shrub PVGs are labeled of high susceptibility to invasions by any weeds in this cluster, the target of weed control efforts would not include any of the problematic weeds listed above. However, the assumption is that the acreage scheduled would target medusahead, which is the major problem weed in this cluster. The IWM steps 5 to 7 focus efforts on control (reduction in infestation size) and reseeding after initial weed control, and these efforts would be prioritized to medusahead-infested areas. Even with these efforts, eliminating medusahead from cool shrub areas is not feasible at present; however, reseeding with native or "desired" exotic species could result in reintroducing these species to the areas.

It was assumed that the 140,000 acres (56,680 ha) scheduled for prescribed burning per decade would be applied judiciously, particularly in areas having cool shrub and clayey soils known to be susceptible to medusahead invasion. Another assumption was that some of this prescribed burning would be directed at controlling medusahead in preparation for reseeding efforts.

Cluster 6 — *Prediction: Prevention of further infestation in cool shrub and reclaiming of some cool shrub by year 100.* Noxious weeds with prevalence in cool shrub in this cluster are medusahead, leafy spurge, cheatgrass, and possibly diffuse knapweed and tansy ragwort. The IWM emphasis of Alternative 3 would not be as strong as Alternative 4, and only cheatgrass of the five weeds listed would be a priority for weed control efforts. However, medusahead, which is often found in proximity to or in association with cheatgrass, is also expected to receive weed control efforts.

The acreage scheduled for weed control would permit control (reduction in infestation size) of medusahead and cheatgrass. Seeding would be an emphasis after initial weed control, particularly in the drier portions. Control of medusahead and cheatgrass in preparation for seeding was assumed to require prescribed burning, and the proposed 135,000 acres (54,656 ha) of prescribed burning per decade would be adequate for this purpose. Leafy spurge and the other weeds listed would probably infest cool shrub, but cool shrub in total is predicted to increase.

Alternative 4 Effectiveness (Cool Shrub, EEIS)

Overall rank: 2.25, at the low end of High effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 4, 5, and 6: High

Range clusters 1, 2, and 3: Moderate

Cluster 1 — *Prediction: Further infestation of cool shrub.* In the Eastside EIS area, this cluster has arguably the most extensive noxious weed problem within the cool shrub PVG. Noxious weeds with prevalence in cool shrub in this cluster are diffuse knapweed, yellow starthistle, leafy spurge, and medusahead. These species would be the priority for weed control efforts under this alternative. Given the rapid spread rates of diffuse knapweed and yellow starthistle particularly, and the relatively large acreage of medusahead in this cluster on BLM- and FS-administered lands, the acreage scheduled for weed control would not prevent these species from spreading.

Medusahead is often located in the understory of western juniper woodlands in this cluster. These woodlands would be a priority for treatment, particularly by burning; it is assumed that much of the 110,000 acres (44,534 ha) of prescribed

burning per decade under Alternative 4 would be targeted to western juniper. There is some expectation that areas where medusahead does not dominate the understory would be the target of most prescribed burning of western juniper woodlands. Prescribed burning of western juniper woodlands where medusahead is present could result in either: (1) a decline in medusahead density, at least temporarily, if the burning were implemented at the vulnerable phenological stage of medusahead; or (2) an opening of new areas to potential invasion by medusahead and perhaps the other noxious weed species. It is assumed, however, that prescribed burning would be applied judiciously so that medusahead spread would not be promoted.

Cluster 2 — *Prediction: Minor further infestation of cool shrub.* The noxious weed infestation of cool shrub in this cluster is predicted to be negligible at the present time, and there is no acreage scheduled for weed control under this alternative. There is concern that diffuse knapweed in central Washington could, or possibly already has, establish and spread along roads near cool shrub. Without any weed control, diffuse knapweed would spread.

Cluster 3 — *Prediction: Minor further infestation of cool shrub.* Noxious weeds proposed as infesting some cool shrub in this cluster are tansy ragwort, whitetop, diffuse knapweed, leafy spurge, and medusahead. Although not listed in appendix 2L table 2L.3, medusahead is suspected to be present on cool shrub in this cluster, particularly in the Powder subbasin where there is substantial clay soil that overlaps the distribution of cool shrub. Based on current information, however, the acreage of cool shrub infested by these weeds is low. Given that no acreage is proposed for weed control for Alternative 4 in this cluster, weeds that are present will spread.

Cluster 4 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* There is presently little noxious weed problem in cool shrub in this cluster, and additionally, only approximately 12,400 acres (5,020 ha) of cool shrub are in this cluster. Most of the cool shrub in this cluster is in the BLM's Spokane District. Although the level of acreage scheduled for weed control in cool shrub would be minor in Alternative 4 (inconsistency; see rangeland assumption 6), it should be adequate to prevent further infestation.

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Noxious weeds with prevalence in cool shrub in this cluster are medusahead, and possibly rush skeletonweed, tansy ragwort, and diffuse knapweed. Although not yet a problem in this cluster's cool shrub, leafy spurge is predicted to be present in the future and would require control efforts. The acreage scheduled for weed control is predicted to be targeted to medusahead, the major problem weed here. The IWM emphasis of this alternative would be strong, with control (reduction in infestation size) and reseeding after initial weed control priorities for medusahead-infested areas. Although eliminating medusahead from cool shrub areas is not presently feasible, reseeding with native or "desired" exotic species could result in reintroduction of these species into the areas.

It is assumed that the 142,500 acres (57,692 ha) scheduled per decade for prescribed burning would be applied judiciously, particularly in areas having cool shrub with clayey soils known to be susceptible to medusahead invasion. Another assumption is that some of this prescribed burning would be used to control medusahead in preparation for reseeding efforts.

Cluster 6 — *Prediction: Prevention of further infestation of cool shrub and reclaiming of some cool shrub by year 100.* Noxious weeds with prevalence in cool shrub in this cluster are medusahead, leafy spurge, cheatgrass, and possibly diffuse knapweed and tansy ragwort. The IWM emphasis of Alternative 4 would be strong and the acreage scheduled for weed control sufficient to control medusahead and cheatgrass and the other weeds listed. Seeding would be an emphasis after initial weed control, particularly in the drier portions, where the majority of weed acreage is expected to be located. The 132,500 acres (53,644 ha) of pre-

scribed burning proposed per decade would be adequate to control medusahead and cheatgrass in preparation for reseeding.

Alternative 5 Effectiveness (Cool Shrub, EEIS)

Overall rank: 1.87, at the high end of Moderate effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 4 and 6: High

Range clusters 2, 3, and 5: Moderate

Range cluster 1: Poor

Cluster 1 — *Prediction: Further infestation of cool shrub.* The extent of further infestation would be greater than in Alternative 3. In the Eastside EIS area, this cluster has arguably the most extensive noxious weed problem within cool shrub. Noxious weeds with prevalence in cool shrub are diffuse knapweed, yellow starthistle, leafy spurge, and medusahead. None of these species would be the target of weed control efforts because PVTs in the cool shrub PVG are not of high susceptibility to invasion by any of these species.

Two assumptions for this alternative and cluster were that: (1) the acreage scheduled for weed control would be directed primarily to the high disturbance areas such as roads near cool shrub, probably to yellow starthistle and diffuse knapweed; and (2) not much weed control acreage would be targeted to medusahead and leafy spurge. Given the rapid spread rates of diffuse knapweed and yellow starthistle particularly, and the relatively large acreage of medusahead in this cluster on BLM- and FS-administered lands, the acreage scheduled for weed control would not prevent these species from spreading.

Medusahead is often located in the understory of western juniper woodlands in this cluster. These woodlands would be a priority for treatment, particularly burning. It was assumed that much of the 45,000 acres (18,219 ha) of prescribed burning scheduled per decade for Alternative 5 would target western juniper; this level of prescribed burning would be less than in Alternative 3. There is some expectation that prescribed burning of western juniper woodlands would mostly be undertaken on areas where medusahead does not dominate the understory. Prescribed burning of western juniper woodlands where medusahead is present could result in either: (1) a decline in medusahead density, at least temporarily, if the burning were implemented at medusahead's vulnerable phenological stage; or (2) an opening of new areas to potential invasion by medusahead and perhaps the other noxious weed species. It was assumed, however, that prescribed burning would be applied judiciously so that medusahead spread would not be promoted.

Cluster 2 — *Prediction: Minor further infestation of cool shrub.* The noxious weed infestation of cool shrub in this cluster is predicted to be negligible at the present time, and no acreage would be scheduled for weed control in this cluster under Alternative 5. The concern is that diffuse knapweed in central Washington could, or possibly already has, established and spread along roads near cool shrub. Without any weed control, diffuse knapweed would spread.

Cluster 3 — *Prediction: Minor further infestation of cool shrub.* The acreage scheduled for weed control in this cluster would be greater in this alternative than with any other alternative (inconsistency; see rangeland assumption 6). Additional information on this cluster is included under Alternative 4.

It is assumed that the acreage scheduled for weed control (inconsistency; see rangeland assumption 6) would be directed primarily to high disturbance areas such as roads in the proximity of cool shrub. If necessary, some acreage would be directed to reseeding of medusahead-infested cool shrub, even though there are no PVTs within the cool shrub PVG that are of high susceptibility to invasion by medusahead.

Cluster 4 — See discussion for this cluster under Alternative 4.

Cluster 5 — *Prediction: Further infestation of cool shrub.* Further infestation would be at a slightly slower rate than in Alternative 6. The species that particularly would contribute to the increase would be medusahead. Additional information about this cluster is provided under Alternative 6.

The IWM emphasis of this alternative would not place priority on weed control of any of the weed species listed for this cluster in cool shrub, but the scheduled weed control acreage is assumed to be targeted to medusahead.

Cluster 6 — See discussion for this cluster under Alternative 3.

The prescribed burning acreage of 100,000 acres (40,486 ha) per decade would be slightly less than in Alternative 3, but still predicted as adequate for control of medusahead and cheatgrass in preparation for seeding efforts.

Alternative 6 Effectiveness (Cool Shrub, EEIS)

Overall rank: 1.87, at the high end of Moderate effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range cluster 6: High

Range clusters 1 through 5: Moderate

Cluster 1 — See discussion for this cluster under Alternative 4, which would be similar except Alternative 6 would schedule a slightly greater level of prescribed burning [about 117,500 acres (47,571 ha) per decade].

Clusters 2 and 3 — See discussion for these clusters under Alternative 4.

Cluster 4 — *Prediction: Minor further infestation of cool shrub.* There would essentially be no weed control scheduled for this cluster under this alternative. The fragmented nature of the BLM- and FS-administered lands in the cool shrub in this cluster, and their close proximity to Other lands, makes them a greater risk for noxious weed invasion. Also, the lack of livestock management in this cluster would not support maintaining a vigorous stand of vegetation that would resist weed invasion. For additional information about this cluster, see its discussion under Alternative 4.

Cluster 5 — *Prediction: Further infestation of cool shrub, particularly by medusahead.* Noxious weeds with prevalence in cool shrub in this cluster are medusahead, and possibly rush skeletonweed, tansy ragwort, and diffuse knapweed. Although not a problem yet in cool shrub in this cluster, leafy spurge may invade in the future, in which case infestations would require control efforts.

The acreage scheduled for weed control under Alternative 6 is predicted to be targeted to medusahead, the major problem weed in this cluster. However, the level of control projected for medusahead would not curtail its spread and infestation size. Although eliminating medusahead from cool shrub areas is not presently feasible, reseeding with native or "desired" exotic species could reintroduce these species into medusahead-infested areas. It is assumed that the 142,500 acres (57,692 ha) scheduled for prescribed burning per decade would be applied judiciously, particularly in areas having cool shrub on clayey soils known to be susceptible to medusahead invasion. A further assumption is that some prescribed burning would be used to control medusahead in preparation for reseeding efforts.

Cluster 6 — *Prediction: Some reclaiming of cool shrub from weeds by year 100.* Noxious weeds with prevalence in cool shrub in this cluster are medusahead, leafy spurge, cheatgrass, and possibly diffuse knapweed and tansy ragwort. The IWM emphasis of this alternative in this cluster would be as strong as in Alternative 4. The acreage scheduled for weed control, however, would be less than Alternative 4 and targeted toward control (reduction in infestation size) of medusahead, cheatgrass, and the other weeds listed. The reduction in weed acreage attributable to control and seeding is expected to outpace the increase in weed acreage attributable to spread, but not to the same extent as in Alternative 4. Some cool shrub

would be reclaimed, but on less acreage than for Alternative 4. Seeding, particularly in the drier portions, would be an emphasis after initial weed control. The 130,000 acres (52,632 ha) of prescribed burning scheduled per decade under Alternative 6 would be adequate for the control assumed to be needed for medusahead and cheatgrass in preparation for seeding.

Alternative 7 Effectiveness (Cool Shrub, EEIS)

Overall rank: 2.04, at the low end of High effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 2, 4, and 5: High

Range clusters 3 and 6: Moderate

Range cluster 1: Poor

Cluster 1 — *Prediction: Further infestation of cool shrub.* Of approximately 887,000 acres (359,109 ha) of cool shrub in this cluster as a whole, only 6 percent or approximately 51,700 acres (20,931 ha), would be in reserves. The acreage scheduled for weed control in Alternative 7 would be roughly one-half that of Alternative 3, but would be directed to roughly the same land mass because nearly all the cool shrub is located outside reserves. Much of the cool shrub in reserves is located in the Lost and Goose Lake subbasins, which are strongly suspected of already having medusahead invasion due to their clayey soils and the known presence of medusahead in those HUCs.

Cluster 2 — *Prediction: Prevention of further infestation of cool shrub by year 100 and reclaiming of some cool shrub that is currently infested.* Approximately 96 percent of the approximately 91,000 acres (36,842 ha) of cool shrub in this cluster for both EIS areas is in reserves. The high amount in reserves and the very minor noxious weed problem in cool shrub in the Eastside EIS portion of this cluster would help prevent further infestations. An assumption in this cluster is that disturbances in reserves that would enhance the spread of weeds would be minor, and also any species in the reserves such as diffuse knapweed would not spread appreciably, even along roads. The minor amount scheduled for weed control outside reserves (inconsistency; see rangeland assumption 6) should be effective in reducing noxious weed extents because there is very little cool shrub outside reserves.

Cluster 3 — *Prediction: Minor further infestation of cool shrub.* Some cool shrub in this cluster in the Eastside EIS portion is in reserves, particularly in the Little Deschutes subbasin. There is concern in this subbasin relative to diffuse knapweed and its potential for invasion and spread along existing roads in the area. Outside reserves, the acreage scheduled for weed control (inconsistency; see rangeland assumption 6) would probably be targeted to high disturbance areas near cool shrub and to medusahead, if necessary.

Cluster 4 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Approximately 64 percent of the approximately 12,400 acres (5,020 ha) of cool shrub on BLM- and FS-administered lands in this cluster would be in reserves. There is not, presently, a noxious weed problem known in this cool shrub area. The acreage scheduled for weed control, although minor (inconsistency; see rangeland assumption 6), should prevent further spread of any noxious weeds outside reserves.

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* The cool shrub within reserves in the Eastside EIS portion of this cluster is primarily the mountain big sagebrush-mesic-west PVT and is mostly located in the Middle Owyhee subbasin. This area does not presently have much of a noxious weed problem. Noxious weeds with prevalence in cool shrub in this cluster are medusahead and possibly rush skeletonweed, tansy ragwort, and diffuse knapweed. Although not a problem yet in cool shrub in this cluster, leafy spurge will be present in the future and would require control efforts. No PVTs with-

in the cool shrub PVG are of high susceptibility to invasion by the weeds listed in this cluster, so the weeds listed above would not be the target of weed control efforts. However, it was assumed that any weed control acreage scheduled would be targeted to medusahead, which is the major problem weed in this cluster outside reserves. Control (reduction in infestation size) and reseeding after initial weed control would be priorities for medusahead-infested areas. Although eliminating medusahead from cool shrub areas is not presently feasible, reseeding with native or "desired" exotic species could result in reintroducing these species to the areas.

It is assumed that the 150,000 acres (60,729 ha) scheduled for prescribed burning per decade would be applied judiciously, particularly relative to cool shrub on clayey soils known to be susceptible to medusahead invasion. Another assumption was that some prescribed burning would be used to control medusahead in preparation for reseeding efforts.

Cluster 6 — *Prediction: Minor further infestation of cool shrub.* There is almost negligible cool shrub in reserves in this cluster on the Eastside EIS area. Therefore, almost all of this cluster's cool shrub is outside reserves, and weed control then would be roughly at the same level as in Alternative 3. The acreage scheduled for weed control, however, would be less than in Alternative 3. The predicted result of this level of weed management would be some control (reduction in infestation size) of cheatgrass and medusahead, but an increase in extent of other noxious weeds. The end result would be a slight increase in cool shrub that is infested with noxious weeds by year 100.

Cool Shrub Potential Vegetation Group (UCRB)

The effectiveness of the alternatives to prevent further infestations of the cool shrub potential vegetation group in the Upper Columbia River Basin EIS area is ranked by range cluster and alternative on table 2.48.

Alternatives 1 and 2 Effectiveness (Cool Shrub, UCRB)

Overall rank: 0.75, which is Low.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 2, 3, 5, and 6: Poor

In clusters 5 and 6, the manner of controlling noxious weeds in these alternatives would be to continue the present approach which is fragmented and does not prevent further infestation of cool shrub by noxious weeds.

Table 2.48 — Rank of the effectiveness of alternatives in controlling noxious weeds and cheatgrass in the cool shrub potential vegetation group by range cluster and alternative (Upper Columbia River Basin).[1]

	Rank of Control Effectiveness by Alternative						
Range Cluster	1	2	3	4	5	6	7
2	1	1	2	2	2	2	2.5
3	1	1	1.5	1.5	1.75	1.5	1.5
5	0.5	0.5	2.75	2.5	0.75	0	2.25
6	0.5	0.5	2	2.25	1.5	1.75	1.75
Overall rank	0.75	0.75	2.06	2.06	1.5	1.31	2

[1]0-1 = low effectiveness.
1-2 = moderate effectiveness.
2-3 = high effectiveness.

Ranks should not be compared between clusters, but rather more appropriately within a cluster across alternatives.

Although current noxious weed infestations are of limited extent in clusters 2 and 3, the lack of any acreage for weed control would permit the continued spread of noxious weeds.

Alternative 3 Effectiveness (Cool Shrub, UCRB)

Overall rank: 2.06, at the low end of High effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range cluster 5: High

Range clusters 2, 3, and 6: Moderate

Cluster 2 — *Prediction: Minor further infestation of cool shrub.* Although the noxious weed extent in this cluster is quite minimal, noxious weeds of concern in cool shrub are thought to be spotted knapweed and leafy spurge. Further infestation, although minor, would occur in these clusters as a result of no acreage being scheduled for weed control under Alternative 3.

Cluster 3 — *Prediction: Further infestation of cool shrub.* Noxious weeds with prevalence in cool shrub in this cluster are proposed as spotted knapweed, leafy spurge, and possibly common crupina. Available information indicates that the noxious weed extent is minor on the approximately 55,000 acres (22,267 ha) of cool shrub on BLM- and FS-administered land in the Upper Columbia River Basin portion of this cluster. Since no weed control would be scheduled in Cluster 3 under Alternative 3, no attempts would be made to prevent the spread of the three species mentioned.

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Noxious weeds with prevalence on cool shrub in this cluster are medusahead, leafy spurge, and possibly rush skeletonweed and spotted knapweed. The IWM emphasis of Alternative 3 in this cluster would not prioritize weed control efforts to any of these species, because the PVTs in the cool shrub PVG are only moderately susceptible to invasion by the listed species. Although weed control acreage would be scheduled, it is assumed the efforts would be directed to all species, but particularly medusahead and leafy spurge. In effect, the large acreage scheduled under Alternative 3 for weed control would tend to overshadow the relatively weak IWM emphasis in this cluster. Emphasis in weed control would be placed on control (reduction in infestation size) and reseeding of medusahead-infested areas after initial weed control.

About 337,500 acres (136,640 ha) scheduled for prescribed burning per decade would be directed to mountain big sagebrush-dominated areas. As mentioned below for cluster 6, there is some expectation that burning of mountain big sagebrush, depending on its proximity to the weed species listed, will enhance noxious weed spread because microsites for establishment would become available.

Cluster 6 — *Prediction: Minor further infestation of cool shrub.* Noxious weeds with some extent on cool shrub in this cluster are leafy spurge, Dyers woad, medusahead, cheatgrass, and possibly rush skeletonweed, diffuse knapweed, and spotted knapweed. The acreage scheduled for weed control would be prioritized in Alternative 3 to Dyers woad, because PVTs in the cool shrub PVG are of high susceptibility to invasion by Dyers woad. Weed control efforts would not be targeted to the other species mentioned on cool shrub. However, it is assumed that some acreage, above the level used for Dyers woad, could be directed toward the other species.

A concern is that leafy spurge is present and is probably the toughest to control of all weeds listed above. Without an emphasis on leafy spurge, its potential to spread is great. Because more than one weed control effort is typically necessary for leafy spurge control, the available acreage for control of leafy spurge would need to be directed toward the same piece of ground in consecutive years.

Prescribed burning in Alternative 3 in cool shrub is about 62,500 acres (25,304 ha) per decade. It is expected that burning of mountain big sagebrush,

depending on its proximity to the weed species listed, would enhance noxious weed spread by making microsites available for its establishment.

Alternative 4 Effectiveness (Cool Shrub, UCRB)

Overall rank: 2.06, at the low end of High effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 5 and 6: High

Range clusters 2 and 3: Moderate

Clusters 2 and 3 — See discussion for these clusters under Alternative 3.

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Noxious weeds of major concern on cool shrub in this cluster are medusahead, leafy spurge, and possibly rush skeletonweed and spotted knapweed. The IWM emphasis of Alternative 4 would permit directing control efforts to all species above, which would be a stronger emphasis than Alternative 3. However, the acreage scheduled for weed control under Alternative 4 would be only two-thirds that of Alternative 3. Because IWM steps 5 through 7 are emphasized, reducing the infestation size of medusahead and leafy spurge would be of greater priority than preventing spread of these species.

The above level of emphasis is expected to result in some reclaiming of cool shrub because the control rate is expected to slowly outpace the spread of noxious weeds.

About 342,500 acres (138,664 ha) scheduled for prescribed burning per decade would be directed to areas dominated by mountain big sagebrush. As mentioned below for cluster 6, there is some expectation that burning of mountain big sagebrush, depending on its proximity to the weed establishment would become available.

Cluster 6 — *Prediction: Prevention of further infestation and some reclaiming of cool shrub by year 100.* Noxious weeds with prevalence on cool shrub in this cluster are leafy spurge, Dyers woad, medusahead, cheatgrass, and possibly rush skeletonweed, diffuse knapweed, and spotted knapweed. Although the IWM emphasis of Alternative 4 would permit the acreage scheduled for weed control to be targeted to all these species, the most likely targets were assumed to be leafy spurge, medusahead, and Dyers woad. Some weed control acreage would need to be directed to reseeding of medusahead-infested areas after initial weed control.

The toughest weed to control of the seven listed above may be leafy spurge, which is of some concern because it is already present in cluster 6, although believed to be in minor amounts on cool shrub. Because more than one weed control effort is typically necessary for leafy spurge control, the available acreage targeting leafy spurge would need to be directed toward the same land area in consecutive years.

In Alternative 4, approximately 70,000 acres (28,340 ha) of prescribed burning would be scheduled per decade in cool shrub. Depending on its proximity to the weed species listed, burning of mountain big sagebrush could enhance noxious weed spread by making microsites available for its establishment.

Some weed control acreage would need to be directed to reseeding of medusahead-infested areas in post-control.

Alternative 5 Effectiveness (Cool Shrub, UCRB)

Overall rank: 1.5, which is Moderate.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 2, 3, and 6: Moderate

Range cluster 5: Poor

Cluster 2 — *Prediction: Minor further infestation of cool shrub.* Although the noxious weed extent in this cool shrub in this cluster is quite minimal, noxious weeds of proposed importance are spotted

knapweed and leafy spurge. The further infestation is related to the almost negligible acreage (inconsistency; see rangeland assumption 6) that would be scheduled for weed control under Alternative 5.

Cluster 3 — *Prediction: Minor further infestation of cool shrub.* See discussion for this cluster under Alternative 3, which would be similar. There would be more acreage scheduled for weed control in Alternative 5 than in the other alternatives for this cluster (inconsistency; see rangeland assumption 6).

Cluster 5 — *Prediction: Further infestation of cool shrub.* Noxious weeds with prevalence on cool shrub in this cluster are medusahead, leafy spurge, and possibly rush skeletonweed and spotted knapweed. The IWM emphasis of Alternative 5 would not target weed control efforts to any of the species listed, because the PVTs in the cool shrub PVG are only of moderate susceptibility to invasion by these species. The acreage scheduled for weed control would likely be directed first towards high disturbance areas near cool shrub, and then towards prevention of spread and eradication of infestations in these high disturbance areas. Any remaining available acreage could be directed to actual infestations of the above listed species within cool shrub.

Cluster 6 — *Prediction: Further infestation of cool shrub.* The rate of infestation would be more rapid than in Alternative 3. Reference that alternative for further information on this cluster. In this cluster, Alternative 5 differs from Alternative 3 by having: (1) much less acreage directed to livestock management [77,500 acres (31,377 ha) per decade compared with 220,000 acres (89,069 ha) in Alternative 3](inconsistency; see rangeland assumption 6), and (2) much less acreage directed to prescribed burning [25,000 acres (10,122 ha) per decade compared with 70,000 acres (28,340 ha) in Alternative 3].

The results of having less acreage in livestock management are more rapid spread of noxious weeds in cool shrub compared with Alternative 3, and possibly greater risk of reinvasion by noxious weeds after initial weed control. The result of having less acreage in prescribed burning is perhaps less rapid spread of noxious weeds, such as leafy spurge, compared with Alternative 3.

Alternative 6 Effectiveness (Cool Shrub, UCRB)

Overall rank: 1.31, at the low end of Moderate effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 2, 3, and 6: Moderate

Range cluster 5: Poor

Clusters 2 and 3 — See discussion for these clusters under Alternative 3.

Cluster 5 — *Prediction: Further infestation of cool shrub, particularly by medusahead and leafy spurge.* Although the IWM emphasis of this alternative would permit weed control efforts to be directed to all noxious weeds listed for this cluster, the acreage would only allow targeting medusahead and leafy spurge. The acreages of control scheduled, however, would not be sufficient to effectively prevent the spread of these two species.

Cluster 6 — *Prediction: Minor further infestation of cool shrub.* See discussion for this cluster under Alternative 4 for more information. Acreage scheduled for weed control would be much less in this cluster than in Alternative 4; also, more spread of noxious weeds is predicted under this alternative. The acreage scheduled for prescribed burning in both alternatives would be almost the same.

Alternative 7 Effectiveness (Cool Shrub, UCRB)

Overall rank: 2, at the high end of Moderate effectiveness.

Effectiveness in preventing further infestation of cool shrub:

Range clusters 2 and 5: High

Range clusters 3 and 6: Moderate

Cluster 2 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Approximately 96 percent of the cool shrub on BLM- and FS-administered lands within this cluster in both EIS areas is in reserves. Whatever noxious weeds are within these reserves are not expected to spread much; further, the spread of noxious weeds on cool shrub outside reserves would be prevented.

Cluster 3 — *Prediction: Further infestation of cool shrub.* There would be acreage scheduled under Alternative 7 for weed control outside reserves, but of an almost negligible amount (inconsistency; see rangeland assumption 6).

Cluster 5 — *Prediction: Prevention of further infestation of cool shrub and some reclaiming of cool shrub by year 100.* Most of the cool shrub within reserves is in southwest Idaho, which does not yet have a major problem with medusahead and other noxious weeds in cool shrub. There is concern, however, that medusahead could become more extensive in this area of cool shrub in reserves due to a prevalence of clay soils in portions of that area. The acreage scheduled for weed control under Alternative 7 is expected to result in control (reduction in infestation size) of medusahead and leafy spurge and reseeding of medusahead-infested areas.

Cluster 6 — *Prediction: Minor further infestation of cool shrub.* There are approximately 474,000 acres (191,903 ha) of cool shrub in reserves in this cluster for both EIS areas, nearly all of which are in the Upper Columbia River Basin EIS area. Given available information, leafy spurge is not proposed as extensive yet in this cool shrub in reserves. However, concern exists for potential invasion of this cool shrub in reserves by leafy spurge and medusahead due to the prevalence of clayey soils in the area that would be in reserves.

Although the acreage scheduled for weed control outside reserves would be directed to Dyers woad only, the assumption is made that not all 30,000 acres (191,903 ha) per decade would be directed to Dyers woad, but that some could be directed to the other species. This would include reseeding of medusahead-infested areas after initial weed control.

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Results and Discussion

Two key management issues surface from our evaluation of alternatives relative to management of forest and rangelands on the BLM- and FS-administered lands of the Interior Columbia River Basin and portions of the Klamath and Great Basins, for the Eastside EIS assessment area and the Upper Columbia River Basin EIS assessment area. A discussion of these issues follows.

Forests

In forested environments, a large amount of contiguous mid- and late-seral, dense, multi-layer forest communities exist in both EIS areas. These areas generally occur on the foothill and lower relief mountains where road networks have been relatively easy to develop. Consequently, much of this condition occurs in areas of high road density where the large, shade-intolerant, insect-, disease- and fire-resistant species have been harvested over the past 20 to 30 years. Historically, these areas had a high component of surface fire (nonlethal) disturbance regimes, which maintained relatively open-canopy, late-seral, single-layer, old forests. We find these areas to be highly correlated with areas of high lightning ignition potential and moderate-to-high urban/wildland interface. Many of these areas are in critical fall big game range where a common objective is to maintain multi-layer, dense, forest cover for big game security. The occurrence of high intensity crown fires of large size has been common and will increase in the future as the mid- and late-seral forest patches grow into similar structures.

Substantial areas also occur with mid- and late-seral, dense, multi-layer forest communities in areas of low road density where the large, shade-intolerant, insect- and disease- and fire-resistant species have not been harvested. This typically occurs in the steeper mountains where extensive road networks have not been developed and the environments are not as dry as in the roaded areas. Historically, a mix of surface, mixed, and crown (nonlethal, mixed, and lethal, respectively) fire disturbance regimes maintained a patchwork of: open-canopy, late-seral, single-layer, old forests on the benches and ridges; late-seral, multi-layer, old forests on the footslopes and benches; and early- to mid-seral forests on the slopes. These areas are typically correlated with moderate to high lightning ignition potential and low urban and wildland interface. The occurrence of high intensity crown fires of large size has been common in these areas and will increase in the future.

The primary difference between the landscape dynamics in the unroaded areas and the roaded areas is that the forest vegetation has higher opportunity for relatively rapid shift to native patterns in the unroaded areas because the large shade-intolerant trees are still present. Fires in unroaded areas are not as severe as in the roaded areas because of less surface fuel, and after fires at least some of the large trees survive to produce seed that regenerates the area. Many of the fires in the unroaded areas produce a forest structure that is consistent with the fire regime, while the fires in the roaded areas commonly produce a forest structure that is not in sync with the fire regime. Fires in the roaded forests commonly are more intense, due to drier conditions, wind zones on the foothill/valley interface, high surface-fuel loading, and dense stands. The effects of these fires often cause serious erosion, nutrient loss, slumps and stream sediment hazards, when combined with high road densities.

In modeling the alternatives we did not find an alternative that substantially changed the trend of these conditions. Alternatives 4 and 6 generally reduce the growth of these conditions and the amount of wildfire more than Alternatives 3, 5, and 7, and more than Alternatives 1 and 2. Within Alternatives 4 and 6, there is flexibility to prioritize the activity levels to high risk subbasins and subwatersheds using hierarchical analysis in order to reverse these conditions.

In the evaluation of management activities and other disturbances found in the previous sections on "Evaluation of Landscape Disturbances" and "Vegetation Response and Disturbance Patterns," we found that the historical fire disturbance regime generally disturbed about 30 percent of the vegetation per decade. In comparing the alternatives to this historical disturbance level, we found that the restoration alternatives were very similar in amounts. The reader might conclude that if the BLM and FS were to implement a similar level of disturbance as the historical system, the result would be restoration of landscape patterns within a short period. This is not the case. The current condition is the result of about 50 years of somewhat successful fire exclusion and about 30 years of harvest techniques that did not mimic landscape disturbance regimes. The landscape patterns are on a very different trajectory than one consistent with the biophysical system and inherent disturbance regime. Consequently, to affect restoration at a large scale, the BLM and FS would need to maintain a well-designed 30 percent disturbance level, and focus additional restoration energy to reverse the changes that have already occurred.

In general, the subbasins that have landscape conditions with high departure from the biophysical regime also have aquatic conditions in need of restoration. Priority for vegetation, road, fuel and watershed restoration could be focused on subbasins and subwatersheds that do not have conflicts with remnant (stronghold) native fish populations.

In considering the adaptive management approach of Alternative 6, we would like to emphasize that the slower rates of activities and need for technology development and research definitely apply to the unroaded steeper mountain areas. There is high risk to watershed capabilities from further road development in these areas. In general, the effects of wildfires in these areas are much lower and do not result in the chronic sediment delivery hazards exhibited in areas that have been roaded. In contrast, the already roaded areas have high potential for restoration action.

As the reader reviews the fire disturbance information in the "Management and Disturbances" section, we would like to emphasize that the amount and intensity of fires in the roaded forests with the conditions previously described may be substantially underestimated. There was not adequate time in this evaluation to model the mid-scale contagion effects of insect, disease, and stress mortality on forests, or the contagion effects of fire on fire size and amount, and to extrapolate to the broad scale. The amount of fire will likely be much greater than projected and of larger average size within the coming decades. Alternatives 4 and 6 have high potential to eventually turn these conditions around. However, to accomplish substantial improvement of these conditions within the next 10 to 20 years, BLM and FS management would prioritize the high risk areas and focus restoration energy in those subbasins and subwatersheds, rather than evenly distribute restoration energy across the forest and range cluster restoration emphasis areas.

Rangeland

In the range and dry forest potential vegetation groups the amount of exotic herbland in the current period is underestimated. The probability of increase of exotics for these different potential vegetation groups within the alternative simulation models is also underestimated. Consequently, it is likely that the evaluation of alternatives relative to response and effects of exotic herblands reports a more positive situation than exists. The integrated weed management strategy in Chapter 3 of the preliminary draft EISs is a very sound strategy for rangelands. It is also applicable to forests, but would require further analysis.

There is a large amount of contiguous exotic herbs in both EIS areas. Much of this is along roadsides and trails, around watering areas, and in areas with historic excessive livestock grazing effects. Much of the exotic herbs also appear to be correlated with stream and river corridors. The two areas of largest size are suspected to occur in the Snake River Plains area of the Upper Columbia River Basin EIS area, and in the south central

Oregon area of the Eastside EIS area. These areas are generally in the dry shrub potential vegetation group, with low annual precipitation. In these environments wildfires tend to increase the rate of spread of the exotic herbs.

Given concern with potential underestimation of exotic herb rates of spread and the results of the simulations of the alternatives, we feel there is high potential that there is no alternative that will assure the recovery of rangelands in the dry environments. There is also high potential for continued spread of exotic herbs in the forest environments as a result of road disturbance and traditional soil disturbing harvest, fuel management, site preparation, and stand improvement activities.

Alternatives 4 and 6 generally appear to stabilize or possibly reduce the growth of these conditions and the amount of wildfire more than Alternatives 3, 5, and 7, and much more than Alternatives 1 and 2. Within Alternatives 4 and 6, there is flexibility to refocus the activity levels to a smaller group of subbasins and subwatersheds to reverse these conditions in subbasins with the highest priority.

In general, the subbasins that have the most problems with exotic herbs do not have substantial conflicts with aquatic conditions. Priority for range management can be focused on range plan revisions and implementation along with restoration activities to achieve objectives. For most of the landscape objectives in the alternatives that relate to range, stocking reductions alone do not address the issues. Range plan revision and implementation, along with range improvements and prescribed fire, to produce a system that is consistent with the biophysical system and inherent disturbance regime will best sustain landscape integrity.

In considering the adaptive management approach of Alternative 6, we emphasize that the need for technology development and research applies to recovery of rangelands in the dry shrub and dry grass potential vegetation groups and in the riparian systems. There is high risk that our current level of activities and types of control and containment treatments will not be adequate.

Summary of Response

Succession/Disturbance Regime

Evaluation of management activities and other disturbances indicated that the historical disturbance regime generally disturbed about 30 percent of the vegetation per decade. For a general summary of disturbance, we used a classification of succession/disturbance regimes (Hann and others 1997) that is presented in table 2.49.

The short-cycle regime currently occurs at high levels on roads and areas of exotic annual grasses and other herbs. In the historical regime this short cycle system generally only occurred in bank areas of flood plains and earth flow patches. At this scale the opportunity with Alternatives 4 and 6 appears to be to restore and mitigate roads and contain the spread of exotics. With the current technology there appears to be a fairly low probability of achieving substantial recovery of what has already changed to domination by exotic herbs without further advances in technology.

The predominant occurrence of the moderate cycle regime was in the shrublands and on the steeper, drier sites in the forest. Currently, there is a low amount of this regime in comparison to the historical regime. Much of the sagebrush zone has converted to a short cycle regime and the forest zone has converted to a long- or very-long-cycle regime. Alternatives 4 and 6 have the highest potential to reestablish these landscape level succession/disturbance regimes.

Through fire suppression, fire has been excluded from many forest habitats that were moderate cycle or maintenance systems. The ability to suppress wildfire is steadily declining as fuel loading increases, the probability of human ignition increases in urban/wildland interface zones, and the probability of consecutive year drought increases. Consequently, the fuel conditions will eventually transition to a level consistent with the biophysical regime, due to either wildfire or management treatments.

Table 2.49 — Succession and disturbance regimes developed for broad-scale assessment.

Regime (Code)	Average Disturbance Interval (years)		Disturbance Severity	Description	Examples
	Intermediate Mixed[1]/ Non-lethal[2]	Lethal			
Cycling	NA[3]	1+	Moderate-High	Succession is reinitiated by disturbances that are lethal[4] to most or all of the upper-layer and some or all of the lower-layer vegetation.	
Accelerated Cycle (AC)	5 - 50	30 - 300	Moderate	Intermediate disturbances that accelerate growth of disturbance-adapted species, often creating an irregular fine-scale mosaic of patches of different vegetation structures. Eventually cycled by a lethal disturbance.	Conifer potential vegetation types (PVTs) with non-lethal or mixed fires, insect, or disease effects that thin the stands of susceptible species, allowing the resistant species to accelerate growth; shrub PVTs with non-lethal or mixed fires, insects, disease, grazing, or beaver cutting effects that open-up stands.
Long Cycle (LC)	NA	101 - 300	High	Successional cycle is long, with reinitiation from seedlings and some resprouting. Intermediate disturbances may happen but they have minimal effects on composition, structure, and density.	Conifer PVTs with longer-lived, fast-growing, shade-intolerant, conifer species that dominate after crown fires, insect attacks, windthrow, or other lethal effects that cycle the community.
Moderate Cycle (MC)	NA	5 - 100	Moderate	Successional cycle is moderately long, with reinitiation from a mixture of resprouting plants and seedlings. Intermediate disturbances may happen but they have minimal effects on composition, structure, and density.	Shrub PVTs where succession after lethal burning, herbicide application, chaining, or insect topkill takes from 10 to 25 years to reestablish the dominant shrub layer; conifer or broadleaf PVTs with short-lived, fast-growing, shade-intolerant, conifer or broadleaf species that dominate after crown fires, insect attacks, windthrow, or other lethal effects that cycle the community; floods in floodplain areas that cycle broadleaf, conifer, or shrub vegetation; cutting or flooding by beaver in riparian areas; avalanche paths; conifer PVTs where lethal disturbance cycles the vegetation prior to dominance by conifers, keeping the system in an herb or shrub dominated stage.

Table 2.49 (continued)

Regime (Code)	Average Disturbance Interval (years)		Disturbance Severity	Description	Examples
	Intermediate Mixed[1]/ Non-lethal[2]	Lethal			
Retrogressive Cycle (RC)	NA	10 - 50	Low	Disturbances that reverse successional direction to an earlier seral stage, typically an annual or biennial cycle of grazing stress insect/ pathogen mortality, drought mortality, or pollutant mortality.	Conifer PVTs with fire exclusion resulting in a dense upper layer that undergoes relatively little annual mortality from insects, disease, and stress that cumulatively are a lethal effect to the dominant vegetation over a long period (10-50 yrs); grazing that selectively causes mortality in relatively small annual increments such that over a long period there is a complete change in dominant vegetation *composition or structure; invasion* by exotic plants that can compete more effectively than native plants due to environment or disturbance (grazing, fire, tillage, or roads).
Short Cycle (SC)	NA	1 - 4	High	Successional cycle is very short with a composition of new seedlings, *annuals, biennials, or weedy perennial species.*	Annual high water in floodplain/draw area adjacent to the channel; annual tillage in *agriculture; soil or gravel surfaced roads* with annual grading and runoff; annual grass and weed dominated vegetation with high amounts of bare soil; annual avalanche path areas.
Very Long Cycle (VC)	NA	301+	High	Successional cycle is very long, with reinitiation primarily from seedlings. *Intermediate disturbances may happen but they have minimal effects on composition, structure, and density.*	Conifer PVTs with a sequence of dominance by shade-intolerant tree species *that succeed to shade-tolerant tree species* and then are cycled by crown fires, insect attacks, windthrow, or other lethal effects on the dominant upper layer vegetation.

Table 2.49 (continued)

Regime (Code)	Average Disturbance Interval (years): Intermediate Mixed[1]/ Non-lethal[2]	Average Disturbance Interval (years): Lethal	Disturbance Severity	Description	Examples
Maintenance	5 - 50	NA	Low	Succession is maintained in one structural stage by periodic disturbances that do not cycle the upper-layer vegetation but are lethal to species in the lower layer that would grow up into, and change the upper layer.	
Frequent Maintenance (FM)	5 - 25	NA	Low	Intermediate effects produce relatively uniform upper and lower layers of vegetation with relatively short intervals between maintenance (M) disturbances.	Warm conifer PVTs with non-lethal fires, insects, disease, or grazing effects that selectively remove the susceptible understory species allowing for recruitment of resistant species into the overstory; warm grassland, shrubland, and conifer PVTs with non-lethal and mixed fires, insects, disease, or grazing effects that maintain the dominant grass or forb vegetation.
Less Frequent Maintenance (GM)	26 - 50	NA	Low	Intermediate effects produce relatively uniform upper and lower layers of vegetation with moderate intervals between disturbances.	Cooler conifer PVTs with non-lethal fires, insects, disease, or grazing effects that selectively remove the susceptible understory species allowing for recruitment of resistant species into the overstory; cooler grassland, shrubland, and conifer PVTs with non-lethal and mixed fires, insects, disease, or grazing effects that maintain the dominant grass or forb vegetation.
Irregular Maintenance (IM)	26 - 50	NA	Low	Intermediate effects produce relatively irregular upper layers of vegetation and multiple lower layers.	Wet conifer, broadleaf, or shrub PVTs with mixed fires, insects, disease, or grazing effects that selectively remove small patches of susceptible species in any vegetative layer allowing for recruitment of resistant species into the structure.

[1]Mixed disturbances maintain a salt and pepper, fine-scale mosaic within a patch by cycling clumps and gaps; mixed disturbances leave patches intact, but maintain a rough textural pattern of clumps and gaps; mixed disturbances can be lethal (maintaining scattered gaps or creating gaps); or non-lethal (creating gaps that are intermingled with clumps).

[2]Non-lethal disturbances do not cycle the upper layer of vegetation; non-lethal disturbances selectively thin susceptible plants in all layers of the patch.

[3]NA = Not Applicable.

[4]Lethal disturbances cycle the upper layer of vegetation in the patch, and may cycle the lower layers.

The maintenance system was historically common in grasslands, open woodlands, and park-like forests. There has been a substantial decline in this regime from the historical system. Much of this system has converted to a long cycle regime via fire exclusion, short cycle via exotics, or retrogression via livestock grazing. Without substantial restoration energy, this regime cannot be recovered. In general, Alternatives 3, 4 and 6 are the only alternatives that have the level of restoration activities to change the amounts of this regime in a pattern consistent with the biophysical system. In subbasins that have a mosaic of forest, range, and riparian the native regime fire interval is typically the same across all three types of vegetation. Reduction of fine grass fuels from summer livestock grazing often has a substantial effect on mosaic burns in these types.

The acceleration regime was historically common in forest potential vegetation groups. These types of insect, disease, and fire disturbance thinned the vegetation and accelerated the development of surviving trees into the late-seral stage. Much of this affected area has shifted to a retrogression regime, where the upper layer of vegetation becomes stressed due to high density, and shifts to an earlier seral stage via mortality of the upper layer.

The retrogression regime, which was not common historically, is now common in the range potential vegetation groups as a result of excessive livestock grazing and invasion of exotic perennials. It is also common in the mid- and late-seral forest where stands are more susceptible to insect, disease, and fire because of past harvest activities and fire exclusion.

Projected fire, smoke, and associated conditions on BLM- and FS-administered lands of the UCRB and EEIS were compared by alternative (table 2.50). The general findings follow those in the sections on "Evaluation of Landscape Disturbances," "Terrestrial Communities," and "Vegetation Response and Disturbances." Of particular importance in this evaluation is the high potential for large wildfire events in the rural and wildland interface areas of the Alternative 7 reserves. Given the fuel conditions and the narrow west to east width of many of the reserves, there is very high potential for wildfires to be blown out of the reserves by a wind event and onto private lands or into the interface with urban or rural housing. Modeling of fire-event size indicated that only the four largest reserve areas (North Cascades, Bob Marshal Complex, Selway-Bitterroot, Frank Church River of No Return) would contain 10- to 20-year type wildfire or large unplanned prescribed natural fire events,[1] and that no areas were large enough for 30- to 100-year type events.

[1]Event type is a set of combined fire, weather and fuel conditions.

Table 2.50 — Relative response by alternative of fire and smoke conditions on BLM- and FS-administered lands.

	Alternative						
Item	1	2	3	4	5	6	7
Wildfire	M	M	M	L	M	L	M
Prescribed Fire	L	L	M	H	M	M	L
Spring Smoke	H	H	H	M	H	M	L
Summer Smoke	M	M	M	M	M	M	H
Fall Smoke	L	L	L	M	L	M	H
Large Wild Fire Events Rural / Wildland Interface	M	H	M	L	M	L	H
Risk of Escape Prescribed Fire	M	H	M	L	M	L	H
Fire Management Suppression Cost	M	H	M	L	M	L	H
Potential Accidents	M	H	M	L	M	L	H

L = Low; M = Moderate; H = High.

Vegetation Change

Detailed information on vegetation response is provided in the sections "Terrestrial Communities," and "Vegetation Response and Disturbance."

Detailed discussions of broad-scale and community vegetation structure and composition comparisons of alternatives are also presented (see "Vegetation Response and Disturbance"). A general summary of fine-scale habitat responses compared between alternatives based on interaction of alternative theme, DFCS, and standards is provided in table 2.51.

The comparison of alternatives for snags, down wood, forest riparian, range riparian, and down woody debris in streams is based on the broad-scale vegetation response and the prescription assumptions concerning treatment of these fine-scale features. In general, Alternatives 4, 6, and to some degree Alternative 7, would provide for the highest improved trend of these fine-scale habitat attributes.

Pattern emphasis may be the most important emphasis of an alternative that is related to landscape integrity. Much of the current vegetation is not in a location consistent with the landscape disturbance regime. For instance, many current late-seral multi-layer communities are located on steep slopes with crown fire (lethal) regimes. Historically, and based on the biophysical template of conditions, these structures should be located on moist footslope landforms where creeping, spotting type fires occur. The widespread effect of traditional management, which has changed the juxtaposition of patch structure, has created landscapes in very high risk of large contiguous disturbance events. When wildfire disturbance events happen during consecutive drought years in these types of conditions, they often have high-severity effects on the soil surface that cause high mortality to plants and increase the hazard of hydrophobic conditions and soil erosion. None of the alternatives address this important issue to any degree. Based on the theme, desired future conditions, and the standards (appendix I), it appears that Alternatives 4

Table 2.51 — Habitat responses within the Upper Columbia River Basin and Eastside EIS, by alternative based on CRBSUM prescriptions.

	Alternative						
Habitat Variable	1	2	3	4	5	6	7
Snags	N(--)	L(-)	M(0)	H(+)	M(0)	H(++)	M(+)
Down wood - upland	N(--)	L(--)	M(-)	H(+)	M(-)	H(++)	M(0)
Forest riparian	L(--)	H(+)	M(+)	H(++)	M(+)	H(++)	H(+)
Range riparian	L(--)	M(-)	M(0)	H(++)	M(0)	H(+)	M(0)
Down wood - riparian	N(--)	M(0)	H(+)	H(+)	M(0)	H(++)	H(+)
Pattern Emphasis	N(--)	N(--)	M(-)	H(++)	M(-)	H(+)	LM(-)

Landscape level response across all ownerships of the Basin. Response relative to emphasis on conservation of existing habitats, and recruitment of future habitats. The rating pertains to the aggregate of types of management (traditional or ecological) and disturbance treatments (prescriptions - Rx).
H = High; M = Moderate; L = Low.

Trend, current to future.
0 stable projected trend, current to future.
+ upward projected trend, current to future.
- downward projected trend, current to future.

Snags, down wood upland, and down wood - riparian based on lookup tables generated from subsample photo interpretation and plot data, and modeled by prescription (Rx) type. Forest riparian and range riparian based on estimate from DEIS theme and DFCs and correlate trends with upland types from the alternative CRBSUM simulations.
Pattern based on estimate from DEIS theme and DFCs.

and 6 would have the highest likelihood of shifting patterns of landscapes to be more consistent with the system and inherent disturbance processes.

Consistency of Standards

Some of the standards were found to be inconsistent relative to ecological relationships. A brief discussion follows with discussion relative to possible resolution.

Dead Standing and Down Wood Fuel, Soil Productivity, and Habitats — In the alternatives, the brief discussion on the amounts and size of down wood fuel compared to down wood for habitats or soil productivity, is inconsistent within the same alternatives. To resolve these inconsistencies, a modeling approach could be used that links relationships of standing-and-down wood with fire, terrestrial habitats, aquatic habitats, and soil productivity. In general, the literature on standing and down wood from these different perspectives is in conflict and we can easily understand why the EIS team specialists from fire, wildlife, aquatics, and soils were not able to resolve the standards based on the published literature.

There are other single state/size default standards in the preliminary draft EIS (such as riparian buffers). Our evaluation of effects of alternatives 3, 4, 5, 6, and 7 was based on the assumption that these standards would be revised to fit ecological relationships within the first decade.

Landscape Integrity Summary Ratings

In this chapter's introduction, we made some assumptions about the type of management that would provide the most positive trends for landscape integrity on public lands (table 2.52). These estimates are in general agreement with the more detailed findings that have already been presented. An integrated rating of the ability of alternatives to restore and sustain landscape integrity results in Alternative 4 having the highest rating. Although the adaptive management approach of Alternative 6 is very valuable in developing technology to restore altered systems, the slower rate of restora-

Table 2.52 — Summary comparison rating of how well various alternatives achieve the landscape assumptions.

	Alternative						
Landscape Management	1	2	3	4	5	6	7
Landscape Approach Assumption	L	L	M	H	M	H	M
Successful Ability to Mimic Conditions/ Represent Processes	L	L	L	M	L	H	L
Hierarchical Assessment, Implementation, Monitoring, and Evaluation	L	L	L	H	L	H	M
Prioritization and Integration of Activities	L	L	L	H	M	H	L
Concentration of Activities Temporally and Spatially	L	L	M	H	M	H	M
Road Management	L	L	M	H	L	H	M
Fire Management	L	L	M	H	M	H	L
Forest and Range Integrated Landscape Management	L	L	M	M	L	H	L
Woodland PVG	L	L	M	H	L	M	L
Dry and Moist Forest PVGs	L	L	M	H	M	M	L
Cold Forest PVGs	L	L	L	H	L	M	L
Dry Grass, Dry Shrub, and Cool Shrub PVGs	L	L	M	H	M	M	L
Riparian PVGs	M	M	M	H	M	H	M
Alpine PVG	M	M	M	H	M	H	M

L = Low; M = Moderate; H = High.

tion activities results in somewhat high risk of wildfire in forests and of exotic plant invasion in rangelands. Consequently, Alternative 6 is ranked second amongst the alternatives, followed by Alternatives 3, 7, and 5, respectively. Although the reserve approach of Alternative 7 would be valuable to landscape integrity if actively managed for native patterns, the traditional reserve management approach results in high risk to landscape integrity. Because of the lack of a landscape approach and restoration emphasis, Alternatives 1 and 2 are rated well below any of the action alternatives (3 through 7).

Simulations Compared to Alternative Management Activities

The simulated combined forest management activities are within or very close to the range given in Chapter 3 of both the preliminary draft EISs for all alternatives. Alternative 2 is slightly low because of lower than desired prescribed fire and thinning, but harvest is slightly high so they could be exchanged (table 2.53 and figures 2.81 and 2.82). Alternative 3 is a little high because of higher levels of simulated prescribed fire than desired. However, this can be exchanged to increase low levels of simulated thinning. Alternative 7 is slightly high for the EEIS area because of higher simulated than desired harvest in the non-reserve areas, but this can be exchanged to increase low levels of simulated thinning.

Simulated rangeland combined-management activities are within or very close to the range given in Chapter 3 of both preliminary draft EISs for all alternatives. Alternatives 1 and 2 are low for the UCRB area because of a low simulation of prescribed fire and range vegetation improvements (table 2.54 and figures 2.83 and 2.84). However, this may be an actual effect when considering the low level of current range management budgets, compared to the expectations of the forest and resource plans. Alternative 2 is somewhat low for the UCRB EIS area for reasons similar to Alternative 1. Alternatives 3, 4, 5 and 6 in the EEIS area are high because of higher levels of simulated prescribed fire than desired from the preliminary

Table 2.53 — Forest vegetation management and prescribed fire for first decade.

EIS Area	Alternative	Preliminary Draft EIS, Minimum	Simulation Activities	Preliminary Draft EIS, Maximum
			Hectares[2]	
EEIS[1]	1	796,000	894,000	107,1000
	2	563,000	530,000	757,000
	3	997,000	1,424,000	1,350,000
	4	1,246,000	1,418,000	1,688,000
	5	1,042,000	1,386,000	1,411,000
	6	1,111,000	1,378,000	1,500,000
	7	609,000	858,000	820,000
UCRB[1]	1	926,000	994,000	1,254,000
	2	608,000	536,000	825,000
	3	1,083,000	1,733,000	1,467,000
	4	1,369,000	1,672,000	1,850,000
	5	1,118,000	1,132,000	1,512,000
	6	1,082,000	1,427,000	1,467,000
	7	717,000	730,000	972,000

[1]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.

[2]Rounded to nearest thousand; includes harvest, thinning and prescribed fire (planned and unplanned ignitions).

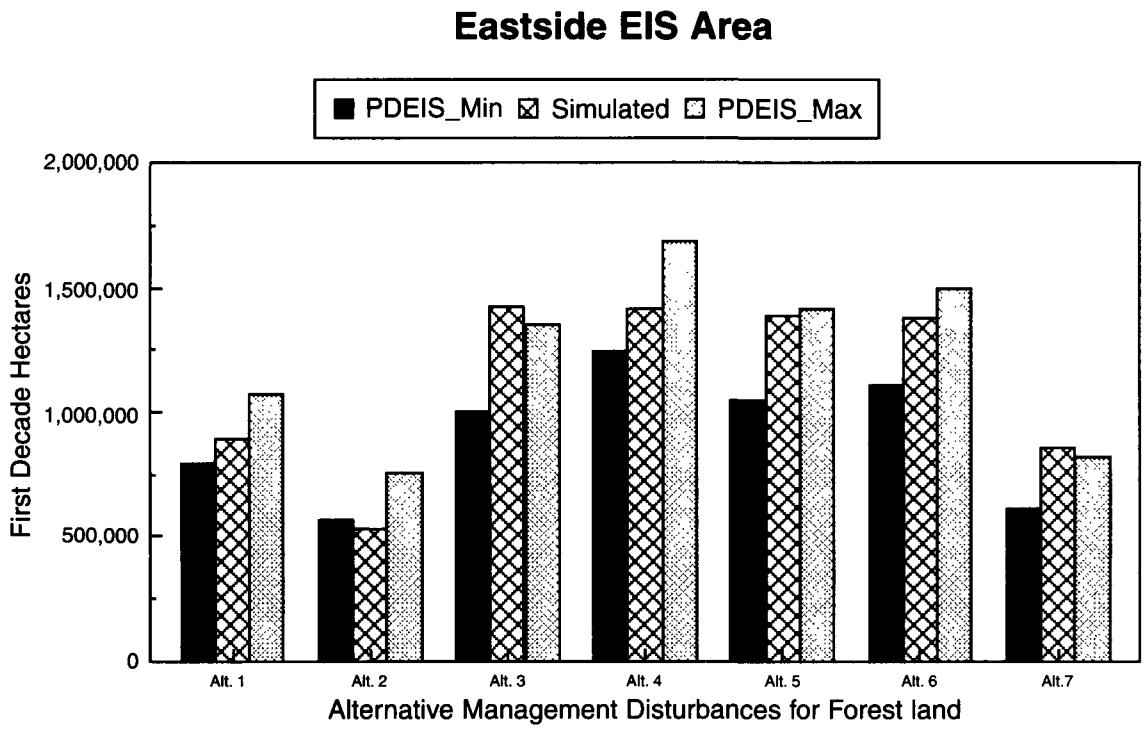


Figure 2.81 — Simulation compared with alternative management activities for BLM- and FS-administered forest land of the EEIS.

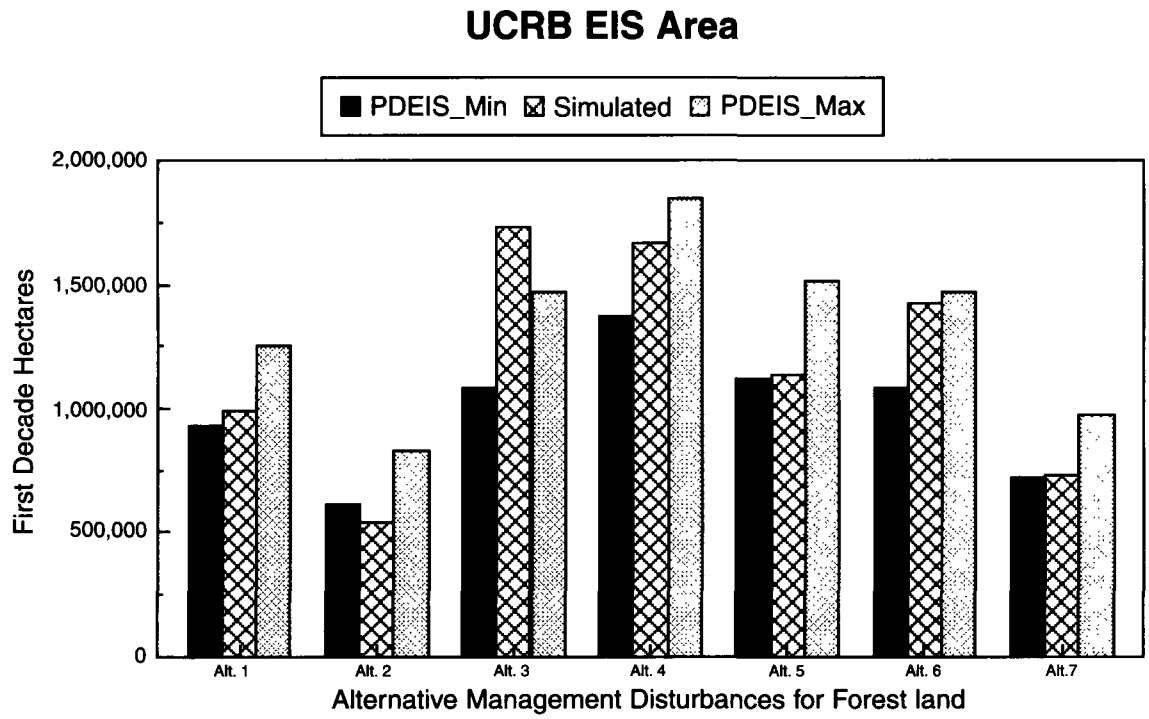


Figure 2.82 — Simulation compared with alternative management activities for BLM- and FS-administered forest land of the UCRB.

draft EIS Chapter 3 activity levels. We feel the preliminary draft EISs underestimated these levels given the amount of decadent shrublands, and woodland and conifer encroachment, in the EEIS area; and that the simulated level better reflects the DFCs and themes of Alternatives 3 and 4 than the Chapter 3 activity levels.

Relative to these critical variables, Alternatives 4 and 6 have the highest ability, Alternatives 3, 7 and 5 moderate ability, and Alternatives 1 and 2 the lowest ability, to transition landscapes toward consistency with their biophysical regime and inherent landscape disturbance processes; thus conserving or improving ecosystem integrity. *We emphasize again, however, that at the broad- and mid-scales, it is not the amount of management activity by area that drives landscape response, but the design, rate of implementation, spatial pattern, and timing of treatments within and across years that are the critical variables.*

Terrestrial Communities

We would recommend that any future analysis of broad-scale communities as terrestrial habitats use the physiognomic type groups stratified potential vegetation group (PVG) or, for a coarser grouping, by forest and rangeland. The changing nature of lower montane, montane, subalpine and non-forest terrestrial communities in relation to existing vegetation cover types with no tie to the biophysical environment is a substantial hindrance to this analysis. Without the tie to the biophysical environment little inference can be made relative to temperature, moisture, soils, terrain, or consistency of the terrestrial communities with the biophysical system and inherent succession and disturbance processes.

Table 2.54 — Rangeland improvements and prescribed fire activities for first decade.

EIS Area	Alternative	Preliminary Draft EIS, Minimum	Simulation Activities	Preliminary Draft EIS EIS, Maximum	Assumed[1] AMP Revision/ Implementation
		Hectares[3]			
EEIS[2]	1	170,000	171,000	227,000	200,000
	2	170,000	225,000	227,000	500,000
	3	412,000	729,000	558,000	500,000
	4	535,000	941,000	720,000	1,000,000
	5	310,000	643,000	418,000	500,000
	6	385,000	799,000	522,000	1,000,000
	7	220,000	565,000	298,000	200,000
UCRB[2]	1	192,000	128,000	261,000	250,000
	2	192,000	150,000	261,000	550,000
	3	518,000	532,000	700,000	600,000
	4	589,000	639,000	795,000	1,200,000
	5	277,000	308,000	374,000	750,000
	6	744,000	345,000	1,004,000	1,200,000
	7	295,000	133,000	401,000	400,000

[1]Assumed for simulation purposes; not in preliminary draft EIS Chapter 3.
[2]EEIS = Eastside EIS area.
UCRB = Upper Columbia River Basin EIS area.
[3]Rounded to nearest thousand; includes structural and nonstructural range improvements plus prescribed fire (planned and unplanned ignitions).

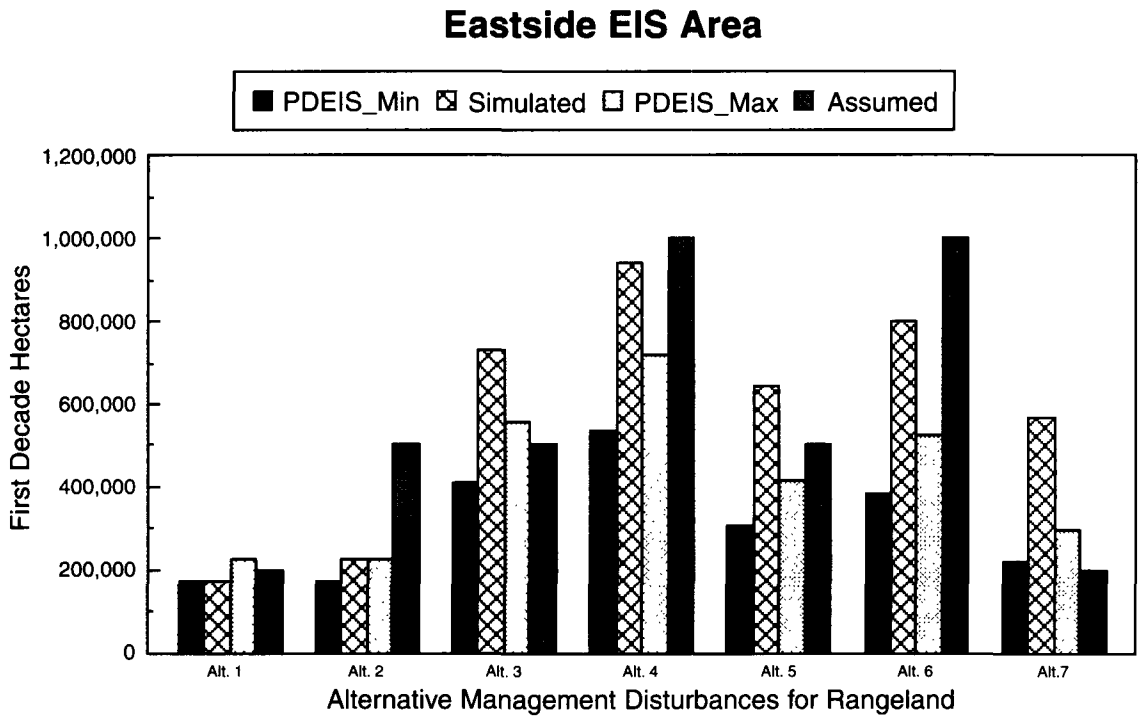


Figure 2.83 — Simulation compared with alternative management activities for BLM- and FS-administered rangeland of the EEIS.

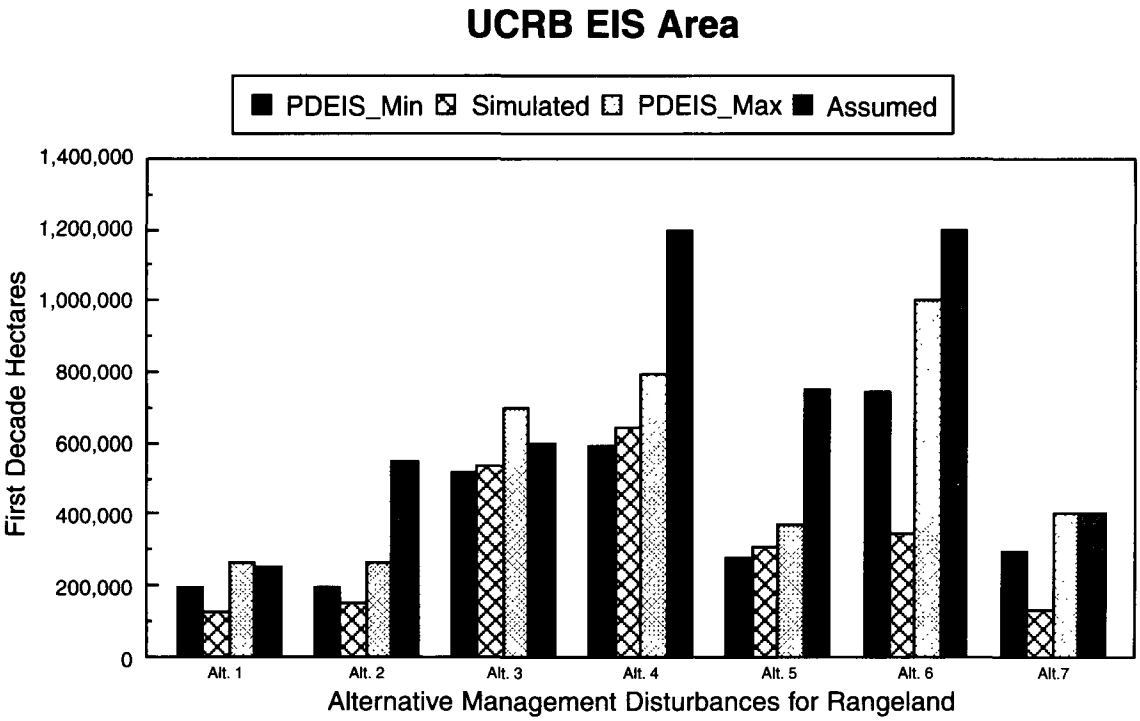


Figure 2.84 — Simulation compared with alternative management activities for BLM- and FS-administered rangeland of the UCRB.

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We express our thanks to all those who worked on the landscape assessment since they provided the platform for this evaluation of alternatives as well as assisting in its evolution.

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Appendix 2-A

Potential Vegetation Groups

This appendix describes the landscape approach to managing potential vegetation groups (PVGs). It includes brief statements about current conditions that serve as a basis for comparing a landscape management approach to traditional approaches. Current conditions of the Basin have been documented in Landscape Dynamics of the Basin (Hann and others in press), Chapter 3 in the Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins (Quigley and others, in press). Additional information about potential vegetation groups is provided by Hann and others (1997).

Woodland Potential Vegetation Group

Through time, the woodland potential vegetation group would improve in integrity. Conditions related to effects of fire exclusion, overgrazing, and introduction of exotic forbs and annual grasses would be prioritized for restoration. Overgrazing by livestock has generally resulted in the loss of fine fuels that historically carried fire and in soil disturbance, both of which increase the rates at which exotics spread and woody species establish. Dominant changes that occurred between historical and current conditions were from upland herb to upland shrub, and from early-seral forest/woodland to mid-seral woodland. Succession/disturbance regimes shifted from a mix of maintenance, cycling, and acceleration to dominance by cycling and retrogression.

Over time, with improved inventory, remote sensing, and ecological modeling, there is a better understanding of the extent of woodland potential vegetation groups, and their juxtaposition in the mid- and fine-scale landscape patterns of succession/disturbance regimes. The woodland PVG physiognomic types are typically associated with site and landform conditions with a mix of maintenance and cycling succession/disturbance regimes. Areas with soils supportive of continuous fine fuels typically have fires at frequent intervals that maintain the upland herb physiognomic type, and cycle the upland shrub, early-seral forest/woodland, or open canopy mid-seral woodland.

Areas that support old, late-seral, multi-layer woodlands are typically steep north aspects with very rocky soils where fires are infrequent. In the broad-scale mapping, due to resolution error some of the dry grass, dry shrub, and cool shrub potential vegetation groups contain inclusions of this type of woodland PVG.

Areas that support old, late-seral, single-layer woodlands typically have rock outcrops or shallow soils where trees are not killed by fires in the intermingled shrub/grass areas capable of carrying fire. These trees are often fire-scarred one to three times before they die. The woodland succession/disturbance relationships on the woodland potential vegetation groups are very different from that in the dry grass, dry shrub, or cool shrub PVGs.

Through time, with the use of prescribed fire, flexible strategies on wildfire management, noncommercial tree cutting, commercial harvest, and other treatments, the mix of physiognomic types shows a trend toward the historical mix consistent with the biophysical template. Treatments are designed to restore areas that have exotics and/or eroded soils with native or desirable non-native perennial herbs that can compete with exotic weeds, provide soil protection, and represent native structures.

For areas where a fine-scale understanding of the above relationships does not exist, a conservative approach is taken relative to use of treatments that convert woodlands to herblands. Large, older trees are saved. Areas where trees exhibit fire scars are treated as underburn (nonlethal) regimes and managed for open mid- or late-seral, single-layer, physiognomic types.

Grazing systems are implemented to result in the dominance of native herbs, which have decreased under cattle and sheep grazing. Typically, these grazing systems are of short duration and low to moderate utilization, with emphasis on higher utilization levels during the dormant seasons of the plants.

Management emphasizes avoiding both the introduction and spread of exotic plants and noxious weeds, which are typically associated with overgrazing, roads, and other soil surface-disturbing activities. Consequently, these soil-disturbing types of activities are adjusted or monitored to reduce the risk of introducing or spreading exotic plants and noxious weeds. Initial introductions are aggressively controlled to avoid spread.

Seeding for wildfire rehabilitation is done only when necessary, either to protect soils or to compete with potential introductions of exotic forbs or annual grasses. If deemed necessary, seeding is done with native species if possible, non-native species that do not produce viable seed, or where necessary for restoration desirable non-native species that have similar form and adaptations as the native species that have been lost.

Dry and Moist Forest Potential Vegetation Groups

Through time, the dry and moist forest potential vegetation groups improve in integrity. Current harvest and road practices that are inconsistent with the biophysical disturbance regime and fire management practices are modified to achieve this change in trend.

In the dry forest potential vegetation groups, there have been:

- Substantial declines in late-seral (old) forest, single-layer physiognomic types.
- Substantial increases in the mid-seral forest.
- Some increases in late-seral multi-layer forest.
- Substantial declines in herb and shrub physiognomic types.
- Substantial change from forests that are shade-intolerant and resistant to insects, diseases, and fires, to forests that are shade-tolerant and susceptible to insects, diseases, and fires.

Dominant transitions from historical to current were:

- From late-seral, intolerant, single-layer forest to late-seral, tolerant, multi-layer forest.
- From late-seral, intolerant, single-layer forest to mid-seral intolerant forest.
- From mid-seral intolerant forest to late-seral tolerant multi-layer forest.

The biophysical template of the dry forest potential vegetation groups supports a succession/disturbance regime that is a mixture of acceleration, maintenance, and cycling. The current succession/disturbance regime has shifted to one dominated by cycling and retrogression. The moist forest potential vegetation group has had substantial declines in both late-seral multi-layer and single-layer types, and substantial increases in the mid-seral forest. Its biophysical template supports a succession/disturbance regime of cycling, acceleration, and maintenance. Currently, this regime is dominated by retrogression and cycling.

For areas where a fine-scale understanding of the above relationships does not exist, a conservative approach is taken relative to use of treatments that convert woodlands to herblands. Large, older trees are saved. Areas where trees exhibit fire scars are treated as underburn (nonlethal) regimes and managed for open mid- or late-seral, single-layer, physiognomic types.

Management activities addressing high risk fire/fuel conditions are prioritized to reduce these hazards where BLM- and FS-administered lands are mingled with urban and rural developments that also contain very hazardous fuel conditions. In general, management activities are designed to improve integrity and produce associated resources and values. In the rural/wildland interface, harvest and prescribed fire are used to maintain the stand structures, composition, fuels, and patch patterns in late-seral forest single-layer, open low density mid-seral forest, or early-seral physiognomic types. These classes generally have low potential for fires that crown, spread rapidly, and burn with high intensity. Fine grass fuels can be managed with grazing to reduce risk of rapid ignition and spread during the summer and early fall.

In dry and moist forests outside the rural/wildland interface zone where an emphasis is to manage for timber products, the biophysical template for underburning (nonlethal) and mixed regimes indicates that two or three fire intervals can be skipped to accumulate wood biomass for harvest.

Harvest treatments with prescribed fire emphasize production of community structure and composition similar to the biophysical template through:

- Removal of small diameter trees to allow selected trees to grow into the overstory to simulate acceleration and maintenance events.
- Removal of some overstory trees to simulate cycling events.
- Retention of a small amount of shade-intolerant overstory trees to simulate cycling events that maintain scattered large emergent trees.

In crown fire regimes, the biophysical template indicates that one or two fire intervals could be skipped to accumulate moderate diameter trees in the overstory with scattered large residual trees. Harvest treatments with prescribed fire emphasize removal of moderate diameter trees, while leaving the large residual shade-intolerant trees and selected smaller replacement shade-intolerant trees. Local fire management plans address effective strategies in areas where risk of investment or loss of property is high, and alternate strategies in areas where risks are lower.

In dry and moist forests outside the rural/wildland interface zone where the emphasis is to manage for maintenance of native patterns and processes, prescribed fire is used to represent the biophysical fire regime. Where stand structures and fuel conditions are excessively high, techniques are employed to reduce fire intensity. These techniques include using prescribed fire during cooler times of the year, pretreating with low intensity prescribed fire, and harvesting or thinning.

Management for dominant species in dry and moist forests generally includes species that are shade intolerant and resistant to mortality from low intensity fires. Progress is made in restoring western white pine on suitable environments by regenerating with blister rust resistant stock.

Introduction and spread of exotic and noxious weeds are actively avoided. Seeding with exotic or native grasses, forbs, and shrubs for wildfire rehabilitation is avoided unless necessary. When deemed necessary, either to protect soils or to compete with potential introductions of exotic forbs or annual grasses, seeding is done with native species if possible, non-native species that do not produce viable seed, or where necessary for restoration desirable non-native species that have similar form and adaptations as the native species that have been lost.

Cold Forest

Through time, using a landscape approach, the cold forest would improve in integrity. The primary conditions that improve relate to outcomes where: fire exclusion has changed community structures and fuel conditions; there has been a loss of whitebark pine to blister rust; and harvest and road practices are inconsistent with the biophysical succession/disturbance regime.

In the cold forest potential vegetation group, there has been a substantial increase in the late-seral forest multi-layer physiognomic type and a substantial decline in the early-seral forest. The succession/disturbance regime for the biophysical template is mixed cycling, acceleration, and maintenance. Currently, the regime is dominated by retrogression, primarily related to insects and disease.

Methods are developed to use prescribed fire and harvest or thinning to represent the biophysical fire regimes. Where emphasis is managing for timber products, one or two fire intervals could be skipped to accumulate small diameter trees in the understory and to moderate closure of larger diameter overstory trees. Other management activities are designed to improve integrity and produce associated resources and values. Progress is made in restoring whitebark pine on suitable environments by providing suitable post-fire ash environments and blister rust resistant seeds or stock.

Seeding of exotic or native grasses, forbs, and shrubs for wildfire rehabilitation is avoided unless necessary. This type of seeding typically shortens the natural successional development of small native grasses and forbs. When deemed necessary, seeding is done using native species where possible, non-native species that do not produce viable seeds, or where necessary for restoration desirable non-native species that have similar form and adaptations as the native species that have been lost.

Dry Grass, Cool Shrub, and Dry Shrub Potential Vegetation Groups

Through time, using a landscape approach for management of the dry grass, cool shrub, and dry shrub potential vegetation groups would improve integrity. The primary conditions that improve relate to outcomes addressing fire exclusion, overgrazing, and introduction of exotic forbs and annual grasses. Overgrazing by livestock has generally resulted in the loss of large decreaser[1] grasses and an increase of smaller grasses, forbs, and exotic forbs and annual grasses. The combined effects of fire exclusion and excessive grazing have resulted in encroachment by woody tree species on some areas, conversion to dominance by noxious weeds and other exotics on other areas, and thickening and decadence of shrubs in remaining areas.

The dominant change that occurred in the dry grass and shrub potential vegetation groups, from historical to current conditions, was the increase in exotics. In the cool shrub potential vegetation groups, there has also been a decline in the upland herb physiognomic type. The succession/disturbance regime for the dry grass biophysical template is dominated by maintenance, while the dry shrub and cool shrub potential vegetation groups are dominated by cycling. Currently, the dry grass and shrub potential vegetation groups have either a much shorter cycle due to invasion of exotic annual grasses, or a much longer cycle due to fire exclusion and excessive grazing. The cool shrub potential vegetation group generally has shifted to a longer cycle in response to fire exclusion, grazing, and invasion of exotic perennials.

A better understanding of the extent of these types and their juxtaposition at the mid- and fine-scale and landscape patterns of succession/disturbance regimes is developed over time through improved inventory, remote sensing, and ecological modeling.

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[1]A plant whose vigor and persistence decreases with grazing use.

Through time, with the use of grazing systems, exotic weed control, prescribed fire, flexible strategies on wildfire management, and noncommercial tree encroachment, the mix of physiognomic types is maintained consistent with the biophysical template. Treatments are designed to restore areas that have exotics and eroded soils with desirable native or exotic perennial herbs that can compete with exotic weeds, provide soil protection, and represent native structures.

Implementation of grazing regimes in these systems reflects the types of grazing to which dominant decreaser native herbs are adapted. Typically, grazing regimes are of short duration and low to moderate utilization.

Both the introduction and the spread of exotic and noxious weeds in these potential vegetation groups are actively avoided. Exotic and noxious weeds are typically associated with excessive grazing, roads, and other soil surface-disturbing activities. Consequently, these types of activities are adjusted or monitored to reduce the risk of introducing exotic or noxious weeds.

Seeding with exotic and native grasses, forbs, and shrubs for wildfire rehabilitation is avoided unless necessary. This type of seeding typically shortens the successional development of small native grasses and forbs. When deemed necessary, seeding is done with native species where possible, non-native species that do not produce viable seed, or where necessary for restoration of desirable non-native species that have similar form and adaptations as the native species that have been lost.

Riparian Potential Vegetation Groups

Through time, using a landscape approach for management of the riparian potential vegetation groups improves integrity. The riparian potential vegetation groups include the riparian shrub and riparian woodland, as mapped at the broad-scale; and the riparian herb, which can only be mapped at mid- and fine-scales.

The primary conditions that improve in riparian potential vegetation groups are outcomes relating to excessive grazing by livestock, invasion by exotics, fire exclusion, and flooding disturbances. The assessment documented changes in dominance of perennial exotic grasses, forbs, shrubs, and trees in all riparian types.

A better understanding of the extent of the riparian potential vegetation groups, their physiognomic types and juxtaposition at the mid- and fine-scales, and the associated landscape patterns of succession/disturbance regimes is developed over time through improved inventory, remote sensing, and ecological modeling.

Through time, with the use of improved livestock grazing practices, a watershed approach to design of roads and vegetation management, road restoration in flood plains, prescribed fire, flexible strategies on wildfire management, reintroduction of beavers, and other riparian/upland management strategies, the mix of physiognomic types trends toward the mix consistent with the biophysical template. Restoration treatments focus on areas with roads, exotics, compacted and eroded soils, and degraded stream channels, within a watershed context.

Grazing regimes implemented in these systems reflect the types of grazing to which the dominant decreaser native trees, shrubs, and herbs are adapted. Typically, the grazing regimes used are of short duration and low utilization.

Both the introduction and spread of exotic species of trees, shrubs, and herbs, and noxious weeds in the riparian potential vegetation groups are actively contained or controlled. Because exotics and noxious weeds are typically associated with excessive grazing, roads, and other soil surface-disturbing activities, these types of activities would be adjusted or monitored to reduce the risk of introducing exotic plants or noxious weeds.

Seeding with exotic or native grasses, forbs, shrubs, or trees for wildfire rehabilitation is avoided unless necessary as this type of seeding typically shortens the natural successional development of native early-seral communities. When deemed necessary, seeding is done with native species when possible, non-natives that do not produce seed, or where necessary for restoration desirable non-native species that have similar form and adaptations as the native species that have been lost.

Alpine Potential Vegetation Group

The alpine potential vegetation group has generally not been identified as having widespread dysfunctional conditions in composition, structure, or succession/disturbance regimes. Localized problems from abandoned mines, roads, and historic grazing disturbance are restored through time.

Appendix 2-B

Table 2-B.1. Prescription model characteristics for forest land Alternative 1, Eastside EIS area.

	BLM/FS Forested Areas				
	Wilderness-like	Other			
Prescription (Rx)	N6	N5	N6	N7	N8
Percent of Area	24	8	1	12	56
Hectares (1,000)	1423.8	442.2	48.9	718.6	3292.2
Harvest (area treated)	N	M	N	M	H
Thin (area treated)	N	M	N	M	H
Prescribed Fire	L	L	L	L	H
Wildfire Hazard	M	M	M	M	M
Road Reductions	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	P	P/C	P/C	P
Commodity Emphasis	N	H	N	H	H
Wildfire Suppression	H	H	H	H	H
Large Snag Conservation	H	M	H	L	N
Large Down Wood Conservation	H	M	H	L	N
Duff/Litter Cover	H	M	H	M	L
Prescription Type	T	T	T	T	T
Allocation Method	P	A	P	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = None
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.2. Prescription model characteristics for forest land Alternative 2, Eastside EIS area.

	BLM/FS Forested Areas				
	Wilderness-like	Other			
Prescription (Rx)	N6	N4	N5	N6	N7
Percent of Area	24	12	45	7	12
Hectares (1,000)	1423.8	732.6	2640	435.6	693.7
Harvest (area treated)	N	L	M	N	M
Thin (area treated)	N	L	M	N	M
Prescribed Fire	L	L	L	L	L
Wildfire Hazard	M	M	M	M	M
Road Reductions	N/A	L	L	L	M
Aquatic/Riparian Emphasis	R/P	C	P/C	C	P/C
Commodity Emphasis	N/A	M	M	N	M
Wildfire Suppression	H	H	H	H	H
Large Snag Conservation	H	M	M	H	L
Large Down Wood Conservation	H	M	M	H	L
Duff/Litter Cover	H	M	M	H	M
Prescription Type	T	T	T	T	T
Allocation Method	P	A	A	P	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.3. Prescription model characteristics for forest land Alternative 3, Eastside EIS area.

	BLM/FS Forested Areas				
	Wilderness-like	Other			
Prescription (Rx)	A1	A1	A2	A3	N2
Percent of Area	24	1	64	7	3
Hectares (1,000)	1394.3	65.8	3816.3	392.3	196.3
Harvest (area treated)	N	N	M	H	M
Thin (area treated)	N	N	H	H	M
Prescribed Fire	H	H	H	H	L
Wildfire Hazard	L	L	L	L	M
Road Reductions	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	C/R	R	R/P	C/R
Commodity Emphasis	N/A	M	M	MU	M
Wildfire Suppression	L	M	M	H	H
Large Snag Conservation	H	H	H	M	L
Large Down Wood Conservation	H	H	H	M	L
Duff/Litter Cover	H	H	H	H	M
Prescription Type	E	E	E	E	E
Allocation Method	M	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.4. Prescription model characteristics for forest land Alternative 4, Eastside EIS area.

	BLM/FS Forested Areas			
	Wilderness-like	Other		
Prescription (Rx)	A1	A1	A2	N2
Percent of Area	24	1	71	3
Hectares (1,000)	1394.3	50.7	4223.7	196.3
Harvest (area treated)	N	N	M	M
Thin (area treated)	N	N	H	M
Prescribed Fire	H	H	H	L
Wildfire Hazard	L	L	L	M
Road Reductions	N/A	N/A	L	L
Aquatic/Riparian Emphasis	C	R	R	R
Commodity Emphasis	N/A	N/A	M	M
Wildfire Suppression	L	L	M	H
Large Snag Conservation	H	H	H	L
Large Down Wood Conservation	H	H	H	L
Duff/Litter Cover	H	H	H	M
Prescription Type	E	E	E	E
Allocation Method	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.5. Prescription model characteristics for forest land Alternative 5, Eastside EIS area.

	BLM/FS Forested Areas						
	Wilderness-like		Other				
Prescription (Rx)	A1	N1	A1	A2	A3	N2	N5
Percent of Area	21	3	2	54	11	7	2
Hectares (1,000)	1244.6	179.2	97.3	3178.4	635.2	440.8	95.8
Harvest (area treated)	N	N	N	M	H	M	M
Thin (area treated)	N	N	N	H	H	M	M
Prescribed Fire	H	L	H	H	H	L	L
Wildfire Hazard	L	M	L	L	L	M	M
Road Reduction	N/A	N/A	L	L	L	L	L
Aquatic/Riparian Emphasis	C	C	R	R	P	R/P	R/P
Commodity Emphasis	N/A	N/A	L	M	M	M	M
Wildfire Suppression	L	L	H	M	H	H	H
Large Snag Conservation	H	H	H	H	M	L	M
Large Down Wood Conservation	H	H	H	H	M	L	M
Duff/Litter Cover	H	H	H	H	H	M	M
Prescription Type	E	E	E	E	E	E	E
Allocation Method	M	M	M	M	M	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.6. Prescription model characteristics for forest land Alternative 6, Eastside EIS area.

	BLM/FS Forested Areas					
	Wilderness-like		Other			
Prescription	A1	N1	A1	A2	N1	N5
Percent of Area	20	4	4	66	2	3
Hectares (1,000)	1186.1	237.7	250.5	3903.6	105.6	196.3
Harvest (area treated)	N	N	N	M	N	M
Thin (area treated)	N	N	N	H	N	M
Prescribed Fire	H	L	H	H	L	L
Wildfire Hazard	L	M	L	L	M	M
Road Reductions	N/A	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	C	R	R	R/C	R/C
Commodity Emphasis	N/A	N/A	L	M	M	M
Wildfire Suppression	L	L	L	M	H	H
Large Snag Conservation	H	H	H	H	H	M
Large Down Wood Conservation	H	H	H	H	H	M
Duff/Litter Cover	H	H	H	H	H	M
Prescription Type	E	E	E	E	E	E
Allocation Method	M	M	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = Prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.7. Prescription model characteristics for forest land Alternative 7, Eastside EIS area.

	BLM/FS Forested Areas							
	Wilderness-like		Other					
Prescription (Rx)	A1	N1	P1	A2	A3	N1	N4	P1
Percent of Area	5	4	15	30	3	5	22	14
Hectares (1,000)	308.5	218.7	896.6	1747.9	172.2	313.4	1324	836
Harvest (area treated)	N	N	N	M	H	N	L	N
Thin (area treated)	N	N	N	H	H	N	L	N
Prescribed Fire	H	L	N	H	H	L	L	N
Wildfire Hazard	L	M	H	L	L	M	M	H
Road Reductions	N/A	N/A	N/A	L	L	L	L	N/A
Aquatic/Riparian Emphasis	C	C	C	C/R	C/R	C/R	C/R	C/R
Commodity Emphasis	N/A	N/A	N/A	M	M	M	M	N/A
Wildfire Suppression	L	L	L	M	H	H	H	L
Large Snag Conservation	H	H	L	H	M	H	M	L
Large Down Wood Conservation	H	H	L	H	M	H	M	L
Duff/Litter Cover	H	H	L	H	H	H	M	L
Prescription Type	E	E	T	E	E	E	E	T
Allocation Method	M	M	P	M	M	M	A	P

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.8. Prescription model characteristics for rangeland Alternative 1, Eastside EIS area.

	BLM/FS Rangeland Areas		
	Wilderness-like	Other	
Prescription (Rx)	C1	N2	N3
Percent of Area	24	72	4
Hectares (1,000)	1376.7	4228.3	221.2
Grazing Effects	L	M	M
Upland Treatments	N	L	L
Riparian Treatments	N	L	L
Woodland Treatments	N	M	M
Prescribed Fire	L	L	L
Noxious Weed Management	L	L	L
Wildfire Hazard	M	M	H
Aquatic/Riparian Emphasis	C	P	P
Commodities	N	H	H
Wildfire Suppression	H	H	H
Prescription Types	T	T	T
Allocation Method	P	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.9. Prescription model characteristics for rangeland Alternative 2, Eastside EIS area.

	BLM/FS Rangeland Areas		
	Wilderness-like	Other	
Prescription (Rx)	N1	N1	N5
Percent of Area	24	1	74
Hectares (1,000)	1376.7	34.6	4316.2
Grazing Effects	L	L	L
Upland Treatments	L	L	L
Riparian Treatments	L	L	L
Woodland Treatments	N	N	M
Prescribed Fire	L	L	L
Noxious Weed Management	L	L	L
Wildfire Hazard	M	M	M
Aquatic/Riparian Emphasis	C	P/C	P/C
Commodities	N	L	L
Wildfire Suppression	M	M	M
Prescription Types	T	T	T
Allocation Method	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.10. Prescription model characteristics for rangeland Alternative 3, Eastside EIS area.

	BLM/FS Rangeland Areas		
	Wilderness-like	Other	
Prescription (Rx)	N1	A2	A3
Percent of Area	24	16	60
Hectares (1,000)	1376.7	915.6	3531.4
Grazing Effects	L	L	L
Upland Treatments	L	H	M
Riparian Treatments	L	H	M
Woodland Treatments	N	H	H
Prescribed Fire	L	H	M
Noxious Weed Management	L	H	M
Wildfire Hazard	M	L	L
Aquatic/Riparian Emphasis	C	C/R	R/P
Commodities	N	M	M
Wildfire Suppression	H	H	H
Prescription Type	E	E	E
Allocation Method	M	M	M

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.11. Prescription model characteristics for rangeland Alternative 4, Eastside EIS area.

	BLM/FS Rangeland Areas	
	Wilderness-like	Other
Prescription (Rx)	N1	A2
Percent of Area	24	76
Hectares (1,000)	1376.7	4465.5
Grazing Effects	L	L
Upland Treatments	L	H
Riparian Treatments	L	H
Woodland Treatments	N	H
Prescribed Fire	L	H
Noxious Weed Management	L	H
Wildfire Hazard	M	L
Aquatic/Riparian Emphasis	C	R
Commodities	N	M
Wildfire Suppression	H	H
Prescription Type	E	E
Allocation Method	M	M

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional: E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.12. Prescription model characteristics for rangeland Alternative 5, Eastside EIS area.

	BLM/FS Rangeland Areas			
	Wilderness-like	Other		
Prescription	N1	A2	A3	N2
Percent of Area	24	3	60	13
Hectares (1,000)	1376.7	194.9	3476.3	776.1
Grazing Effects	L	L	L	M
Upland Treatments	L	H	M	L
Riparian Treatments	L	H	M	L
Woodland Treatments	N	H	H	M
Prescribed Fire	L	H	M	L
Noxious Weed Management	L	H	M	L
Wildfire Hazard	M	L	L	M
Aquatic/Riparian Emphasis	C	R/P	R/P	P
Commodities	N	M	M	H
Wildfire Suppression	H	H	H	H
Prescription Type	E	E	E	E
Allocation Method	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.13. Prescription model characteristics for rangeland Alternative 6, Eastside EIS area.

	BLM/FS Rangeland Areas				
	Wilderness-like	Other			
Prescription	N1	A2	A3	N1	N4
Percent of Area	24	61	3	2	11
Hectares (1,000)	1376.7	3546.3	154.7	141.5	623.6
Grazing Effects	L	L	L	L	L
Upland Treatments	L	H	M	L	L
Riparian Treatments	L	H	M	L	L
Woodland Treatments	N	H	H	N	M
Prescribed Fire	L	H	M	L	L
Noxious Weed Management	L	H	M	L	L
Wildfire Hazard	M	L	L	M	M
Aquatic/Riparian Emphasis	C	R	C/R	C	C
Commodities	N	M	M	L	L
Wildfire Suppression	H	H	H	H	H
Prescription Type	E	E	E	E	E
Allocation Method	M	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional: E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.14. Prescription model characteristics for rangeland, Alternative 7, Eastside EIS area.

	BLM/FS Rangeland Areas						
	Wilderness-like		Other				
Prescription	N1	P1	A2	N1	N4	N5	P1
Percent of Area	14	9	43	9	11	10	3
Hectares (1,000)	829.3	547.4	2513.9	512.7	653.2	605.1	181.2
Grazing Effects	L	L	L	L	L	L	L
Upland Treatments	L	N	H	L	L	L	N
Riparian Treatments	L	N	H	L	L	L	N
Woodland Treatments	N	N	H	N	M	M	N
Prescribed Fire	L	N	H	L	L	L	N
Noxious Weed Management	L	L	H	L	L	L	L
Wildfire Hazard	M	H	L	M	M	M	H
Aquatic/Riparian Emphasis	C	C	C/R	C	C	C	C
Commodities	N	N	M	L	L	L	N
Wildfire Suppression	L	L	H	H	H	H	L
Prescription Type	E	T	E	E	E	E	T
Allocation Method	M	P	M	M	A	A	P

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.15. Prescription model characteristics for forest land Alternative 1, Upper Columbia River Basin EIS area

	BLM/FS Forested Areas				
	Wilderness-like	Other			
Prescription	N6	N4	N5	N6	N8
Percent of Area	28	22	5	4	41
Hectares (1,000)	2861.5	2258.1	551.2	374.4	4180.1
Harvest (area treated)	N	L	M	N	H
Thin (area treated)	N	L	M	N	H
Prescribed Fire	L	L	L	L	L
Wildfire Hazard	M	M	M	M	M
Road Reductions	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	P	P	C/P	P
Commodity Emphasis	N/A	M	H	L	H
Wildfire Suppression	H	H	H	H	H
Large Snag Conservation	H	M	M	H	N
Large Down Wood Conservation	H	M	M	H	N
Duff/Litter Cover	H	M	M	H	M
Prescription Type	T	T	T	T	T
Allocation Method	P	A	A	P	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.16. Prescription model characteristics for forest land Alternative 2, Upper Columbia River Basin EIS area.

	BLM/FS Forested Areas		
	Wilderness-like	Other	
Prescription (Rx)	N6	N4	N6
Percent of Area	28	49	24
Hectares (1,000)	2861.5	4960.2	2403.6
Harvest (area treated)	N	L	N
Thin (area treated)	N	L	N
Prescribed Fire	L	L	L
Wildfire Hazard	M	M	M
Road Reductions	N/A	L	L
Aquatic/Riparian Emphasis	C	P/C	C
Commodity Emphasis	N/A	M	L
Wildfire Suppression	H	H	H
Large Snag Conservation	H	M	H
Large Down Wood Conservation	H	M	H
Duff/Litter Cover	H	M	H
Prescription Type	T	T	T
Allocation Method	P	A	P

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.17. Prescription model characteristics for forest land Alternative 3, Upper Columbia River Basin EIS area.

	BLM/FS Forested Areas					
	Wilderness-like	Other				
Prescription (Rx)	A1	A1	A2	A3	N2	N5
Percent of Area	28	7	43	21	1	1
Hectares (1,000)	2811.7	702.2	4375.9	2114.1	84.7	61.9
Harvest (area treated)	N	N	M	H	M	M
Thin (area treated)	N	N	H	H	M	M
Prescribed Fire	H	H	H	H	L	L
Wildfire Hazard	L	L	L	L	M	M
Road Reductions	N/A	L	L	L	L	L
Aquatic/Riparian Emphasis	C	C/R	R	R/P	R/P	R/P
Commodity Emphasis	N/A	M	M	M	M	M
Wildfire Suppression	H	H	H	H	H	H
Large Snag Conservation	H	H	H	M	L	M
Large Down Wood Conservation	H	H	H	M	L	M
Duff/Litter Cover	H	H	H	H	M	M
Prescription Type	E	E	E	E	E	E
Allocation Method	M	M	M	M	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.18. Prescription model characteristics for forest land Alternative 4, Upper Columbia River Basin EIS area.

	BLM/FS Forested Areas				
	Wilderness-like	Other			
Prescription (Rx)	A1	A1	A2	N2	N5
Percent of Area	28	4	66	1	1
Hectares (1,000)	2811.7	449.5	6742.7	84.7	61.9
Harvest (area treated)	N	N	M	M	M
Thin (area treated)	N	N	H	M	M
Prescribed Fire	H	H	H	L	L
Wildfire Hazard	L	L	L	M	M
Road Reductions	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	C/R	R	C/R	C/R
Commodity Emphasis	N/A	L	M	M	M
Wildfire Suppression	H	H	H	H	H
Large Snag Conservation	H	H	H	L	M
Large Down Wood Conservation	H	H	H	L	M
Duff/Litter Cover	H	H	H	M	M
Treatment Type	E	E	E	E	E
Allocation Method	M	M	M	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high: N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T= traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.19. Prescription model characteristics for forest land Alternative 5, Upper Columbia River Basin EIS area.

	BLM/FS Forested Areas							
	Wilderness-like		Other					
Prescription (Rx)	A1	N1	A1	A2	A3	N1	N2	N5
Percent of Area	17	11	8	26	24	5	4	5
Hectares (1,000)	1783.4	1078.1	780.7	2692.2	2459.7	513.2	407.3	485.7
Harvest (area treated)	N	N	N	M	H	N	M	M
Thin (area treated)	N	N	N	H	H	N	M	M
Prescribed Fire	H	L	H	H	H	L	L	L
Wildfire Hazard	L	M	L	L	L	M	M	M
Road Reductions	N/A	N/A	N/A	L	L	L	L	L
Aquatic/Riparian Emphasis	C	C	C/R	C/R	R/P	R/C	R/P	R/P
Commodity Emphasis	N/A	N/A	M	M	M	M	M	M
Wildfire Suppression	H	H	H	H	H	H	H	H
Large Snag Conservation	H	H	H	H	M	H	L	M
Large Down Wood Conservation	H	H	H	H	M	H	L	M
Duff/Litter Cover	H	H	H	H	H	H	M	M
Prescription Type	E	E	E	E	E	E	E	E
Allocation Method	M	M	M	M	M	M	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.20. Prescription model characteristics for forest land Alternative 6, Upper Columbia River Basin EIS area

	BLM/FS Forested Areas					
	Wilderness-like		Other			
Prescription (Rx)	A1	N1	A1	A2	N1	N4
Percent of Area	17	11	13	49	6	3
Hectares (1,000)	1722	1139.5	1360.5	5039.4	567.5	311.7
Harvest (area treated)	N	N	N	M	N	L
Thin (area treated)	N	N	N	H	N	L
Prescribed Fire	H	L	H	H	L	L
Wildfire Hazard	L	M	L	L	M	M
Road Reductions	N/A	N/A	L	L	L	L
Aquatic/Riparian Emphasis	C	C	C/R	R	R	R
Commodity Emphasis	N/A	N/A	M	M	M	M
Wildfire Suppression	H	H	H	H	H	H
Large Snag Conservation	H	H	H	H	H	M
Large Down Wood Conservation	H	H	H	H	H	M
Duff/Litter Cover	H	H	H	H	H	M
Prescription Type	E	E	E	E	E	E
Allocation Method	M	M	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.21. Prescription model characteristics for forest land Alternative 7, Upper Columbia River Basin EIS area.

	BLM/FS Forested Areas							
	Wilderness-like		Other					
Prescription (Rx)	A1	N1	P1	A1	A2	N1	N4	P1
Percent of Area	3	4	21	4	22	16	20	9
Hectares (1,000)	317.8	354.9	2188.8	445.3	2217.4	1637.8	2080.7	891.7
Harvest (area treated)	N	N	N	N	M	N	L	N
Thin (area treated)	N	N	N	N	H	N	L	N
Prescribed Fire	H	L	N	H	H	L	L	N
Wildfire Hazard	L	M	H	L	L	M	M	H
Road Reductions	N/A	N/A	N/A	L	L	L	L	N/A
Aquatic/Riparian Emphasis	C	C	C	C/R	C/R	C/R	C/R	C/R
Commodity Emphasis	N/A	N/A	N/A	M	M	M	M	N/A
Wildfire Suppression	L	L	L	M	M	H	H	L
Large Snag Conservation	H	H	L	H	H	H	M	L
Large Down Wood Conservation	H	H	L	H	H	H	M	L
Duff/Litter Cover	H	H	L	H	H	H	M	L
Prescription Type	E	E	T	E	E	E	E	T
Allocation Method	M	M	P	M	M	M	A	P

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.22. Prescription model characteristics for rangeland Alternative 1, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas		
	Wilderness-like	Other	
Prescription (Rx)	C1	N2	N3
Percent of Area	15	75	10
Hectares (1,000)	1017.8	5081.7	646.7
Grazing Effects	L	M	M
Upland Treatments	N	L	L
Riparian Treatments	N	L	L
Woodland Treatments	N	M	M
Prescribed Fire	L	L	L
Noxious Weed Management	L	L	L
Wildfire Hazard	M	M	H
Aquatic/Riparian Emphasis	C	P	P
Commodities	N	H	H
Wildfire Suppression	H	H	H
Prescription Type	T	T	T
Allocation Method	P	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.23. Prescription model characteristics for rangeland Alternative 2, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas			
	Wilderness-like	Other		
Prescription (Rx)	N1	N1	N4	N5
Percent of Area	15	1	10	74
Hectares (1,000)	1017.8	63.2	663.9	5008.5
Grazing Effects	L	L	L	L
Upland Treatments	L	L	L	L
Riparian Treatments	L	L	L	L
Woodland Treatments	N	N	M	M
Prescribed Fire	L	L	L	L
Noxious Weed Management	L	L	L	L
Wildfire Hazard	M	M	M	M
Aquatic/Riparian Emphasis	C	P/C	P/C	P/C
Commodities	N	L	L	L
Wildfire Suppression	M	M	H	M
Prescription Type	T	T	T	T
Allocation Method	M	M	A	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.24. Prescription model characteristics for rangeland Alternative 3, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas		
	Wilderness-like	Other	
Prescription	N1	A2	A3
Percent of Area	15	55	30
Hectares (1,000)	1017.8	3683.2	2023.1
Grazing Effects	L	L	L
Upland Treatments	L	H	M
Riparian Treatments	L	H	M
Woodland Treatments	N	H	H
Prescribed Fire	L	H	M
Noxious Weed Management	L	H	M
Wildfire Hazard	M	L	L
Aquatic/Riparian Emphasis	C	C/R	R/P
Commodities	N	M	M
Wildfire Suppression	H	H	H
Prescription Type	E	E	E
Allocation Method	M	M	M

Hectare = 2.47 acres
L = low; M = moderate; H = high: N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.25. Prescription model characteristics for rangeland Alternative 4, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas	
	Wilderness-like	Other
Prescription (Rx)	N1	A2
Percent of Area	15	85
Hectares (1,000)	1017.8	5713.1
Grazing Effects	L	L
Upland Treatments	L	H
Riparian Treatments	L	H
Woodland Treatments	N	H
Prescribed Fire	L	H
Noxious Weed Management	L	H
Wildfire Hazard	M	L
Aquatic/Riparian Emphasis	C	R
Commodities	N	M
Wildfire Suppression	H	H
Prescription Type	E	E
Allocation Method	M	M

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.26. Prescription model characteristics for rangeland Alternative 5, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas			
	Wilderness-like	Other		
Prescription (Rx)	N1	A2	A3	N2
Percent of Area	15	4	30	51
Hectares (1,000)	1017.8	298.8	2018.8	3410.8
Grazing Effects	L	L	L	M
Upland Treatments	L	H	M	L
Riparian Treatments	L	H	M	L
Woodland Treatments	N	H	H	M
Prescribed Fire	L	H	M	L
Noxious Weed Management	L	H	M	L
Wildfire Hazard	M	L	L	M
Aquatic/Riparian Emphasis	C	R/P	R/P	P
Commodities	N	M	M	H
Wildfire Suppression	H	H	H	H
Prescription Type	E	E	E	E
Allocation Method	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.27. Prescription model characteristics for rangeland Alternative 6, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas				
	Wilderness-like	Other			
Prescription (Rx)	N1	A2	A3	N1	N4
Prescription of Area	15	30	5	13	37
Hectares (1,000)	1017.8	2045.2	320.4	903	2467
Grazing Effects	L	L	L	L	L
Upland Treatments	L	H	M	L	L
Riparian Treatments	L	H	M	L	L
Woodland Treatments	N	H	H	N	M
Prescribed Fire	L	H	M	L	L
Noxious Weed Management	L	H	M	L	L
Wildfire Hazard	M	L	L	M	M
Aquatic/Riparian Emphasis	C	R	C/R	C	C
Commodities	N	M	M	L	L
Wildfire Suppression	H	H	H	H	H
Prescription Type	E	E	E	E	E
Allocation Method	M	M	M	M	A

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Table 2-B.28. Prescription model characteristics for rangeland Alternative 7, Upper Columbia River Basin EIS area.

	BLM/FS Rangeland Areas						
	Wilderness-like		Other				
Prescription (Rx)	N1	P1	A2	N1	N4	N5	P1
Percent of Area	5	11	15	34	10	17	8
Hectares (1,000)	304.3	713.5	1015	2313.9	680.7	1170.8	553.5
Grazing Effects	L	L	L	L	L	L	L
Upland Treatments	L	N	H	L	L	L	N
Riparian Treatments	L	N	H	L	L	L	N
Woodland Treatments	N	N	H	N	M	M	N
Prescribed Fire	L	N	H	L	L	L	N
Noxious Weed Management	L	L	H	L	L	L	L
Wildfire Hazard	M	H	L	M	M	M	H
Aquatic/Riparian Emphasis	C	C	C/R	C	C	C	C
Commodities	N	N	M	L	L	L	N
Wildfire Suppression	L	L	H	H	H	H	L
Prescription Type	E	T	E	E	E	E	E
Allocation Method	M	P	M	M	A	A	P

Hectare = 2.47 acres
L = low; M = moderate; H = high; N = none
Emphasis: C = conserve; R = restore; P = produce
Prescription: T = traditional; E = ecological
Allocation: P = prescription; A = area; M = multi-scale
N/A = not applicable

Appendix 2-C

Management Emphasis[1] Categories

A. Ecosystem Management Emphasis Categories

Conservation (C) — "planned management to prevent exploitation, destruction, or neglect."

A conservation emphasis assumes that the area of assessment has a dominant landscape component that is functioning relatively well as a native or naturalized system and is producing associated human needs and values within the capabilities of the system. These landscapes generally have moderate to high ecological integrity and socioeconomic resiliency. Integrity is based on the wholeness of elements and relationships of the primary ecological systems (geologic, geomorphic, climatic, hydrologic, carbon-nutrient, food web, evolutionary, and toxins). There may be inclusions (less than 20% of the area) with other emphases.

*The geologic, geomorphic, pedogenic, climatic, hydrologic, and carbon-nutrient systems are functioning similar to the native (HRV) system, and are shifting in a resilient manner to current and potential future climate change and geologic events. Resilient change in response to climate change or geologic events would mean shifts in land forms (geomorphic), soil development (pedogenic), water flow or transpiration (hydrologic), and vegetation types (carbon-nutrient) that are in sync with the changes in climate and the geologic events (for example, erosion rates would not be excessive or forest soils would not be developing on grassland soils as climates changed to warmer conditions).

*Terrestrial and aquatic systems (species and habitats) have a relatively complete array of native diversity. This does not mean that the composition is equivalent to native (HRV). However, the opportunity to manage for systems somewhat similar to native (HRV) should be available.

A conservation emphasis assumes that relatively low management activity energy is needed for active restoration of terrestrial, aquatic, hydrologic, carbon-nutrient and pedogenic systems because their current and future trends are relatively stable in response to disturbance and human effects.

A conservation emphasis assumes that human values and needs will flow from management systems that are designed to simulate the changes and disturbances that would occur within or relatively close to native (HRV) patterns.

A conservation emphasis assumes that a coarse-filter strategy of managing landscape patterns of succession/disturbance regimes similar to HRV will conserve and recover most native species diversity. Stronghold or relic populations of threatened, endangered, candidate, or sensitive species may need short-term protection from disturbance of habitat that would occur in an HRV regime in order to expand the population to adjacent habitats.

[1]The strategy of conserve, restore and produce as a basis for ecosystem management was developed by Jeff Blackwood and other Project staff, based on the concepts in "Forest Service Ethics and Course to the Future" by Jack Ward Thomas, and coordinated with BLM leadership.

Restoration (R) — "to bring back to a former or original condition, pattern, or process."

A restoration emphasis assumes that the area of assessment has a dominant landscape component that is not functioning well as a native, naturalized, or non-native system and/or in the production of human needs and values within the capability of the system. Ecological integrity is usually low and socioeconomic resiliency is low or at risk. There may be inclusions (less than 20% of the area) of other emphases.

*The geologic, geomorphic, pedogenic, climatic, hydrologic, and carbon-nutrient systems are not functioning similar to the native (HRV) system, and are not resilient to current and potential future disturbance, climate change and geologic events.

*Terrestrial and aquatic systems (species and habitats) are not functioning like native systems. Generally the composition and structure will be well outside of native (HRV). There may be permanent alteration to biophysical potentials.

A restoration emphasis assumes that moderate management activity energy is needed for active restoration of terrestrial, aquatic, hydrologic, carbon-nutrient, and/or pedogenic systems because their current and future trends are unstable in response to disturbance and human effects. Productivity may be at risk as well as increased risk of erratic disturbance events.

A restoration emphasis assumes that human values and needs will not flow from managed systems unless there is active restoration to shift composition, structure, and disturbance to a system that would be more consistent with native (HRV) patterns. It is likely that altered biophysical systems cannot be managed for consistency with native (HRV) patterns because cause-and effect responses have changed. These systems will require a different type of management to provide for resiliency and predictable response to disturbance, while conserving productivity and native diversity. Some processes and functions may be similar to native (HRV), while others may be different in order to account for the altered causes and effects.

A restoration emphasis assumes that a coarse-filter strategy of managing landscape patterns of succession/disturbance regimes similar to native (HRV) will not conserve and recover native species diversity. Active restoration of "lost" functions and species may recover the landscapes to a functioning condition that can then be managed with a conservation or production strategy. Stronghold or relic populations of threatened, endangered, candidate, or sensitive species will need protection from disturbance of habitat that would occur in or outside the native (HRV) regime in order to expand the population to adjacent habitats.

Production (P) — "output of a commodity, value, or need."

A production emphasis assumes that the area of assessment has a dominant landscape component that is functioning relatively well as a native, naturalized or non-native system in association with production of human needs, commodities, and values. Ecological integrity is usually moderate to high, as is socioeconomic resiliency. In some cases ecological integrity may be low and substantial mitigation is needed in order maintain biophysical potentials and avoid catastrophic disturbance. There may be inclusions (less than 20% of the area) of other emphases.

*The geologic, geomorphic, pedogenic, climatic, hydrologic, and carbon-nutrient systems may or may not be functioning similar to the native (HRV) system. However these systems are shifting in a resilient manner to current and potential future climate change and geologic events.

Resilient change in response to climate change or geologic events would mean shifts in land forms (geomorphic), soil development (pedogenic), water flow or transpiration (hydrologic), and vegetation types (carbon-nutrient) that are in sync with the changes in climate and the geologic events (for example, erosion rates would not be excessive or forest soils would not be developing on grassland soils as climates changed to warmer conditions) such that they would not affect the capacity to produce human commodities, values, and needs.

*Terrestrial and aquatic systems (species and habitats) may or may not function like native systems. Generally the composition and structure will be well outside of HRV and there may be permanent alteration to biophysical potentials. However the departure from native (HRV) and alteration of biophysical potentials does not affect the capacity to sustain human commodities, values, and needs. The risks to productivity, current native diversity, and human values and needs caused by departure from native (HRV) system processes are relatively low in these systems, or high risks can be mitigated with increased management activity.

A production emphasis assumes that relatively high management activity is needed for active production of human commodities, values, and needs, while conserving the productive capacity and current native diversity of the terrestrial, aquatic, hydrologic, carbon-nutrient, and/or pedogenic systems.

A production emphasis assumes that human commodities, values, and needs, will flow from management systems with mitigation to conserve current native composition, structure, and disturbance. The systems may not be consistent with native (HRV) patterns but they are managed consistently with biophysical potentials, not against internal system disturbance trends. This will enhance the ability of the system to achieve multiple emphases of production, conservation, and restoration. It is likely that altered biophysical systems cannot be managed for consistency with native (HRV) because cause-and-effect responses have changed. These systems will require a different type of management to conserve productivity and provide for resiliency and predictable response to disturbance. Active mitigation will be needed to conserve current native diversity. Some processes and functions may be similar to native (HRV), while others may be different in order to account for altered causes and effects. Some systems may need to be artificially supported to maintain or enhance production emphasis.

A production emphasis assumes that a coarse-filter strategy of managing landscape patterns of succession/disturbance regimes similar to native (HRV) or with mitigation will conserve the current native species diversity. Active restoration of "lost" functions and species may occur in association with some production activities to recover landscapes to a more native functioning condition that will more efficiently achieve production objectives. Stronghold or relic populations of threatened, endangered, candidate, or sensitive species will need protection from disturbance of habitat or migration corridors that would occur in order to expand the population to adjacent habitats.

Restoration/Conservation (RC) — dominant component of the area is a landscape strategy for restoration and conversion to conservation. The objective is to rapidly restore the area because of its adjacency to an area with a conservation strategy, that has an objective for expansion.

Restoration/Production (RP) — dominant component of the area is in a landscape strategy for restoration, while producing at reduced levels. This strategy is designed to restore the area in order to achieve a long-term strategy of sustainable production.

Conservation/Production (CP) — dominant component of the area is a landscape strategy for conservation, but with considerable opportunities for production of human commodities and values while maintaining ecological processes. This strategy is designed to conserve the area while producing sustainable commodities and values.

Mixed (MM) — the various conservation, restoration, and production strategies are mixed within the assessment area to achieve proper functioning systems with multiple ecosystem management objectives for conservation, restoration, and production. This strategy is common for larger landscapes, subregions, and regions.

B. Traditional Management Emphasis Categories

Traditional Commodity (TC) — "output of a commodity, value, or need."

A traditional commodity emphasis assumes that the area of assessment has a dominant landscape component that is managed for traditional production of human needs, commodities, and values. Emphasis is on the multiple, but relatively independent management of various resources (fire protection, timber, forage, recreation, wildlife, fisheries, and water) for sustained yield of the resource.

*The geologic, geomorphic, pedogenic, climatic, hydrologic, and carbon-nutrient systems are typically not functioning similar to the native (HRV) system. These systems are typically not responding in a resilient manner to current and potential future climate change and geologic events.

*Terrestrial and aquatic systems (species and habitats) generally are not functioning as native systems. Generally the composition and structure will be well outside of HRV and there may be high risk or actual permanent alteration to biophysical potentials. The departure from HRV and alteration of biophysical potentials often result in reduced production or risk to production of human commodities, values, and needs. Attempts to mitigate for loss of system capabilities, reduced native diversity, and increasing risk of species extinctions typically are unsuccessful or require very high investments of management activities.

A traditional commodity emphasis assumes that relatively high management activity energy is needed for active production of human commodities, values, and needs with substantial emphasis on protection to conserve current native diversity of the terrestrial, aquatic, hydrologic, carbon-nutrient, and/or pedogenic systems. Energy invested in commodities and protection of systems is often precluded by disturbance events.

A traditional commodity emphasis assumes that human commodities, values and needs will flow from management systems that are often in conflict with ecological relationships and landscape limitations. Mitigation is typically used to conserve current native composition, structure, and disturbance, but these efforts are often unsuccessful because of conflicts with ecological relationships and landscape limitations. Most systems will need to be artificially supported to maintain commodity production, but the long-term outcome is typically a loss of commodity production capability.

A traditional commodity production emphasis assumes that a single species approach for recovery of threatened, endangered, candidate, or sensitive species is used to conserve current native species diversity. Stronghold or relic populations of threatened, endangered, candidate, or sensitive species may be protected from human disturbance of habitats. However, these habitats may be at high risk to system disturbances as well as in conflict with other species habitats.

Traditional Reserve (TR) — "protection of current native habitats, aesthetic values, and roadless recreation values."

A traditional reserve emphasis assumes that the area of assessment has a dominant landscape component that is managed for protection of current native habitats, aesthetic values, and roadless recreation values. Emphasis is on multiple, but relatively independent management of various resources (fire protection, forage, roadless recreation, wilderness, wildlife, fisheries, and water) for sustained yield of the resource.

*The geologic, geomorphic, pedogenic, climatic, hydrologic, and carbon-nutrient systems are typically not functioning similar to the native (HRV) system. These systems are typically not shifting in a resilient manner to current and potential future climate change and geologic events.

*Terrestrial and aquatic systems (species and habitats) may be functioning to some extent as native systems. Generally the composition and structure will be well outside of HRV and there may be low to moderate risk of permanent alteration to biophysical potentials. The departure from HRV often results in moderate risk of severe disturbance and potential loss of aesthetic values, native diversity, and biophysical potential. Attempts to mitigate for loss of system capabilities, reduced native diversity, and increasing risk of species extinctions typically are unsuccessful because of the high cost of investments and lack of funds for this type of land use management.

A traditional reserve emphasis assumes that low management activity energy is needed for management of human values and needs. However, substantial emphasis is required for protection to control disturbance and conserve current native diversity of the terrestrial and aquatic systems.

A traditional reserve emphasis assumes that human values and needs will flow from management systems that are in conflict with ecological relationships and landscape limitations. Mitigation is typically used to conserve current native composition, structure, and disturbance, but these efforts are often unsuccessful because of conflicts with disturbance relationships and landscape limitations. Most systems will need to be artificially managed to control disturbance and provide protection to current conditions. The long-term outcome is typically a loss of native diversity and system capability.

A traditional reserve emphasis assumes that the protection of areas from disturbance and roads will protect native species and habitats. A single species approach for recovery of threatened, endangered, candidate, or sensitive species is used to conserve current native species diversity. Stronghold or relic populations of threatened, endangered, candidate, or sensitive species may be protected from human disturbance of habitats. However, these habitats may be at high risk to system disturbances as well as in conflict with other species habitats.

Traditional Mixed (TM) — mixed traditional commodity production is a mosaic with protection of current native habitats, aesthetic values, and roadless recreation values, where none of the types of management predominate in the area.

Appendix 2-D. Total hectares disturbed during the first decade.

Management Area	Management Class	Alternatives 1	2	3	4	5	6	7
Forest - Harvest								
EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
EEIS	BLM/FS Other	615700	357700	424200	419200	438100	400900	295800
UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UCRB	BLM/FS Other	572300	250400	390000	324000	392500	265400	204000
Forest - Thinning								
EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
EEIS	BLM/FS Other	158600	77200	117600	116600	114200	112000	66500
UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UCRB	BLM/FS Other	264600	91200	159300	162600	162300	145000	103900
Forest - Prescribed Fire								
EEIS	BLM/FS Natural Processes	24700	24700	163700	163700	156600	153200	76600
EEIS	BLM/FS Other	95900	70200	718900	719900	677200	712600	419300
UCRB	BLM/FS Natural Processes	77600	77600	377200	377200	283900	279900	44700
UCRB	BLM/FS Other	77600	117200	805200	809200	692900	736800	378000
Forest -Wildfire								
EEIS	BLM/FS Natural Processes	101300	101300	71200	71200	75100	77600	147500
EEIS	BLM/FS Other	361600	380700	259700	261300	269000	267300	410100
UCRB	BLM/FS Natural Processes	194600	194600	142400	142400	156000	156000	352500
UCRB	BLM/FS Other	404700	433300	294300	292600	318100	315200	436500
Range - Exotics								
EEIS	BLM/FS Natural Processes	4800	2000	2000	2000	2000	2000	2100
EEIS	BLM/FS Other	31700	147600	14900	17100	18500	13400	27500
UCRB	BLM/FS Natural Processes	3000	2900	2900	2900	2900	2900	1700
UCRB	BLM/FS Other	85500	109800	43200	45900	65000	23700	32200
Range - Prescribed Fire								
EEIS	BLM/FS Natural Processes	0	9000	9000	9000	9000	9000	7500
EEIS	BLM/FS Other	51400	45900	336000	384400	330900	375100	320600
UCRB	BLM/FS Natural Processes	0	4900	4900	4900	4900	4900	400
UCRB	BLM/FS Other	27400	23500	112500	122200	48400	60500	57700
Range - Range Improvement								
EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
EEIS	BLM/FS Other	20600	20700	83600	148000	53300	115200	86300
UCRB	BLM/FS Natural Processes	0	100	100	100	100	100	0
UCRB	BLM/FS Other	11800	11200	139200	213200	55000	129600	65000

Appendix 2-D (continued).

Management Area	Management Class	Alternatives 1	2	3	4	5	6	7
Range - Grazing Effects								
EEIS	BLM/FS Natural Processes	297100	298300	298300	298300	298300	298300	214700
EEIS	BLM/FS Other	3800500	2573100	3711000	4238000	3726600	3986500	3102000
UCRB	BLM/FS Natural Processes	47800	49000	49000	49000	49000	49000	42600
UCRB	BLM/FS Other	2231300	1504200	2448800	2613700	2242600	1608500	1148000
Range - Wildfire								
EEIS	BLM/FS Natural Processes	101300	101300	71200	71200	75100	77600	147500
EEIS	BLM/FS Other	361600	380700	259700	261300	269000	267300	410100
UCRB	BLM/FS Natural Processes	194600	194600	142400	142400	156000	156000	352500
UCRB	BLM/FS Other	404700	433300	294300	292600	318100	315200	436500

Appendix 2-E. Total hectares per decade disturbed during the long term (50 to 100 years).

Management Area	Management Class	Alternatives 1	2	3	4	5	6	7
Forest - Harvest								
EEIS	BLM/FS Natural Processes	0	0	20	0	0	0	0
EEIS	BLM/FS Other	551770	325260	399400	391840	400830	374980	266710
EEIS	Other Lands	612280	660970	612280	612280	612280	612280	629230
UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UCRB	BLM/FS Other	527780	230880	374770	341930	368860	281600	205110
UCRB	Other Lands	418970	434950	418970	418970	418970	418970	420500
Forest - Thinning								
EEIS	BLM/FS Natural Processes	0	0	20	0	0	0	0
EEIS	BLM/FS Other	229270	111550	141390	142710	138680	135560	81020
EEIS	Other Lands	296970	304390	296970	296970	296970	296970	300440
UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UCRB	BLM/FS Other	285830	93930	137710	138510	151230	123280	92440
UCRB	Other Lands	223980	224970	223980	223980	223980	223980	221090
Forest - Prescribed Fire								
EEIS	BLM/FS Natural Processes	26980	26980	161620	161620	155130	151360	71450
EEIS	BLM/FS Other	116350	97980	770950	772280	731480	763140	450670
EEIS	Other Lands	760	157370	760	760	760	760	37490
UCRB	BLM/FS Natural Processes	81800	81800	361030	361030	278820	273880	41660
UCRB	BLM/FS Other	87460	117180	830690	831530	704150	751870	370450
UCRB	Other Lands	2300	64620	2300	2300	2300	2300	10560
Forest - Wildfire								
EEIS	BLM/FS Natural Processes	109180	109180	73010	73030	76270	77540	153170
EEIS	BLM/FS Other	357860	377060	234700	235460	243670	243640	399720
EEIS	Other Lands	495590	486280	495590	495590	495590	495590	491840
UCRB	BLM/FS Natural Processes	214210	214210	143460	143460	165200	166680	378270
UCRB	BLM/FS Other	427770	472640	301660	304430	333060	337730	481020
UCRB	Other Lands	339870	334540	339870	339870	339870	339870	336530
Range - Exotics								
EEIS	BLM/FS Natural Processes	7410	4720	4720	4720	4720	4720	4340
EEIS	BLM/FS Other	43770	122430	17720	23080	21680	20180	29150
EEIS	Other Lands	285590	285590	285590	285590	285590	253460	245130
UCRB	BLM/FS Natural Processes	3200	3390	3390	3390	3390	3390	2790
UCRB	BLM/FS Other	80910	95410	50040	55660	62250	32360	36700
UCRB	Other Lands	125020	125020	125020	125020	125020	108570	104400

Appendix 2-E (continued).

Management Area	Management Class	Alternatives 1	2	3	4	5	6	7
Range - Prescribed Fire								
EEIS	BLM/FS Natural Processes	30	3240	3240	3240	3240	3240	2770
EEIS	BLM/FS Other	35660	31300	166580	171690	164040	166760	140940
EEIS	Other Lands	202300	202300	202300	202300	202300	197690	181700
UCRB	BLM/FS Natural Processes	0	1090	1090	1090	1090	1090	160
UCRB	BLM/FS Other	23550	20530	63190	64420	34740	36910	29300
UCRB	Other Lands	159300	159300	159300	159300	159300	161260	133080
Range - Range Improvement								
EEIS	BLM/FS Natural Processes	0	10	10	10	10	10	10
EEIS	BLM/FS Other	35050	38080	57870	75310	46980	63780	49710
EEIS	Other Lands	210100	210100	210100	210100	210100	200830	174870
UCRB	BLM/FS Natural Processes	0	10	10	10	10	10	0
UCRB	BLM/FS Other	16640	16730	73460	85780	36200	45680	24430
UCRB	Other Lands	75850	75850	75850	75850	75850	74520	63860
Range - Grazing Effects								
EEIS	BLM/FS Natural Processes	695820	655320	655320	655320	655320	655320	538730
EEIS	BLM/FS Other	3624220	2439530	3397550	3722150	3470740	3552690	2826810
EEIS	Other Lands	3459780	3459780	3459780	3459780	3459780	3814390	3410300
UCRB	BLM/FS Natural Processes	79210	71200	71200	71200	71200	71200	48890
UCRB	BLM/FS Other	2341200	1479500	2421140	2617720	2367560	1753630	1304000
UCRB	Other Lands	2068230	2068230	2068230	2068230	2068230	2028660	1943080
Range - Wildfire								
EEIS	BLM/FS Natural Processes	99650	115280	115280	115280	115280	115280	181930
EEIS	BLM/FS Other	521100	759440	308240	300880	340850	323420	413880
EEIS	Other Lands	713480	713480	713480	713480	713480	668900	732930
UCRB	BLM/FS Natural Processes	77130	84540	84540	84540	84540	84540	156520
UCRB	BLM/FS Other	699260	772380	389500	386750	522580	477550	683140
UCRB	Other Lands	360740	360740	360740	360740	360740	334440	360380

Appendix 2-F. Total hectares disturbed for the first decade by ERU.

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
Forest - Harvest									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	EEIS	BLM/FS Other	153,600	86,300	118,800	118,800	119,200	114,100	86,400
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	2,400	600	2,100	2,300	2,000	1,700	100
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Other	0	100	100	100	100	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	199,400	59,700	137,800	142,200	112,200	105,900	53,500
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	EEIS	BLM/FS Other	50,100	27,300	33,400	33,400	34,600	30,900	23,200
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	UCRB	BLM/FS Other	9,400	2,800	4,300	4,300	4,500	4,000	4,700
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	144,000	61,100	98,600	61,800	104,500	57,400	52,100
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Other	53,700	15,700	36,200	35,400	32,400	31,300	700
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	65,100	45,600	30,500	27,100	43,700	23,600	25,300
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	166,400	107,600	106,700	72,200	130,400	65,900	65,200
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	65,700	43,400	35,500	35,500	35,500	34,800	39,800
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	EEIS	BLM/FS Other	900	1,200	900	900	900	1,000	1,100
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	UCRB	BLM/FS Other	1,600	300	1,300	1,300	1,300	900	1,000
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
SNAKE HEADWATERS	UCRB	BLM/FS Other	5,100	700	2,600	3,300	3,000	2,400	1,700
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
SOUTHERN CASCADES	EEIS	BLM/FS Other	83,800	57,100	53,600	52,800	56,500	51,500	19,300
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	42,600	17,200	36,100	36,100	34,000	26,500	25,200

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER KLAMATH	EEIS	BLM/FS Other	142,800	81,000	115,200	115,200	115,200	113,700	100,000
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER SNAKE	UCRB	BLM/FS Other	1,400	400	500	500	600	700	500
Forest - Thinning									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	EEIS	BLM/FS Other	64,200	31,000	41,000	41,100	41,200	40,200	29,600
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	1,700	200	500	500	500	300	0
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Other	0	0	100	100	100	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	76,200	20,500	59,500	62,800	52,400	49,700	23,400
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	EEIS	BLM/FS Other	14,700	5,800	10,100	10,400	9,400	10,000	7,300
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	UCRB	BLM/FS Other	6,700	1,200	3,000	3,000	2,800	3,200	3,100
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	89,900	30,000	56,600	56,900	59,300	55,600	40,200
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Other	19,200	4,200	19,500	19,300	18,400	18,000	1,100
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	15,700	8,200	14,900	13,300	14,600	12,300	8,800
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	50,500	25,100	22,200	21,800	30,000	21,300	20,200
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	11,000	5,400	9,400	9,400	9,400	9,200	7,500
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	EEIS	BLM/FS Other	100	100	100	100	100	300	600
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	UCRB	BLM/FS Other	1,900	400	700	700	700	800	1,600
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
SNAKE HEADWATERS	UCRB	BLM/FS Other	6,100	1,100	1,700	1,800	1,800	1,200	1,600
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
SOUTHERN CASCADES	EEIS	BLM/FS Other	15,400	12,000	11,300	11,700	9,800	10,800	2,300
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	30,900	12,700	14,900	14,900	14,600	12,700	13,700
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER KLAMATH	EEIS	BLM/FS Other	18,300	10,500	11,200	11,200	11,200	11,200	9,300
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER SNAKE	UCRB	BLM/FS Other	700	0	200	200	200	200	100
Forest - Prescribed Fire									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	8,700	8,700	60,200	60,200	60,200	58,100	21,000
BLUE MOUNTAINS	EEIS	BLM/FS Other	12,300	9,500	151,400	150,900	150,200	151,000	78,300
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	100	100	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	0	0	2,300	2,000	1,900	1,700	200
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	300	300	1,300	1,300	1,300	1,300	1,300
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Other	0	0	0	0	0	100	100
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	44,100	44,100	272,900	272,900	215,500	211,800	17,200
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	42,500	63,300	394,400	395,100	365,500	349,800	122,100
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	400	400	1,200	1,200	1,200	500	500
COLUMBIA PLATEAU	EEIS	BLM/FS Other	7,000	6,200	37,500	37,300	37,400	35,600	30,500
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	0	100	100	100	100	100
COLUMBIA PLATEAU	UCRB	BLM/FS Other	900	400	3,500	3,500	3,600	4,000	5,500
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	4,600	4,600	16,900	16,900	16,900	16,900	7,700
LOWER CLARK FORK	UCRB	BLM/FS Other	11,300	15,600	138,400	136,100	114,800	136,900	80,100
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	8,800	8,800	26,100	26,100	19,000	19,000	1,900
NORTHERN CASCADES	EEIS	BLM/FS Other	4,500	7,000	47,200	47,100	38,900	41,700	2,700
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Natural Processes	1,600	1,600	6,200	6,200	6,200	5,600	5,600
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	2,700	5,300	48,400	47,200	36,200	45,500	27,400
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	21,200	21,200	65,600	65,600	29,700	29,700	9,100
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	15,900	21,200	171,000	175,700	111,600	157,000	118,300
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	600	600	20,000	20,000	20,000	20,000	19,800
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	12,400	9,000	84,000	84,000	84,000	84,700	78,300
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	EEIS	BLM/FS Other	0	0	100	100	100	200	200
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
OWYHEE UPLANDS	UCRB	BLM/FS Other	100	100	200	200	200	300	300

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	400	400	400	100	100
SNAKE HEADWATERS	UCRB	BLM/FS Other	4,100	3,400	19,500	20,700	20,100	15,100	4,600
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	2,100	2,100	9,100	9,100	9,100	9,100	0
SOUTHERN CASCADES	EEIS	BLM/FS Other	11,500	8,300	78,200	81,200	58,300	81,800	4,000
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	7,600	7,600	21,300	21,300	21,300	21,300	10,500
UPPER CLARK FORK	UCRB	BLM/FS Other	2,700	13,100	75,500	75,500	74,900	71,800	45,500
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	2,200	2,200	39,600	39,600	39,600	39,600	26,500
UPPER KLAMATH	EEIS	BLM/FS Other	45,500	24,900	272,100	272,100	272,100	272,000	197,800
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER SNAKE	UCRB	BLM/FS Other	100	100	400	400	300	200	1,400
Forest - Wildfire									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	33,200	33,200	26,200	26,200	26,200	27,500	65,700
BLUE MOUNTAINS	EEIS	BLM/FS Other	112,100	109,600	83,200	83,100	83,300	83,200	112,600
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	200	200	100	100	100	100	300
BLUE MOUNTAINS	UCRB	BLM/FS Other	3,300	2,300	2,200	2,100	2,200	2,100	6,400
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	500	500	200	200	200	200	200
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Other	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	137,600	137,600	99,100	99,100	108,900	108,700	279,400
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	208,200	230,200	151,100	149,900	163,700	164,900	245,000
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	1,500	1,500	1,300	1,300	1,300	1,300	1,300
COLUMBIA PLATEAU	EEIS	BLM/FS Other	25,900	26,500	19,400	19,400	18,600	19,300	22,300
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	500	500	600	600	600	600	600
COLUMBIA PLATEAU	UCRB	BLM/FS Other	3,800	3,500	2,900	2,900	3,100	3,200	2,800
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	8,500	8,500	6,000	6,000	6,000	6,000	8,400
LOWER CLARK FORK	UCRB	BLM/FS Other	58,100	59,800	40,600	38,100	44,200	38,100	50,200
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	33,400	33,400	20,500	20,500	24,400	24,400	41,900
NORTHERN CASCADES	EEIS	BLM/FS Other	58,300	59,900	39,900	41,600	44,600	44,600	108,000
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Natural Processes	3,800	3,800	3,100	3,100	3,100	4,300	4,300
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	25,400	32,700	18,900	19,200	20,500	20,700	24,800
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	29,200	29,200	22,000	22,000	25,800	25,800	39,600
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	65,200	64,600	47,500	50,100	54,600	54,800	62,700
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	4,400	4,400	2,700	2,700	2,700	2,700	3,000
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	28,900	27,800	24,900	24,900	24,900	24,300	22,500
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	700

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	1,400	1,700	1,500	1,500	1,500	2,000	1,300
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	3,500	3,500	1,700	1,700	1,700	1,800	8,000
OWYHEE UPLANDS	UCRB	BLM/FS Other	3,000	4,000	2,500	2,500	2,600	2,900	3,400
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	500	500	300	300	300	400	400
SNAKE HEADWATERS	UCRB	BLM/FS Other	9,600	10,800	7,400	6,900	6,700	7,100	10,700
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	11,900	11,900	8,600	8,600	8,600	8,600	16,700
SOUTHERN CASCADES	EEIS	BLM/FS Other	41,400	47,900	28,600	28,300	32,300	29,300	65,500
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	14,600	14,600	12,500	12,500	12,500	12,500	15,700
UPPER CLARK FORK	UCRB	BLM/FS Other	52,000	57,200	38,000	38,000	39,000	40,800	54,000
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	12,600	12,600	8,600	8,600	8,600	8,600	13,700
UPPER KLAMATH	EEIS	BLM/FS Other	68,200	74,600	43,300	43,300	43,300	43,900	53,100
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	0	100	100	100	100	100
UPPER SNAKE	UCRB	BLM/FS Other	1,500	900	2,100	2,100	2,000	1,300	1,300
Range - Exotics									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	500	400	400	400	400	400	200
BLUE MOUNTAINS	EEIS	BLM/FS Other	4,300	5,000	2,600	2,800	2,800	2,700	2,900
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	100	0	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	1,200	200	900	1,300	1,100	700	300
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	500	900	900	900	900	900	400
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	20,500	3,700	10,900	10,800	18,000	7,600	6,100
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	400	100	100	100	100	100	100
COLUMBIA PLATEAU	EEIS	BLM/FS Other	4,300	10,900	2,100	2,200	2,100	2,100	3,100
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	100	100	100	100	100	100
COLUMBIA PLATEAU	UCRB	BLM/FS Other	800	100	100	400	400	400	400
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	100	0	0	0	0	0	300
NORTHERN CASCADES	EEIS	BLM/FS Other	600	100	900	900	400	200	0
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	100	100	100	100	100	100	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	0	0	100	100	100	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	2,000	1,000	1,000	1,000	1,000	1,000	1,000
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	8,400	87,700	3,100	3,500	5,100	1,900	11,100
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	1,700	500	500	500	500	500	500

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	12,300	43,600	5,600	7,400	7,500	6,100	10,300
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	2,300	1,900	1,900	1,900	1,900	1,900	1,200
OWYHEE UPLANDS	UCRB	BLM/FS Other	52,200	67,200	27,400	29,500	40,600	11,200	16,000
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
SNAKE HEADWATERS	UCRB	BLM/FS Other	500	100	600	400	600	200	200
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
SOUTHERN CASCADES	EEIS	BLM/FS Other	600	100	100	100	100	300	100
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	700	100	200	200	200	400	100
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	100	0	0	0	0	0	0
UPPER KLAMATH	EEIS	BLM/FS Other	1,100	100	400	100	400	0	0
UPPER SNAKE	UCRB	BLM/FS Natural Processes	100	0	0	0	0	0	0
UPPER SNAKE	UCRB	BLM/FS Other	9,600	38,400	3,000	3,200	4,000	3,200	9,100
Range - Prescribed Fire			100	0	0	0	0	0	0
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	0	100	100	100	100	100	100
BLUE MOUNTAINS	EEIS	BLM/FS Other	2,200	1,800	16,200	16,800	16,100	16,200	13,700
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	100	0	100	100	100	300	0
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	0	400	400	400	400	400	400
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	2,900	2,300	23,700	24,700	2,100	6,400	4,600
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	0	5,700	5,700	5,700	5,700	5,700	5,700
COLUMBIA PLATEAU	EEIS	BLM/FS Other	33,600	33,900	244,600	284,900	242,600	284,700	262,300
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	UCRB	BLM/FS Other	0	0	300	300	300	0	0
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Other	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	100	0	0	0	0	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	0	1,600	1,600	1,600	1,600	1,600	1,500
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	5,600	4,200	30,700	34,600	27,800	31,200	22,900
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	600	400	3,000	4,000	2,900	4,100	3,700
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	0	4,400	4,400	4,400	4,400	4,400	0
OWYHEE UPLANDS	UCRB	BLM/FS Other	17,700	15,400	52,000	57,800	22,400	29,100	30,400
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
SNAKE HEADWATERS	UCRB	BLM/FS Other	100	200	1,600	1,800	1,600	1,700	1,700
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	1,400	1,400	1,400	1,400	1,400	0
SOUTHERN CASCADES	EEIS	BLM/FS Other	7,100	3,500	24,400	24,400	24,400	19,900	7,200
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	200	0	100	100	100	0	0
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	0	200	200	200	200	200	200
UPPER KLAMATH	EEIS	BLM/FS Other	2,300	2,100	17,100	19,700	17,100	19,000	10,800
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	100	100	100	100	100	0
UPPER SNAKE	UCRB	BLM/FS Other	6,300	5,600	34,700	37,400	21,800	23,000	21,000
Range - Improvement									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	EEIS	BLM/FS Other	800	500	9,200	15,100	7,600	12,400	10,300
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
BLUE MOUNTAINS	UCRB	BLM/FS Other	0	0	400	500	0	100	0
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	1,000	1,400	23,700	26,100	2,000	9,500	3,000
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	EEIS	BLM/FS Other	10,000	8,600	7,700	11,000	5,600	9,600	7,300
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
COLUMBIA PLATEAU	UCRB	BLM/FS Other	0	100	700	800	700	300	0
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	300	0	100	100	100	100	100
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN CASCADES	EEIS	BLM/FS Other	0	100	800	800	0	100	0
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	0	0	100	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	100	0	0	0	0	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	4,900	5,600	47,000	76,400	23,200	51,600	30,900
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	2,400	3,200	16,100	42,400	14,200	40,400	36,100
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	0	100	100	100	100	100	0
OWYHEE UPLANDS	UCRB	BLM/FS Other	7,700	7,400	72,300	92,300	20,300	38,100	22,300
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
SNAKE HEADWATERS	UCRB	BLM/FS Other	100	400	2,400	6,800	2,100	6,200	4,000
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
SOUTHERN CASCADES	EEIS	BLM/FS Other	800	1,000	1,500	1,600	1,500	400	0
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	100	100	500	500	500	200	100
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER KLAMATH	EEIS	BLM/FS Other	1,700	1,700	1,200	700	1,200	700	1,700
UPPER SNAKE	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
UPPER SNAKE	UCRB	BLM/FS Other	2,500	1,800	39,100	86,100	29,300	75,100	35,500
Range - Grazing Effects									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	6,400	11,100	11,100	11,100	11,100	11,100	7,700
BLUE MOUNTAINS	EEIS	BLM/FS Other	306,900	207,200	281,400	325,100	279,500	305,400	263,300
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	200	500	500	500	500	500	600
BLUE MOUNTAINS	UCRB	BLM/FS Other	6,500	2,700	9,400	10,700	6,600	5,600	4,000
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	16,300	20,100	20,100	20,100	20,100	20,100	18,000
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	570,000	355,100	700,700	710,600	567,300	328,200	239,500
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	3,000	3,100	3,100	3,100	3,100	3,100	3,100
COLUMBIA PLATEAU	EEIS	BLM/FS Other	91,500	54,000	102,500	128,800	101,700	122,000	106,700
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	200	300	300	300	300	300	300
COLUMBIA PLATEAU	UCRB	BLM/FS Other	36,600	26,600	38,600	46,500	39,100	33,800	31,000
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	500	200	200	200	200	200	200
LOWER CLARK FORK	UCRB	BLM/FS Other	1,200	800	2,300	2,300	2,300	1,000	800
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	2,900	2,800	2,800	2,800	2,800	2,800	1,100
NORTHERN CASCADES	EEIS	BLM/FS Other	9,000	6,800	3,000	3,800	6,800	4,200	2,300
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	2,100	2,100	3,400	800	2,200	600	1,200
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	300	200	200	200	200	200	200
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	1,700	1,000	2,000	2,200	2,000	1,200	1,300
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	182,100	172,000	172,000	172,000	172,000	172,000	98,900
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	2,232,400	1,526,900	2,391,000	2,666,800	2,403,300	2,459,700	1,701,200
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	92,900	100,100	100,100	100,100	100,100	100,100	99,100

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	1,124,500	749,900	897,000	1,079,200	900,400	1,063,300	1,007,000
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	20,000	16,400	16,400	16,400	16,400	16,400	19,100
OWYHEE UPLANDS	UCRB	BLM/FS Other	1,326,800	911,500	1,377,000	1,467,400	1,327,800	948,400	637,700
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	100	100	100	100	100	100	200
SNAKE HEADWATERS	UCRB	BLM/FS Other	25,500	17,600	23,400	30,100	23,200	27,200	24,900
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	3,700	3,700	3,700	3,700	3,700	3,700	1,100
SOUTHERN CASCADES	EEIS	BLM/FS Other	17,700	14,800	19,400	19,500	19,400	17,500	6,300
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	300	0	0	0	0	0	0
UPPER CLARK FORK	UCRB	BLM/FS Other	20,300	11,800	22,100	22,100	22,100	10,800	6,300
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	6,100	5,500	5,500	5,500	5,500	5,500	3,700
UPPER KLAMATH	EEIS	BLM/FS Other	16,400	11,400	13,300	14,000	13,300	13,800	14,000
UPPER SNAKE	UCRB	BLM/FS Natural Processes	9,900	11,200	11,200	11,200	11,200	11,200	4,000
UPPER SNAKE	UCRB	BLM/FS Other	242,700	177,100	273,300	321,800	252,200	252,300	202,500
Range - Wildfire									
BLUE MOUNTAINS	EEIS	BLM/FS Natural Processes	9,200	11,200	11,200	11,200	11,200	11,200	51,800
BLUE MOUNTAINS	EEIS	BLM/FS Other	54,000	46,100	32,600	31,600	33,900	31,000	59,200
BLUE MOUNTAINS	UCRB	BLM/FS Natural Processes	300	200	200	200	200	200	700
BLUE MOUNTAINS	UCRB	BLM/FS Other	4,100	3,400	2,500	2,600	3,900	3,100	16,500
CENTRAL IDAHO MOUNTAINS	EEIS	BLM/FS Natural Processes	0	0	0	0	0	0	0
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Natural Processes	17,100	17,900	17,900	17,900	17,900	17,900	71,000
CENTRAL IDAHO MOUNTAINS	UCRB	BLM/FS Other	153,000	120,800	82,000	82,800	116,200	105,100	220,600
COLUMBIA PLATEAU	EEIS	BLM/FS Natural Processes	6,100	7,300	7,300	7,300	7,300	7,300	7,300
COLUMBIA PLATEAU	EEIS	BLM/FS Other	71,200	62,400	44,500	44,600	47,400	45,300	49,200
COLUMBIA PLATEAU	UCRB	BLM/FS Natural Processes	300	0	0	0	0	0	0
COLUMBIA PLATEAU	UCRB	BLM/FS Other	800	400	400	300	400	200	100
LOWER CLARK FORK	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
LOWER CLARK FORK	UCRB	BLM/FS Other	500	300	100	100	100	100	100
NORTHERN CASCADES	EEIS	BLM/FS Natural Processes	2,400	1,900	1,900	1,900	1,900	1,900	13,600
NORTHERN CASCADES	EEIS	BLM/FS Other	2,800	2,400	1,800	1,700	2,500	1,500	5,900
NORTHERN GLACIATED MOUNTAINS	EEIS	BLM/FS Other	600	800	400	300	500	300	400
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Natural Processes	0	0	0	0	0	0	0
NORTHERN GLACIATED MOUNTAINS	UCRB	BLM/FS Other	500	100	200	200	200	400	100
NORTHERN GREAT BASIN	EEIS	BLM/FS Natural Processes	43,900	54,200	54,200	54,200	54,200	54,200	59,200
NORTHERN GREAT BASIN	EEIS	BLM/FS Other	174,200	198,300	119,900	119,600	131,500	128,500	146,600
OWYHEE UPLANDS	EEIS	BLM/FS Natural Processes	27,400	33,200	33,200	33,200	33,200	33,200	39,500

Appendix 2-F (continued).

ERU NAME	Management Area	Management Class	Alternative 1	2	3	4	5	6	7
OWYHEE UPLANDS	EEIS	BLM/FS Other	107,100	114,500	78,000	80,500	80,700	84,600	91,500
OWYHEE UPLANDS	UCRB	BLM/FS Natural Processes	37,400	42,000	42,000	42,000	42,000	42,000	63,900
OWYHEE UPLANDS	UCRB	BLM/FS Other	310,100	307,100	215,600	214,500	272,100	269,200	315,700
SNAKE HEADWATERS	UCRB	BLM/FS Natural Processes	500	700	700	700	700	700	700
SNAKE HEADWATERS	UCRB	BLM/FS Other	15,300	11,000	10,100	10,400	9,900	10,400	10,600
SOUTHERN CASCADES	EEIS	BLM/FS Natural Processes	600	500	500	500	500	500	2,300
SOUTHERN CASCADES	EEIS	BLM/FS Other	9,900	4,700	2,700	2,600	2,700	3,700	6,700
UPPER CLARK FORK	UCRB	BLM/FS Natural Processes	100	100	100	100	100	100	700
UPPER CLARK FORK	UCRB	BLM/FS Other	4,800	2,400	1,900	1,900	1,900	2,100	4,300
UPPER KLAMATH	EEIS	BLM/FS Natural Processes	500	300	300	300	300	300	500
UPPER KLAMATH	EEIS	BLM/FS Other	8,200	6,700	5,100	6,000	5,100	5,800	5,700
UPPER SNAKE	UCRB	BLM/FS Natural Processes	19,600	21,100	21,100	21,100	21,100	21,100	27,100
UPPER SNAKE	UCRB	BLM/FS Other	101,600	109,200	67,600	68,300	71,000	72,200	95,700

Appendix 2-G. Total hectares per decade disturbed for the long term (50 to 100 years) for potential vegetation group (PVG).

Management Area	Management Class	PVG Group	Alternatives 1	2	3	4	5	6	7
Forest - Harvest									
EEIS	BLM/FS Natural Processes	COLD FOREST	0	0	0	0	0	0	0
EEIS	BLM/FS Natural Processes	DRY FOREST	0	0	20	0	0	0	0
EEIS	BLM/FS Natural Processes	MOIST FOREST	0	0	0	0	0	0	0
EEIS	BLM/FS Other	COLD FOREST	18050	7750	18160	17820	14740	13180	3450
EEIS	BLM/FS Other	DRY FOREST	411760	240730	303690	301700	301600	2951100	2214700
EEIS	BLM/FS Other	MOIST FOREST	1219600	767800	775500	723200	844900	666900	417900
EEIS	Other Lands	COLD FOREST	80900	80300	80900	80900	80900	80900	80300
EEIS	Other Lands	DRY FOREST	4289100	4712900	4289100	4289100	4289100	4289100	4439100
EEIS	Other Lands	MOIST FOREST	1752800	1816500	1752800	1752800	1752800	1752800	1772900
UCRB	BLM/FS Natural Processes	COLD FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	DRY FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	MOIST FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Other	COLD FOREST	647400	190700	494500	517300	403600	331900	199200
UCRB	BLM/FS Other	DRY FOREST	1492900	393800	1071900	1104200	961000	860600	479100
UCRB	BLM/FS Other	MOIST FOREST	3137500	1724300	2181300	1797800	2324000	1623500	1372800
UCRB	Other Lands	COLD FOREST	175300	170500	175300	175300	175300	175300	169000
UCRB	Other Lands	DRY FOREST	2168500	2298400	2168500	2168500	2168500	2168500	2186200
UCRB	Other Lands	MOIST FOREST	1845900	1880600	1845900	1845900	1845900	1845900	1849800
Forest - Thinning									
EEIS	BLM/FS Natural Processes	COLD FOREST	0	0	0	0	0	0	0
EEIS	BLM/FS Natural Processes	DRY FOREST	0	0	200	0	0	0	0
EEIS	BLM/FS Natural Processes	MOIST FOREST	0	0	0	0	0	0	0
EEIS	BLM/FS Other	COLD FOREST	36300	16900	14000	13700	13700	11100	6800
EEIS	BLM/FS Other	DRY FOREST	1606200	794600	937200	934600	935700	901300	627600
EEIS	BLM/FS Other	MOIST FOREST	650200	304000	462700	478800	437400	443200	175800
EEIS	Other Lands	COLD FOREST	6500	3500	6500	6500	6500	6500	5600
EEIS	Other Lands	DRY FOREST	1988900	2081300	1988900	1988900	1988900	1988900	2024800
EEIS	Other Lands	MOIST FOREST	974300	959100	974300	974300	974300	974300	974000
UCRB	BLM/FS Natural Processes	COLD FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	DRY FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	MOIST FOREST	0	0	0	0	0	0	0
UCRB	BLM/FS Other	COLD FOREST	304800	104600	26300	27900	37100	44800	66700
UCRB	BLM/FS Other	DRY FOREST	728700	158500	544100	567400	532300	422000	251600
UCRB	BLM/FS Other	MOIST FOREST	1824800	676200	806700	789800	942900	766000	606100
UCRB	Other Lands	COLD FOREST	28200	15900	28200	28200	28200	28200	22200

Appendix 2-G (continued).

Management Area	Management Class	PVG Group	Alternatives 1	2	3	4	5	6	7
UCRB	Other Lands	DRY FOREST	1151200	1246400	1151200	1151200	1151200	1151200	1170600
UCRB	Other Lands	MOIST FOREST	1060400	987400	1060400	1060400	1060400	1060400	1018100
Forest - Prescribed Fire									
EEIS	BLM/FS Natural Processes	COLD FOREST	151000	151000	407600	407600	374500	370900	83900
EEIS	BLM/FS Natural Processes	DRY FOREST	43500	43500	973700	973700	953000	929800	54000
EEIS	BLM/FS Natural Processes	MOIST FOREST	75300	75300	234900	234900	223800	212900	90600
EEIS	BLM/FS Other	COLD FOREST	3100	22100	206300	206200	182100	20060	63400
EEIS	BLM/FS Other	DRY FOREST	1159400	928700	6863600	6866100	6620500	6803000	4210100
EEIS	BLM/FS Other	MOIST FOREST	1000	29000	639600	650500	512200	627800	233200
EEIS	Other Lands	COLD FOREST	4400	4100	4400	4400	4400	4400	4300
EEIS	Other Lands	DRY FOREST	1900	1568300	1900	1900	1900	1900	369300
EEIS	Other Lands	MOIST FOREST	1300	1300	1300	1300	1300	1300	1300
UCRB	BLM/FS Natural Processes	COLD FOREST	442500	442500	1185300	1185300	747700	731000	141200
UCRB	BLM/FS Natural Processes	DRY FOREST	74000	74000	1494100	1494100	1343100	1315100	72400
UCRB	BLM/FS Natural Processes	MOIST FOREST	301500	301500	930900	930900	697400	692700	203000
UCRB	BLM/FS Other	COLD FOREST	114200	494300	1738200	1727100	1402300	1427400	619500
UCRB	BLM/FS Other	DRY FOREST	722500	494700	3865700	3825900	3516900	3397300	1501500
UCRB	BLM/FS Other	MOIST FOREST	37900	182800	2703000	2762300	2122300	2694000	1583500
UCRB	Other Lands	COLD FOREST	19800	19400	19800	19800	19800	19800	19500
UCRB	Other Lands	DRY FOREST	2200	625800	2200	2200	2200	2200	85100
UCRB	Other Lands	MOIST FOREST	1000	1000	1000	1000	1000	1000	1000
Forest - Wildfire									
EEIS	BLM/FS Natural Processes	COLD FOREST	367900	367900	250900	250900	267800	269900	361900
EEIS	BLM/FS Natural Processes	DRY FOREST	447900	447900	272200	272100	277000	287000	789100
EEIS	BLM/FS Natural Processes	MOIST FOREST	276000	276000	207000	207300	217900	218500	380700
EEIS	BLM/FS Other	COLD FOREST	263900	290900	188300	188400	210500	210400	293500
EEIS	BLM/FS Other	DRY FOREST	2584500	2690900	1595200	1601600	1642100	1630800	2686800
EEIS	BLM/FS Other	MOIST FOREST	730200	788800	563500	564600	584100	595200	1016900
EEIS	Other Lands	COLD FOREST	120600	114200	120600	120600	120600	120600	119300
EEIS	Other Lands	DRY FOREST	3925700	3858500	3925700	3925700	3925700	3925700	3901600
EEIS	Other Lands	MOIST FOREST	909600	890100	909600	909600	909600	909600	897500
UCRB	BLM/FS Natural Processes	COLD FOREST	856000	856000	563400	563400	701800	707800	864000
UCRB	BLM/FS Natural Processes	DRY FOREST	742800	742800	453700	453700	490200	497500	2114600
UCRB	BLM/FS Natural Processes	MOIST FOREST	543300	543300	417500	417500	46000	461500	804100
UCRB	BLM/FS Other	COLD FOREST	1158100	1295800	749700	742700	898200	917400	1213500
UCRB	BLM/FS Other	DRY FOREST	1551800	1704900	1061300	1053300	1147800	1154100	1915000
UCRB	BLM/FS Other	MOIST FOREST	1567800	1725700	1205600	1248300	1284600	1305800	1681700
UCRB	Other Lands	COLD FOREST	392300	371700	392300	392300	392300	392300	384300

Appendix 2-G (continued).

Management Area	Management Class	PVG Group	Alternatives 1	2	3	4	5	6	7
UCRB	Other Lands	DRY FOREST	2094000	2123500	2094000	2094000	2094000	2094000	2083500
UCRB	Other Lands	MOIST FOREST	912400	850200	912400	912400	912400	912400	897500
Range - Exotics									
EEIS	BLM/FS Natural Processes	COOL SHRUB	2100	4000	4000	4000	4000	4000	3500
EEIS	BLM/FS Natural Processes	DRY GRASS	16100	13800	13800	13800	13800	13800	11600
EEIS	BLM/FS Natural Processes	DRY SHRUB	55300	29400	29400	29400	29400	29400	28300
EEIS	BLM/FS Natural Processes	WOODLAND	600	0	0	0	0	0	0
EEIS	BLM/FS Other	COOL SHRUB	71400	8100	30200	35400	36100	35600	29500
EEIS	BLM/FS Other	DRY GRASS	50300	1000	42000	50900	40900	39500	25200
EEIS	BLM/FS Other	DRY SHRUB	304000	1202500	99500	137500	133900	119700	23000
EEIS	BLM/FS Other	WOODLAND	12000	3700	5500	7000	5900	7000	6800
EEIS	Other Lands	COOL SHRUB	173900	173900	173900	173900	173900	178000	159700
EEIS	Other Lands	DRY GRASS	765400	765400	765400	765400	765400	774000	764100
EEIS	Other Lands	DRY SHRUB	1902600	1902600	1902600	1902600	1902600	1568500	1511200
EEIS	Other Lands	WOODLAND	8300	8300	8300	8300	8300	8200	8400
UCRB	BLM/FS Natural Processes	COOL SHRUB	5400	16500	16500	16500	16500	16500	15500
UCRB	BLM/FS Natural Processes	DRY GRASS	9700	7400	7400	7400	7400	7400	5000
UCRB	BLM/FS Natural Processes	DRY SHRUB	15400	8900	8900	8900	8900	8900	6900
UCRB	BLM/FS Natural Processes	WOODLAND	1300	1100	1100	1100	1100	1100	400
UCRB	BLM/FS Other	COOL SHRUB	227500	14500	127500	144800	185900	86600	82800
UCRB	BLM/FS Other	DRY GRASS	172100	20600	195400	212800	181200	112500	75900
UCRB	BLM/FS Other	DRY SHRUB	394100	913400	167000	186600	243700	115100	201000
UCRB	BLM/FS Other	WOODLAND	14200	5400	9600	11500	10500	9200	7100
UCRB	Other Lands	COOL SHRUB	202400	202400	202400	202400	202400	212300	190300
UCRB	Other Lands	DRY GRASS	297300	297300	297300	297300	297300	311300	306100
UCRB	Other Lands	DRY SHRUB	736900	736900	736900	736900	736900	548000	532700
UCRB	Other Lands	WOODLAND	7800	7800	7800	7800	7800	7900	7900
Range - Prescribed Fire									
EEIS	BLM/FS Natural Processes	COOL SHRUB	100	31900	31900	31900	31900	31900	27200
EEIS	BLM/FS Natural Processes	DRY GRASS	0	0	0	0	0	0	0
EEIS	BLM/FS Natural Processes	DRY SHRUB	0	500	500	500	500	500	500
EEIS	BLM/FS Natural Processes	WOODLAND	0	0	0	0	0	0	0
EEIS	BLM/FS Other	COOL SHRUB	314200	287900	1630200	1688700	1606500	1640700	1393200
EEIS	BLM/FS Other	DRY GRASS	15200	3700	14500	2500	14100	4300	2300
EEIS	BLM/FS Other	DRY SHRUB	26800	21400	20300	24100	19400	21500	13800
EEIS	BLM/FS Other	WOODLAND	0	0	0	0	0	0	0
EEIS	Other Lands	COOL SHRUB	926300	926300	926300	926300	926300	909100	802300
EEIS	Other Lands	DRY GRASS	478500	478500	478500	478500	478500	490700	480900

Appendix 2-G (continued).

Management Area	Management Class	PVG Group	Alternatives 1	2	3	4	5	6	7
EEIS	Other Lands	DRY SHRUB	568400	568400	568400	568400	568400	526300	507400
EEIS	Other Lands	WOODLAND	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	COOL SHRUB	0	9900	9900	9900	9900	9900	1400
UCRB	BLM/FS Natural Processes	DRY GRASS	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	DRY SHRUB	0	1000	1000	1000	1000	1000	200
UCRB	BLM/FS Natural Processes	WOODLAND	0	0	0	0	0	0	0
UCRB	BLM/FS Other	COOL SHRUB	86200	77500	454500	458500	206300	223600	192100
UCRB	BLM/FS Other	DRY GRASS	30800	2800	43100	41400	35600	23900	8100
UCRB	BLM/FS Other	DRY SHRUB	114900	123500	10030	105900	98500	110200	87700
UCRB	BLM/FS Other	WOODLAND	0	0	19000	21000	0	2000	700
UCRB	Other Lands	COOL SHRUB	507200	507200	507200	507200	507200	505500	373500
UCRB	Other Lands	DRY GRASS	166100	166100	166100	166100	166100	196100	188300
UCRB	Other Lands	DRY SHRUB	477900	477900	477900	477900	477900	465100	413400
UCRB	Other Lands	WOODLAND	0	0	0	0	0	0	0
Range - Improvement									
EEIS	BLM/FS Natural Processes	COOL SHRUB	0	0	0	0	0	0	0
EEIS	BLM/FS Natural Processes	DRY GRASS	0	0	0	0	0	0	0
EEIS	BLM/FS Natural Processes	DRY SHRUB	0	100	100	100	100	100	100
EEIS	BLM/FS Natural Processes	WOODLAND	0	0	0	0	0	0	0
EEIS	BLM/FS Other	COOL SHRUB	292700	28000	183500	193900	181600	188700	181200
EEIS	BLM/FS Other	DRY GRASS	5100	2100	22000	31000	17000	24000	13000
EEIS	BLM/FS Other	DRY SHRUB	52200	97700	372400	527000	270200	424000	301700
EEIS	BLM/FS Other	WOODLAND	0	0	300	400	300	400	400
EEIS	Other Lands	COOL SHRUB	695100	695100	695100	695100	695100	705200	649000
EEIS	Other Lands	DRY GRASS	30020	30020	30020	30020	30020	310400	30020
EEIS	Other Lands	DRY SHRUB	1101900	1101900	1101900	1101900	1101900	981100	788500
EEIS	Other Lands	WOODLAND	1300	1300	1300	1300	1300	1300	1200
UCRB	BLM/FS Natural Processes	COOL SHRUB	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	DRY GRASS	0	0	0	0	0	0	0
UCRB	BLM/FS Natural Processes	DRY SHRUB	0	100	100	100	100	100	0
UCRB	BLM/FS Natural Processes	WOODLAND	0	0	0	0	0	0	0
UCRB	BLM/FS Other	COOL SHRUB	107200	91300	194100	219300	136400	141500	80500
UCRB	BLM/FS Other	DRY GRASS	13100	4800	132500	152200	48200	57100	20500
UCRB	BLM/FS Other	DRY SHRUB	4000	59700	404500	481800	175600	254600	137100
UCRB	BLM/FS Other	WOODLAND	100	0	800	600	500	200	200
UCRB	Other Lands	COOL SHRUB	229100	229100	229100	229100	229100	245400	208000
UCRB	Other Lands	DRY GRASS	10030	10030	10030	10030	10030	116800	110700
UCRB	Other Lands	DRY SHRUB	394300	394300	394300	394300	394300	329000	256700

Appendix 2-G (continued).

Management Area	Management Class	PVG Group	Alternatives 1	2	3	4	5	6	7
UCRB	Other Lands	WOODLAND	600	600	600	600	600	700	700
Range - Grazing Effects									
EEIS	BLM/FS Natural Processes	COOL SHRUB	4130	5160	5160	5160	5160	5160	4250
EEIS	BLM/FS Natural Processes	DRY GRASS	17160	23180	23180	23180	23180	23180	17500
EEIS	BLM/FS Natural Processes	DRY SHRUB	597390	556460	556460	556460	556460	556460	502610
EEIS	BLM/FS Natural Processes	WOODLAND	640	1060	1060	1060	1060	1060	1060
EEIS	BLM/FS Other	COOL SHRUB	85820	51620	108520	130730	108630	125800	110490
EEIS	BLM/FS Other	DRY GRASS	95990	46670	78840	82060	82290	68410	47610
EEIS	BLM/FS Other	DRY SHRUB	3260990	2162990	2552990	2850580	2624790	2705980	2464170
EEIS	BLM/FS Other	WOODLAND	6870	2750	6890	6280	6940	6310	5610
EEIS	Other Lands	COOL SHRUB	125110	125110	125110	125110	125110	124630	118140
EEIS	Other Lands	DRY GRASS	1223660	1223660	1223660	1223660	1223660	1221160	1212000
EEIS	Other Lands	DRY SHRUB	1380460	1380460	1380460	1380460	1380460	1773700	1694380
EEIS	Other Lands	WOODLAND	7320	7320	7320	7320	7320	7380	7000
UCRB	BLM/FS Natural Processes	COOL SHRUB	12090	14920	14920	14920	14920	14920	12470
UCRB	BLM/FS Natural Processes	DRY GRASS	10530	11720	11720	11720	11720	11720	20290
UCRB	BLM/FS Natural Processes	DRY SHRUB	54140	42680	42680	42680	42680	42680	14790
UCRB	BLM/FS Other	COOL SHRUB	103670	41040	103380	117200	104100	89830	81990
UCRB	BLM/FS Other	DRY GRASS	1007940	481190	1054740	1135680	966110	587280	375200
UCRB	BLM/FS Other	DRY SHRUB	868250	610820	830910	928700	920250	755840	547870
UCRB	Other Lands	COOL SHRUB	57110	57110	57110	57110	57110	57380	51960
UCRB	Other Lands	DRY GRASS	728090	728090	728090	728090	728090	736040	728540
UCRB	Other Lands	DRY SHRUB	560310	560310	560310	560310	560310	600950	575340
UCRB	Other Lands	WOODLAND	5830	5830	5830	5830	5830	5630	3820
Range - Wildfire									
EEIS	BLM/FS Natural Processes	COOL SHRUB	131600	139900	139900	139900	139900	139900	229800
EEIS	BLM/FS Natural Processes	DRY GRASS	106700	114300	114300	114300	114300	114300	626300
EEIS	BLM/FS Natural Processes	DRY SHRUB	747600	887500	887500	887500	887500	887500	934900
EEIS	BLM/FS Natural Processes	WOODLAND	3600	3800	3800	3800	3800	3800	3800
EEIS	BLM/FS Other	COOL SHRUB	1053700	949800	561200	527900	608300	578800	683300
EEIS	BLM/FS Other	DRY GRASS	271800	189200	143700	144200	151900	149100	363100
EEIS	BLM/FS Other	DRY SHRUB	3852700	6426000	2356400	2315500	2626300	2483800	3063200
EEIS	BLM/FS Other	WOODLAND	17800	16000	11400	12000	11400	12400	14500
EEIS	Other Lands	COOL SHRUB	1010500	1010500	1010500	1010500	1010500	100430	1094000
EEIS	Other Lands	DRY GRASS	688000	688000	688000	688000	688000	675500	685500
EEIS	Other Lands	DRY SHRUB	5392200	5392200	5392200	5392200	5392200	4964500	550050
EEIS	Other Lands	WOODLAND	16100	16100	16100	16100	16100	15900	17700
UCRB	BLM/FS Natural Processes	COOL SHRUB	231600	244400	244400	244400	244400	244400	583100

Appendix 2-G (continued).

Management Area	Management Class	PVG Group	Alternatives						
			1	2	3	4	5	6	7
UCRB	BLM/FS Natural Processes	DRY GRASS	59900	68500	68500	68500	68500	68500	383900
UCRB	BLM/FS Natural Processes	DRY SHRUB	467800	518900	518900	518900	518900	518900	578900
UCRB	BLM/FS Natural Processes	WOODLAND	5800	7600	7600	7600	7600	7600	13100
UCRB	BLM/FS Other	COOL SHRUB	1855400	1748300	1139000	1103100	1544300	1483200	1963000
UCRB	BLM/FS Other	DRY GRASS	803900	568800	412800	418600	522600	468400	1478900
UCRB	BLM/FS Other	DRY SHRUB	4113000	5231500	2215200	2215100	3017000	2663500	3203500
UCRB	BLM/FS Other	WOODLAND	31200	24800	17000	17400	24400	28200	36200
UCRB	Other Lands	COOL SHRUB	576600	576600	576600	576600	576600	565300	636600
UCRB	Other Lands	DRY GRASS	40060	40060	40060	40060	40060	403500	409700
UCRB	Other Lands	DRY SHRUB	2383500	2383500	2383500	2383500	2383500	2129700	2299900
UCRB	Other Lands	WOODLAND	7400	7400	7400	7400	7400	6500	7000

Appendix 2-H. Percent of Basin Forested and Rangeland PVGs affected by decade by direct forest disturbance (wildfire, prescribed fire, thinning, harvest, seeding, exotic control) by broad-scale alternative.

Vegetation Type	Ownership Class	PVT Group	Projection Years	Historical	Alternative 1	2	3	4	5	6	7
Forest	BLM/FS	COLD FOREST	First decade	10	10	10	15	15	13	13	9
Forest	BLM/FS	COLD FOREST	Long-term	10	11	11	15	15	13	13	10
Forest	BLM/FS	DRY FOREST	First decade	40	25	18	39	39	38	37	30
Forest	BLM/FS	DRY FOREST	Long-term	40	27	19	39	40	38	37	31
Forest	BLM/FS	MOIST FOREST	First decade	13	17	11	17	16	16	15	13
Forest	BLM/FS	MOIST FOREST	Long-term	13	16	11	17	16	16	16	13
Forest	OTHER	COLD FOREST	First decade	10	9	9	9	9	9	9	9
Forest	OTHER	COLD FOREST	Long-term	10	11	10	11	11	11	11	10
Forest	OTHER	DRY FOREST	First decade	43	31	38	31	31	31	31	32
Forest	OTHER	DRY FOREST	Long-term	43	34	40	34	34	34	34	35
Forest	OTHER	MOIST FOREST	First decade	16	21	22	21	21	21	21	21
Forest	OTHER	MOIST FOREST	Long-term	16	19	19	19	19	19	19	19
Range	BLM/FS	COOL SHRUB	First decade	28	14	13	24	26	23	25	27
Range	BLM/FS	COOL SHRUB	Long-term	28	14	14	16	16	17	16	19
Range	BLM/FS	DRY GRASS	First decade	84	14	10	10	10	10	9	31
Range	BLM/FS	DRY GRASS	Long-term	84	14	10	10	10	11	10	30
Range	BLM/FS	DRY SHRUB	First decade	15	9	10	9	11	9	10	10
Range	BLM/FS	DRY SHRUB	Long-term	15	12	17	9	9	9	9	10
Range	BLM/FS	WOODLAND	First decade	9	5	4	12	14	6	6	6
Range	BLM/FS	WOODLAND	Long-term	9	5	4	5	6	4	4	5
Range	OTHER	COOL SHRUB	First decade	28	24	24	24	24	24	23	22
Range	OTHER	COOL SHRUB	Long-term	28	24	24	24	24	24	24	23
Range	OTHER	DRY GRASS	First decade	76	13	13	13	13	13	14	13
Range	OTHER	DRY GRASS	Long-term	76	16	16	16	16	16	16	16
Range	OTHER	DRY SHRUB	First decade	19	14	14	14	14	14	13	13
Range	OTHER	DRY SHRUB	Long-term	19	20	20	20	20	20	18	19
Range	OTHER	WOODLAND	First decade	9	1	1	1	1	1	1	1
Range	OTHER	WOODLAND	Long-term	9	1	1	1	1	1	1	2

Appendix 2-I

Average yearly hectares of disturbance for BLM/FS lands for long-term simulation years by forest and range cluster group.

Disturbance	Cluster Group	Alternative						
		1	2	3	4	5	6	7
		Hectares						
Forest-Harvest	F	8941	2671	4725	5974	6958	4627	2453
	H	17322	5152	14931	14931	10777	11577	2751
	J	11037	5396	6788	6788	6788	5681	4628
	L	41732	24421	29566	29566	29566	28509	24240
	M	31301	18766	23043	18072	24754	16696	13993
Forest-Prescribed Fire	F	2354	2488	16181	16294	16559	10713	2332
	H	13946	16191	79622	79622	59620	62261	7444
	J	2206	2649	16975	16975	16975	16826	10972
	L	10457	8920	68091	68091	68091	68051	50793
	M	4109	4669	41479	41580	32258	41765	25620
Forest-Thinning	F	4753	1032	1921	2556	2675	1881	939
	H	8283	2206	4740	4740	3960	4092	1194
	J	5520	2013	2871	2871	2871	2527	1964
	L	16262	8032	8997	8997	8997	8721	6969
	M	17747	7707	9616	9234	10863	8862	6528
Forest-Wildfire	F	8885	9564	6159	5793	5714	7609	10787
	H	48795	52094	32503	32503	39642	38480	78086
	J	10254	10920	7236	7236	7236	7567	11249
	L	29756	30674	19397	19397	19397	19707	25978
	M	20836	22122	15209	15784	16411	16080	22971
Range - Exotics	F	1481	860	900	1123	1119	962	860
	H	1419	371	1435	1453	1534	911	634
	J	131	59	144	156	139	104	74
	L	6339	15333	2510	3373	2550	3219	3222
	M	4289	5995	2704	2719	3989	979	2601
Range - Grazing Effects	F	26101	17823	28277	32769	29123	30808	25684
	H	47149	25314	51060	52274	46734	23782	17163
	J	5865	4274	5874	6004	5963	3988	3295
	L	386117	271464	367272	414513	367239	402709	311851
	M	217101	150887	209357	210171	215249	149645	121232
Range - Prescribed Fire	F	1221	1391	5852	6163	5739	5996	5786
	H	279	108	810	839	164	283	116
	J	62	24	115	108	88	73	23
	L	2868	2795	12324	12734	12241	12377	10433
	M	1569	1318	4624	4656	2273	2319	1171
Range - Rangeland Improvement	F	1110	1006	1239	1560	1012	1308	1098
	H	181	170	1025	1031	220	311	35
	J	22	12	116	130	96	64	31
	L	2852	3225	6096	8723	6015	8422	5849
	M	1098	1228	4720	4739	1043	889	462

Appendix 2-I (continued).

Disturbance	Cluster Group	Alternative						
		1	2	3	4	5	6	7
		Hectares						
Range-Wildfire	F	12506	12116	7538	7349	8584	7858	15390
	H	12977	10334	8305	8192	10608	9217	23732
	J	873	534	408	416	452	475	1061
	L	71861	99485	45930	45113	46257	45730	57937
	M	45154	53504	29772	29789	42968	39228	47967

Continue

Previous

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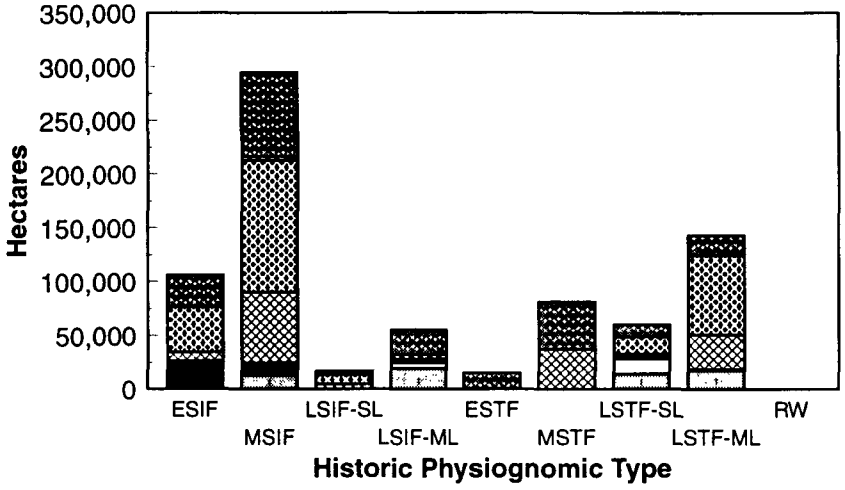
Appendix 2-J

Transitions of physiognomic types to other physiognomic types by potential vegetation group (PVG) for historic to current and current to alternative futures.

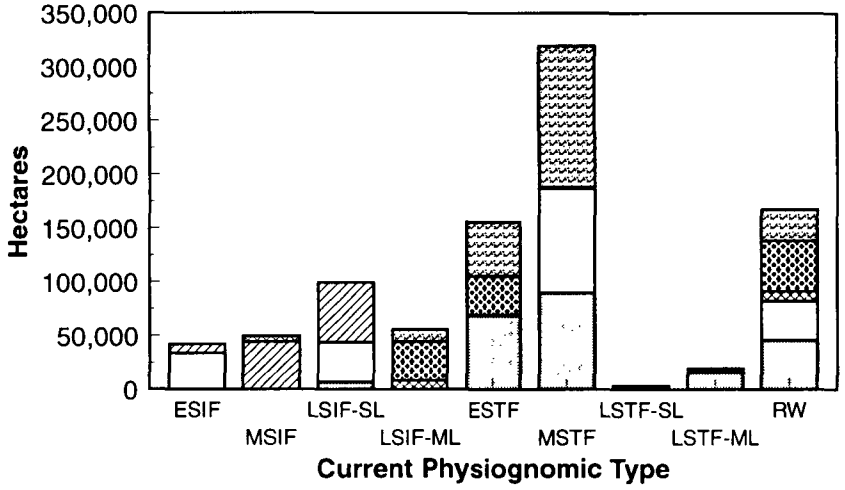
Transitions to Other Physiognomic types -- Cold Forest

BLM / FS Lands

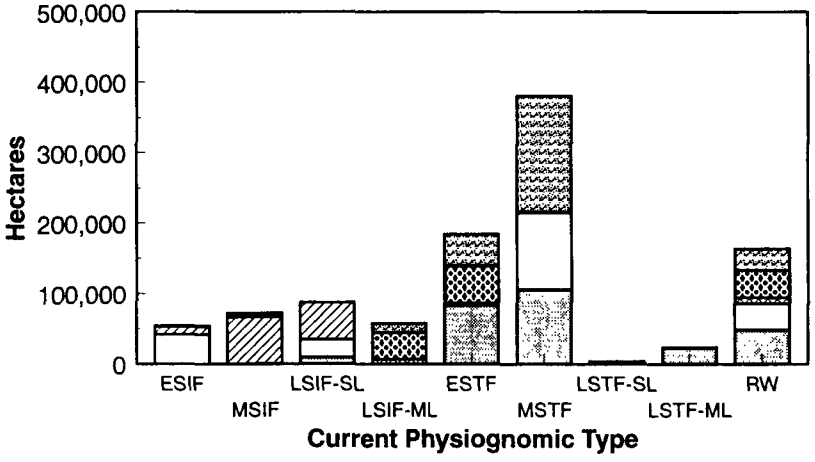
Historic to Current Transitions



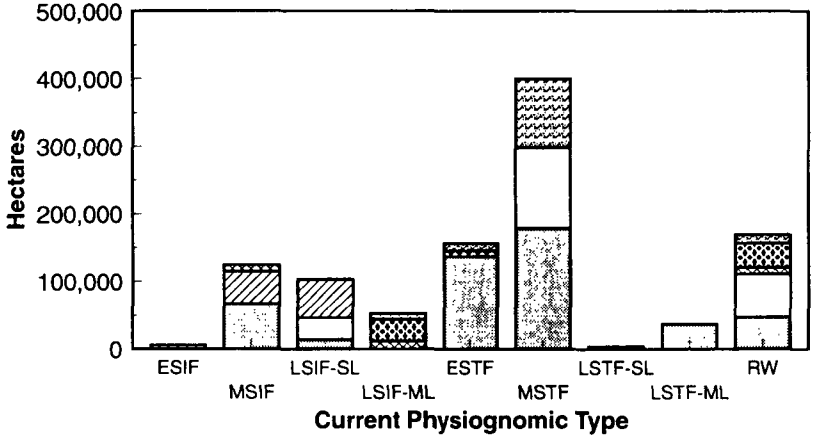
Alternative 1 Current to Future

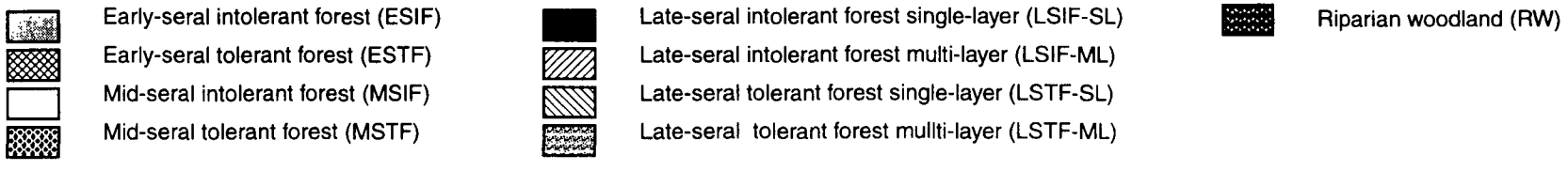


Alternative 2 Current to Future



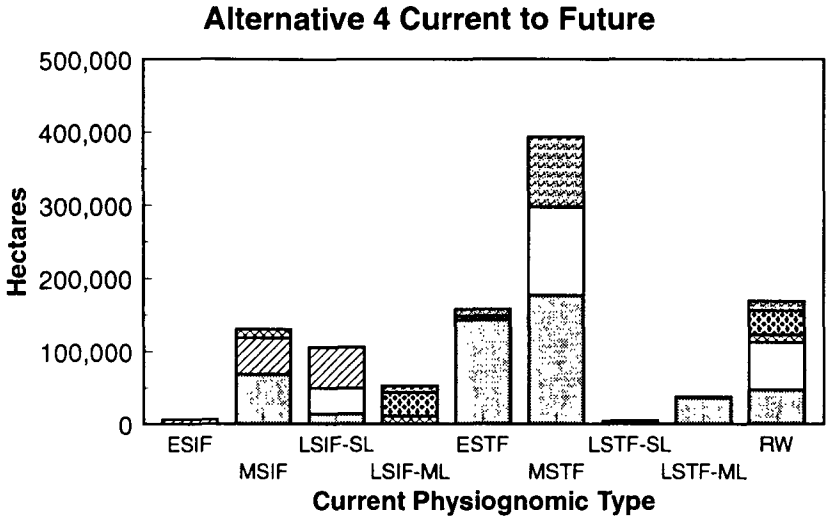
Alternative 3 Current to Future

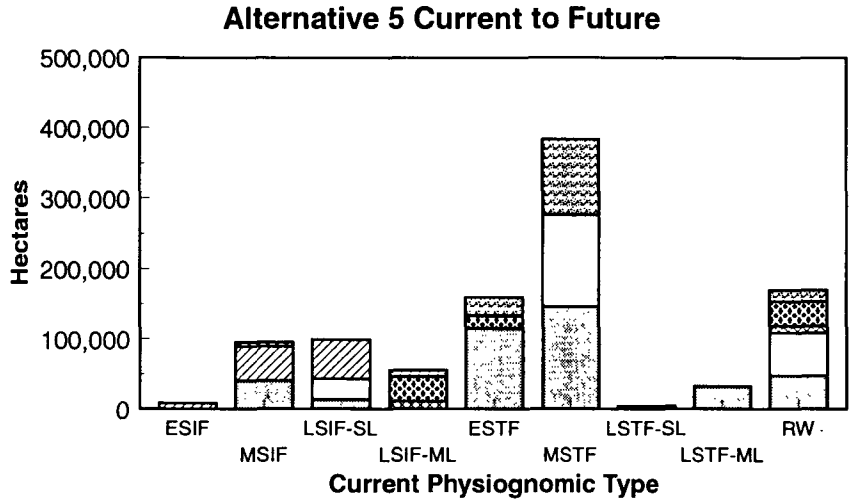


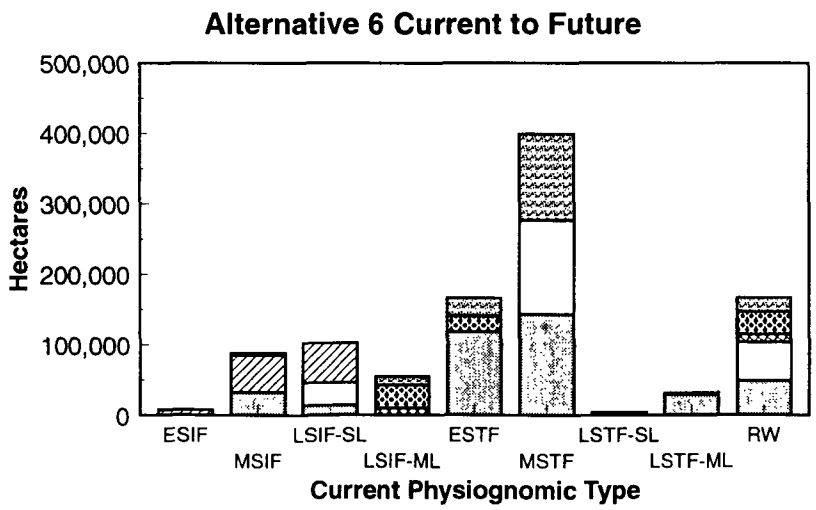


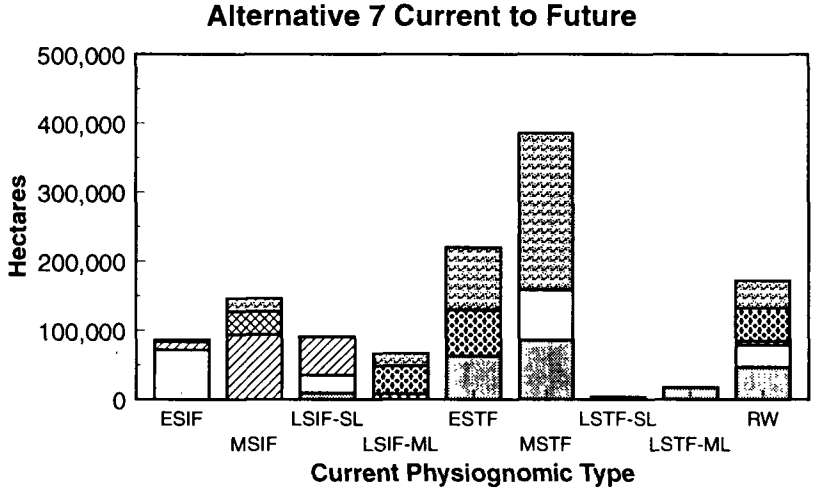
Transitions to Other Physiognomic Types -- Cold Forest

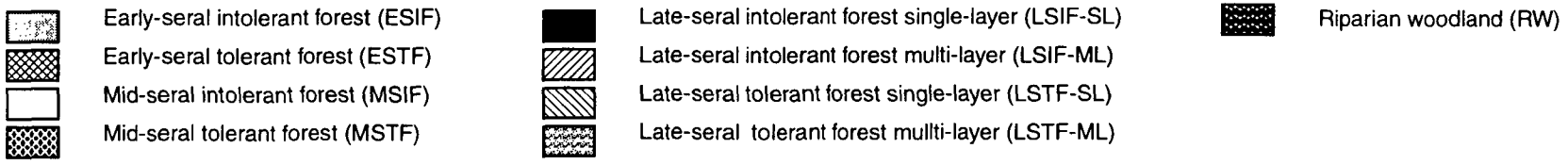
BLM / FS Lands







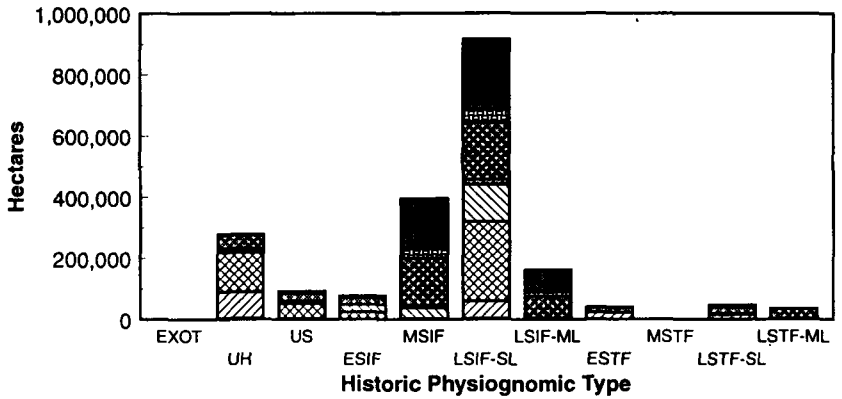




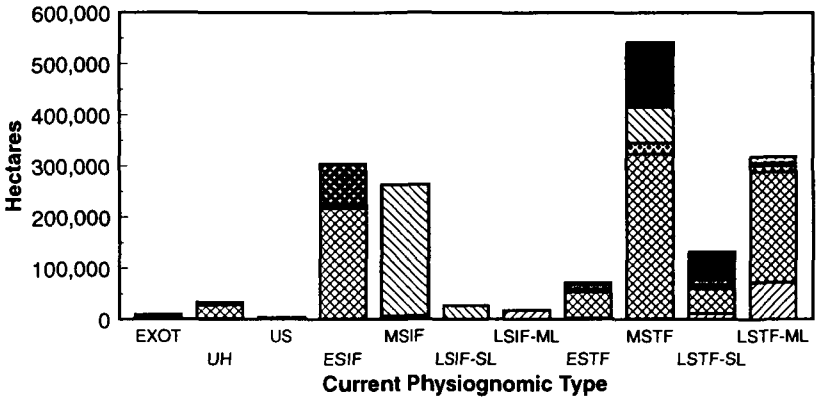
Transitions to Other Physiognomic Types -- Dry Forest

BLM / FS Lands

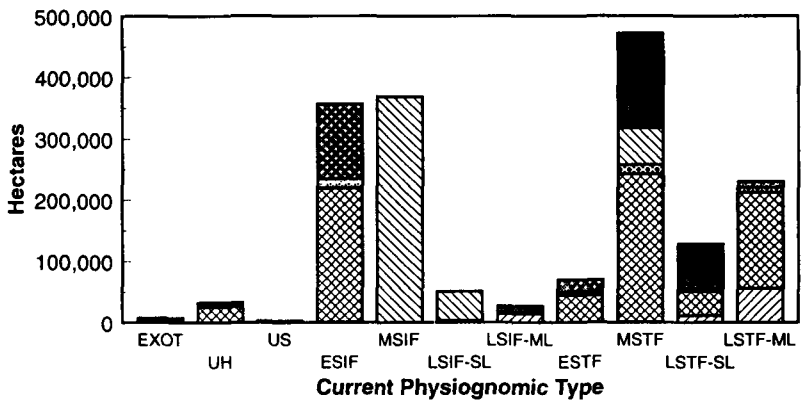
Historic to Current Transitions



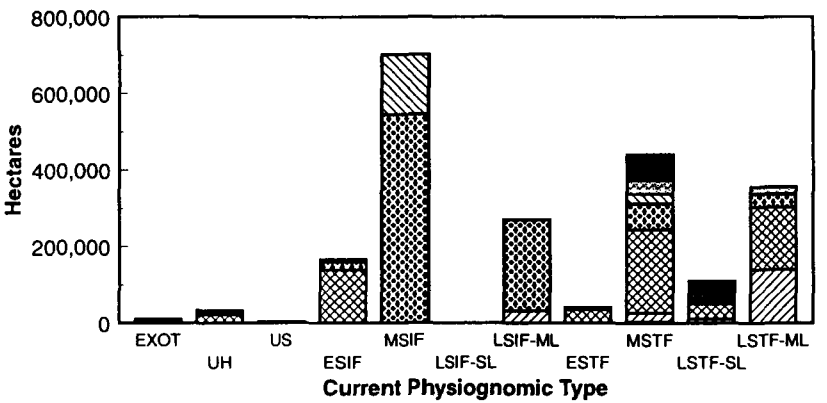
Alternative 1 Current to Future



Alternative 2 Current to Future



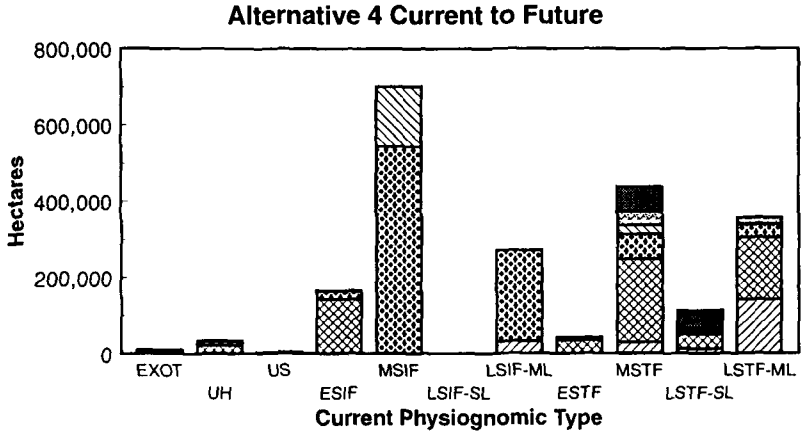
Alternative 3 Current to Future

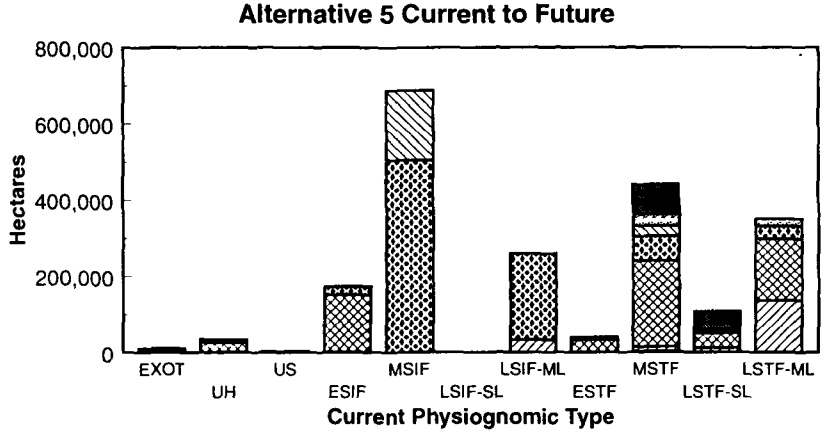


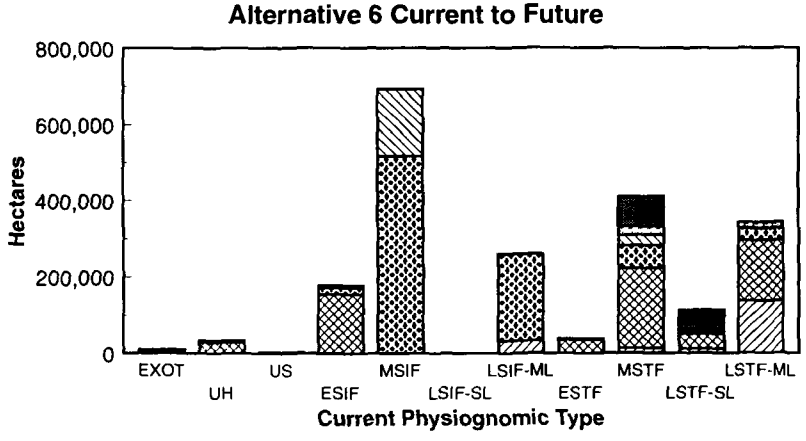
- Exotic Herbland (EXOT)
- Upland Herbland (UH)
- Upland Shrubland (US)
- Early-seral intolerant forest (ESIF)
- Early-seral tolerant forest (ESTF)
- Mid-seral intolerant forest (MSIF)
- Mid-seral tolerant forest (MSTF)
- Late-seral intolerant forest single-layer (LSIF-SL)
- Late-seral intolerant forest multi-layer (LSIF-ML)
- Late-seral tolerant forest single-layer (LSTF-SL)
- Late-seral tolerant forest mullti-layer (LSTF-ML)

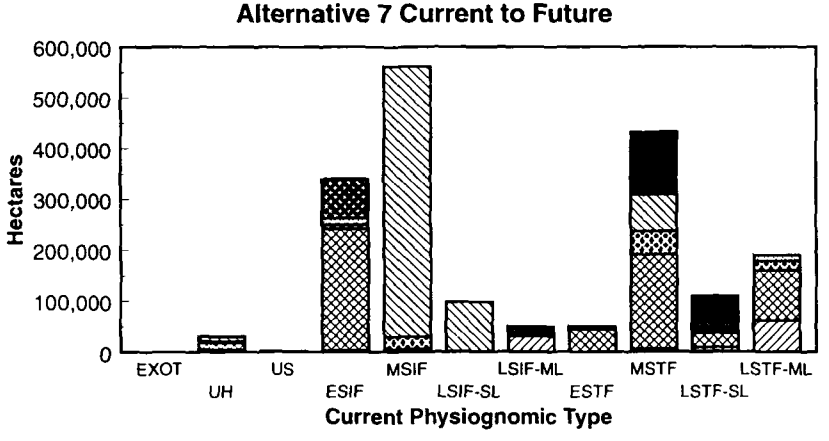
Transitions to Other Physiognomic Types -- Dry Forest

BLM / FS Lands





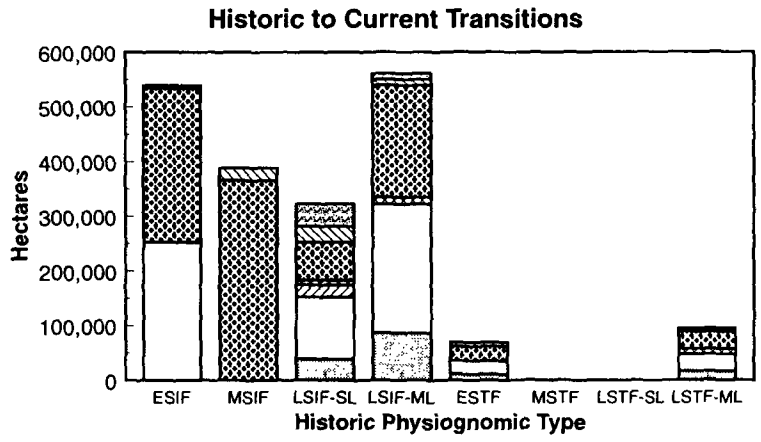


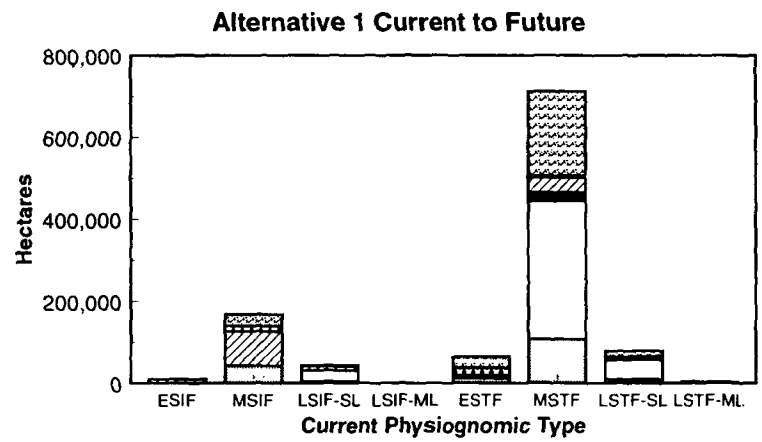


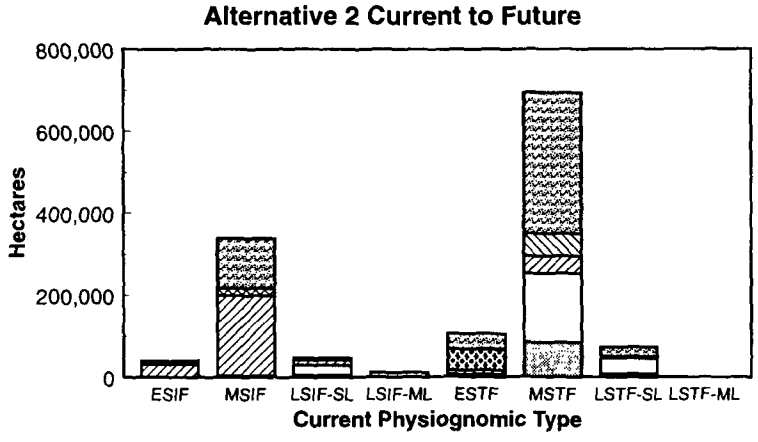
Exotic Herbland (EXOT)
Upland Herbland (UH)
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Early-seral intolerant forest (ESIF)
Early-seral tolerant forest (ESTF)
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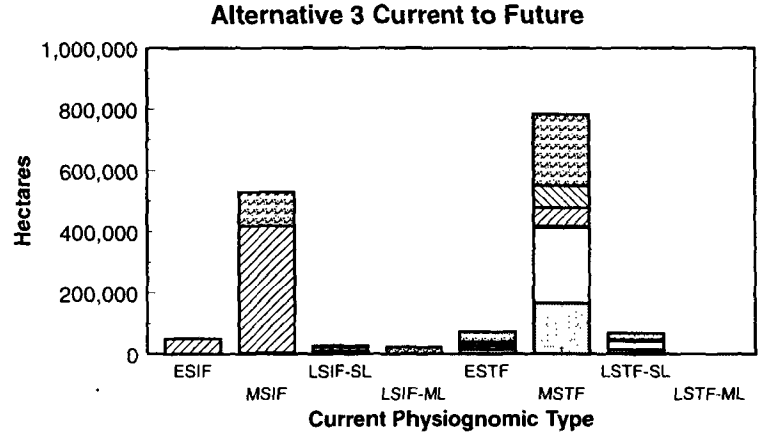
Transitions to Other Physiognomic Types -- Moist Forest

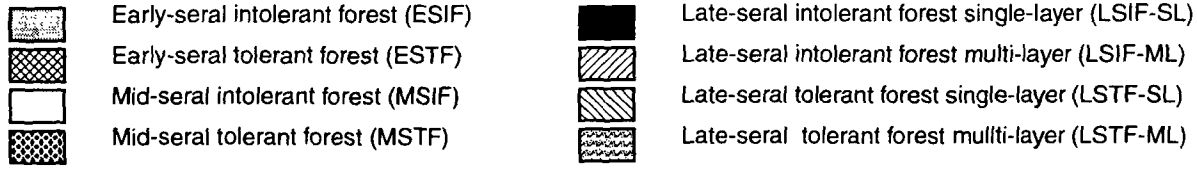
BLM / FS Lands





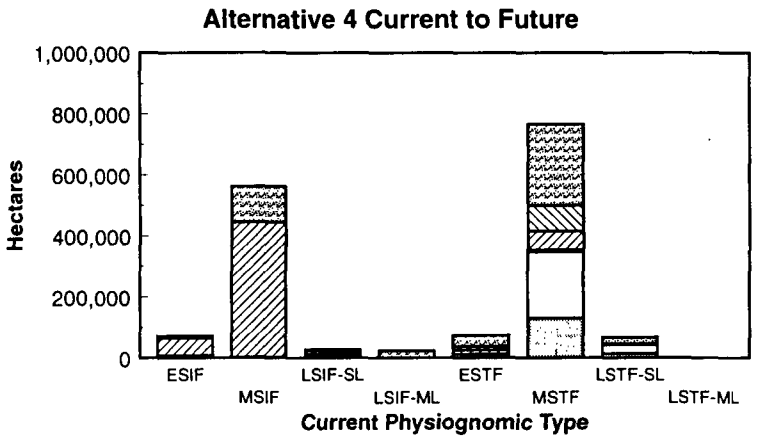


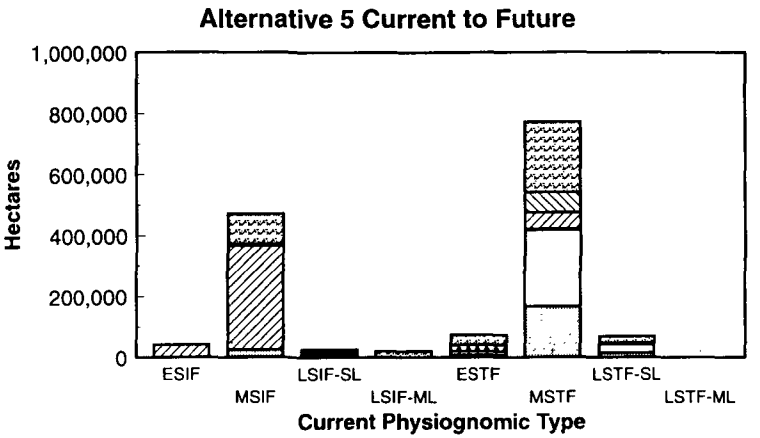


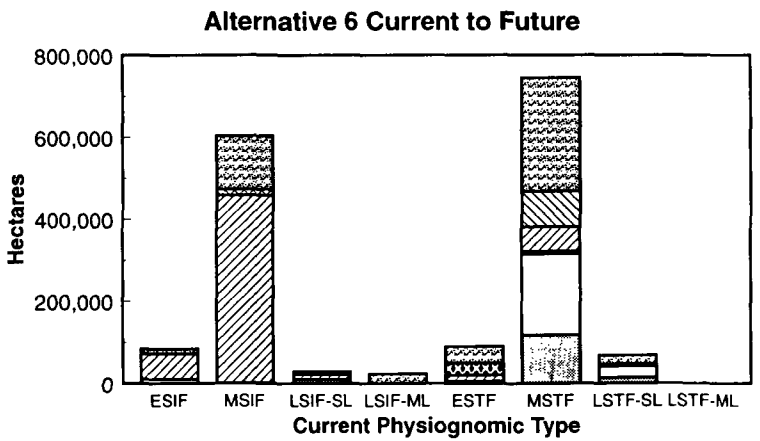


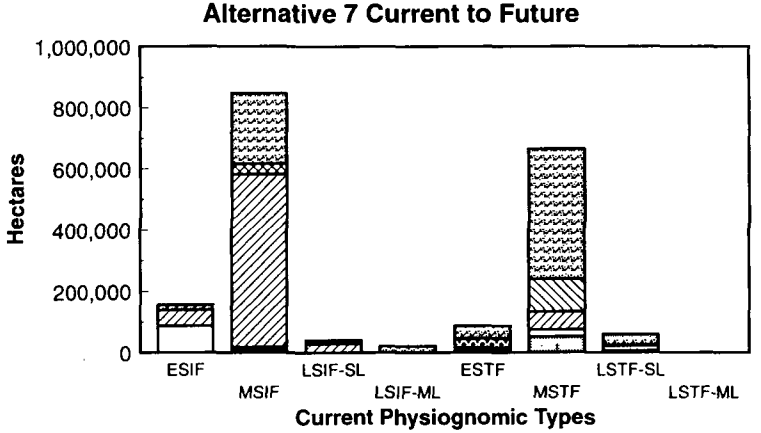
Transitions to Other Physiognomic Types -- Moist Forest

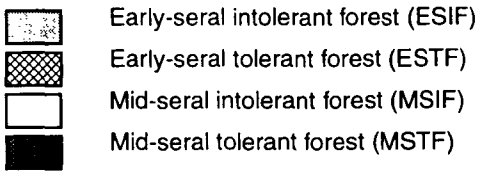
BLM / FS Lands

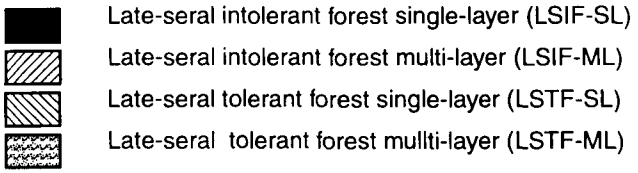






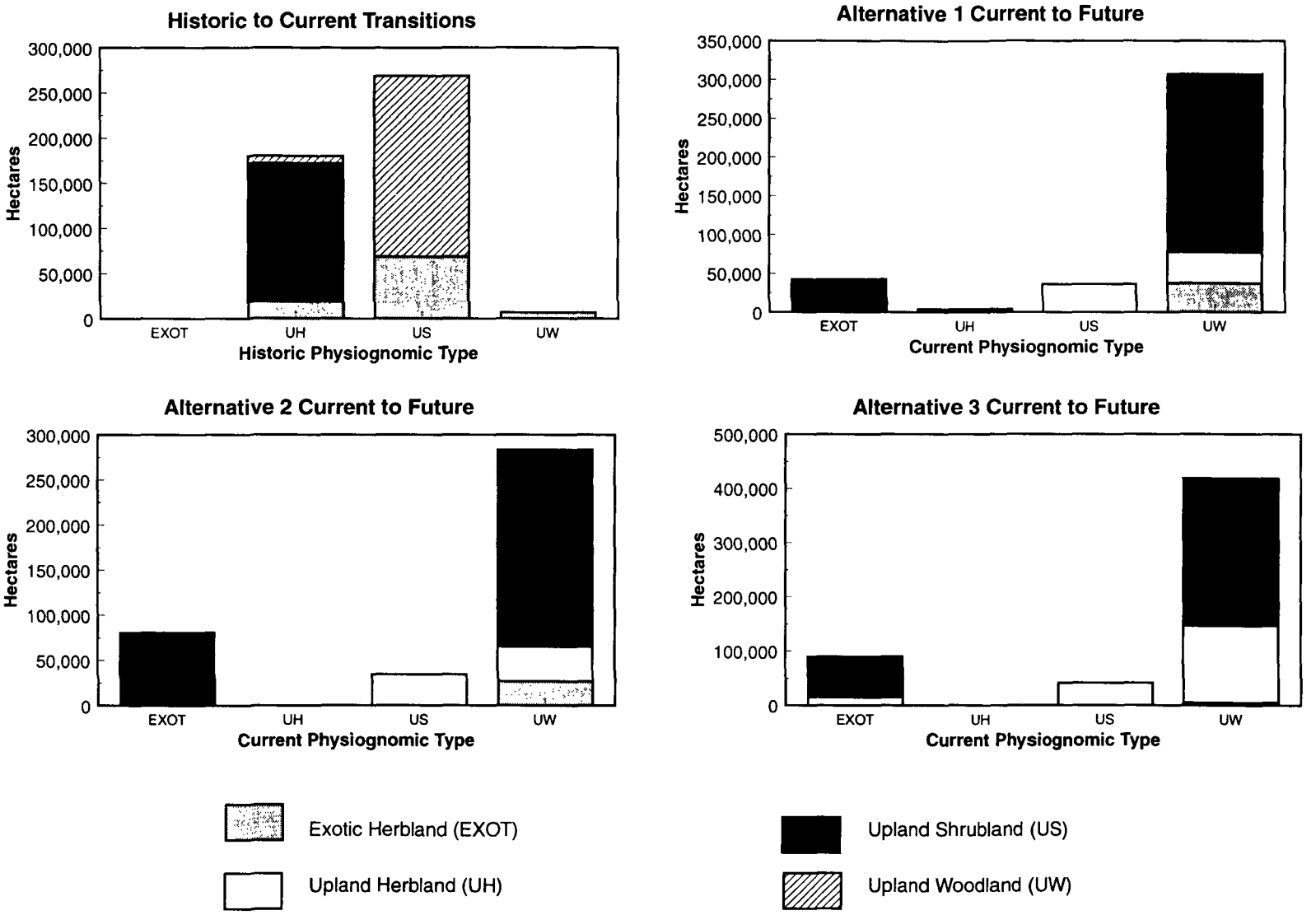






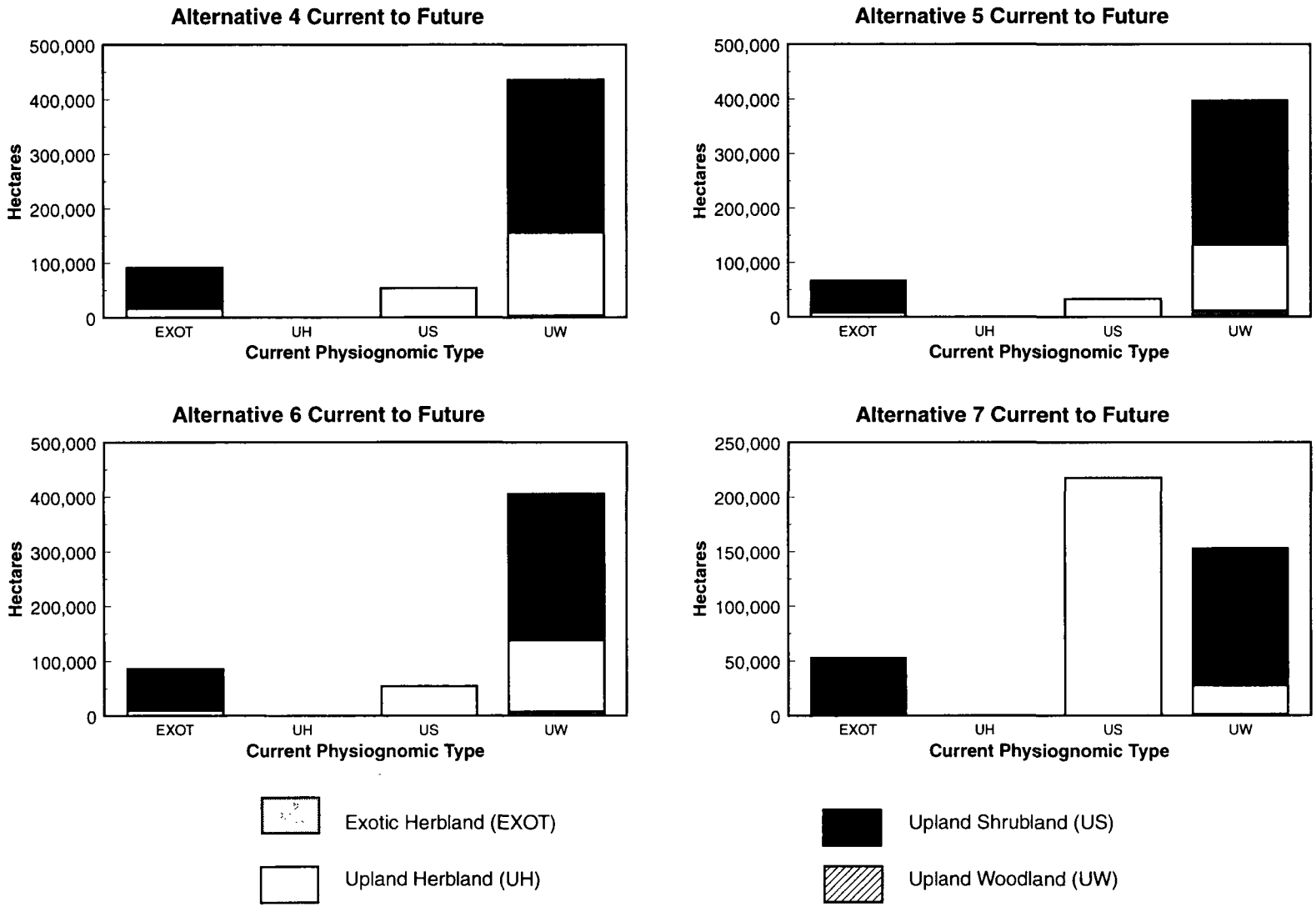
Transitions to Other Physiognomic Types -- Cool Shrub

BLM / FS Lands



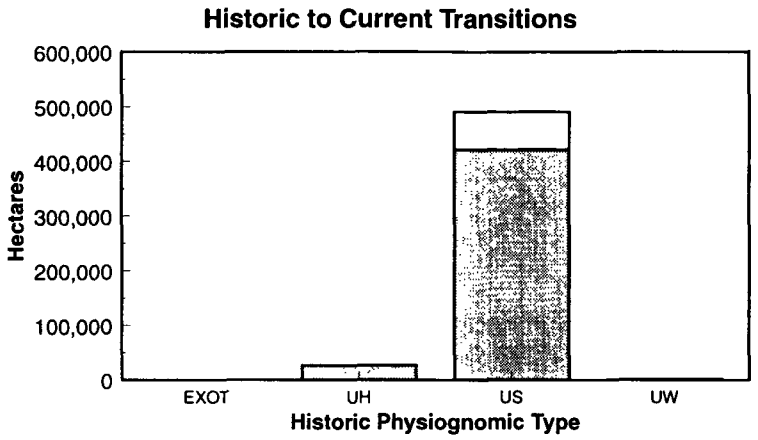
Transitions to Other Physiognomic Types -- Cool Shrub

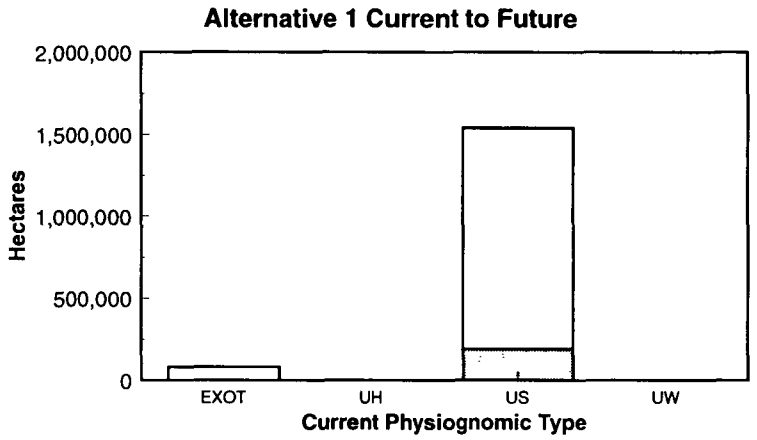
BLM / FS Lands

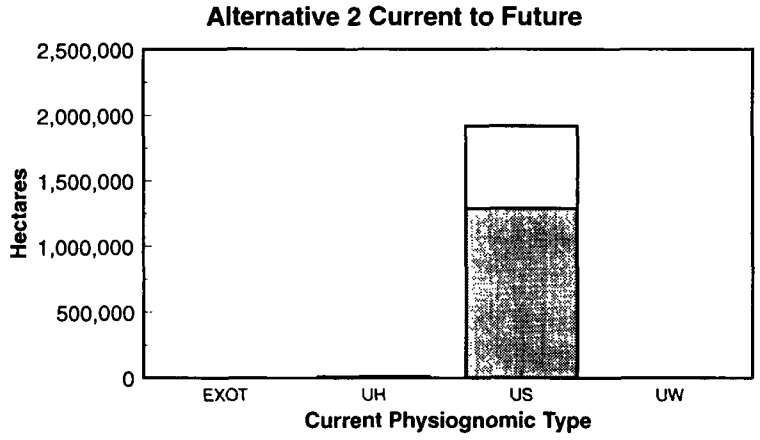


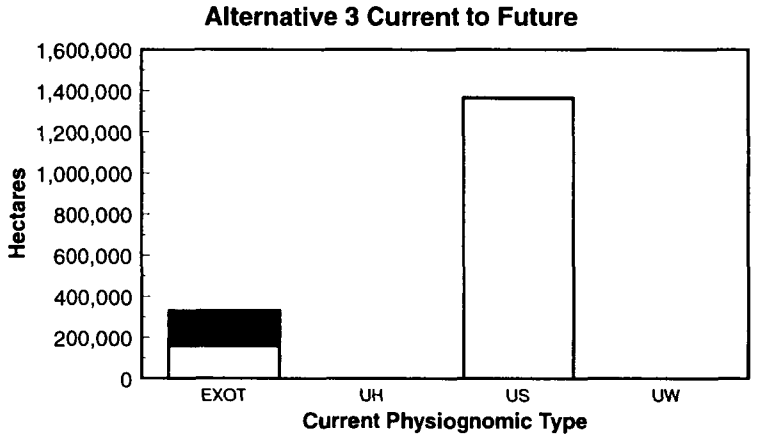
Transitions to Other Physiognomic Types -- Dry Shrub

BLM / FS Lands





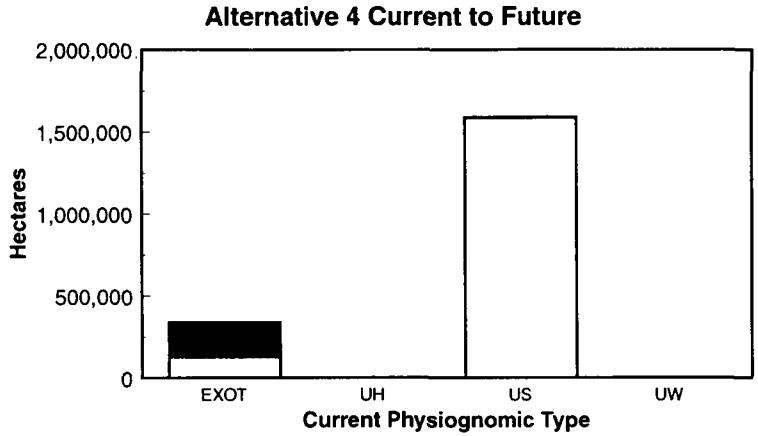


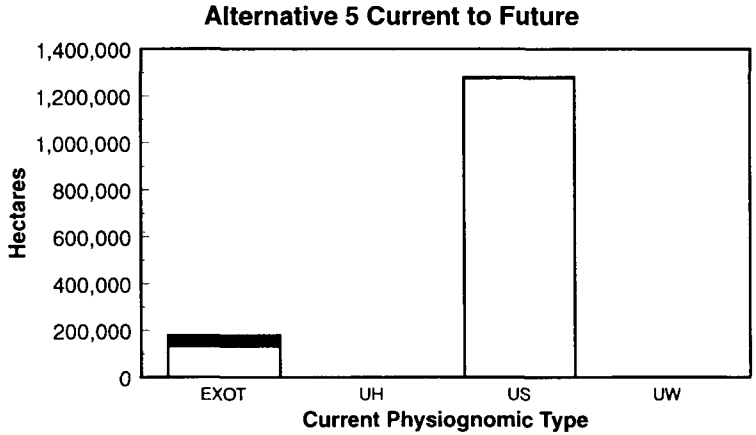


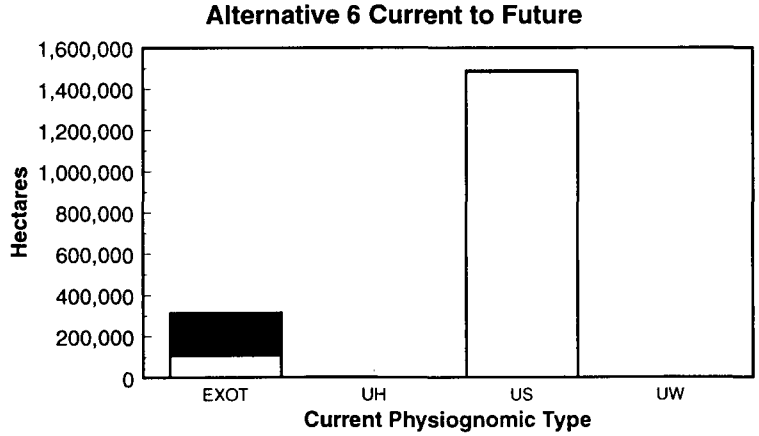
Exotic Herbland (EXOT) | Upland Herbland (UH) | Upland Shrubland (US) | Upland Woodland (UW)

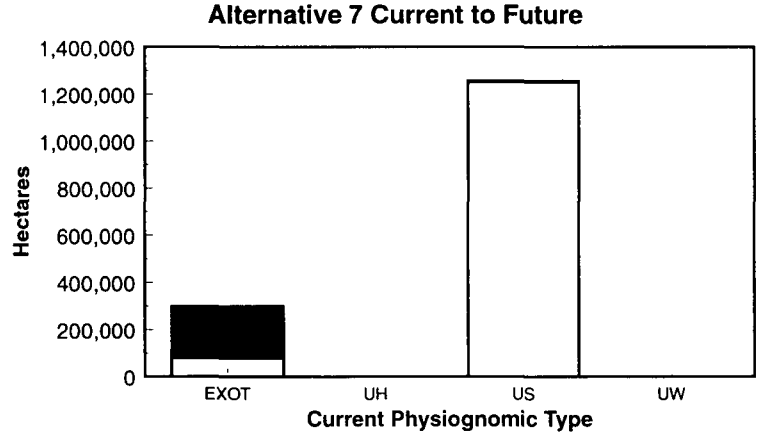
Transitions to Other Physiognomic Types -- Dry Shrub

BLM / FS Lands





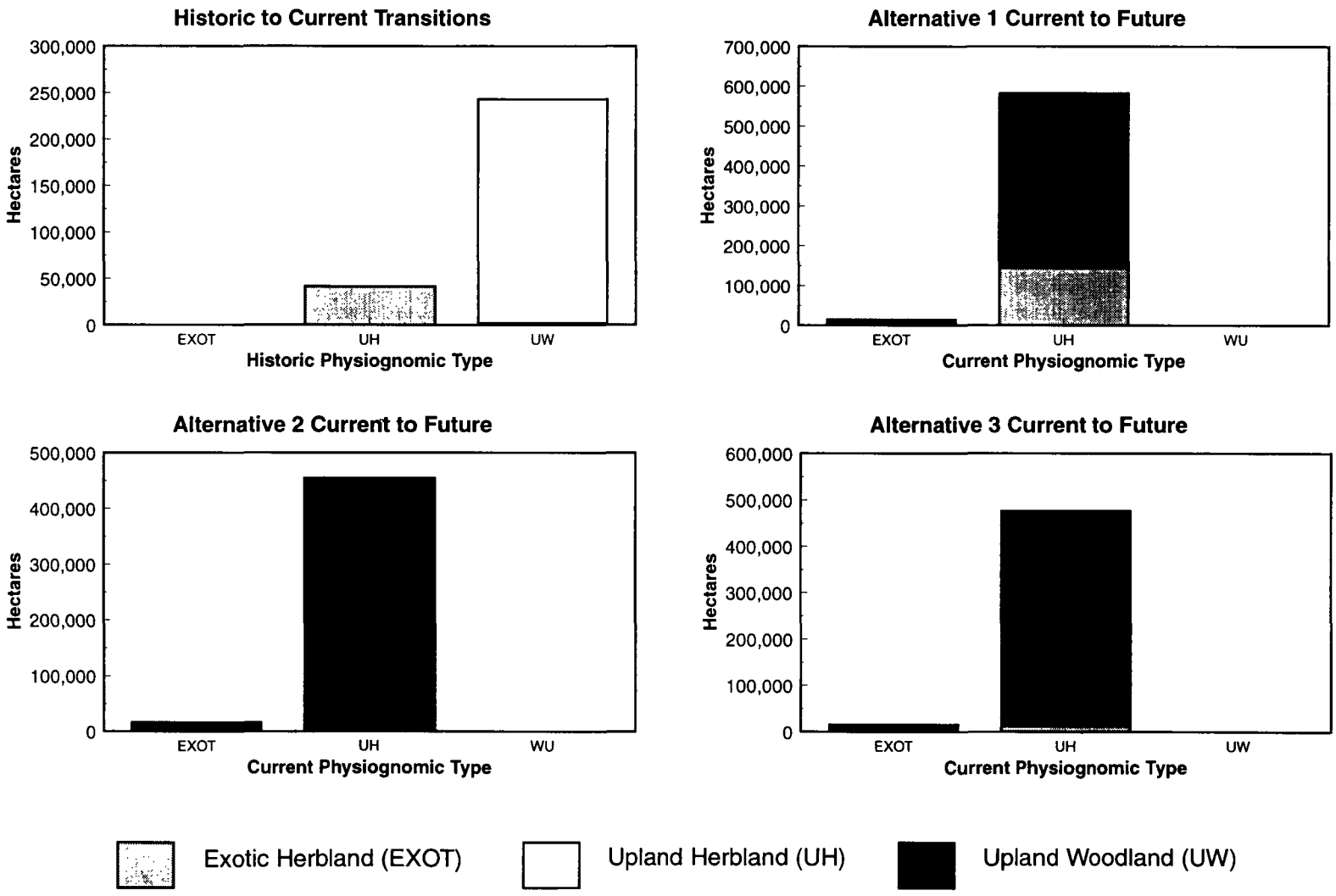




Exotic Herbland (EXOT) Upland Herbland (UH) Upland Shrubland (US) Upland Woodland (UW)

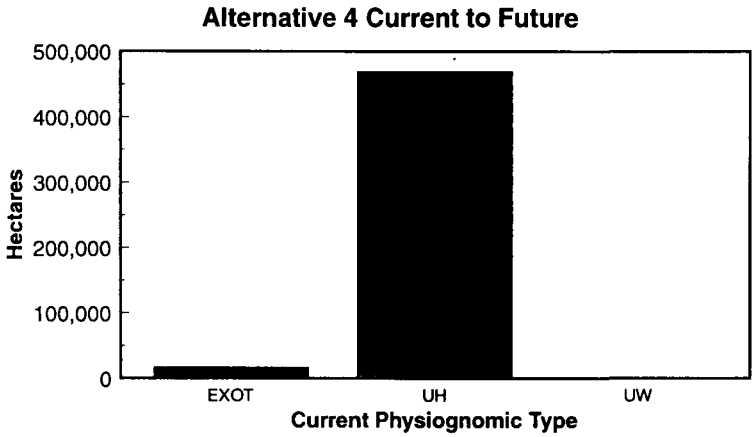
Transitions to Other Physiognomic Types -- Dry Grass

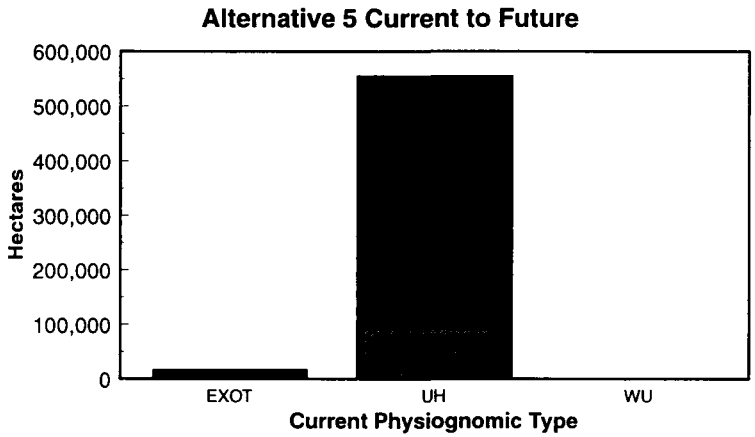
BLM / FS Lands

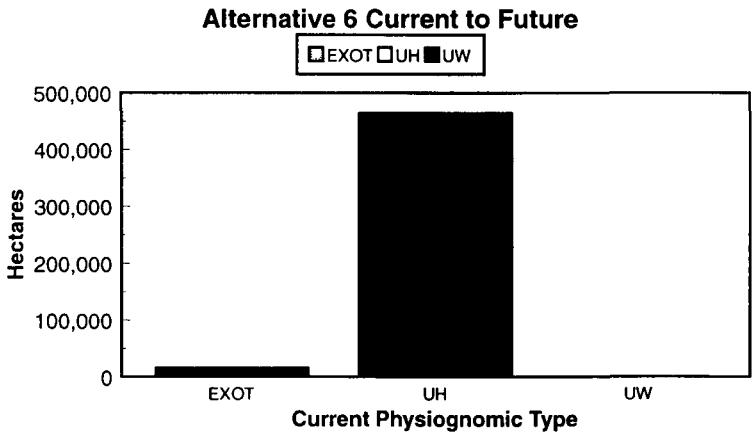


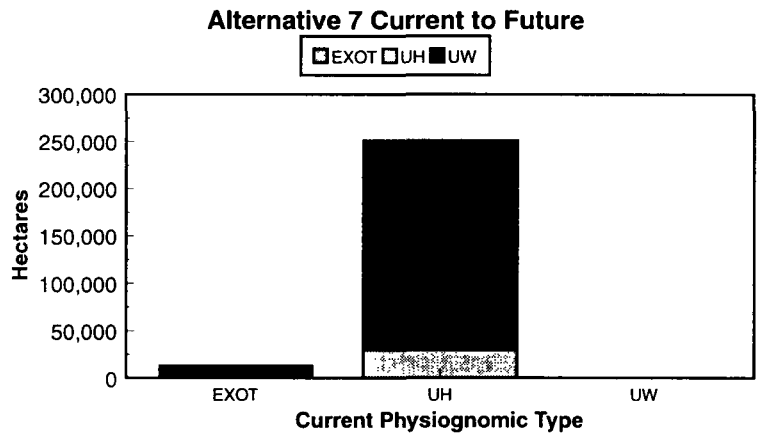
Transitions to Other Physiognomic Types -- Dry Grass

BLM / FS Lands







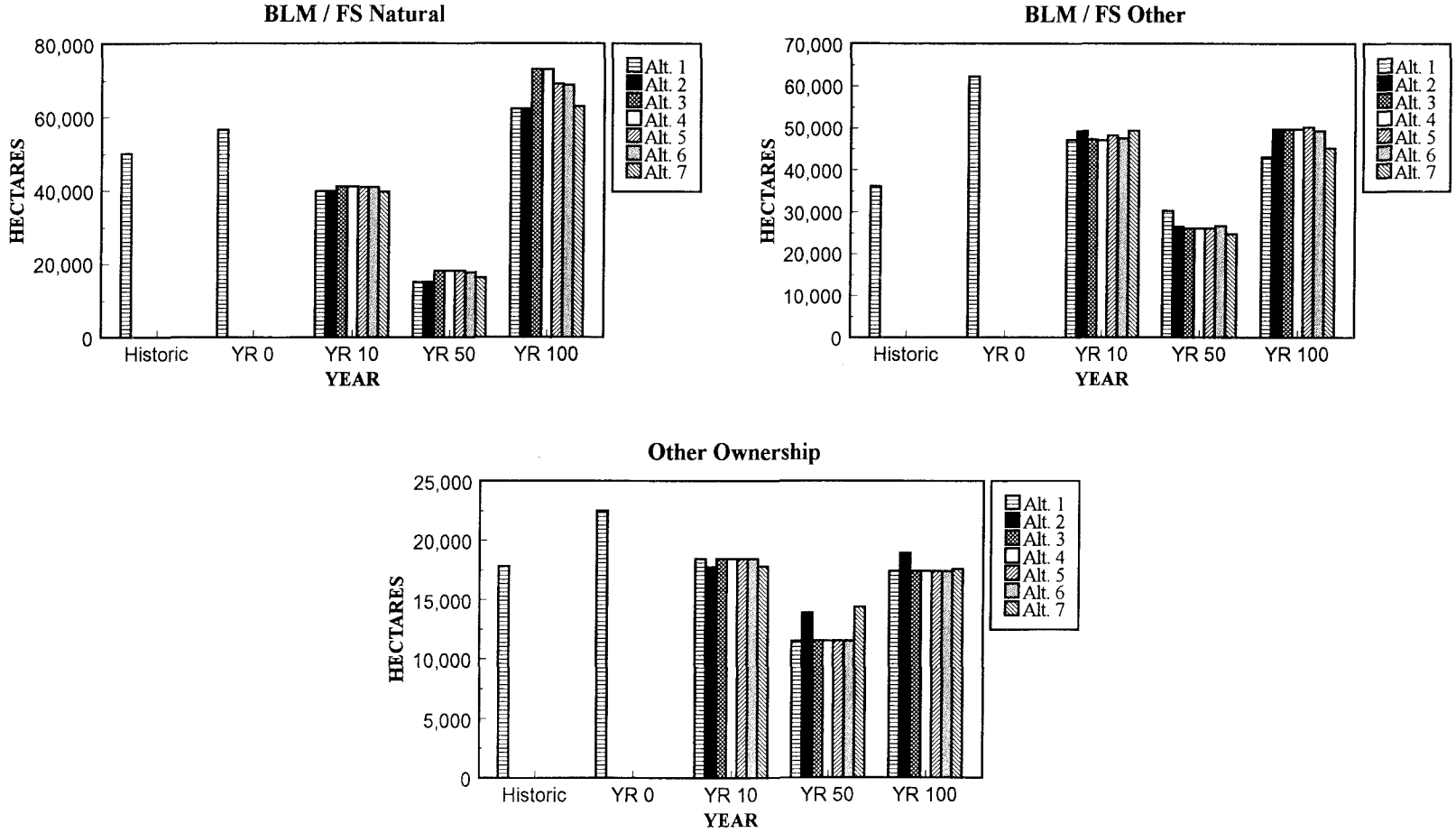




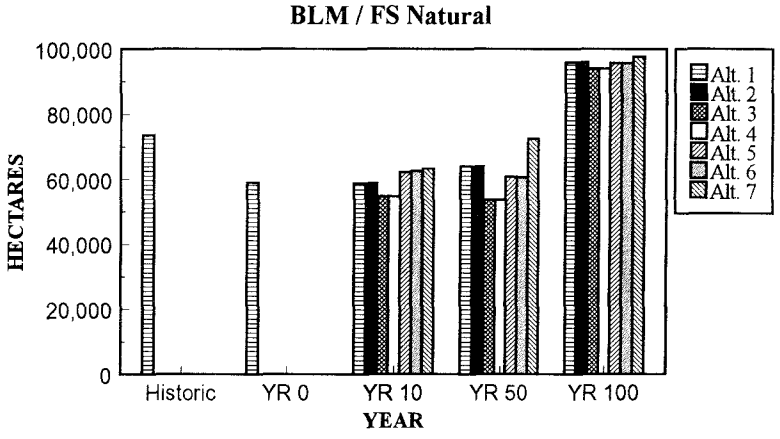
Appendix 2-K

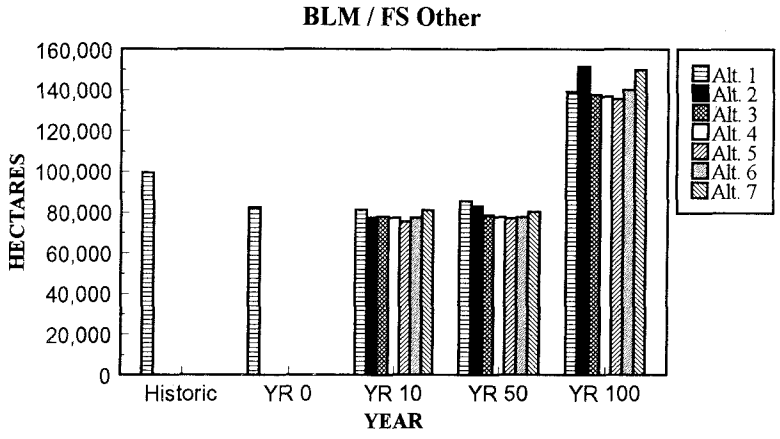
Physiognomic type group trends by PVG for alternatives.

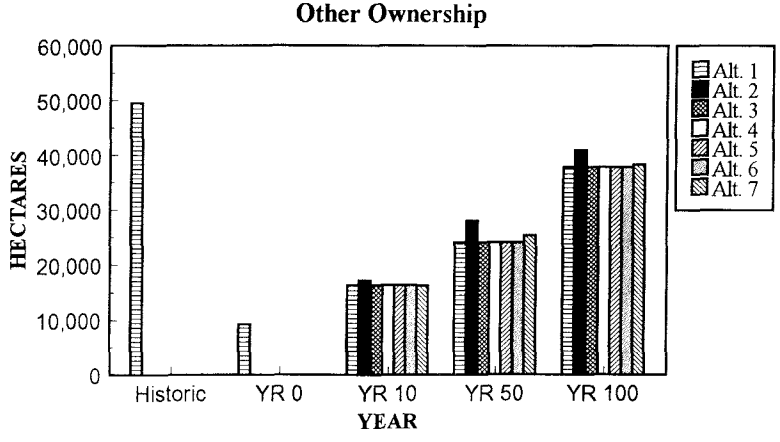
EASTSIDE E.I.S.
COLD FOREST / LATE-SERAL INTOLERANT MULTI-LAYER



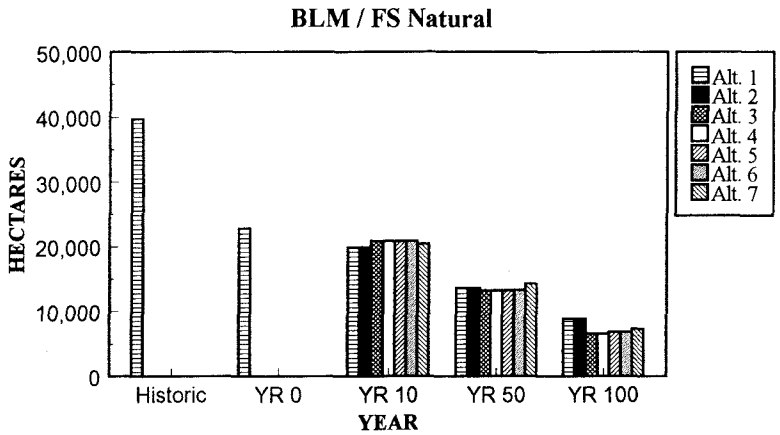
UPPER COLUMBIA RIVER BASIN
COLD FOREST / LATE-SERAL INTOLERANT MULTI-LAYER

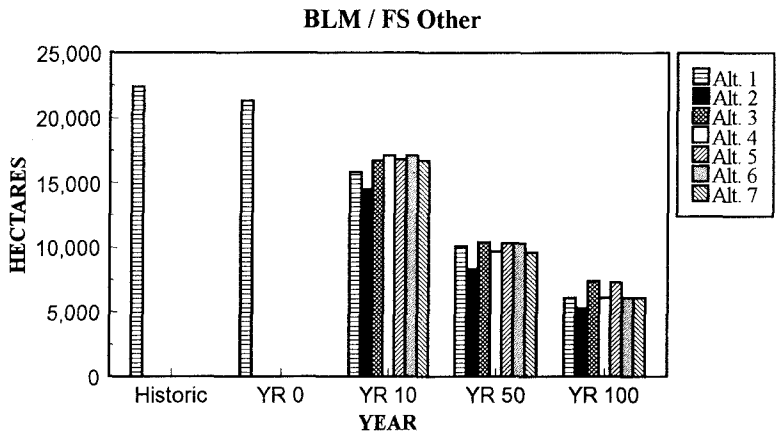


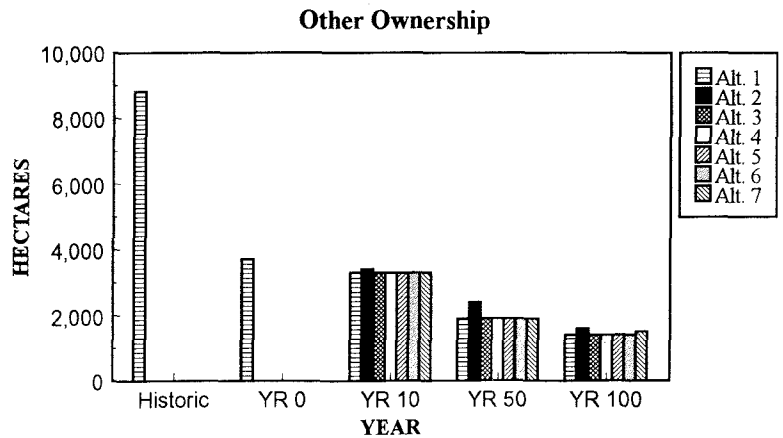




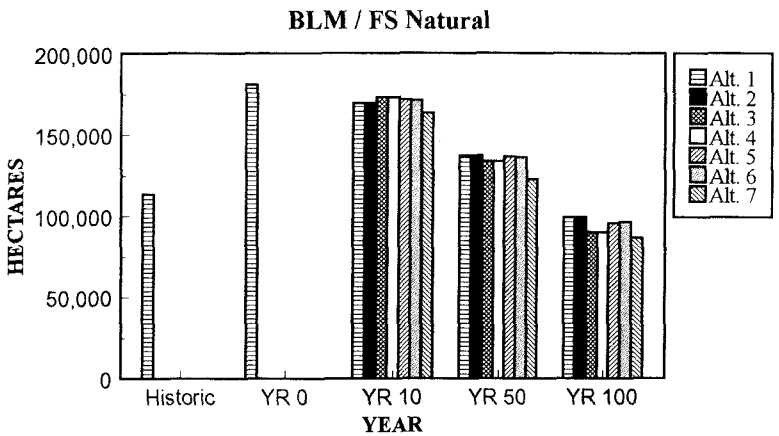
EASTSIDE E.I.S.
COLD FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

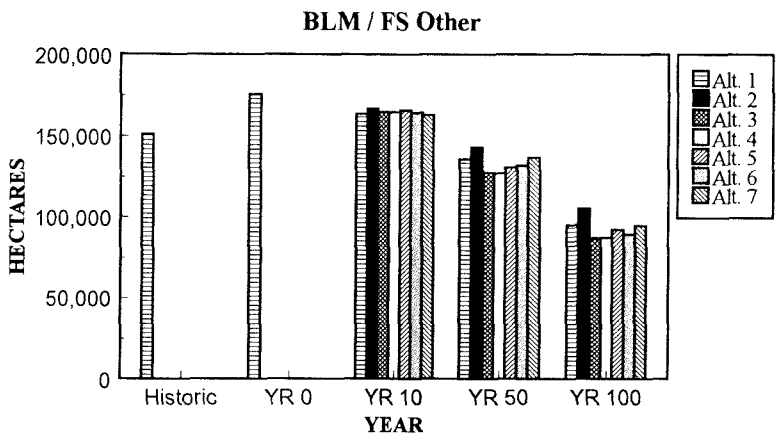


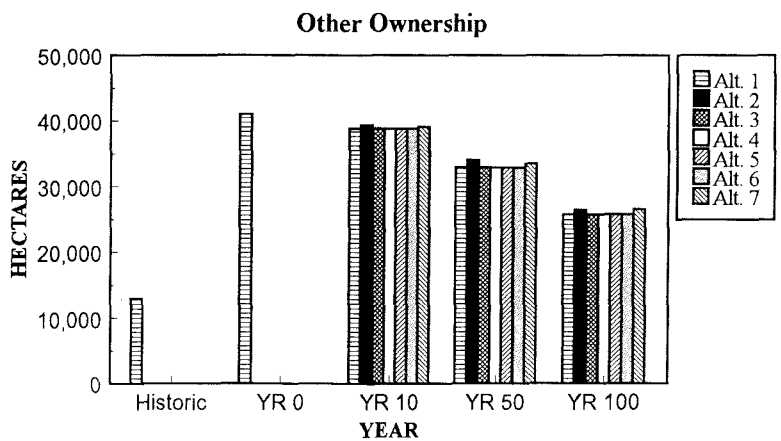




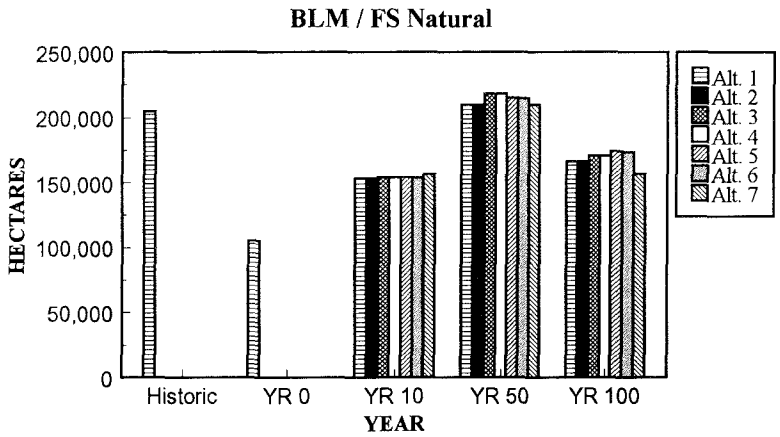
UPPER COLUMBIA RIVER BASIN
COLD FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

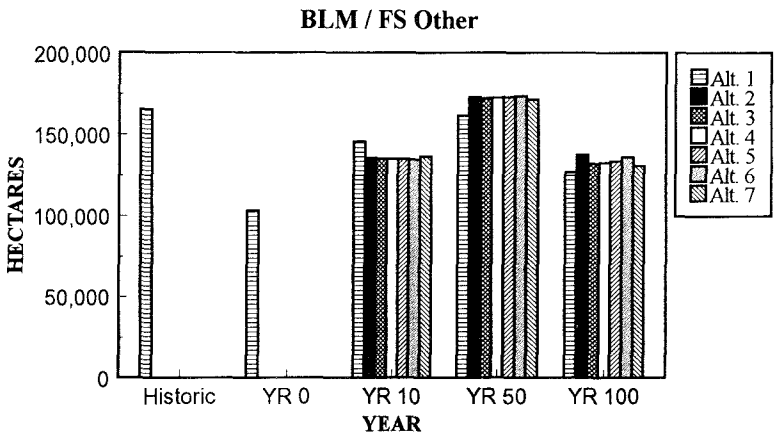


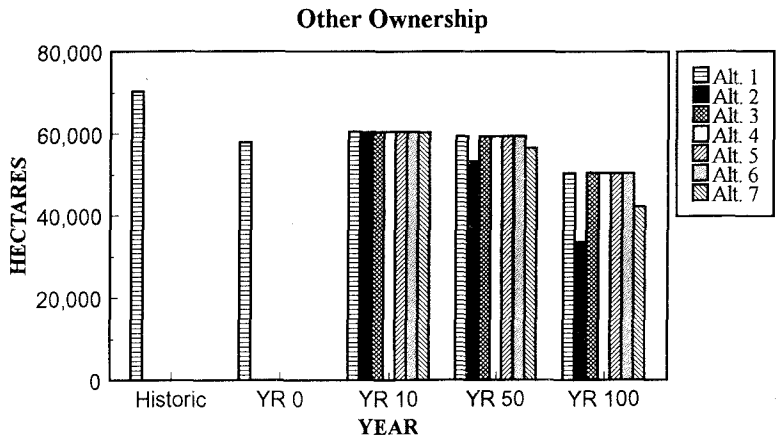




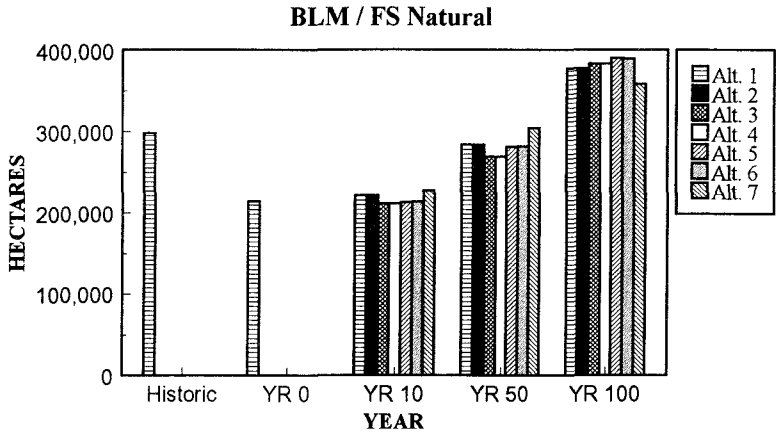
EASTSIDE E.I.S.
COLD FOREST / MID-SERAL INTOLERANT

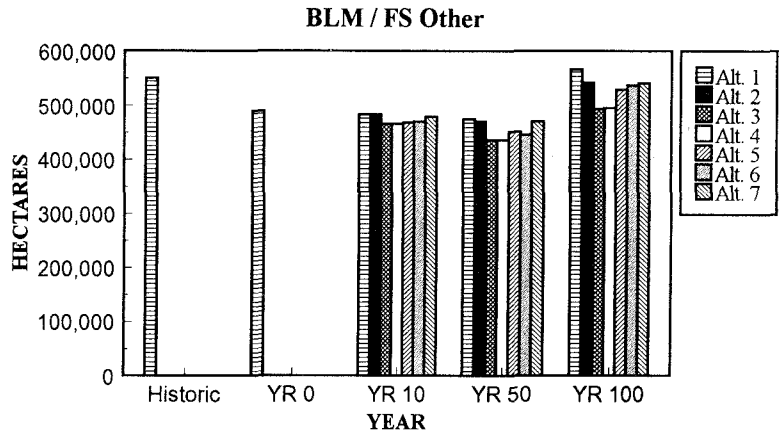


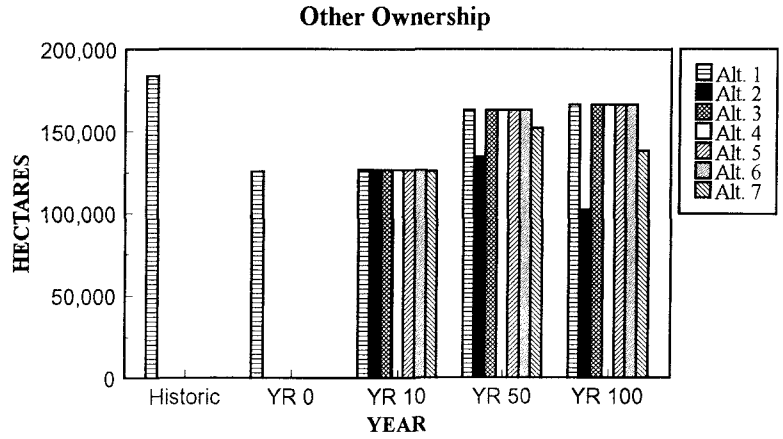




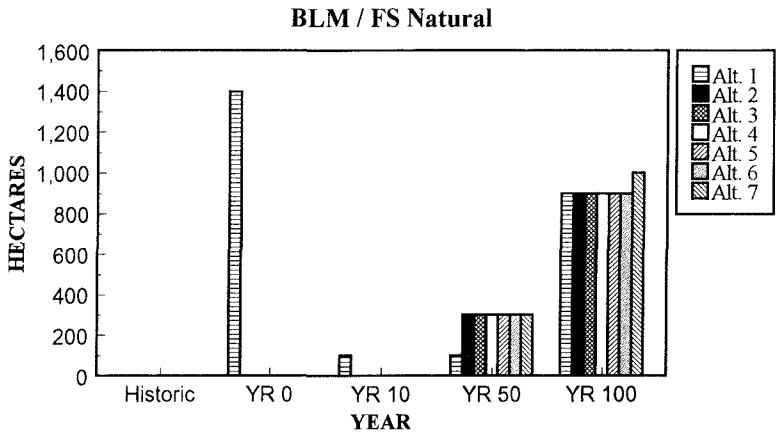
UPPER COLUMBIA RIVER BASIN
COLD FOREST / MID-SERAL INTOLERANT

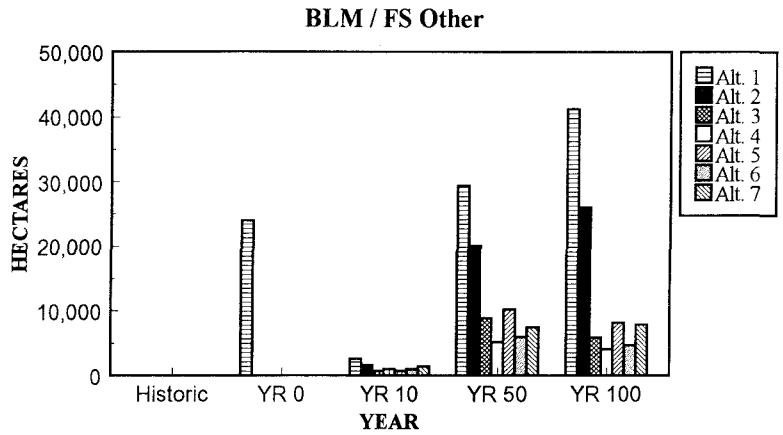


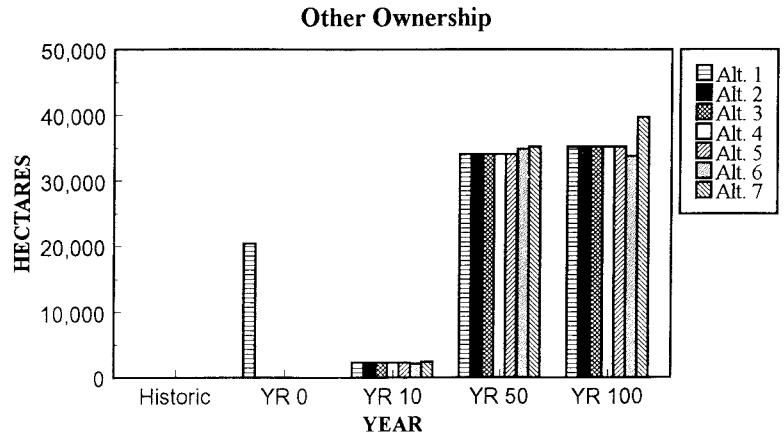




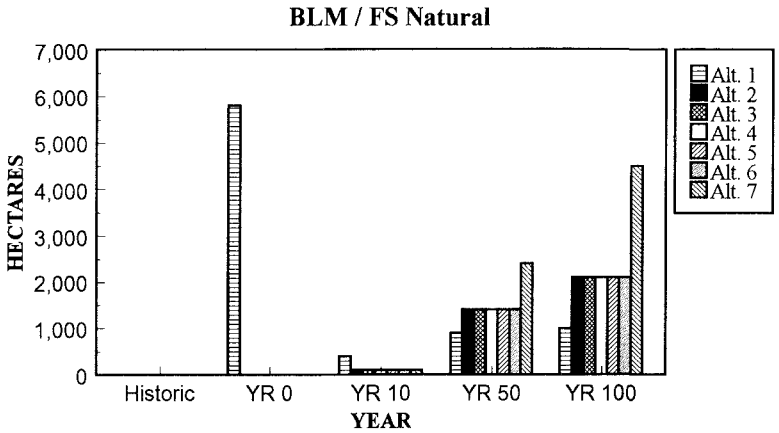
EASTSIDE E.I.S.
COOL SHRUB / EXOTICS

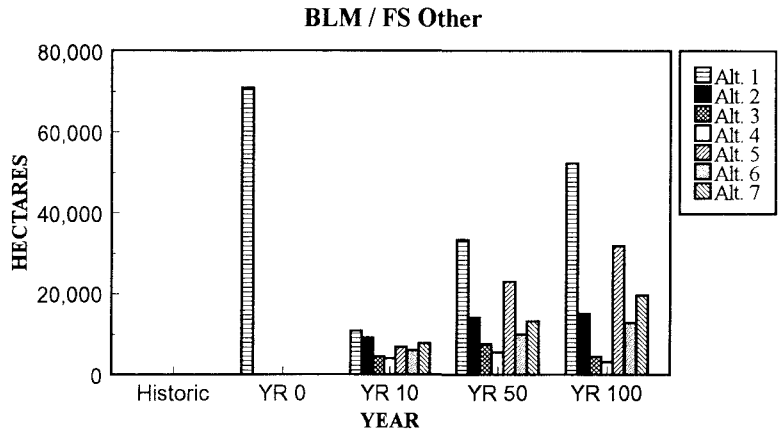


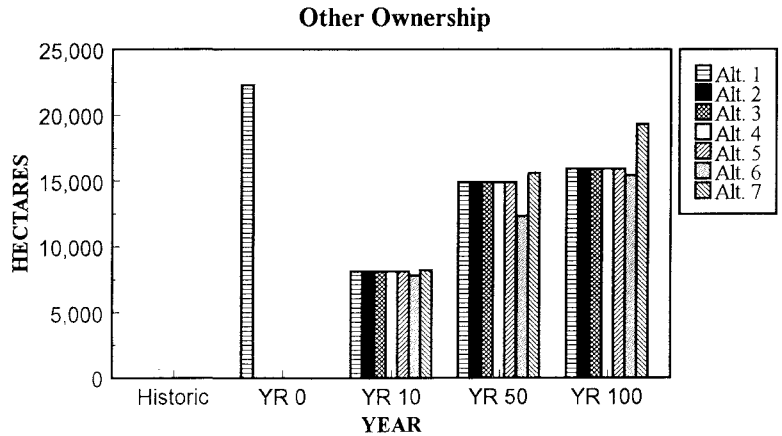




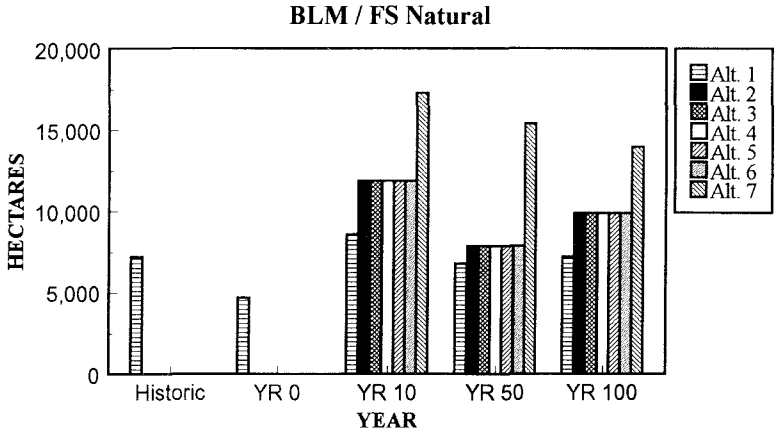
UPPER COLUMBIA RIVER BASIN
COOL SHRUB / EXOTICS

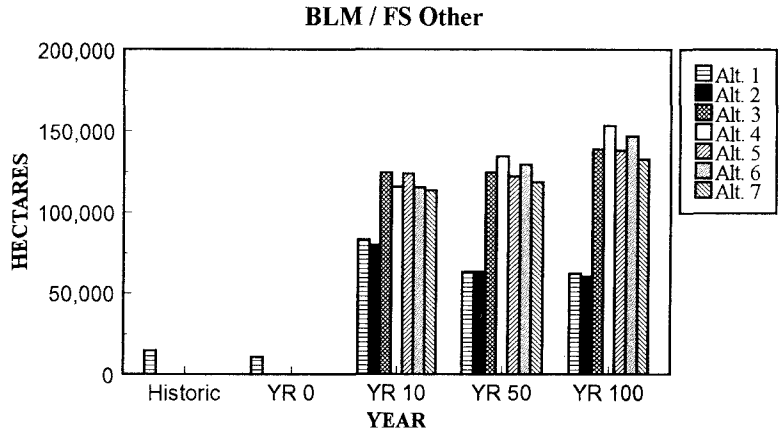


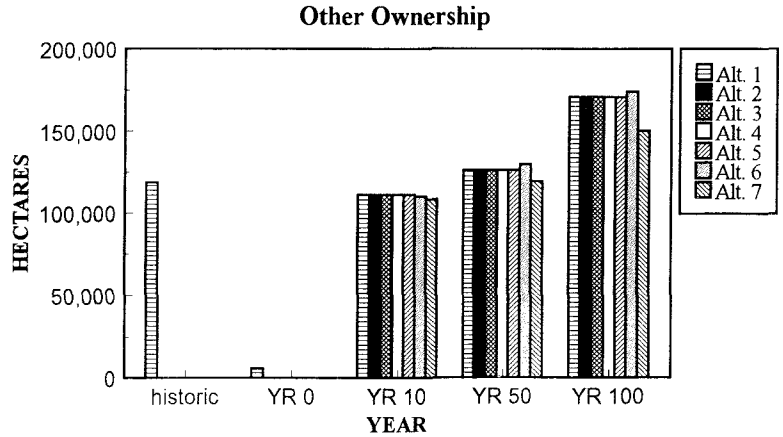




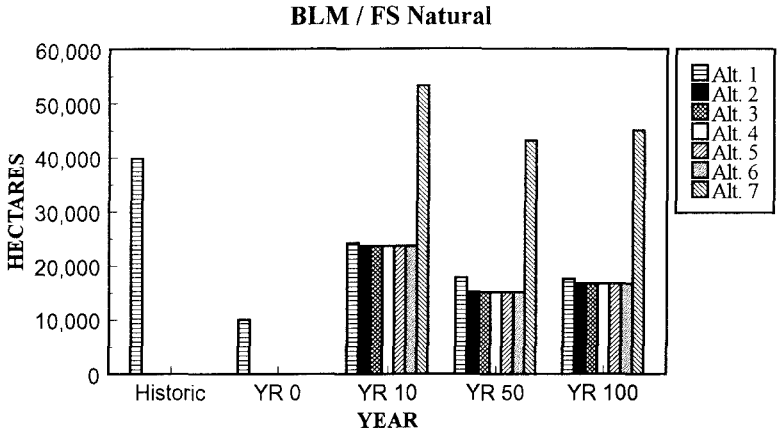
EASTSIDE E. I. S.
COOL SHRUB / UPLAND HERBLAND

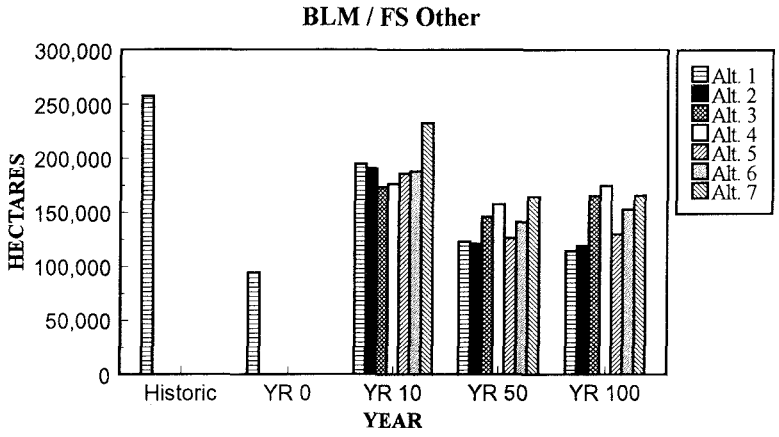


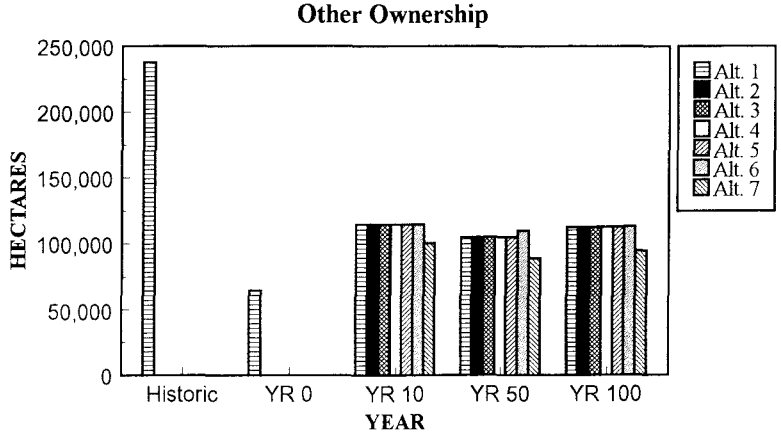




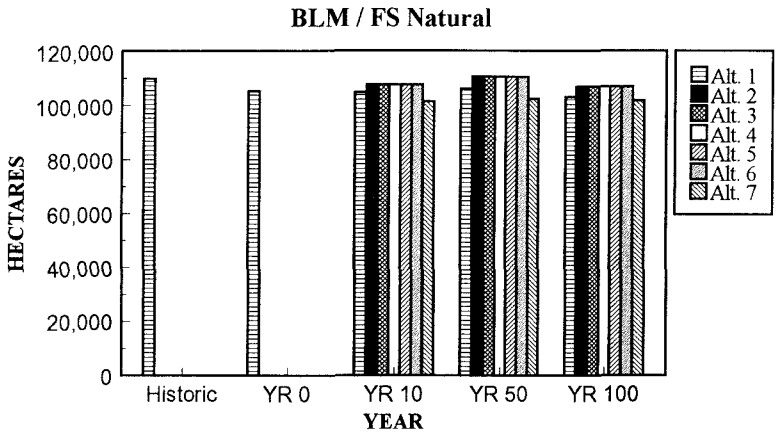
UPPER COLUMBIA RIVER BASIN
COOL SHRUB / UPLAND HERBLAND

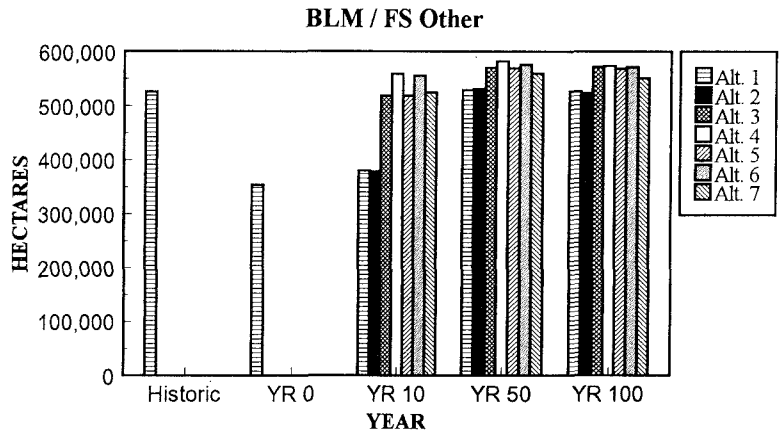


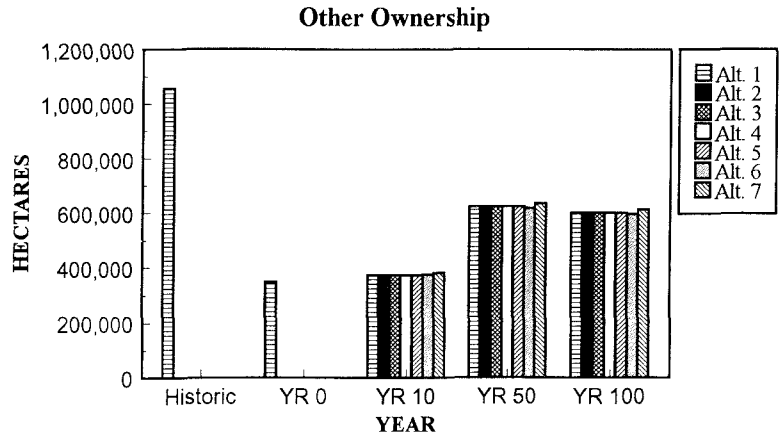




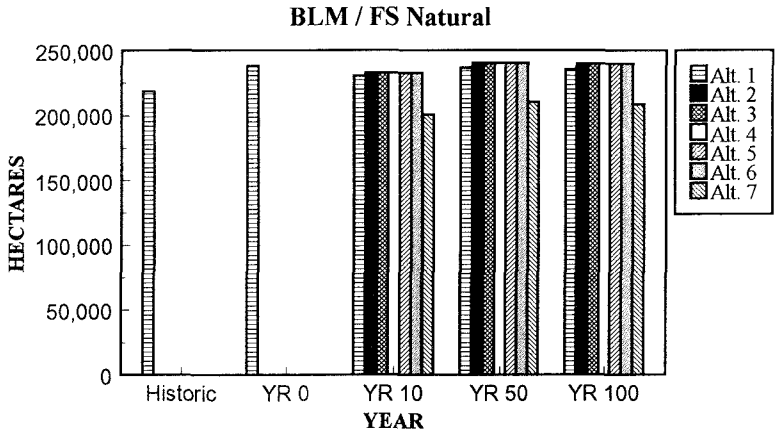
EASTSIDE E. I. S.
COOL SHRUB / UPLAND SHRUBLAND

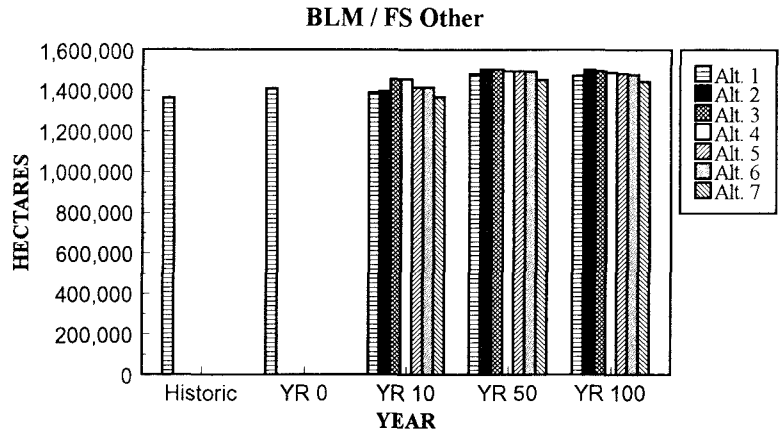


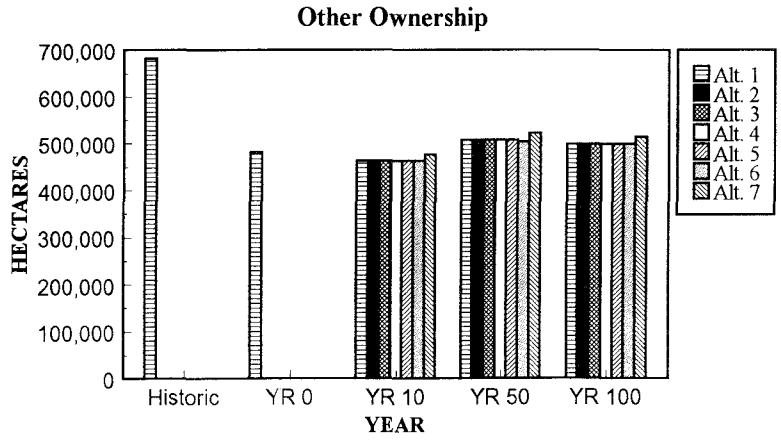




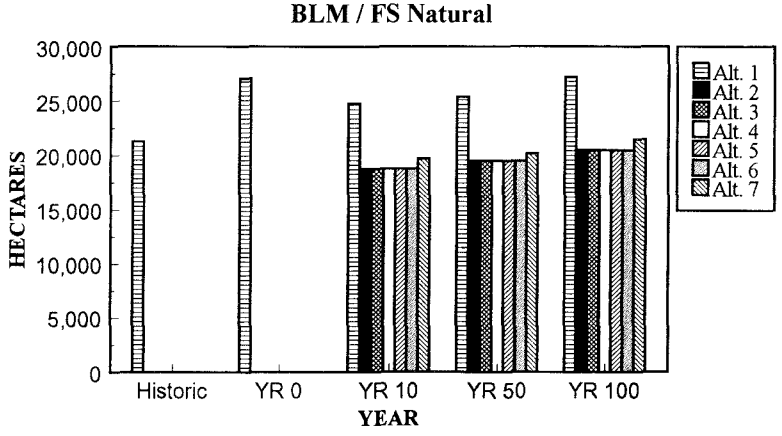
UPPER COLUMBIA RIVER BASIN
COOL SHRUB / UPLAND SHRUBLAND

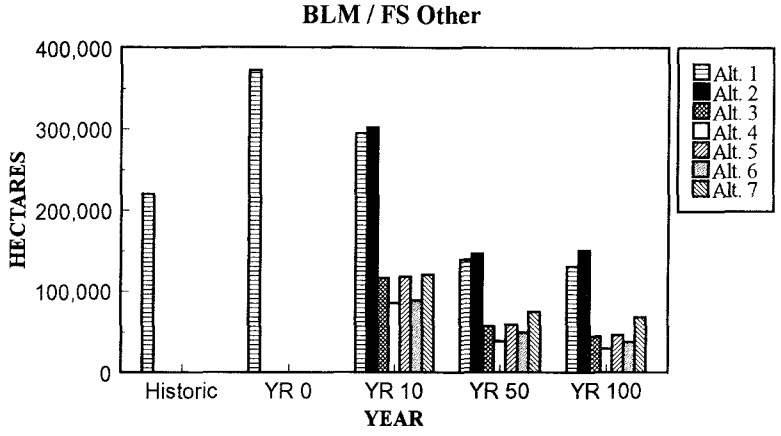


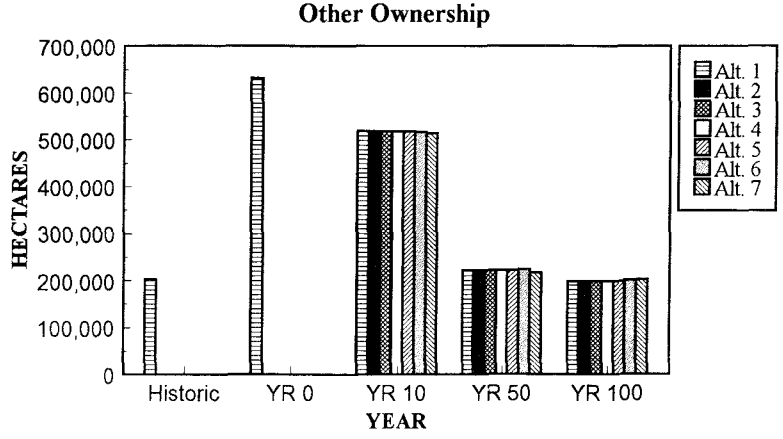




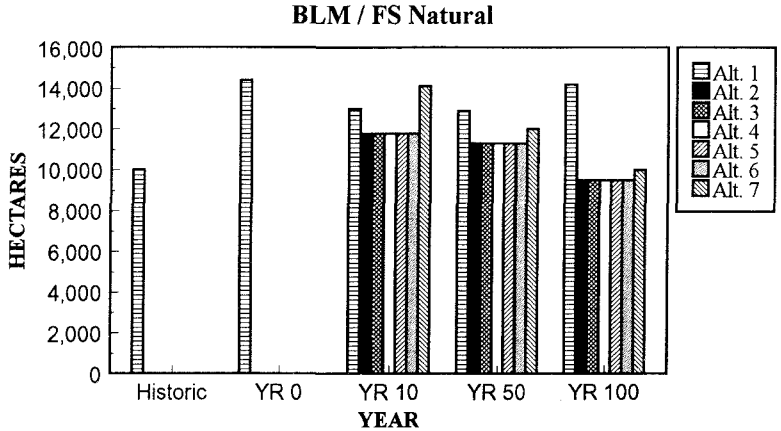
EASTSIDE E.I.S.
COOL SHRUB / UPLAND WOODLAND

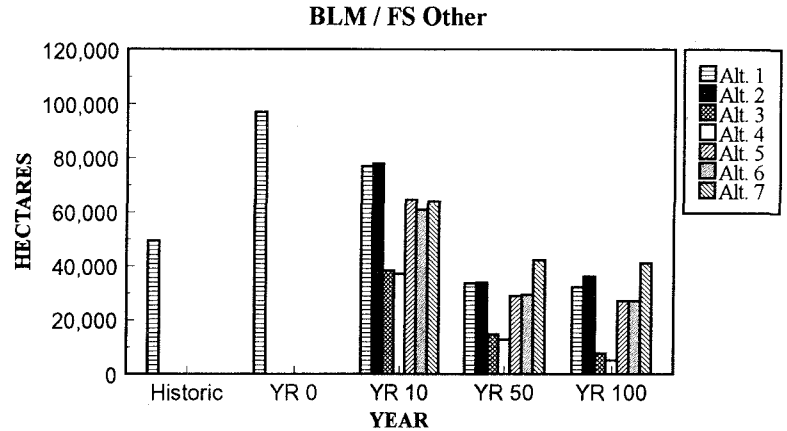


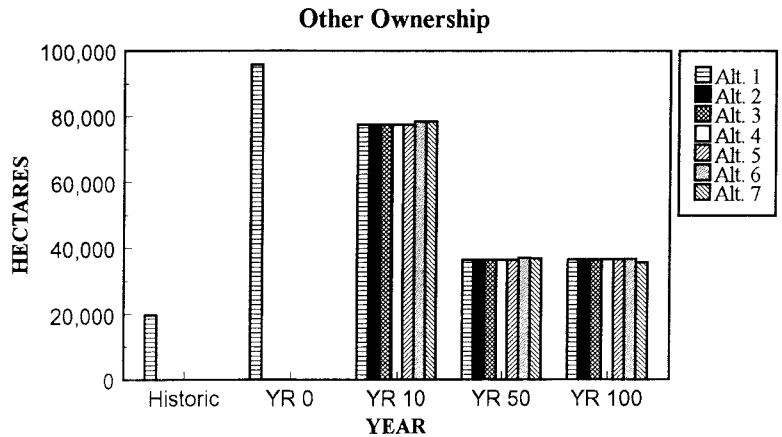




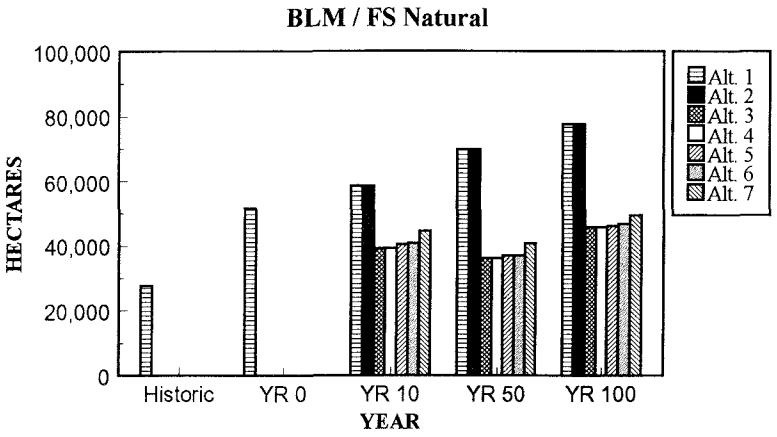
UPPER COLUMBIA RIVER BASIN
COOL SHRUB / UPLAND WOODLAND

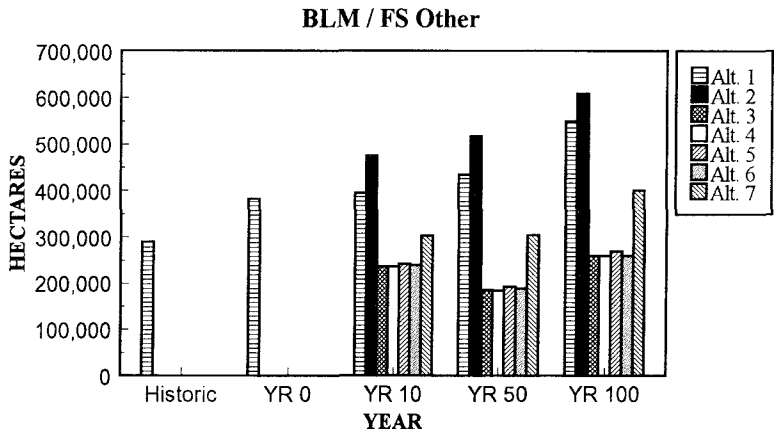


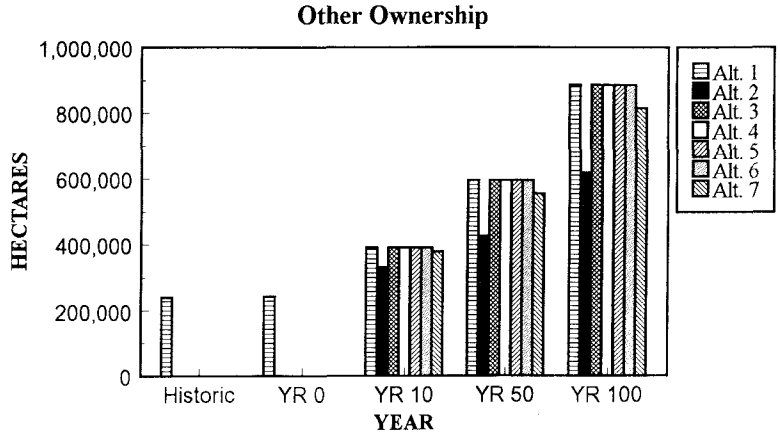




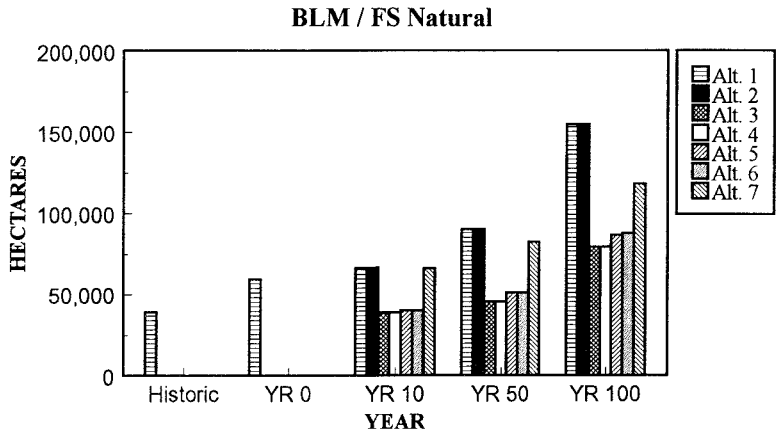
EASTSIDE E.I.S.
DRY FOREST / LATE-SERAL INTOLERANT MULTI-LAYER

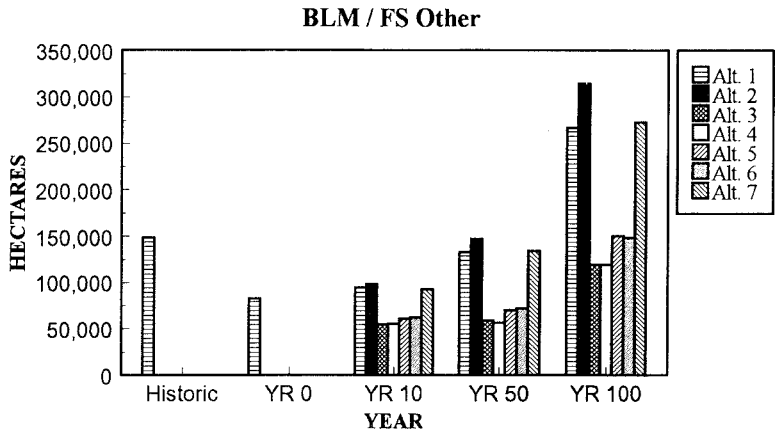


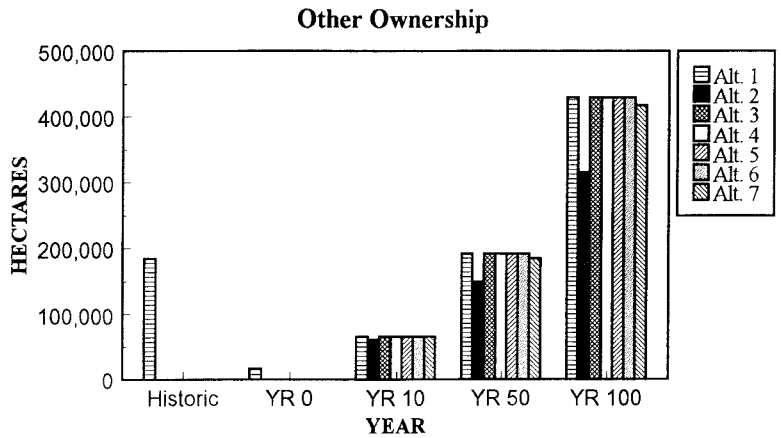




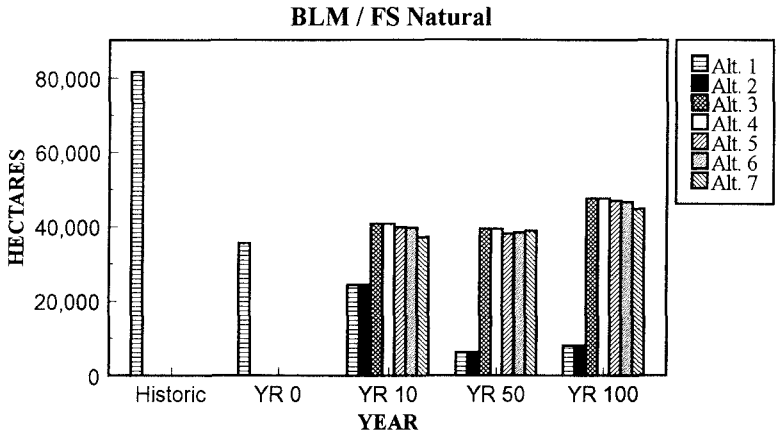
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DRY FOREST / LATE-SERAL INTOLERANT MULTI-LAYER

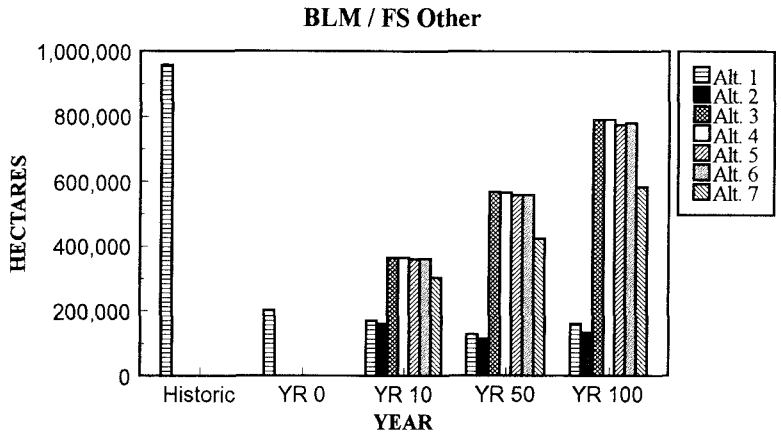


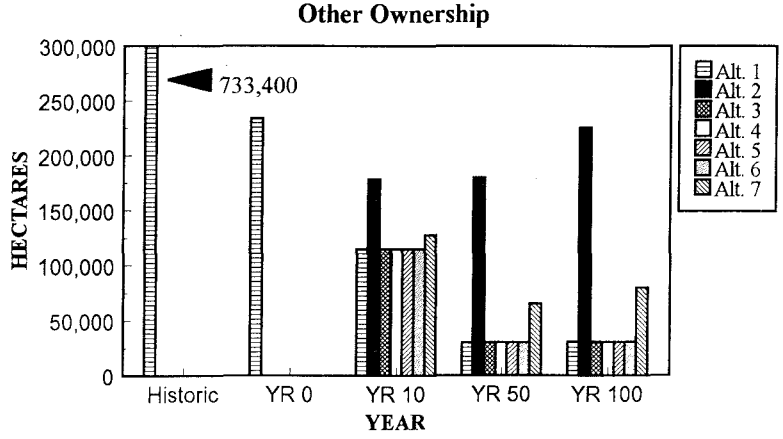




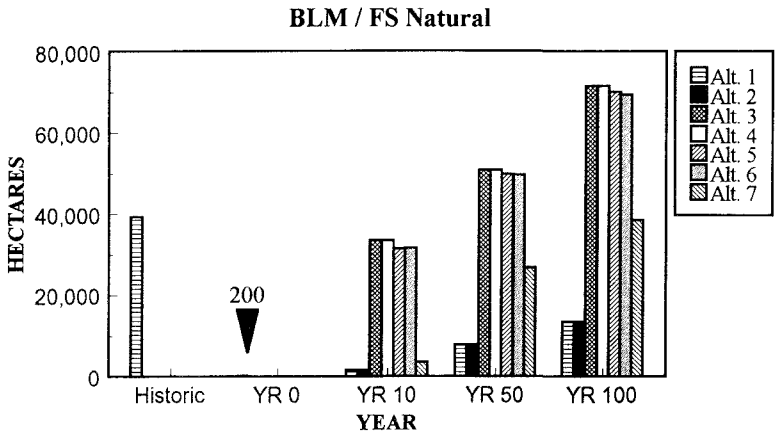
EASTSIDE E. I. S.
DRY FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

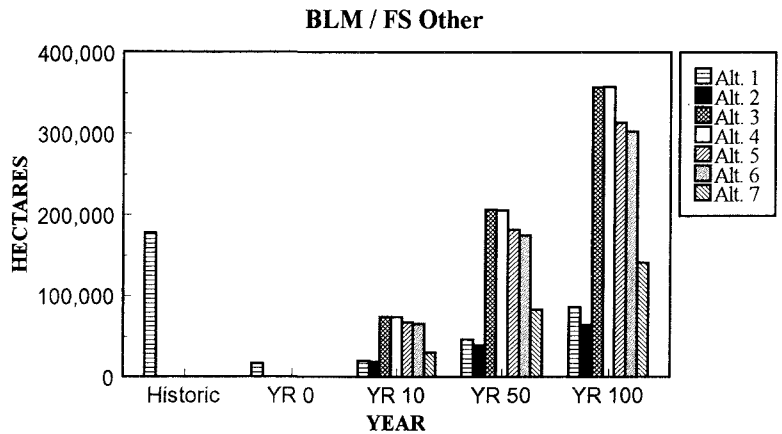


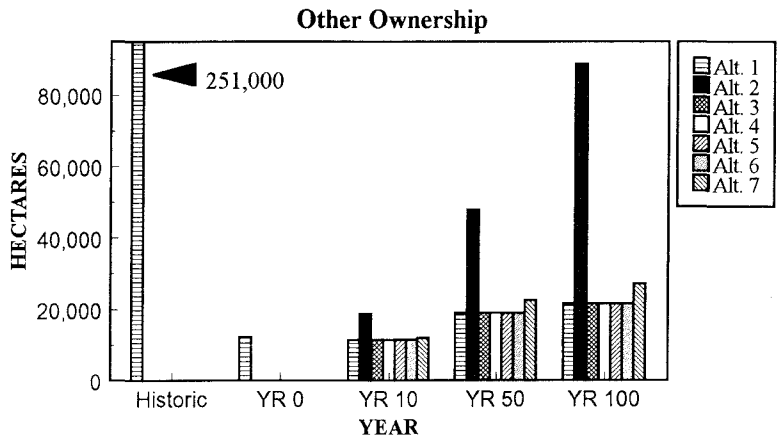




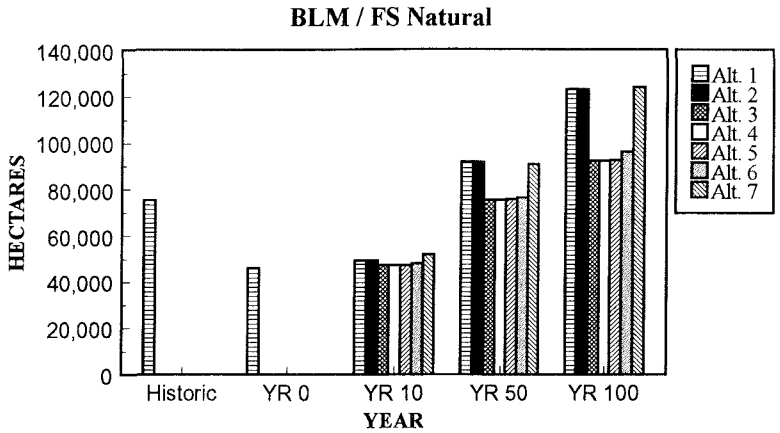
UPPER COLUMBIA RIVER BASIN
DRY FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

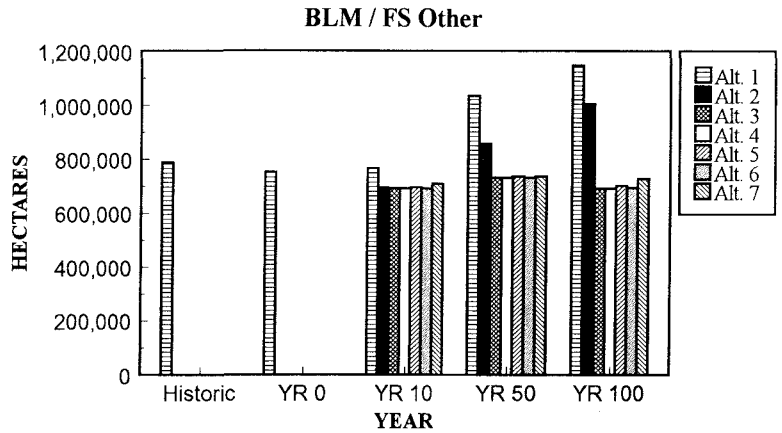


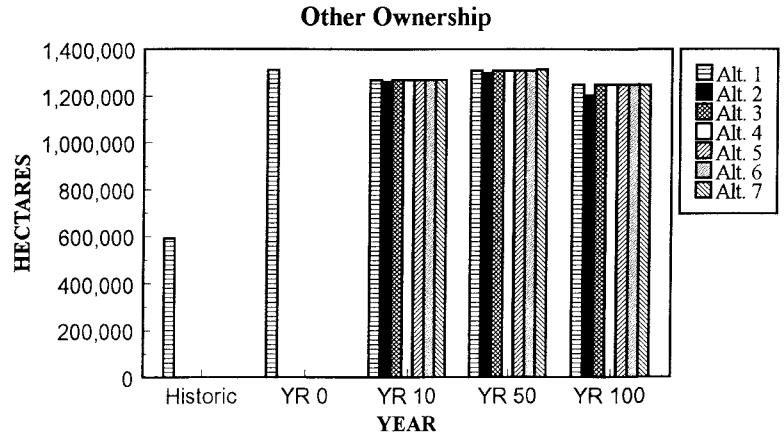




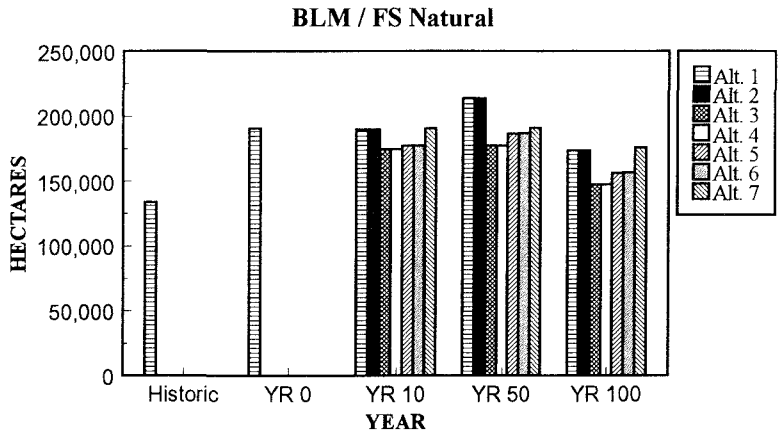
EASTSIDE E.I.S.
DRY FOREST / MID-SERAL INTOLERANT

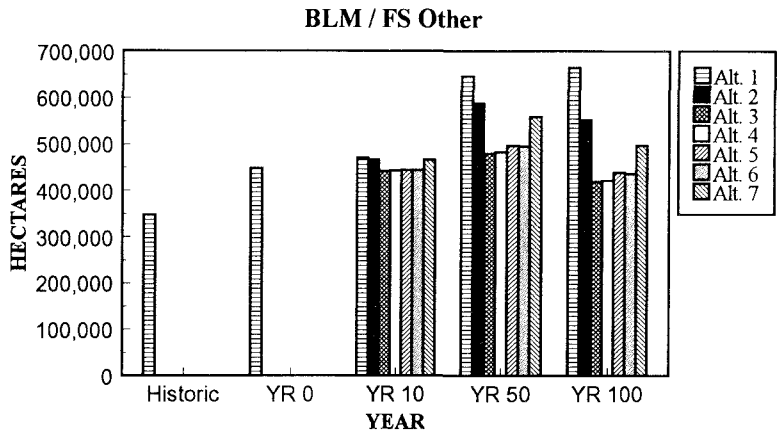


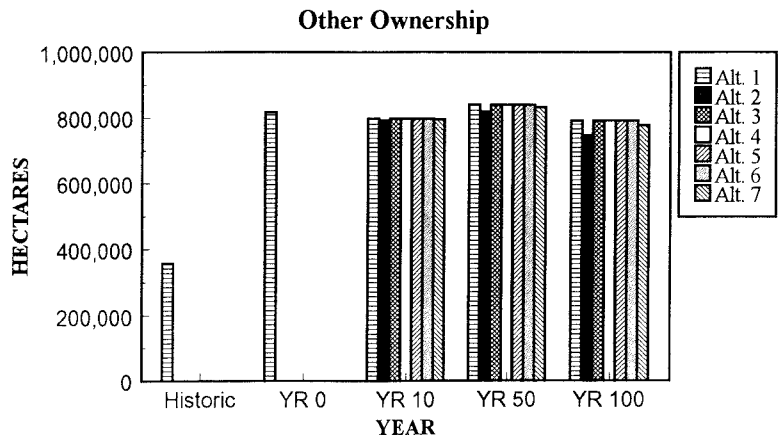




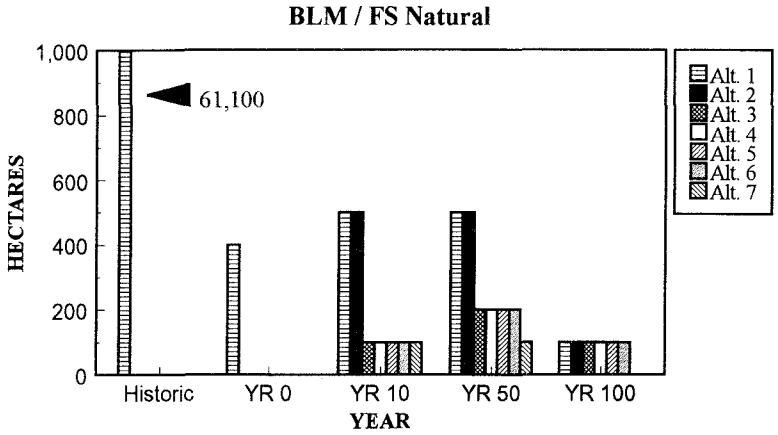
UPPER COLUMBIA RIVER BASIN
DRY FOREST / MID-SERAL INTOLERANT

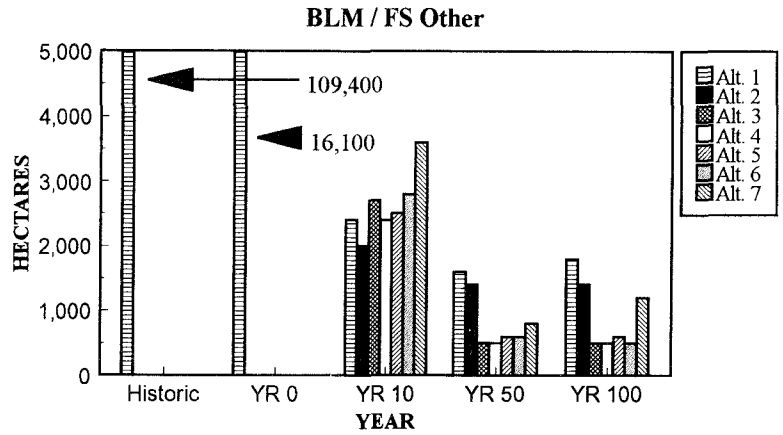


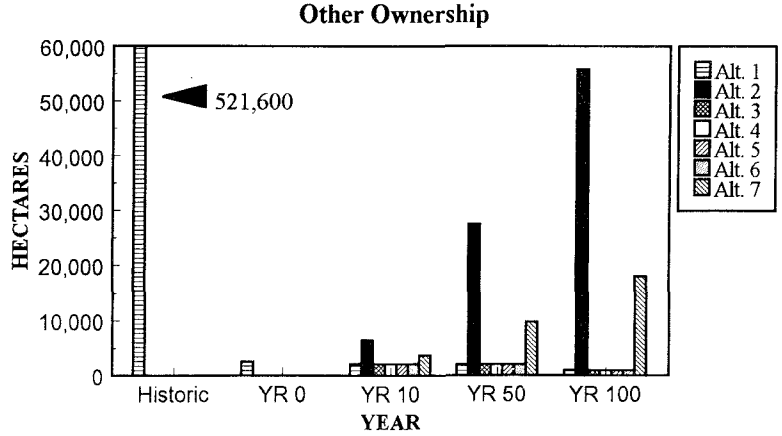




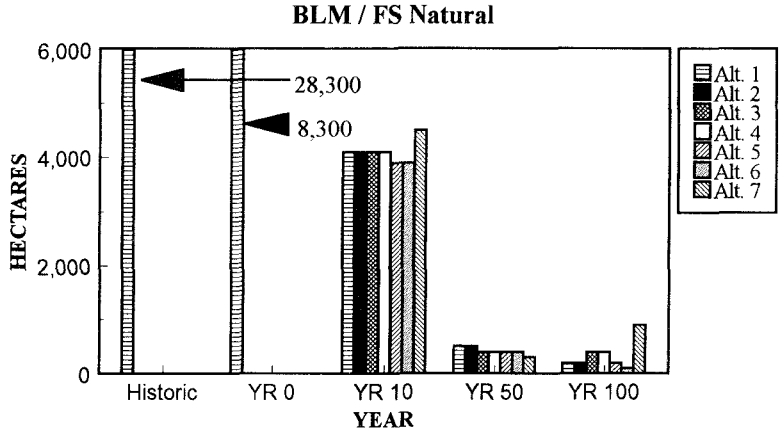
EASTSIDE E.I.S.
DRY FOREST / UPLAND HERBLAND

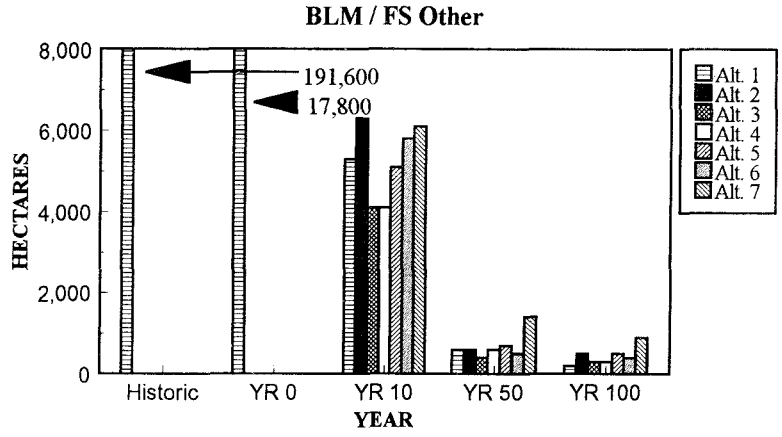


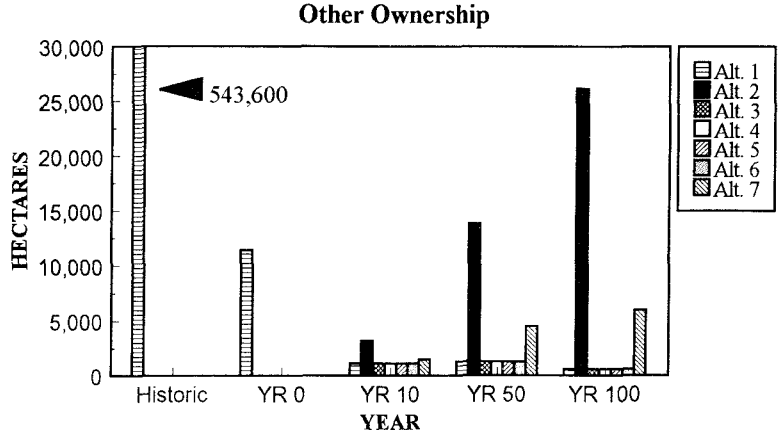




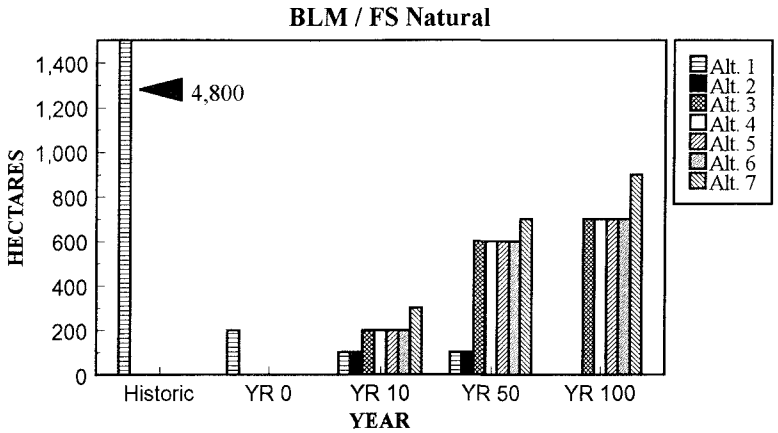
UPPER COLUMBIA RIVER BASIN
DRY FOREST / UPLAND HERBLAND

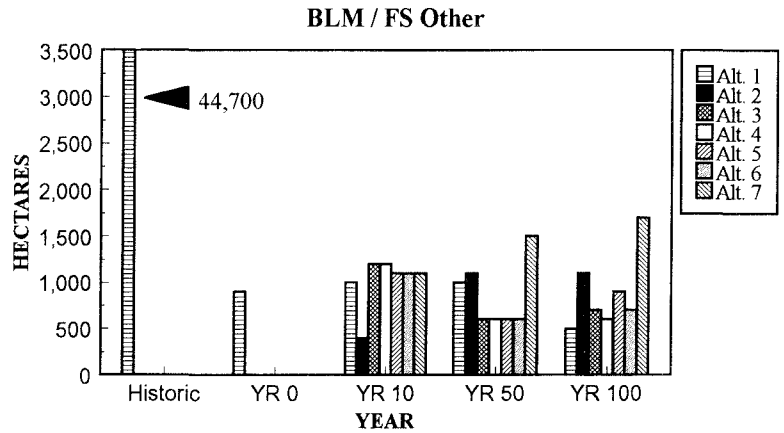


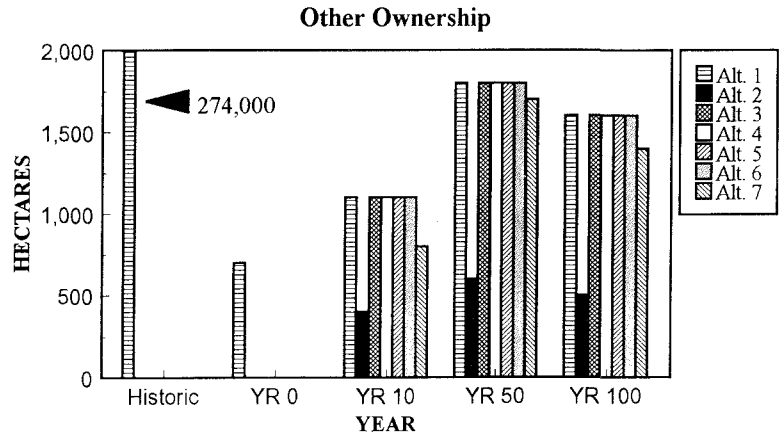




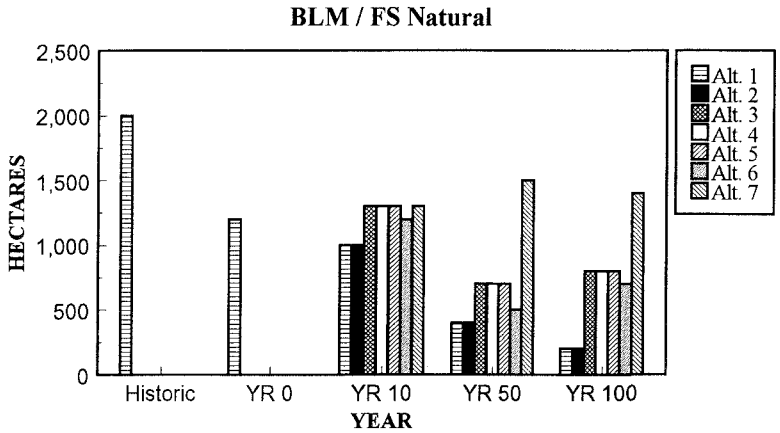
EASTSIDE E.I.S.
DRY FOREST / UPLAND SHRUBLAND

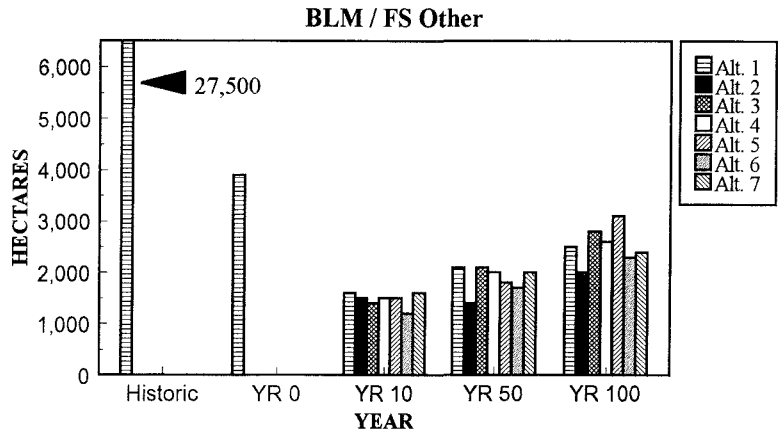


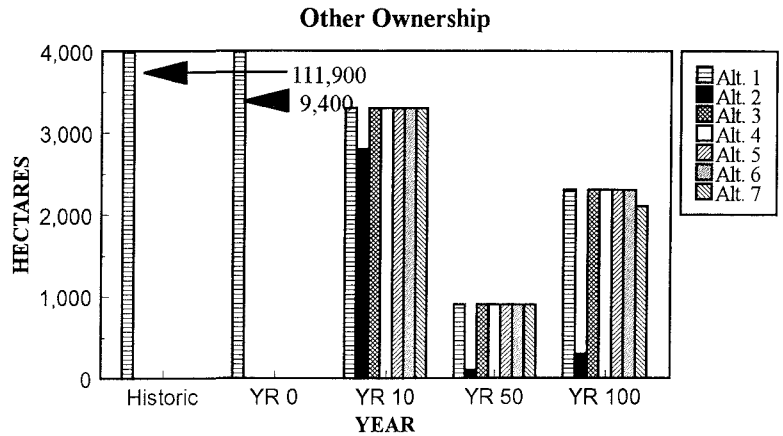




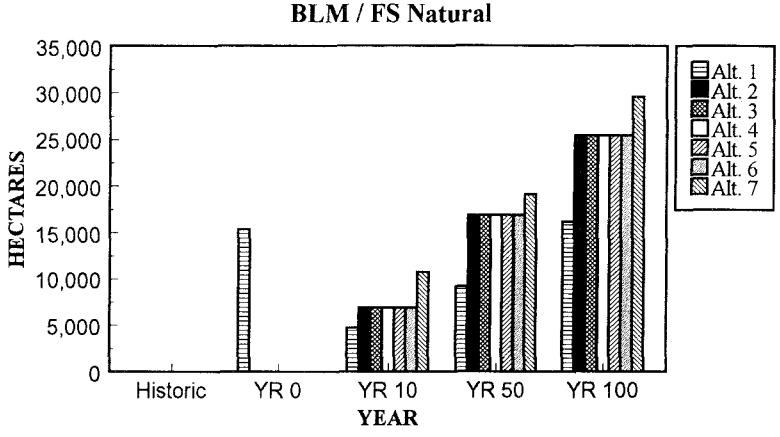
UPPER COLUMBIA RIVER BASIN
DRY FOREST / UPLAND SHRUBLAND

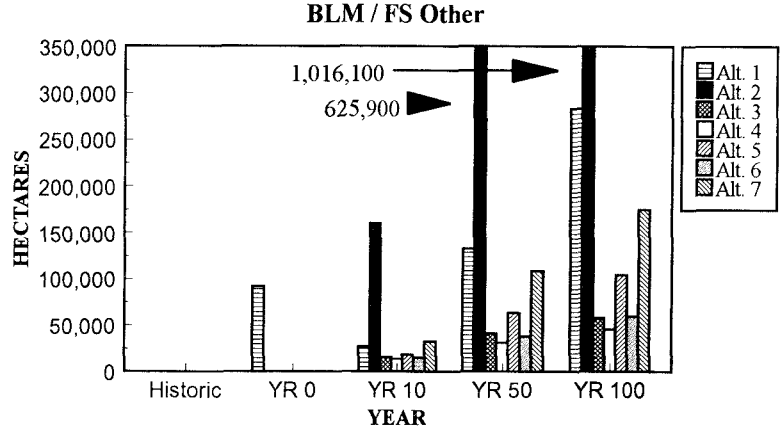


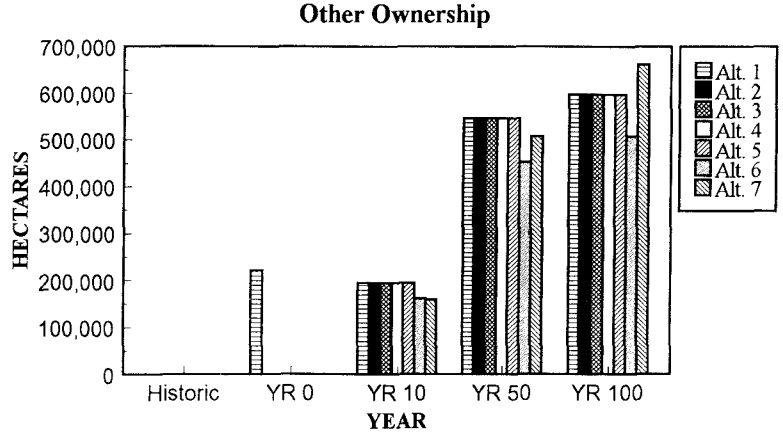




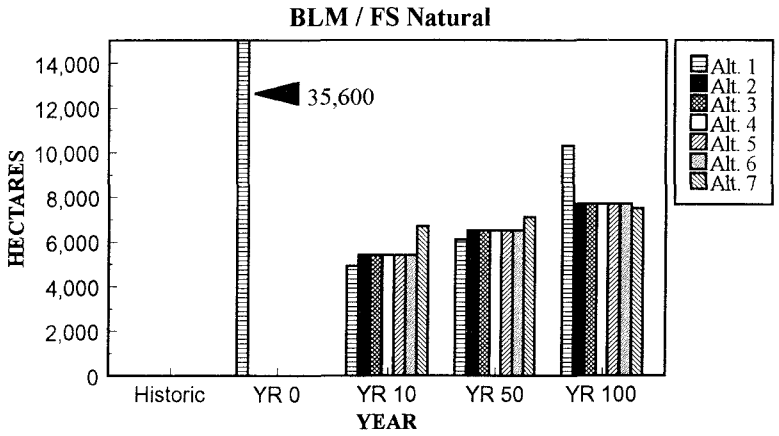
EASTSIDE E.I.S
DRY SHRUB / EXOTICS

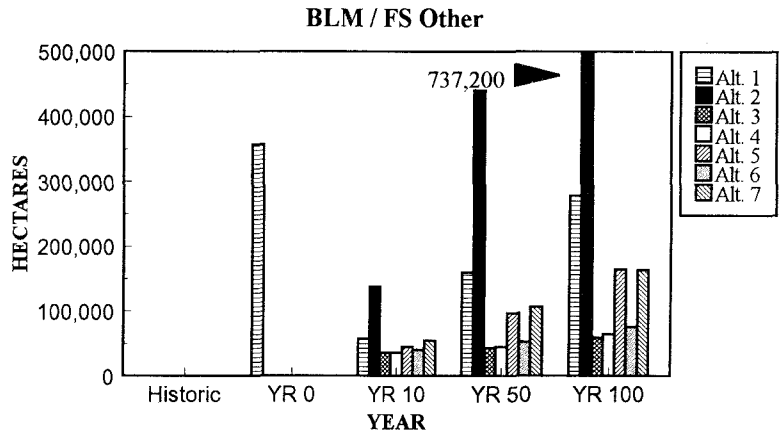


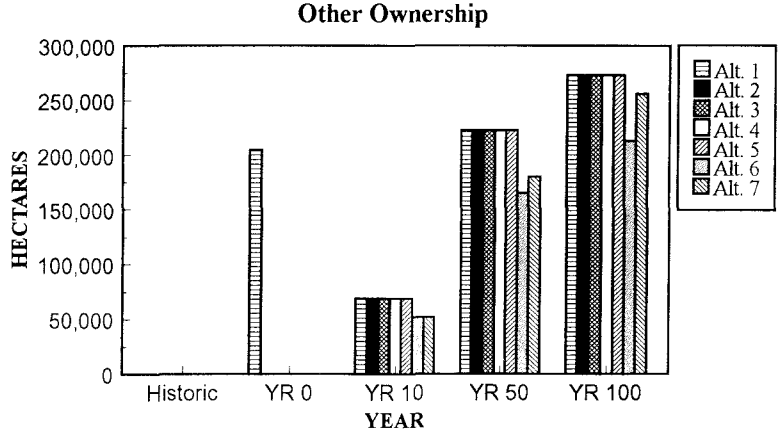




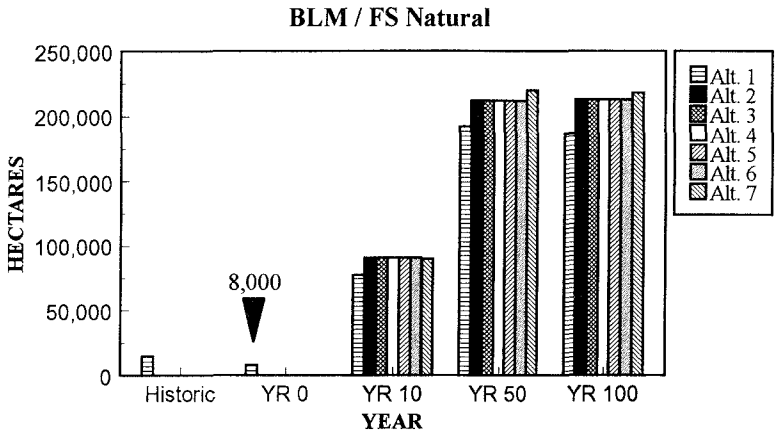
UPPER COLUMBIA RIVER BASIN
DRY SHRUB / EXOTICS

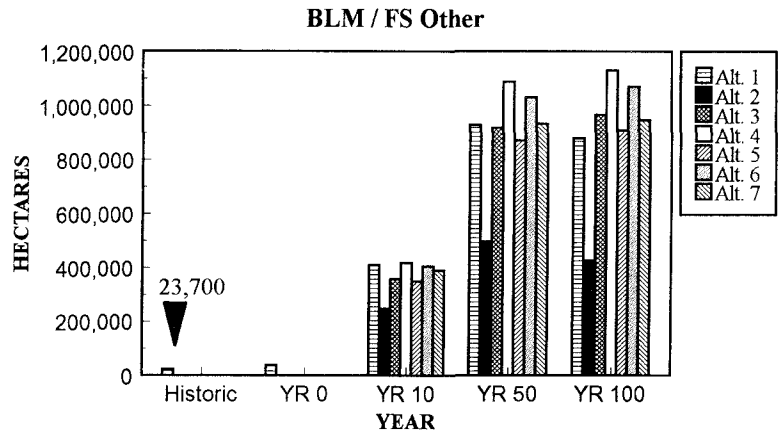


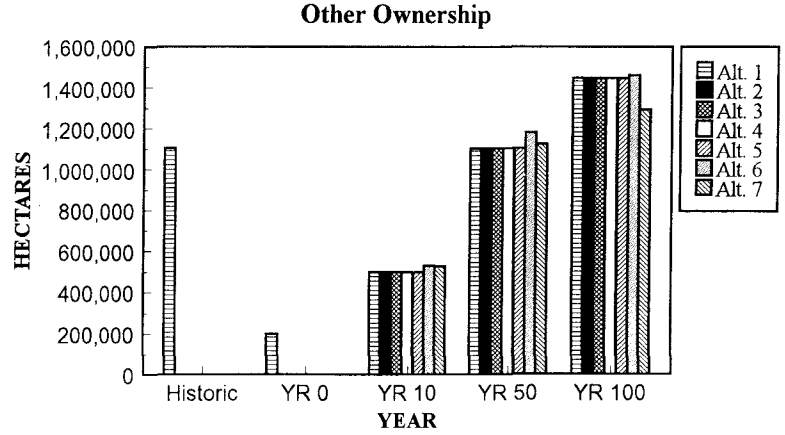




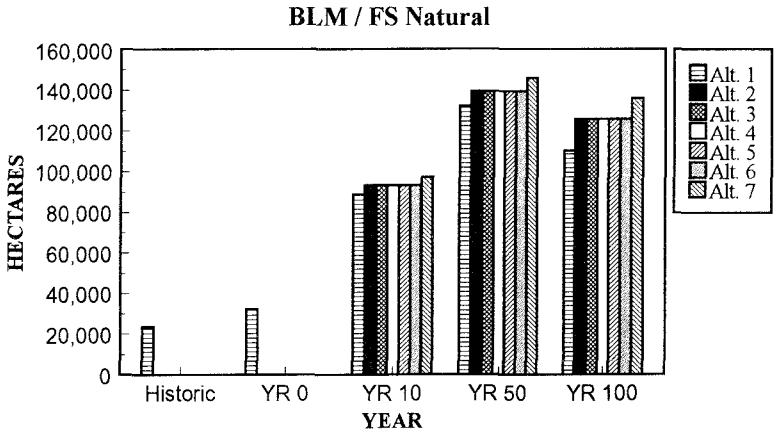
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DRY SHRUB / UPLAND HERBLAND

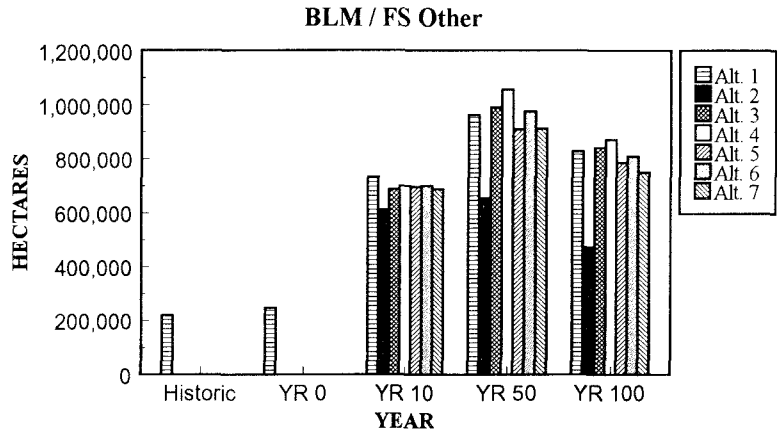


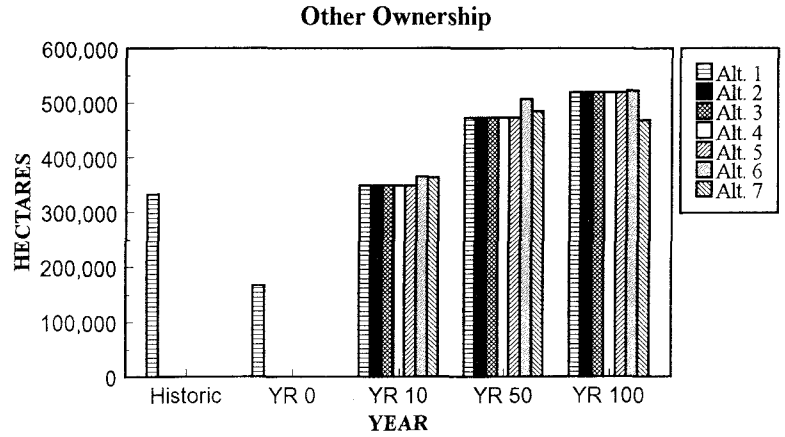




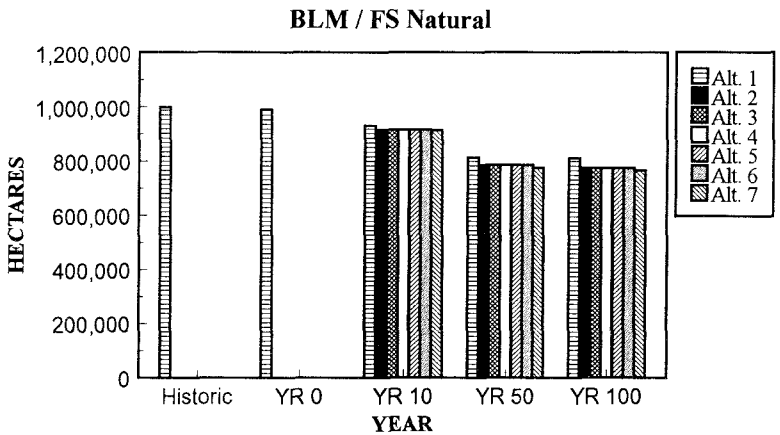
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DRY SHRUB / UPLAND HERBLAND

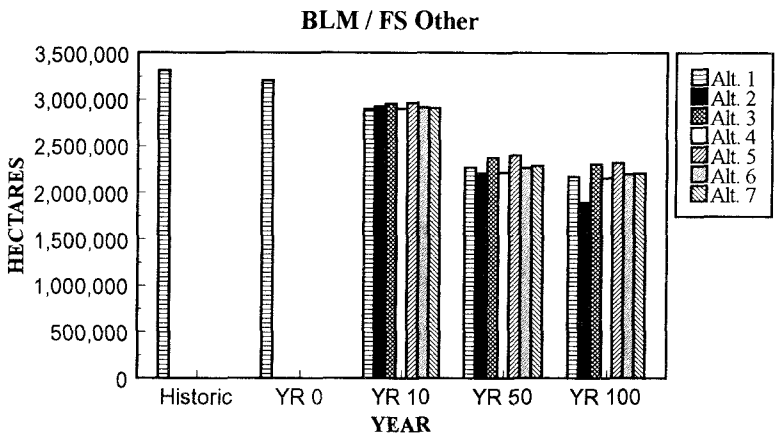


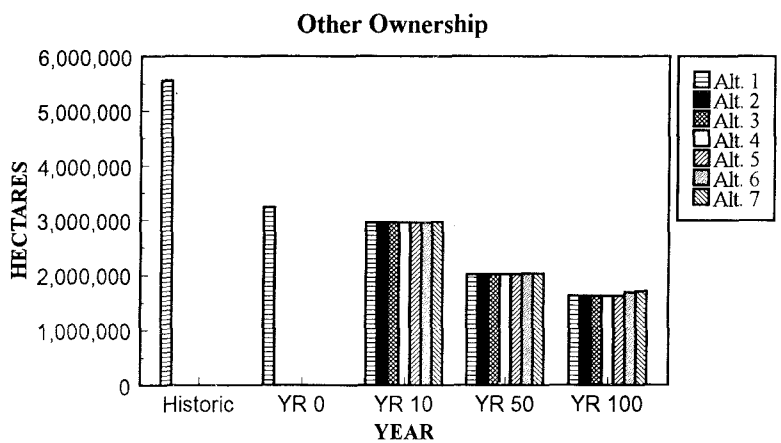




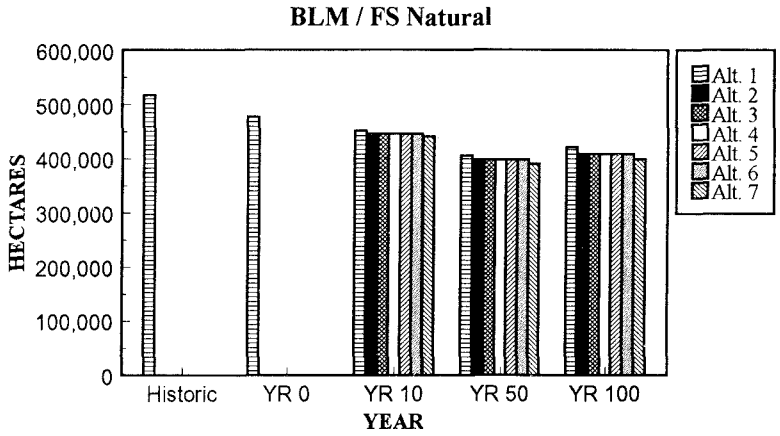
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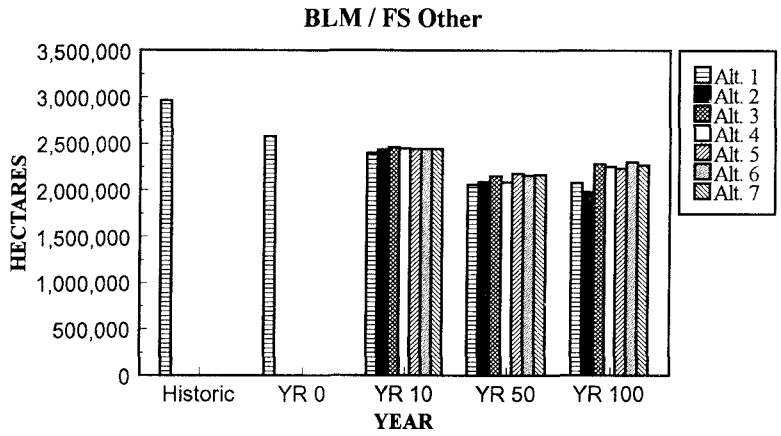


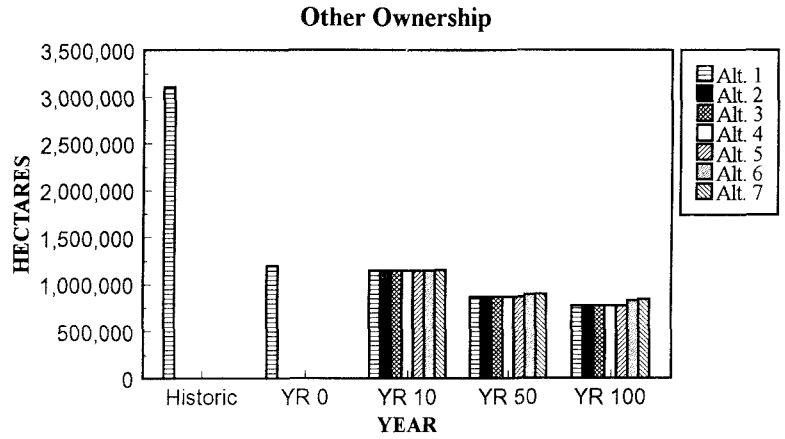




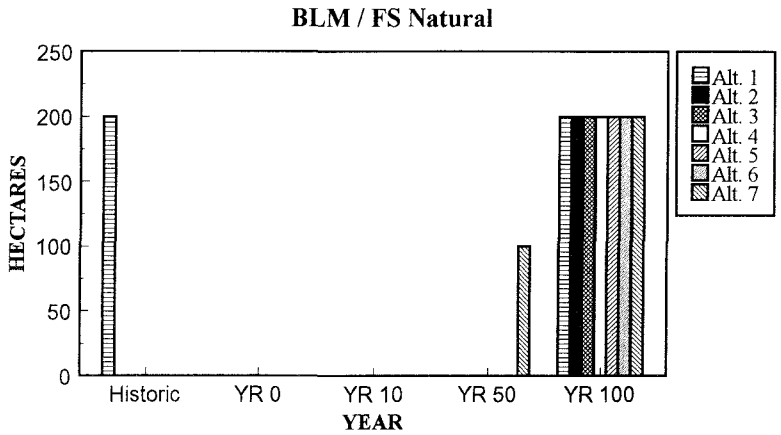
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DRY SHRUB / UPLAND SHRUBLAND

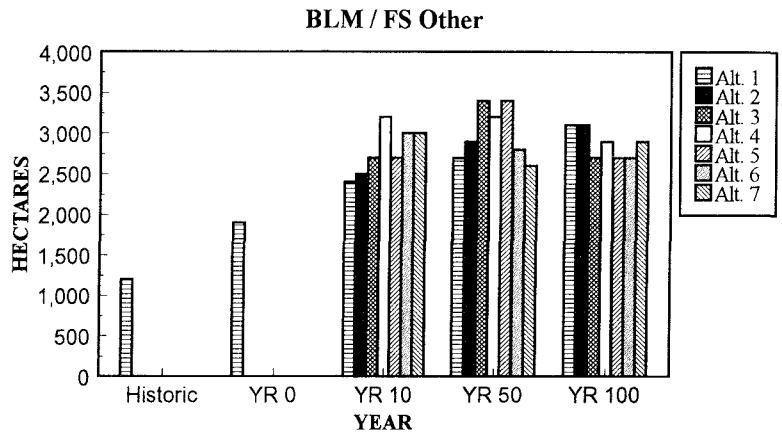


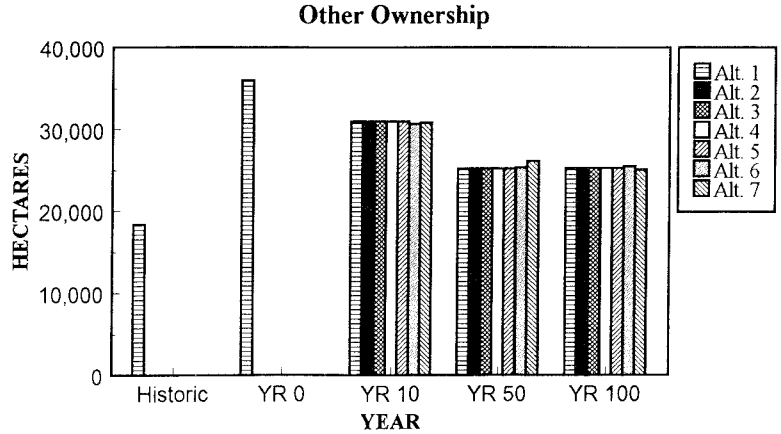




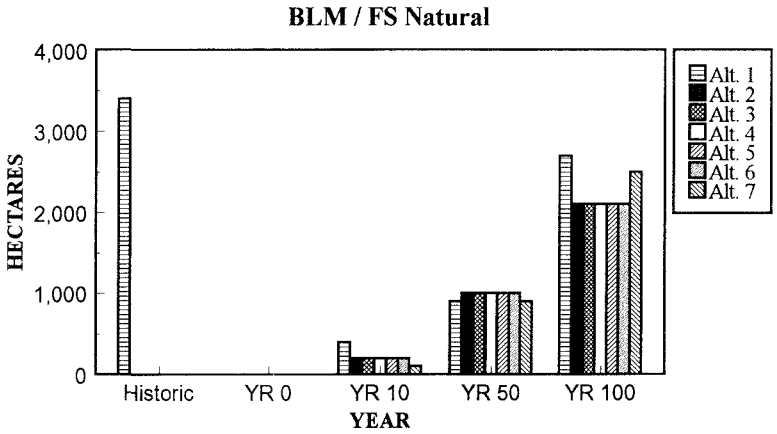
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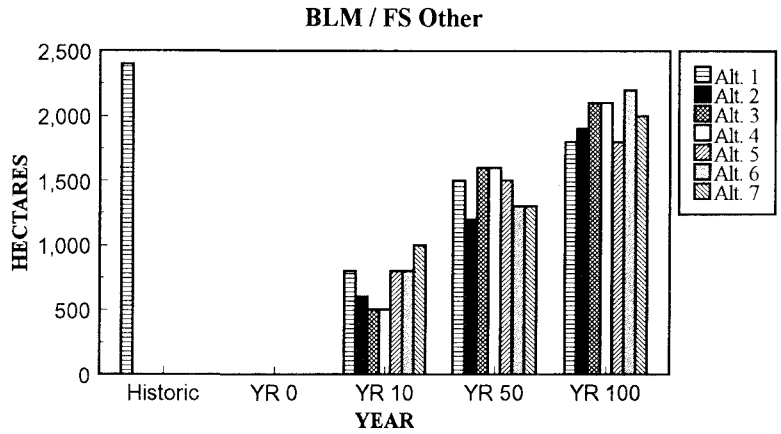


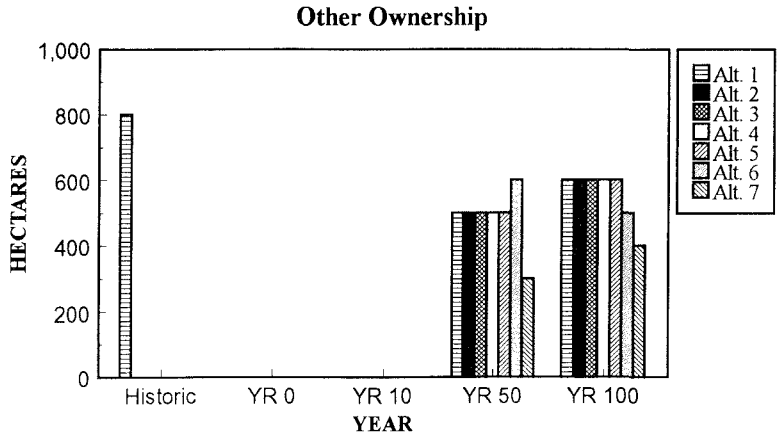




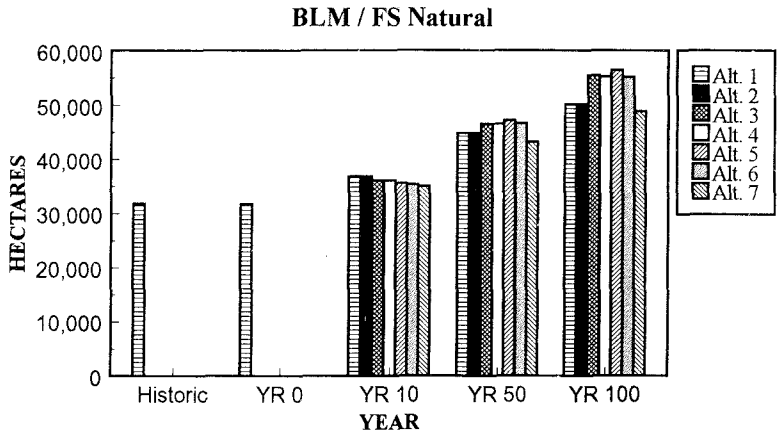
UPPER COLUMBIA RIVER BASIN
DRY SHRUB / UPLAND WOODLAND

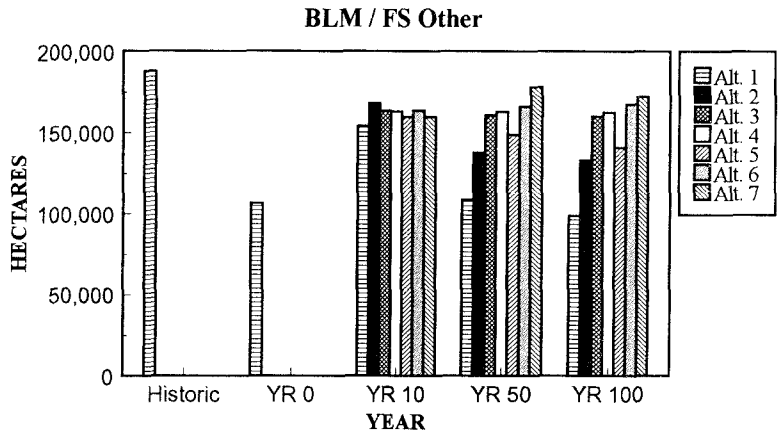


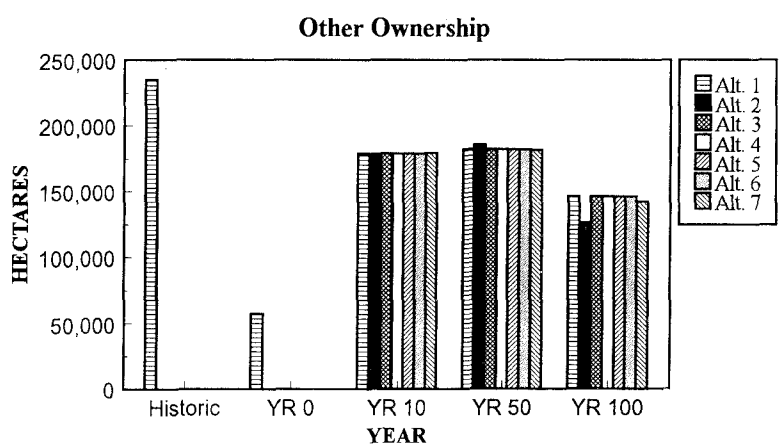




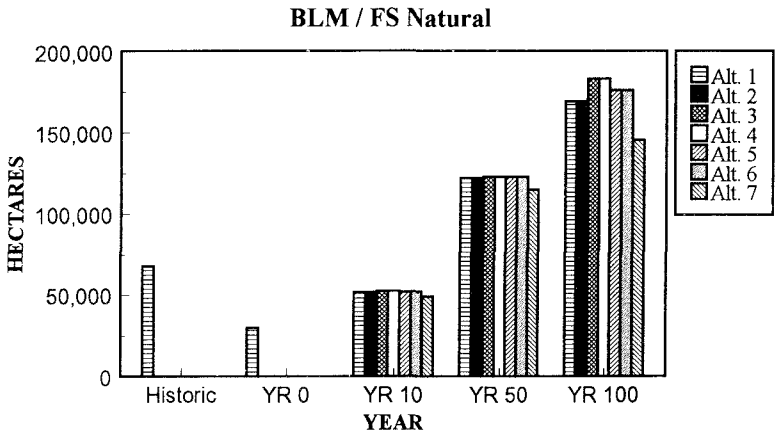
EASTSIDE E.I.S.
MOIST FOREST / LATE-SERAL INTOLERANT MULTI-LAYER

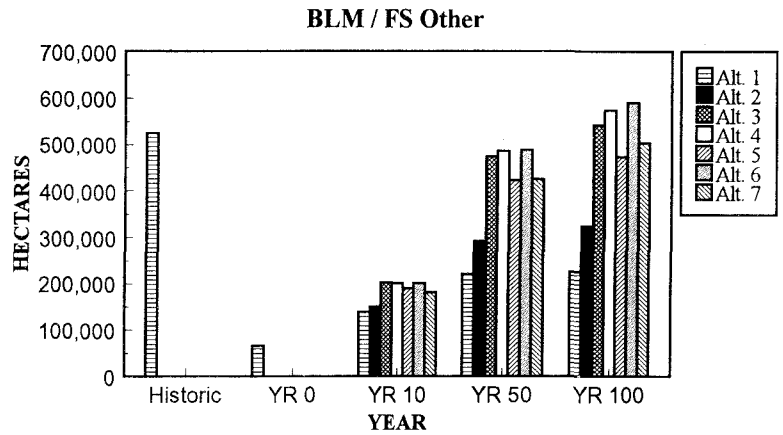


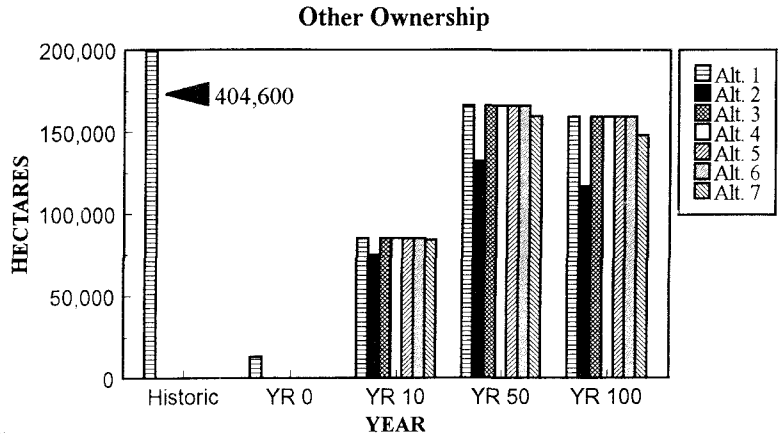




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MOIST FOREST / LATE-SERAL INTOLERANT MULTI-LAYER

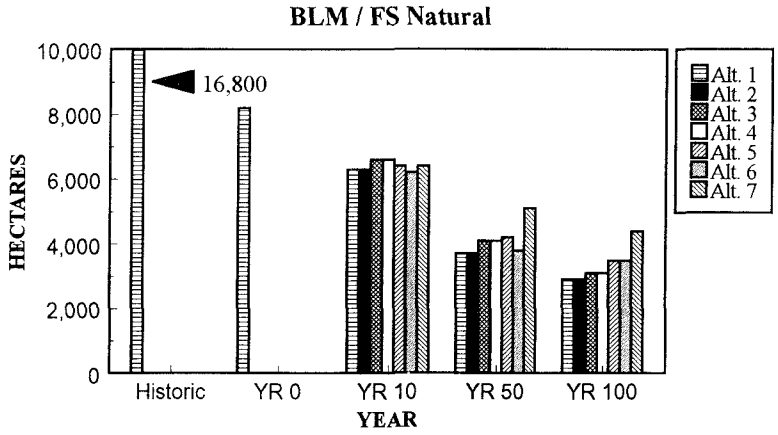


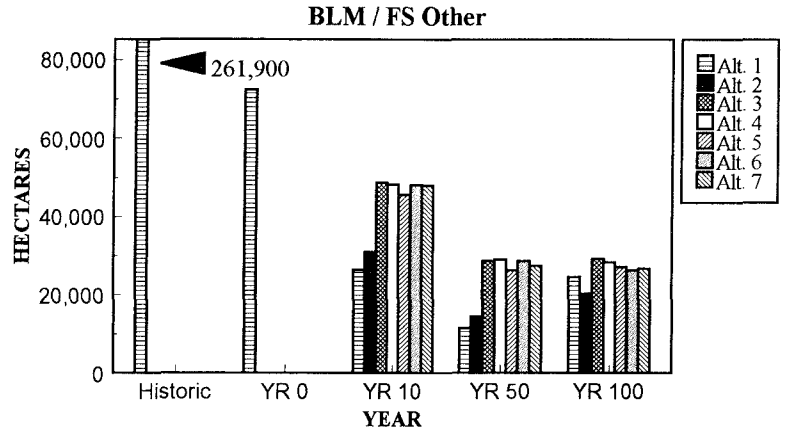


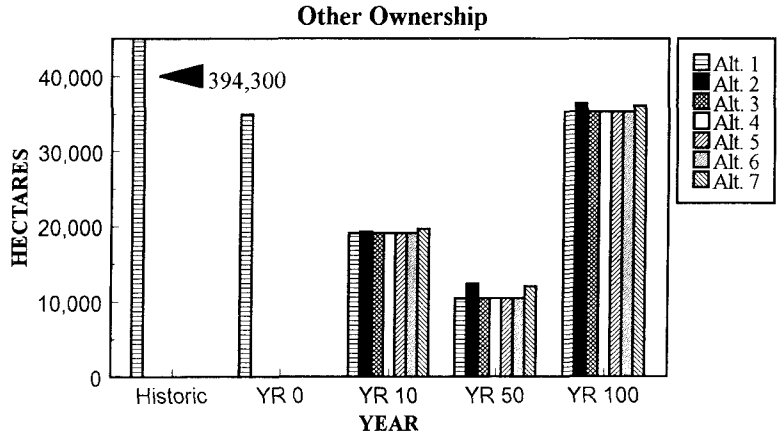


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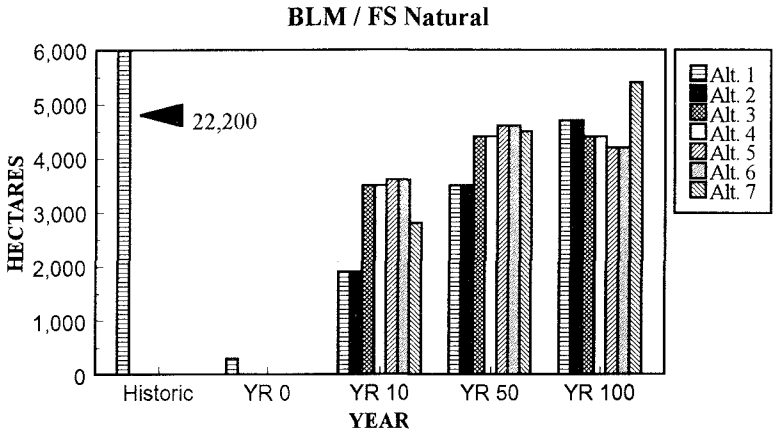
MOIST FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

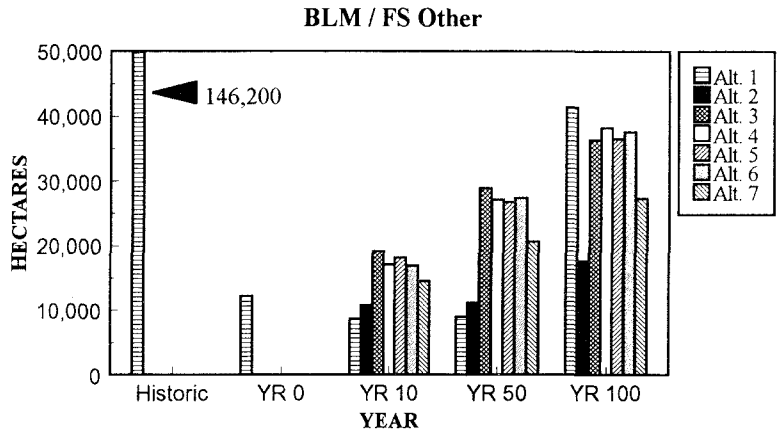


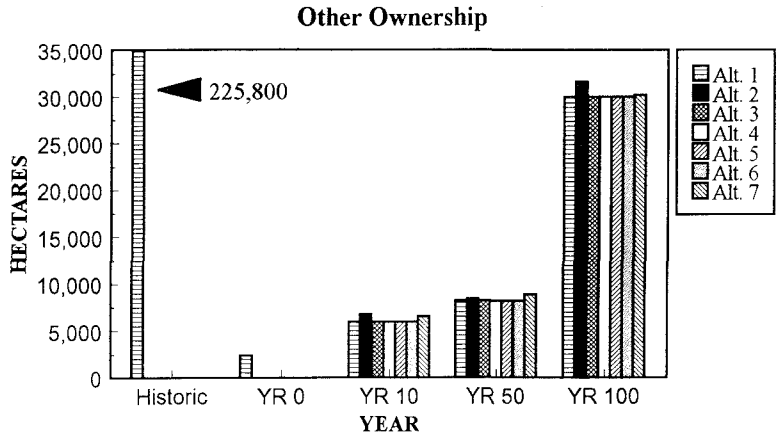




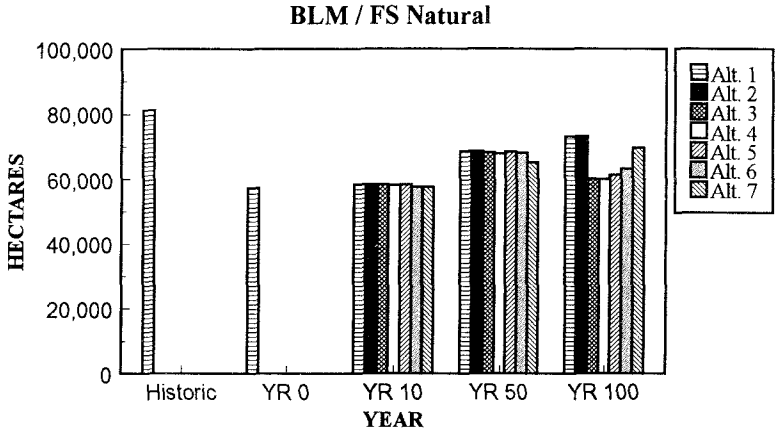
UPPER COLUMBIA RIVER BASIN
MOIST FOREST / LATE-SERAL INTOLERANT SINGLE-LAYER

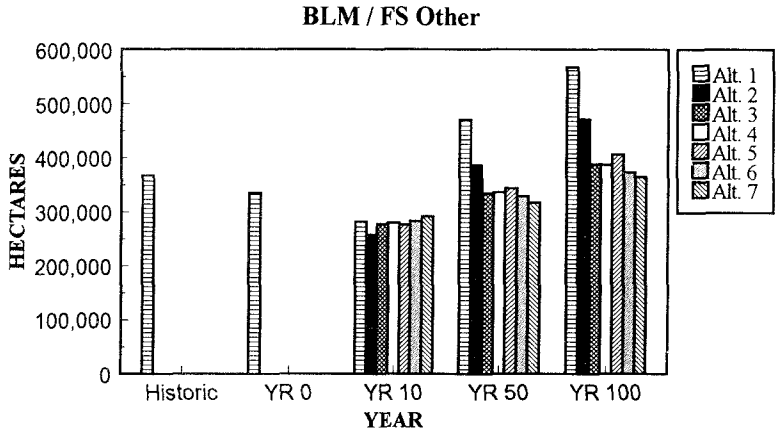


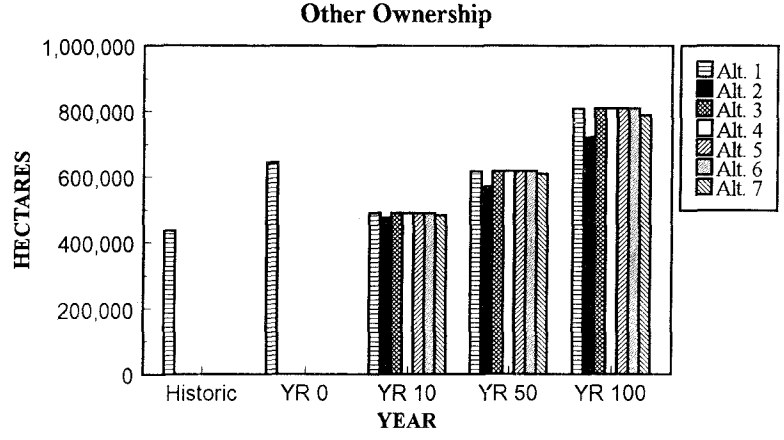




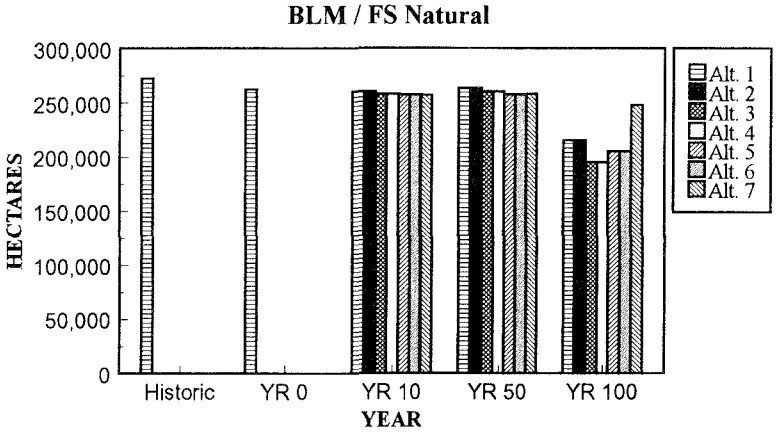
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MOIST FOREST / MID-SERAL INTOLERANT

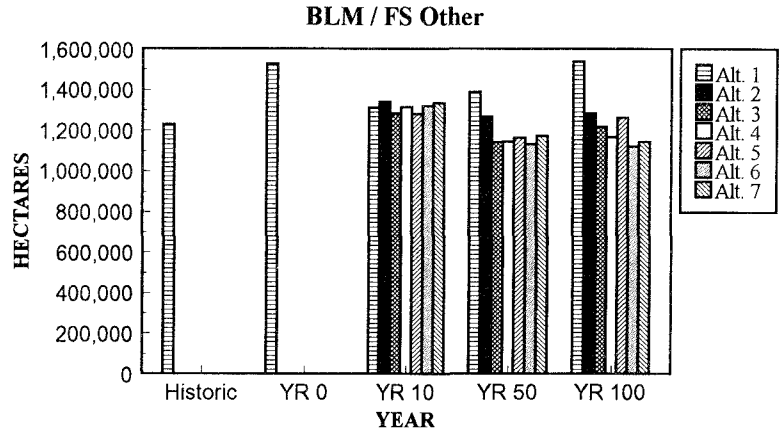






UPPER COLUMBIA RIVER BASIN
MOIST FOREST / MID-SERAL INTOLERANT





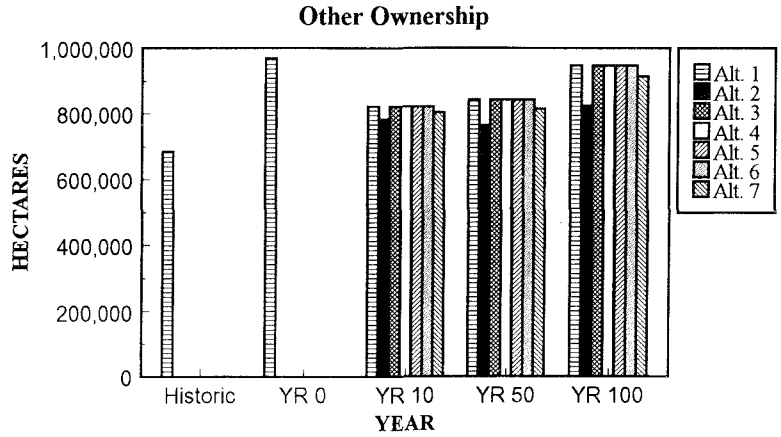


Table 2L.1. Problematic noxious weeds within range cluster 1, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Diffuse Knapweed	• Deschutes County, Oregon, BLM Prineville District. (especially along Deschutes River). • Gilliam and Sherman counties, Oregon along John Day River. • Along south fork of John Day River, Grant County, Oregon. • Expected to expand greatly in next 10-20 years. • As reported in 1990, 1million acres in central Oregon, of which 3-5% or 30,000-50,000 acres was on BLM, including some in this cluster.	Wheatgrass Grassland	Antelope Bitterbrush, Big Sagebrush - warm	Mountain Big Sagebrush- Mesic west with Juniper	Riparian in general
Yellow Starthistle	• Especially southern Oregon, Klamath County, BLM Lakeview District. • BLM Prineville District, Oregon; encroaching upon rangeland from private lands, roads, and waterways. • John Day Fossil Beds National Monument, Oregon. • Between Mitchell and John Day River, Wheeler County, Oregon; hundreds of small infestations. • Expected to expand greatly in BLM's Prineville District, Oregon, in next 10-20 years; reported as 20,000 acres in 1990 in central Oregon counties, of which 15% or 3,000 acres was BLM-administered, probably within this cluster.			Mountain Big Sagebrush - Mesic west with Juniper	Riparian in general, White Oak
Rush Skeleton-weed	• BLM's Prineville District, along lower portion of Deschutes River, Oregon; negligible infestation on BLM in 1990 due to its control, but possible infestations in future.		Basin Big Sagebrush		Riparian in general

Table 2L.1 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Leafy Spurge	• Near Klamath Falls, Klamath County, Oregon. • As of 1991, not yet on BLM-administered land in Prineville District, Oregon, but predicted soon.			Mountain Big Sagebrush - Mesic west with Juniper	
Medusahead	• Klamath and Lake counties, Oregon; expected to expand greatly in next 10- 20 years. • Jefferson and Wasco counties, Oregon. • Along John Day River all the way to Kimberly, Oregon; reported as extensive along this river. • 1 million acres reported in 1990 from central Oregon, of which 20% or 200,000 acres was on BLM-administered land, including some in this cluster.		Low Sagebrush - Mesic with Juniper; Wyomic Big Sagebrush - Warm	Mountain Big Sagebrush - Mesic west with Juniper	
Dalmatian Toadflax	• Gilliam County, Oregon; on BLM-administered land. • Sherman County, Oregon; along John Day River. • Grant County, Oregon; on private land. • Expected to expand greatly in next 10-20 years. • 25,000 acres reported 1990 from Umatilla, Grant, and Harney counties, Oregon eastward, of which 5% or 1,250 acres was on BLM, including some in this cluster; 5,000 acres reported in 1990 from central Oregon counties, of which less than 1% or 50 acres was on BLM, east of Bend.	Wheatgrass Grassland, Fescue Grassland	Big Sagebrush - warm		Riparian in general, Mountain Mahogany
Whitetop	• Gilliam County, Oregon along John Day River (minor problem in 1989). • Deschutes County, Oregon. • Expected to expand greatly in next 10-20 years.				Riparian in general
Russian Knapweed	• Along Lower John Day River, Oregon (minor problem in 1989, more of a major problem as of 1991). • Prineville BLM District, Oregon, in general.				Riparian in general

Table 2L.1 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Scotch Thistle	• Along Lower John Day River, Oregon (minor problem in 1989). • Lakeview area, Oregon; probably private land. • Prineville BLM District in general, along Deschutes River, Oregon.				Riparian in general
Halogeton	• Along Lower John Day River, Oregon (reported as present).				
Perennial Pepperweed	• Along Lower John Day River, Oregon; reported as present.				Riparian in general
Iberian and/or Purple Starthistle	• Sherman and Wasco counties, Oregon; reported as present.				
Canada Thistle	• Widespread.				Riparian in general

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Table 2L.2– Problematic noxious weeds within range cluster 2, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Common Crupina	• Mostly in north-central Washington and central Idaho (not real extensive yet, more in the category of new invaders at present).	Wheatgrass Grassland, Fescue Grassland		Mountain Shrub	Mountain Mahogany, Cottonwood Riverine, Riparian in general
Diffuse Knapweed	• Mostly in Washington in counties bordering Cascade Crest; 820,000 acres in 1993, as reported from half of the eastern Washington counties; including a substantial portion in this cluster.		Antelope Bitterbrush, Big Sagebrush (in general)	Possibly Mountain Big Sagebrush (in general) and Mountain Shrub	
Mediterranean Sage	• Idaho County, Idaho; 4,000 acres reported, including some possibly in this cluster; needs resolving.				
Leafy Spurge	• Central Idaho. Western Montana.	Fescue Grassland, Fescue Grassland with Conifer		Possibly Mountain Big Sagebrush (in general)	Riparian in general
Tansy Ragwort	• Northeast Oregon, Wallowa County.	Proposed: Fescue Grassland, Fescue Grassland with Conifer, Wheatgrass Grassland		Proposed: Mountain Shrub	Proposed: Riparian in general
Spotted Knapweed	• Selway-Bitterroot Wilderness, Idaho, Montana.	Fescue Grassland (mountain meadows)		Possibly Mountain Big Sagebrush (in general)	
Yellow Starthistle	• Idaho County, Idaho, near Hells Canyon.	Wheatgrass Grassland			

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Table 2L.3 – Problematic noxious weeds within range cluster 3, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Whitetop	• Northeast Oregon.	Fescue Grassland, Fescue Grassland with Conifer	Big Sagebrush (in general)	Big Sagebrush (in general)	
Common Crupina	• Central Idaho.	Wheatgrass Grassland, Fescue Grassland		Mountain Shrub	Mountain Mahogany, Cottonwood Riverine, Riparian in general
Diffuse Knapweed	• Northeast Washington; a large portion of the 820,000 acres reported from half of counties in eastern Washington in 1993 are in this cluster. • Northeast Oregon, Union County. • As reported in 1990, about 500,000 acres in Eastern Oregon (Umatilla, Grant, and Harney counties and eastward), of which less than 5,000 was on BLM.		Antelope Bitterbrush	Possibly Mountain Big Sagebrush (in general)	Riparian in general
Spotted Knapweed	• Spokane County, Washington. • Ferry County, Washington. • Northern Idaho. • Northwest Montana.	Fescue Grassland with Conifer, Fescue Grassland, Wheatgrass Grassland		Possibly Mountain Big Sagebrush (in general)	
Yellow Starthistle	• Idaho, Lewis, and Nez Perce counties in Idaho; reported as 300,000 acres in Idaho. • Klamath County, Oregon, Lakeview BLM District.	Wheatgrass Grassland	Antelope Bitterbrush		White Oak
Orange and Yellow Hawkweeds	• Northern Idaho. • Northwest Montana. • Northeast Washington.	Fescue Grassland (mountain meadows)			Riparian in general
Leafy Spurge	• Northeast Oregon along Grande Ronde. • Western Montana. • Idaho.	Fescue Grassland, Fescue Grassland with Conifer		Proposed: Mountain Big Sagebrush (in general)	Riparian in general

Table 2L.3 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Squarrose Knapweed	• Union Co. Oregon; about 800 acres reported in 1990 in eastern Oregon, which is Umatilla, Grant, and Harney counties eastward; none on BLM-administered lands.				
Matgrass	• Western Klamath County, Oregon.	Wheatgrass Grassland, Fescue Grassland			
Sulfur Cinquefoil	• Western Montana; thousands of acres. • Idaho Panhandle. • Northeast Washington. • Northeast Oregon.	Wheatgrass Grassland, Fescue Grassland, Fescue Grassland with Conifer			Riparian Graminoid
Mediterranean Sage	• Idaho County, Idaho; 4,000 acres, including some in this cluster.				
Tansy Ragwort	• Union, Baker, Grant counties. in northeast Oregon.	Proposed: Fescue Grassland, Fescue Grassland with Conifer, Wheatgrass Grassland		Proposed: Mountain Shrub	Proposed: Riparian in general
Rush Skeleton-weed	• Baker County, Oregon on the Powder River arm of Brownlee Reservoir; fairly recent (last five years) infestation in this county.				
Canada Thistle	• Widespread.				Riparian in general
Medusahead	• Northeast Oregon.			Mountain Big Sagebrush (in general)	

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Table 2L.4 – Problematic noxious weeds within range cluster 4, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Whitetop	• Northeast Oregon. • Lincoln County, Washington.	Wheatgrass Grassland			Riparian in general
Diffuse Knapweed	• Northern Washington. • Yakima Co. Washington. • Southern Grant Co. Washington. • Some of the 820,000 acres reported from half of eastern Washington counties in 1993 are in this cluster.		Antelope Bitterbrush, Big Sagebrush - Warm		Riparian in general
Russian Knapweed	• East-central Washington. • Yakima County, Washington. • Douglas County, Washington. • Lincoln County, Washington.		Basin Big Sagebrush		Riparian in general
Yellow Starthistle	• Southeast Washington, especially Walla Walla and Columbia counties; 148,000 acres reported for Washington, most of which was in these two counties. • Umatilla County, Oregon; exceeds 286,000 acres, most of which is in this cluster.	Wheatgrass Grassland, Fescue Grassland	Big Sagebrush - Warm		
Rush Skeleton-weed	• Northwest Umatilla County, Vale BLM District, Oregon. • Franklin County, Washington; Juniper Dunes Wilderness Area; possibly on BLM-administered lands in future. • 998,000 acres in 15 eastern Washington counties.	Wheatgrass Grassland, Fescue Grassland			
Leafy Spurge	• Lincoln County, Washington; only 0.5 acre at present.				
Musk Thistle	• Kittitas and Lincoln counties, Washington.				Riparian in general
Dalmatian Toadflax	• Lincoln County, Washington.		Big Sagebrush - Warm		

Table 2L.4 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Canada Thistle	• Widespread.				Riparian in general
Syrian Bean-Caper	• Adams, Grant, Okanogan, and Whitman counties, Washington; already present, but in small acreages; possible in future; new invader.	Proposed: Fescue Grassland	Proposed: Big Sagebrush - Warm		
African Rue	• Ephrata in Grant County, Washington; reported as present; new invader.		Proposed: Big Sagebrush - Warm		
Iberian and/or Purple Starthistle	• Asotin and Walla Walla counties, Washington; reported as present; new invader.				
Saltcedar	• Grant and Franklin counties, Washington, along Columbia River; about 350 acres.				Riparian in general

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Table 2L.5 –Problematic noxious weeds within range cluster 5, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Diffuse Knapweed	• Along Cascade Crest in Washington, especially Kittitas County. • Baker Resource Area of BLM's Vale District, Oregon, near Halfway. • As reported in 1990, about 500,000 acres in Eastern Oregon (Umatilla, Grant, and Harney counties and eastward, of which less than 5,000 was on BLM.		Big Sagebrush - Warm, Basin Big Sagebrush	Possibly Mountain Big Sagebrush (in general)	
Yellow Starthistle	• Hells Canyon area, Oregon. • Harney County, Oregon, Andrews Resource Area BLM; minor problem in 1994, possibly bigger problem in future. • Southwest Idaho; reported as 300,000 acres in Idaho, including some in this cluster. • Reported in 1990 as 150,000 acres in eastern Oregon counties, (Umatilla, Grant, and Harney counties eastward; of which 10% or 15,000 acres was on BLM-administered land, including some in this cluster.	Wheatgrass Grassland Big Sagebrush -	Warm (particularly if dominated by cheatgrass)		
Spotted Knapweed	• Eastern Idaho.				
Rush Skeleton-weed	• Southwest Idaho; reported as exceeding 4 million acres, including some in this cluster.	Proposed: Fescue Grassland	Proposed: Big Sagebrush - Warm, Basin Big Sagebrush	Proposed: Mountain Big Sagebrush (in general)	
Medusahead	• Southwest Idaho. • Along Snake River in BLM's Vale District, Oregon. • Steens Mt. Oregon, Harney County. • Elko Coutny, Nevada; 100,000 acres reported, including some in this cluster. • 1.5 million acres reported in 1990 for eastern Oregon counties (Umatilla, Grant, and Harney counties, eastward), of which 60% or 900,000 acres was on BLM-administered land, including some in this cluster. • Nearly 1million acres reported for Idaho, including a substantial but unknown portion in this cluster.	Wheatgrass Grassland	Big Sagebrush - Warm	Mountain Big Sagebrush - Mesic west, Mountain Big Sagebrush - Mesic east, Mountain Big Sagebrush - Mesic west with Juniper	

Table 2L.5 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Mediterranean Sage	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but possible infestation in future. • 500 acres reported in 1990 from eastern Oregon counties, (Umatilla, Grant, and Harney counties eastward), of which 25% or 125 acres was on BLM-administered lands.				
Russian Knapweed	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but possible bigger problem in future.				Riparian in general
Dalmatian Toadflax	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but probably bigger problem in future.				
Scotch Thistle	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but possibly bigger problem in future.				Riparian in general
Perennial Pepperweed	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but possibly bigger problem in future.				Riparian in general
Whitetop	• Harney County, Oregon, BLM's Andrews Resource Area; minor problem as of 1994, but possibly bigger problem in future.				
Halogeton	• Southeast Oregon, especially in southern Harney County between Fields and Denio. • Owyhee County, Idaho.		Salt Desert Shrub		
Purple Loosestrife	• Along Owyhee River in southeast Oregon; 100 acres reported in 1990 from eastern Oregon counties, (Umatilla, Grant, and Harney counties eastward), including some in this cluster; none reported on BLM-administered lands. • Along Snake River in western Idaho.				Riparian in general
Leafy Spurge	• Eastern Idaho.	Fescue Grassland, Fescue Grassland with Conifer		Proposed: Mountain Big Sagebrush (in general)	Riparian in general

Table 2L.5 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Tansy Ragwort	• Wallowa County, Oregon.	Proposed: Fescue Grassland, Fescue Grassland with Conifer, Wheatgrass Grassland		Proposed: Mountain Shrub	Proposed: Riparian in general
Canada Thistle		• Widespread.			Riparian in general

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Table 2L.6 – Problematic noxious weeds within range cluster 6, where they are problematic within the cluster, acres infested (if available), and the PVTs which they are invading and to which they pose a threat within the dry grass, dry shrub, and cool shrub PVGs.

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Dyers Woad	• Southeast Idaho.	Fescue Grassland, Fescue Grassland with Conifer	Big Sagebrush - Cool	Mountain Big Sagebrush - Mesic east; Mountain Big Sagebrush - Mesic West with Juniper	Aspen
Perennial Pepperweed	• Widespread.				Riparian Graminoid, Salix-Carex, Cottonwood Riverine
Halogeton	• Southeast Oregon; BLM's Lakeview District. • BLM's Vale District, Malheur Resource Area; expected to expand greatly in next 10-20 years. • Idaho.			Salt Desert Shrub	
Diffuse Knapweed	• South-central Idaho, Blaine County; about 50,000 acres. • Eastern Oregon.	Fescue Grassland with Conifer	Big Sagebrush - Warm	Mountain Big Sagebrush (in general)	
Russian Knapweed	• Southeast Idaho; about 12,000 acres. • BLM's Lakeview District BLM, Oregon.				Riparian in general
Yellow Starthistle	• Malheur County, Oregon near Snake River. • Snake River Plains in western Idaho; reported as 300,000 acres in Idaho, some of which is in this cluster. • Reported in 1990 as 150,000 acres in eastern Oregon counties (Umatilla, Grant, and Harney eastward), of which 10% or 15,000 acres was BLM-administered, including some in this cluster.		Wheatgrass Grassland	Antelope Bitterbrush	
Leafy Spurge	• Baker County, Oregon. • Extreme Northeast Oregon, along Grande Ronde; minor problem in 1993, but imminently more problematic. • South-central Idaho, Cassia County. • Eastern Idaho.	Fescue Grassland, Fescue Grassland with Conifer		Mountain Big Sagebrush - Mesic west with Juniper; Mountain Big Sagebrush - Mesic east	Riparian in general

Table 2L.6 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Medusahead	• Western Idaho. • Lake Co. Oregon (expected to expand greatly in next 10-20 years). • Harney County, Oregon (especially northeast part). • BLM's Vale District, Oregon; medusahead moving south, expected to expand greatly in next 10-20 years. • 1.5 million acres reported in 1990 for eastern Oregon counties (Umatilla, Grant, and Harney counties eastward), of which 60% or 900,000 acres was on BLM-administered land, including some in this cluster. • Nearly 1million acres reported for Idaho, including a substantial but unknown portion in this cluster.		Big Sagebrush Warm; Low Sagebrush (in general).	Possibly Mountain Big Sagebrush (in general).	
Mediterranean Sage	• Lake and Harney counties, Oregon. • Fremont National Forest; expected to expand greatly in next 10-20 years. • 1 million acres reported in 1990 from central Oregon counties, of which 20% or 200,000 acres was reported on BLM-administered land, most believed to be in this cluster.		Big Sagebrush Warm; Big Sagebrush Cool		
Sulfur Cinquefoil	• Extreme northeast Oregon along Grande Ronde; minor in extent, but could be problematic soon.				Riparian in general
Scotch Thistle	• Extreme northeast Oregon along Grande Ronde; minor in extent, but could be problematic soon. • Along Burnt River Canyon in BLM's Vale District, Oregon.				Riparian in general
Musk Thistle	• Lake County, Oregon; minor problem as of 1991.				Riparian in general
Whitetop	• Lakeview District BLM, Oregon. • BLM's Vale District, Oregon, especially along roads.				Riparian in general

Table 2L.6 (continued).

Weed Species	Location Within Cluster and Acreage[1]	Dry Grass	Dry Shrub	Cool Shrub	Other
Spiny Cocklebur	• BLM's Lakeview • District, Oregon; minor problem as of 1991; new invader.				
St. Johnswort	• Lakeview BLM District, Oregon; minor problem as of 1991.				
Dalmatian Toadflax	• Burns BLM District, Harney County, Oregon; expected to expand greatly in next 10-20 years.				
Spotted Knapweed	• Near Riley, Oregon and along roads in Burns BLM District, Oregon. • Eastern Idaho.				
Purple Loosestrife	• Along Snake and Boise rivers in western Idaho.				Riparian in general
Tansy Ragwort	• Wallowa County, Oregon.	Proposed: Fescue Grassland, Fescue Grassland with Conifer, Wheatgrass Grassland		Proposed: Mountain Shrub	Proposed: Riparian in general
Rush Skeleton-weed	• Western Idaho; reported as exceeding 4 million acres in southwest Idaho, including some in this cluster.	Fescue Grassland	Big Sagebrush Warm, Basin Big Sagebrush	Mountain Big Sagebrush (in general)	
Canada Thistle	• Widespread.				Riparian in general

[1]Acre = 0.4047 hectare; acres listed are estimates and are not always specific only to BLM- and FS-administered lands.

Appendix 2-M

Table 2M.1– Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 1 on BLM- and FS-administered and Other lands. The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type (PVT)	BLM/FS	Other Lands
	Hectares	
Dry Grass PVG		
Wheatgrass Grassland	22,500	131,100
Fescue Grassland	1,400	21,800
Fescue Grassland with Conifer	21,800	58,700
Total Dry Grass:	45,700	211,600
	(112,925 acres)	(522,864 acres)
High Susceptibility	45,700	211,600
Moderate Susceptibility	45,700	211,600
Dry Shrub PVG		
Antelope Bitterbrush	2,100	3,500
Basin Big Sagebrush	6,000	40,000
Low Sagebrush Mesic	1,400	900
Low Sagebrush Mesic with Juniper	700	28,800
Big Sagebrush Warm	234,500	585,700
Big Sagebrush Cool	31,600	44,000
Salt Desert Shrub	100	
Threetip Sagebrush	300	1,000
Total Dry Shrub:	276,700	703,900
	(683,726 acres)	(1,739,337 acres)
High Susceptibility	2,200	3,500
	(5,436 acres)	(8,648 acres)
Moderate Susceptibility	276,700	703,900
Cool Shrub PVG		
Mountain Big Sagebrush Mesic East	22,700	64,700
Mountain Big Sagebrush Mesic East with Conifer	9,300	9,100
Mountain Big SagebrushMesic West	1,200	3,200
Mountain Big SagebrushMesic West with Juniper	325,600	408,400
Total Cool Shrub:	358,800	485,400
	(886,595 acres)	(1,199,423 acres)
High Susceptibility	0	0
Moderate Susceptibility	358,800	485,400
Other PVGs		
Cottonwood Riverine	400	
Salix-Carex	300	8,800
Aspen	100	200
Mountain Mahogany	400	7,900
Mountain Mahogany with Mountain Big Sagebrush	3,200	8,900
Saltbrush Riparian	200	800
Juniper	13,000	400
Alpine Shrub-Herbaceous	1,000	

[1]Hectare = 2.47 acres

Table 2M.2 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 2 on BLM- and FS-administered (EEIS). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS
	Hectares
Dry Grass PVG	
Wheatgrass Grassland	1,300
Fescue Grassland	
Fescue Grassland with Conifer	27,800
Total Dry Grass:	29,100
	(71,906 acres)
High Susceptibility	0
Moderate Susceptibility	29,100
Dry Shrub PVG	
Antelope Bitterbrush	4,500
Basin Big Sagebrush	
Low Sagebrush Mesic	
Low Sagebruch Mesic with Juniper	
Big Sagebrush Warm	100
Big Sagebrush Cool	300
Salt Desert Shrub	
Threetip Sagebrush	
Total Dry Shrub:	4,900
	(12,108 acres)
High Susceptibility	4,500
	(11,119 acres)
Moderate Susceptibility	4,900
Cool Shrub PVG	
Mountain Big Sagebrush Mesic East	1,700
Mountain Big Sagebrush Mesic East with Conifer	4,700
Mountain Big Sagebrush Mesic West	
Mountain Big Sagebrush Mesic West with Juniper	100
Mountain Shrub	2,800
Total Cool Shrub:	9300
	(22,980 acres)
High Susceptibility	None
Moderate Susceptibility	9,300
Other PVGs	
Cottonwood Riverine	
Salix-Carex	
Aspen	1,400
Mountain Mahogany	
Mountain Mahogany with Mountain Big Sagebrush	
Saltbrush Riparian	
Juniper	
Alpine Shrub-Herbaceous	22,500

[1] Hectare = 2.47 acres

Table 2M.3 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 2 on BLM- and FS-administered (UCRB). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS
	Hectares
Dry Grass PVG	
Wheatgrass Grassland	12,400
Fescue Grassland	100
Fescue Grassland with Conifer	39,300
Total Dry Grass:	51,800
	(127,998 acres)
High susceptibility	51,800
Moderate susceptibility	51,800
Dry Shrub PVG	
Antelope Bitterbrush	
Basin Big Sagebrush	
Low Sagebrush Mesic	
Low Sagebrush Mesic with Juniper	
Big Sagebrush Warm	
Big Sagebrush Cool	4,000
Salt Desert Shrub	
Threetip Sagebrush	
Total Dry Shrub:	4,000
	(9,884 acres)
High Susceptibility	4,000
Moderate susceptibility	4,000
Cool Shrub PVG	
Mountain Big Sagebrush Mesic East	27,700
Mountain Big Sagebrush Mesic East with Conifer	
Mountain Big Sagebrush Mesic West	
Mountain Big Sagebrush Mesic West with Juniper	
Total Cool Shrub:	27,700
	(68,447 acres)
High Susceptibility	0
Moderate Susceptibility	27,700
Other PVGs	
Cottonwood Riverine	
Salix-Carex	
Aspen	18,000
Mountain Mahogany	100
Mountain Mahogany wtih Mountain Big Sagebrush	600
Saltbrush Riparian	
Mountain Riparian Low Shrub	3,500
Juniper	300
Alpine Shrub-Herbaceous	14,900

[1]Hectare = 2.47 acres

Table 2M.4 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 3 on BLM- and FS-administered (EEIS). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS
	Hectares
Dry Grass PVG	
Wheatgrass Grassland	3,800
Fescue Grassland	700
Fescue Grassland with Conifer	64,900
Total Dry Grass:	69,400
	(171,487 acres)
High Susceptibility	
Moderate Susceptibility	
Dry Shrub PVG	
Antelope Bitterbrush	2,000
Basin Big Sagebrush	3,600
Low Sagebrush Mesic	
Low Sagebrush Mesic with Juniper	1,000
Big Sagebrush Warm	11,600
Big Sagebruch Cool	6,400
Salt Desert Shrub	
Threetip Sagebrush	
Total Dry Shrub:	24,600
	(60,787 acres)
High Susceptibility	
Moderate Susceptibility	
Cool Shrub PVG	
Mountain Big Sagebrush Mesic East	11,200
Mountain Big Sagebrush Mesic East w/Conifer	19,200
Mountain Big Sagebrush Mesic West	1,300
Mountain Big Sagebrush Mesic West w/Juniper	33,500
Mountain Shrub	1,200
Total Cool Shrub:	66400
	(164074 acres)
High Susceptibility	
Moderate Susceptibility	
Other PVGs	
Cottonwood Riverine	300
Salix-Carex	3,400
Aspen	2,700
Mountain Mahogany	100
Mountain Mahogany w/Mountain Big Sagebrush	700
Saltbrush Riparian	700
Mountain Riparian Low Shrub	
Juniper	
Alpine Shrub-Herbaceous	5,800

[1]Hectare = 2.47 acres

Table 2M.5 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 3 on BLM- and FS-administered (UCRB). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS
	Hectares
Dry Grass PVG	
Wheatgrass Grassland	10,100
Fescue Grassland	5,400
Fescue Grassland w/Conifer	67,900
Total Dry Grass:	83,400
	(206,081 acres)
High Susceptibility	83,400
Moderate Susceptibility	83,400
Dry Shrub PVG	
Antelope Bitterbrush	
Basin Big Sagebrush	
Low Sagebrush Mesic	
Low Sagebruch Mesic with Juniper	
Big Sagebrush Warm	
Big Sagebrush Cool	1,300
Salt Desert Shrub	
Threetip Sagebrush	100
Total Dry Shrub:	1,400
	(3,459 acres)
High Susceptibility	0
Moderate Susceptibility	1,400
Cool Shrub PVG	
Mountain Big Sagebrush Mesic East	21,500
Mountain Big Sagebrush Mesic East with Conifer	
Mountain Big Sagebrush Mesic West	
Mountain Big Sagebrush Mesic West with Juniper	800
Total Cool Shrub:	22,300
	(55,103 acres)
High Susceptibility	0
Moderate Susceptibility	22,300
Other PVGs	
Cottonwood Riverine	
Salix-Carex	3,900
Aspen	39,800
Mountain Mahogany	
Mountain Mahogany with Mountain Big Sagebrush	
Saltbrush Riparian	100
Mountain Riparian Low Shrub	1,400
Juniper	
Alpine Shrub-Herbaceous	800

[1]Hectare = 2.47 acres

Table 2M.6 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 4 on BLM- and FS-administered (EEIS). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS
	Hectares
Dry Grass PVG	
Agropyron Steppe	5,400
Fescue Grassland	3,500
Fescue Grassland w/Conifer	19,700
Total Dry Grass:	28,600
	(70,671 acres)
High Susceptibility	
Moderate Susceptibility	
Dry Shrub PVG	
Antelope Bitterbrush	1,500
Basin Big Sagebrush	6,800
Low Sagebrush Mesic	
Low Sagebrush Mesic weith Juniper	
Big Sagebrush Warm	37,700
Big Sagebrush Cool	400
Salt Desert Shrub	
Threetip Sagebrush	600
Dry Shrub Total:	47,000
	(116,137 acres)
High Susceptibility	
Moderate Susceptibility	
Cool Shrub PVG	
Mountain Big Sagebrush Mesic East	400
Mountain Big Sagebrush Mesic East with Conifer	
Mountain Big Sagebrush Mesic West	2,100
Mountain Big Sagebrush Mesic West with Juniper	2,500
Total Cool Shrub:	5,000
	(12,355 acres)
High Susceptibility	
Moderate Susceptibility	
Other PVGs	
Cottonwood Riverine	
Salix-Carex	1,400
Aspen	5,100
Mountain Mahogany	
Mountain Mahogany with Mountain Big Sagebrush	
Saltbrush Riparian	100
Mountain Riparian Low Shrub	
Juniper	
Alpine Shrub-Herbaceous	400

[1]Hectare = 2.47 acres

Table 2M.7–Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 5 on BLM- and FS-administered and Other lands (EEIS). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS	Other Lands
	Hectares	
Dry Grass PVG		
Wheatgrass Grassland	17,400	8,000
Fescue Grassland	5,900	3,100
Fescue Grassland w/Conifer	54,400	29,100
Total Dry Grass:	77,700	40,200
High Susceptibility	77,700	40,200
	(191,997 acres)	(99,334 acres)
Moderate Susceptibility	77,700	40,200
Dry Shrub PVG		
Antelope Bitterbrush	4,000	14,600
Basin Big Sagebrush	14,000	79,000
Low Sagebrush Mesic	117,500	12,400
Low Sagebrush Mesic w/Juniper	200	
Low Sage Xeric	12,200	3,000
Big Sagebrush Warm	594,200	273,600
Big Sagebrush Cool	11,500	10,200
Salt Desert Shrub	144,400	23,000
Threetip Sagebrush	300	1,600
Total Dry Shrub:	898,300	417,400
High Susceptibility	754,100	321,400
	(1,863,381 acres)	(794,179 acres)
Moderate Susceptibility	898,300	417,400
	(2,219,699 acres)	(1,031,395 acres)
Cool Shrub PVG		
Mountain Big Sagebrush Mesic East	71,400	46,400
Mountain Big Sagebrush Mesic East w/Conifer	300	100
Mountain Big Sagebrush Mesic West	154,600	23,500
Mountain Big Sagebrush Mesic West w/Juniper	20,500	33,700
Mt. Shrub	800	2,900
Total Cool Shrub:	247,600	106,600
High Susceptibility	0	0
Moderate Susceptibility	247,600	106,600
	(611,820 acres)	(263,409 acres)
Other PVGs		
Cottonwood Riverine		8,100
Salix-Carex	200	2,500
Aspen	6,400	900
Mountain Mahogany with Mountain Big Sagebrush	2,000	300
Saltbrush Riparian	2,600	7,500
Juniper	4,500	600
Alpine Shrub-Herbaceous	10,700	500

[1]Hectare = 2.47 acres

Table 2M.8 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 5 on BLM- and FS-administered and Other lands (UCRB). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS	Other Lands
	Hectares	
Dry Grass PVG		
Wheatgrass Grassland	32,500	4,900
Fescue Grassland	72,500	10,100
Fescue Grassland with Conifer	234,300	57,000
Total Dry Grass:	339,300	72,000
High Susceptibility	339,300	72,000
	(838,410 acres)	(177,912 acres)
Moderate Susceptibility	339,300	72,000
	(838,410 acres)	(177,912 acres)
Dry Shrub PVG		
Antelope Bitterbrush	32,800	10,600
Basin Big Sage Steppe	42,100	29,900
Low Sagebrush Mesic	303,900	89,500
Low Sagebrush Mesic with Juniper	5,800	800
Low Sage Xeric	90,600	78,200
Big Sagebrush Warm	1,086,200	220,900
Big Sagebrush Cool	307,400	51,200
Salt Desert Shrub	77,900	45,000
Threetip Sagebrush	77,300	32,100
Total Dry Shrub:	2,024,000	558,200
High Susceptibility	0	0
Moderate Susceptibility	2,024,000	558,200
	(5,001,304 acres)	(1,379,312 acres)
Cool Shrub PVG		
Mountain Big Sagebrush Mesic East	635,900	135,300
Mountain Big Sagebrush Mesic East with Conifer	4,900	1,700
Mountain Big Sagebrush Mesic West	665,800	72,700
Mountain Big Sagebrush Mesic West with Juniper	75,700	23,300
Mountain Shrub	400	1,000
Total Cool Shrub:	1,382,700	234,000
High Susceptibility	0	0
Moderate Susceptibility	1,382,700	234,000
	(3,416,652 acres)	(578,214 acres)
Other PVGs		
Cottonwood Riverine	1,200	5,700
Salix-Carex	1,200	400
Aspen	154,700	26,100
Mt. Mahogany	1,400	500
Mt. Mahogany with Mountain Big Sagebrush	27,900	1,600
Saltbrush Riparian	24,500	21,300
Mountain Riparian Low Shrub	1,000	
Juniper	12,000	3,600
Alpine Shrub-Herbaceous	17,300	1,000

[1]Hectare = 2.47 acres

Table 2M.9 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 6 on BLM- and FS-administered and Other lands (EEIS). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS	Other Lands
	Hectares	
Dry Grass PVG		
Wheatgrass Grassland	14,700	14,200
Fescue Grassland	6,200	4,600
Fescue Grassland w/Conifer	40,500	55,500
Total Dry Grass:	61,400	74,300
	(151,719 acres)	
High Susceptibility	61,400	
Moderate Susceptibility	61,400	
Dry Shrub PVG		
Antelope Bitterbrush	300	
Basin Big Sagebrush	26,400	31,100
Low Sagebrush Mesic	86,500	75,900
Low Sagebrush Mesic with Juniper	2,000	1,300
Low Sagebrush Xeric	40,200	21,800
Big Sagebrush Warm	2,403,400	922,400
Big Sagebrush Cool	75,000	34,900
Salt Desert Shrub	456,200	93,300
Threetip Sagebrush	400	300
Total Dry Shrub:	3,090,400	1,181,000
	(7,636,378 acres)	
High Susceptibility		
Moderate Susceptibility		
Cool Shrub PVG		
Mountain Big Sagebrush Mesic East	162,700	112,300
Mountain Big Sagebrush Mesic East with Conifer	18,400	1,800
Mountain Big Sagebrush Mesic West	36,800	13,600
Mountain Big Sagebrush Mesic West with Juniper	52,500	80,900
Mountain Shrub	100	
Total Cool Shrub:	270,500	208,600
	(668,405 acres)	
High Susceptibility		
Moderate Susceptibility		
Other PVGs		
Cottonwood Riverine		
Salix-Carex	200	500
Aspen	4,200	1,500
Mountain Mahogany	300	700
Mountain Mahogany with Mountain Big Sagebrush	37,200	9,500
Saltbrush Riparian	73,300	40,900
Juniper	6,000	6,300
Alpine Shrub-Herbaceous	1,400	800

[1]Hectare = 2.47 acres

Table 2M.10 – Hectares[1] of potential vegetation types within 4th-field subbasins, by potential vegetation group and type, for range cluster 6 on BLM- and FS-administered and Other lands (UCRB). The High and Moderate Susceptibility categories denote the number of hectares of the PVG that are of either High or Moderate Susceptibility to invasion by at least one of the weed species analyzed in Karl and others (1995) known to be present in this range cluster.

Potential Vegetation Type	BLM/FS	Other Lands
	Hectares	
Dry Grass PVG		
Wheatgrass Grassland	9,500	20,700
Fescue Grassland	31,600	30,700
Fescue Grassland with Conifer	144,200	73,600
Total Dry Grass:	185300	125,000
	(457,876 acres)	
High Susceptibility	185,300	
Moderate Susceptibility	185,300	
Dry Shrub PVG		
Antelope Bitterbrush	5,000	4,200
Basin Big Sagebrush	92,400	62,400
Low Sagebrush Mesic	41,300	52,400
Low Sagebrush Mesic with Juniper		
Low Sagebrush Xeric	43,100	69,500
Big Sagebrush Warm	1,468,200	729,400
Big Sagebrush Cool	40,600	18,400
Salt Desert Shrub	12,900	11,300
Threetip Sagebrush	10,500	16,100
Total Dry Shrub:	1,714,000	963,700
High Susceptibility		
Moderate Susceptibility		
Cool Shrub PVG		
Mountain Big Sagebrush Mesic East	337,600	192,900
Mountain Big Sagebrush Mesic East with Conifer	1,800	9,300
Mountain Big Sagebrush Mesic West	74,200	36,100
Mountain Big Sagebrush Mesic West with Juniper	51,700	83,200
Mountain Shrub	5,800	12,200
Total Cool Shrub:	471,100	333,700
High Susceptibility		
Moderate Susceptibility		
Other PVGs		
Cottonwood Riverine	100	100
Salix-Carex	500	15,800
Aspen	168,800	253,000
Mountain Mahogany	6,400	78,300
Mountain Mahogany with Mountain Big Sagebrush	300	1,400
Saltbrush Riparian	17,200	24,100
Mountain Riparian Low Shrub		2,300
Juniper	14,400	6,600
Alpine Shrub-Herbaceous	4,300	300

[1]Hectare = 2.47 acres

Appendix 2-N

Table 2N.1 – Emphasis of integrated weed management for PVTs in the dry grass potential vegetation group by range cluster and alternative including: assumed acres[1] for weed control and livestock management per decade, integrated weed management steps, and PVTs prioritized for control efforts, in the EEIS area.

Range Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
1	17,500	22,500	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	0	1 through 7	High
4	0	0	5, 6, and 7	High
5	30,000	42,500	5, 6, and 7	High
6	77,500	120,000	5, 6, and 7	High
			Alternative 4	
1	17,500	22,500	5, 6, and 7	High and Moderate
2	0	0	1 through 7	High and Moderate
3	0	0	5, 6, and 7	High and Moderate
4	0	0	5, 6, and 7	High and Moderate
5	30,000	72,500	5, 6, and 7	High and Moderate
6	125,000	212,500	5, 6, and 7	High and Moderate
			Alternative 5	
1	2,500	2,500	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	0	1 through 7	High
4	0	0	1 through 4	High
5	2,500	12,500	1 through 7	High
6	22,500	40,000	5, 6, and 7	High
			Alternative 6	
1	12,500	22,500	5, 6, and 7	High and Moderate
2	0	0	1 through 7	High and Moderate
3	0	0	1 through 7	High and Moderate
4	0	0	5, 6, and 7	High and Moderate
5	7,500	72,500	1 through 7	High and Moderate
6	87,500	215,000	5, 6, and 7	High and Moderate
			Alternative 7	
1	7,500	17,500	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	0	1 through 7	High
4	0	0	5, 6, and 7	High
5	17,500	32,500	5, 6, and 7	High
6	45,000	137,500	5, 6, and 7	High

[1]Acreage on this table reflects modifications of further EIS analyses and, therefore, may be inconsistent with some text references based on earlier analyses; acre = 0.4047 hectare.

Table 2N.2 – Emphasis of integrated weed management for PVTs in the dry grass potential vegetation group by range cluster and alternative, including: assumed acres[1] for weed control and livestock management per decade, integrated weed management steps to be emphasized, and PVTs prioritized for control efforts, in the UCRB EIS area.

Range Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	90,000	140,000	5, 6, and 7	High
6	52,500	77,500	5, 6, and 7	High
			Alternative 4	
2	0	0	1 through 7	High and Moderate
3	0	0	5, 6, and 7	High and Moderate
5	92,500	247,500	5, 6, and 7	High and Moderate
6	82,500	140,000	5, 6, and 7	High and Moderate
			Alternative 5	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	12,500	45,000	1 through 7	High
6	17,500	27,500	5, 6, and 7	High
			Alternative 6	
2	0	0	1 through 7	High and Moderate
3	2,500	0	1 through 7	High and Moderate
5	30,000	247,500	1 through 7	High and Moderate
6	55,000	140,000	5, 6, and 7	High and Moderate
			Alternative 7	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	50,000	115,000	5, 6, and 7	High
6	27,500	92,500	5, 6, and 7	High

[1]Acreage figures on this table reflect modifications of further EIS analyses and, therefore, may be inconsistent with some text references based on earlier analyses; acre = 0.4047 hectare.

Table 2N.3 – Emphasis of integrated weed management for PVTs in the dry shrub potential vegetation group by range cluster and alternative, including: assumed acres[1] scheduled for weed control and livestock management per decade, integrated weed management steps, and PVTs prioritized for control efforts, in the EEIS area.

Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
1	67,500	105,000	5, 6, and 7	High
2	0	7,500	1 through 4	High
3	0	7,500	1 through 7	High
4	2,500	2,500	5, 6, and 7	High
5	140,000	185,000	5, 6, and 7	High
6	370,000	552,500	5, 6, and 7	High
			Alternative 4	
1	72,500	112,500	5, 6, and 7	High and Moderate
2	2,500	7,500	1 through 7	High and Moderate
3	2,500	12,500	5, 6, and 7	High and Moderate
4	2,500	2,500	5, 6, and 7	High and Moderate
5	147,500	357,500	5, 6, and 7	High and Moderate
6	625,000	1,052,500	5, 6, and 7	High and Moderate
			Alternative 5	
1	22,500	40,000	5, 6, and 7	High
2	0	7,500	1 through 4	High
3	2,500	7,500	1 through 7	High
4	2,500	2,500	1 through 4	High
5	57,500	215,000	1 through 7	High
6	422,500	640,000	5, 6, and 7	High
			Alternative 6	
1	72,500	112,500	5, 6, and 7	High and Moderate
2	0	2,500	1 through 7	High and Moderate
3	2,500	12,500	1 through 7	High and Moderate
4	2,500	2,500	5, 6, and 7	High and Moderate
5	55,000	357,500	1 through 7	High and Moderate
6	390,000	1,055,000	5, 6, and 7	High and Moderate
			Alternative 7	
1	17,500	30,000	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	2,500	1 through 7	High
4	2,500	2,500	5, 6, and 7	High
5	35,000	70,000	5, 6, and 7	High
6	85,000	280,000	5, 6, and 7	High

[1]Acreage figures in this table reflect modifications of further EIS analyses and, therefore, may be inconsistent with some text references based on earlier analyses; acre = 0.4047 hectare.

Table 2N.4 – Emphasis of integrated weed management for PVTs in the dry shrub potential vegetation group by range cluster and alternative, including: assumed acres[1] scheduled for weed control and livestock management per decade, integrated weed management steps, and PVTs prioritized for control efforts, in the UCRB EIS area.

Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
2	0	7,500	1 through 4	High
3	0	7,500	1 through 7	High
5	427,500	650,000	5, 6, and 7	High
6	247,500	370,000	5, 6, and 7	High
			Alternative 4	
2	0	7,500	1 through 7	High and Moderate
3	2,500	7,500	5, 6, and 7	High and Moderate
5	455,000	1,245,000	5, 6, and 7	High and Moderate
6	417,500	692,500	5, 6, and 7	High and Moderate
			Alternative 5	
2	0	7,500	1 through 4	High
3	2,500	7,500	1 through 7	High
5	155,000	740,000	1 through 7	High
6	287,500	422,500	5, 6, and 7	High
			Alternative 6	
2	2,500	7,500	1 through 7	High and Moderate
3	0	7,500	1 through 7	High and Moderate
5	150,000	1,240,000	1 through 7	High and Moderate
6	265,000	697,500	5, 6, and 7	High and Moderate
			Alternative 7	
2	0	0	1 through 4	High
3	0	2,500	1 through 7	High
5	102,500	232,500	5, 6, and 7	High
6	60,000	182,500	5, 6, and 7	High

[1]Acreage figures in this table reflect modifications of further EIS analyses and, therefore, may be inconsistent with some text references based on earlier analyses; acre = 0.4047 hectare.

Table 2N.5 – Emphasis of integrated weed management for PVTs in the cool shrub potential vegetation group by range cluster and alternative, including: assumed acres[1] scheduled for weed control and livestock management per decade, integrated weed management steps, and PVTs prioritized for control efforts, in the EEIS EIS area.

Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
1	17,500	22,500	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	2,500	1 through 7	High
4	0	0	5, 6, and 7	High
5	30,000	40,000	5, 6, and 7	High
6	77,500	120,000	5, 6, and 7	High
			Alternative 4	
1	7,500	12,500	5, 6, and 7	High and Moderate
2	0	0	1 through 7	High and Moderate
3	0	0	5, 6, and 7	High and Moderate
4	0	0	5, 6, and 7	High and Moderate
5	22,500	50,000	5, 6, and 7	High and Moderate
6	80,000	145,000	5, 6, and 7	High and Moderate
			Alternative 5	
1	7,500	7,500	5, 6, and 7	High
2	0	2,500	1 through 4	High
3	0	2,500	1 through 7	High
4	0	0	1 through 4	High
5	7,500	40,000	1 through 7	High
6	85,000	120,000	5, 6, and 7	High
			Alternative 6	
1	12,500	12,500	5, 6, and 7	High and Moderate
2	0	0	1 through 7	High and Moderate
3	0	0	1 through 7	High and Moderate
4	0	0	5, 6, and 7	High and Moderate
5	7,500	50,000	1 through 7	High and Moderate
6	50,000	145,000	5, 6, and 7	High and Moderate
			Alternative 7	
1	7,500	17,500	5, 6, and 7	High
2	0	0	1 through 4	High
3	0	0	1 through 7	High
4	0	0	5, 6, and 7	High
5	17,500	35,000	5, 6, and 7	High
6	45,000	135,000	5, 6, and 7	High

[1]Acreage figures in this table reflect modifications of further EIS analyses and, therefore, may be inconsistent with text references based on earlier analyses; acre = 0.4047 hectare.

Table 2N.6 – Emphasis of integrated weed management for PVTs in the cool shrub potential vegetation group by range cluster and alternatiave, including: assumed acres[1] scheduled for weed control and livestock management per decade, integrated weed management steps, and PVTs prioritized for control efforts, in the UCRB EIS area.

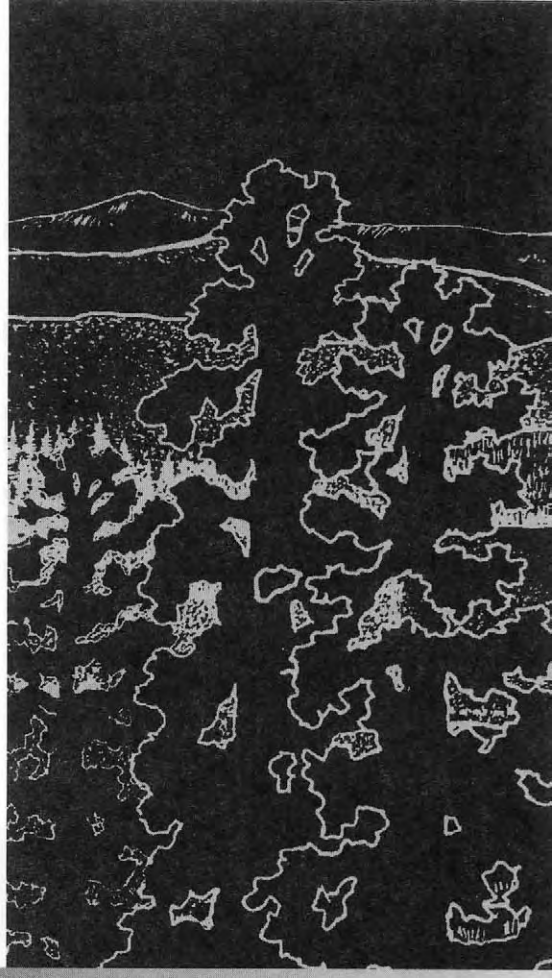
Cluster	Weed Control[1]	Livestock Management[1]	IWM Step Emphasis	PVT Susceptibility Emphasis
			Alternative 3	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	90,000	140,000	5, 6, and 7	High
6	52,500	77,500	5, 6, and 7	High
			Alternative 4	
2	0	0	1 through 7	High and Moderate
3	0	0	5, 6, and 7	High and Moderate
5	60,000	167,500	5, 6, and 7	High and Moderate
6	55,000	92,500	5, 6, and 7	High and Moderate
			Alternative 5	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	30,000	142,500	1 through 7	High
6	55,000	77,500	5, 6, and 7	High
			Alternative 6	
2	0	0	1 through 7	High and Moderate
3	0	0	1 through 7	High and Moderate
5	20,000	167,500	1 through 7	High and Moderate
6	35,000	92,500	5, 6, and 7	High and Moderate
			Alternative 7	
2	0	0	1 through 4	High
3	0	0	1 through 7	High
5	50,000	117,500	5, 6, and 7	High
6	30,000	92,500	5, 6, and 7	High

[1]Acreage figures in this table reflect modifications of further EIS analyses and, therefore, may be inconsistent with text references based on earlier analyses; acre = 0.4047 hectare.

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CHAPTER 3

Effects of Proposed Alternatives on Aquatic Habitats and Native Fishes

James R. Sedell
Danny C. Lee
Bruce E. Rieman
Russell F. Thurow
Jack E. Williams



James R. Sedell is a research ecologist at the Pacific Northwest Forest and Research Experiment Station, Forestry Sciences Laboratory, Corvallis, Oregon 97331.

Danny C. Lee is a research biologist at the Intermountain Forest and Research Experiment Station, Forestry Sciences Laboratory, Boise, Idaho 83702.

Bruce E. Rieman is a research fisheries biologist at the Intermountain Forest and Research Experiment Station, Forestry Sciences Laboratory, Boise, Idaho 83702.

Russell F. Thurow is a research fisheries biologist at the Intermountain Forest and Research Experiment Station, Forestry Sciences Laboratory, Boise, Idaho 83702.

Jack E. Williams is a fisheries ecologist at the U.S. Department of Interior, Bureau of Land Management, Columbia Northwest Technical Assistance Network, Boise, Idaho 83706.

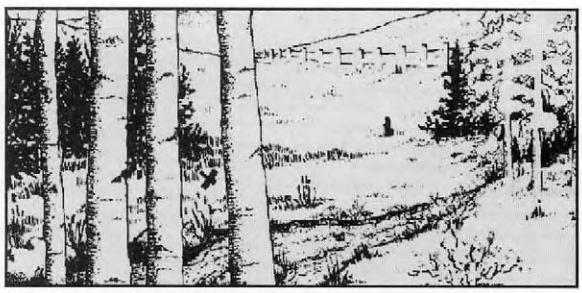


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Introduction

The Aquatics and Riparian Science Teams analyzed the seven alternatives by evaluating their effectiveness in sustaining aquatic ecosystem structure and function, and their expected effect on 25 taxa of native fishes. Our analysis focused on alternatives as defined in Chapter 3 of the Preliminary Draft Environmental Impact Statements (EISs) (USDA and USDI 1996a, 1996b).[1] The analysis consisted of three steps. In step one, we identified the level of protection, maintenance, or restoration of aquatic and riparian habitats offered by each alternative. In step two, we identified expected changes in distribution and status of seven widely-distributed salmonid species that would likely result from implementation of each alternative. Step three involved a similar, though less intensive, effort to identify expected changes in the populations of 18 more narrowly-distributed fish species of special concern. Each step built on the preceding one, as the sections below demonstrate.

Our assessment is based on professional interpretation of both quantitative and qualitative information collected for the purpose of this evaluation or generated as part of the broader scientific assessment (Lee and others, in press). Participants in the evaluation (evaluation team) included Forest Service (FS) and Bureau of Land Management (BLM) scientists from the Science Integration Team (SIT) Aquatics Team that participated in the Broadscale Assessment of Aquatics Species and Habitats (Lee and others, in press), and additional invited scientists from the FS, Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) (appendix 3-A). Information relative to the alternatives and individual fish species were prepared by the SIT, Eastside EIS (EEIS) and Upper Columbia River Basin EIS (UCRB) staffs and presented to the evaluation team in a series of discussions held at the Forestry Sciences Laboratory in Boise, Idaho, on March 7 and 8, and 11 to 13, 1996. The intent of the discussions was to explore issues and probable outcomes associated with each alternative. A series of questions was developed by the evaluation team and used to guide discussion (described below). Notes taken during the discussion were used by the SIT aquatics team to frame the issues and formulate the evaluation in this report. The conclusions presented herein reflect the consensus view of the SIT Aquatics Team that participated in the evaluation.

Our analysis remains subjective in the sense that to draw conclusions we filtered the anticipated allocations and patterns of ground-disturbing and restoration activities, and the current distribution and status of fishes through our understanding of the likely mitigative effects of each alternative. Our analysis is based in existing data and spatial patterns in those data. We believe any interpretations that must rationalize conclusions against existing species distributions, patterns of disturbance, and relationships between the two cannot strongly diverge from those we have made in our analysis. In the time available for analysis, however, we had the choice to either develop data and relationships on which to base our opinions or more systematically develop opinions expressed without the benefit of any detailed understanding or data. We chose to draw conclusions from data and relationships.

In our evaluation, we refer to two separate elements of a species' range, core and fringe. Core areas refer to those portions of the species' distribution where there are concentrations of strong populations (strongholds) and the species is well distributed among adjacent watersheds and subbasins. Generally, such areas are found toward the central part of the species' distribution, but may

[1]Analysis of the seven alternatives is based on the definitions found in the preliminary draft version of the Environmental Impact Statements (February 1996). Detailed information cited in this chapter pertaining to the Preliminary Draft EIS is reproduced in appendix I in Volume II of this document.

occur broadly across the Basin.[2] For anadromous species with very few strong populations remaining, core areas are distinguished by large, contiguous blocks that are occupied by the species. For example, the central Idaho subbasins of the Salmon River would be considered core areas for steelhead, even though populations are generally depressed in that area. In general, we anticipate that populations associated with the core(s) of a species' distribution are most likely to persist in the face of environmental change and disturbance (Lee and others, in press). Strong populations generally support the full expression of life histories including migratory forms, and are likely to be more resilient than depressed populations or those on the fringe of the species' range. We believe conservation of core areas is critical to species preservation, since these areas are most likely to persist in the face of unforeseen environmental change. In contrast, fringe areas refer to the portions of the range that are on the periphery of the species' range. Fringe areas are characterized by a relatively small number of occupied watersheds that are often isolated from the larger portions of the species' range. Fringe areas are potentially important because they may include significant portions of the genetic variability found in a species. The core and fringe distributions considered in this analysis are based on the distribution and status of fishes as described in Lee and others (in press).

In the sections below, we describe each step in the evaluation process. Within each step, we present major assumptions and information used in the evaluation, criteria or questions used to judge alternatives, major findings, and major uncertainties.

Aquatic Viability Analysis: Species, Rationale, and Approach

Our analysis of viability was directed exclusively at fish by examining fish distribution and status, and inferred habitat conditions as influenced by allocations and patterns of ground-disturbing and restoration activities. The analysis consisted of two parts. Part one addressed the viability of the seven widely-distributed salmonids focused on in the aquatics assessment (Lee and others, in press): bull trout, redband trout, westslope and Yellowstone cutthroat trout, ocean-type and stream-type chinook salmon, and steelhead trout. As discussed in Lee and others (in press), these species are viewed as important indicators of aquatic integrity.

Part two focused on 18 of the 39 narrowly-distributed endemic or sensitive taxa that were identified in Lee and others (in press) (table 3.1). Some of these species are federally listed under the Endangered Species Act of 1973 (ESA). Whether listed or not, we omitted from analysis those taxa that do not occur in more than one National Forest or BLM District, since they are better addressed by the individual administrative units. We also omitted species for which Federal land management has little or no perceived influence on their viability.

We did not assess viability of desirable introduced species because the distribution of introduced species tends to be irregular. Viability is more of a local issue that applies to individual populations within small areas. It is not a broad-scale issue, and there is little for our analysis to contribute. Introduced species tend to persist wherever humans choose to stock them.

Information on non-fish, aquatic organisms and pertinent aspects of aquatic systems is limited, and is often specific to an individual site. Many aquatic invertebrates have very localized distributions, making effects of watershed-scale disturbance difficult to detect. For these reasons, we decided it was inappropriate to address the non-fish, aquatic biota in a broad-scale evaluation of alternatives.

[2]The Basin is defined a those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those porions of the Klamath River basin and the Great Basin in Oregon.

Table 3.1. Rare and sensitive fish taxa in the Interior Columbia Basin Ecosystem Management Project (ICBEMP) analysis areas. This list excludes seven widely-distributed salmonids that were focal species in the Aquatics chapter of the *Assessment of Ecosystem Components.*[1] Viability analyses will be conducted only on those 18 taxa occurring in more than one BLM/Forest Service jurisdiction and affected by land management activities.

ICBEMP Sensitive Fish Species	Occur in more than one BLM/FS jurisdiction?	Affected by land management?	Viability analysis?
White sturgeon	Yes	No	No
Klamath lamprey	No	No	No
River lamprey	Yes	No	No
Pacific lamprey	Yes	Yes	Yes
Goose Lake lamprey	No	Yes	No
Pit-Klamath brook lamprey	Yes	Yes	Yes
Sockeye salmon	Yes	No	No
Chum salmon	Yes	No	No
Coho salmon	Yes	No	No
Coastal cutthroat trout	No	Yes	No
Lahontan cutthroat trout	Yes	Yes	Yes
Pygmy whitefish	Yes	Yes	Yes
Burbot	Yes	No	No
Sand roller	Yes	No	No
Northern roach	No	Yes	No
Alvord chub	No	Yes	No
Borax Lake chub	No	Yes	No
Catlow tui chub	No	Yes	No
Oregon Lakes tui chub	Yes	Yes	Yes
Summer Basin tui chub	No	Yes	No
Sheldon tui chub	No	Yes	No
Hutton tui chub	No	Yes	No
Leatherside chub	Yes	Yes	Yes
Foskett speckled dace	No	Yes	No
Lost River sucker	Yes	Yes	Yes
Warner sucker	Yes	Yes	Yes
Goose Lake sucker	Yes	Yes	Yes
Shortnose sucker	Yes	Yes	Yes
Klamath largescale sucker	Yes	Yes	Yes
Wood River bridgelip sucker	Yes	Yes	Yes
Torrent sculpin	Yes	Yes	Yes
Shorthead sculpin	Yes	Yes	Yes
Pit sculpin	No	Yes	No
Slender sculpin	Yes	Yes	Yes
Margined sculpin	Yes	Yes	Yes
Wood River sculpin	Yes	Yes	Yes
Shoshone sculpin	No	No	No
Malheur sculpin	Yes	Yes	Yes
Sunapee char	No	No	No

[1]Lee, D.C.; Sedell, J.R.; Rieman, B.; [and others]. (in press). Chapter 4. Broadscale assessment of aquatic species and habitats. In: Quigley, Thomas M.; Arbelbide, S.J., tech. eds. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great basins. Gen. Tech. Rep. PNW-GTR-XXX. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: scientific assessment).

Step 1: Suitability of Proposed Alternatives for Aquatic Ecosystem Protection

The major elements of the aquatic conservation strategy were evaluated on the basis of interim widths of riparian areas and activities allowed within them, treatment of strongholds and "at-risk" populations, treatment of priority watershed or aquatic categories, amount of watershed and riparian restoration, and major assumptions needed to determine successful outcomes.

Riparian Widths and Activities

Current forest plans and forest practice rules regulate two major features of Riparian Habitat Conservation Areas (RHCA) used in Alternatives 2, 3, and 7 and Riparian Management Areas (RMA) used in Alternatives 4, 6, and parts of Alternative 5: their width and the type and amount of activities permitted to take place within them. Evaluating the effectiveness of RHCAs and RMAs to protect and manage riparian areas is difficult because of the complexity of the ecological functions they provide, the extended time over which impacts can occur, and the often long duration it can take for ecosystems to recover. Four biophysical principles underlie any evaluation of a riparian management strategy: (1) the functions and processes that govern production in a stream are generally dependent on predictable and near-natural energy and nutrient inputs; (2) wildlife has a disproportionally high use of riparian areas and stream-side forests compared with the overall landscape; (3) small streams are generally more affected by hill-slope activities than are larger streams; and (4) as adjacent slopes become steeper, the likelihood of disturbance resulting in discernable instream effects increases.

The width necessary to protect stream and riparian area structure and function at the small watershed level, and limits to disturbance near streams, will necessarily be based on watershed and site-specific analysis. The dimensions of riparian protection areas, particularly if they are to be used as interim or default standards, could include safety factors to allow for natural disturbances, uncertainties about the riparian ecosystem of interest, and changes in public values (National Research Council 1995). If an additional margin of error is allowed (not unlike bridge design accounting for unknown factors and longevity of structure), the probability of habitat improvement becomes greater and options for future management decisions are increased (FEMAT 1993, National Research Council 1995).

Channelized flow from intermittent and small streams into fish-bearing streams is a primary source of sediment in mountainous regions (Belt and others 1992). Gray (1970, 1978) identified four mechanisms by which vegetation enhances soil stability including: (1) mechanical reinforcement by roots; (2) regulation of soil moisture content; (3) buttressing between trunks or stems of plants; and (4) surcharge from the weight of trees. Gray and Megahan (1981) evaluated these hydromechanical effects in the Idaho batholith and found that the first three are highly important in stabilizing slopes, hollows, and intermittent streams. Gray and Megahan (1981) recommended using buffer zones along the margins of streams, and establishment of vegetative-leave-areas in critical areas, such as hollows and intermittent streams. Further, the assumption that large woody debris (LWD) recruitment in streams comes only from adjacent stream banks is not warranted given that intermittent streams provide large quantities of LWD during floods, after fires, and from debris torrents (Reeves and others 1995). Many of these small intermittent streams will not have full protection of ecological functions without an adequate RMA (Erman and Mahoney 1983, McGurk and Fong 1995).

The riparian goals and objectives of Alternatives 2 through 7, with the exception of the commodity-emphasis areas of Alternative 5, are to protect and restore riparian functions. The actual size of the riparian areas depends on the local characteristics that define them and a clear vision of how to

achieve the riparian management goals and objectives. Some of the goals of the aquatic conservation strategy for an alternative are to maintain the function of instream processes over the life of the plan and several additional decades. With the exception of current forest plans (Alternative 1) and the commodity-emphasis areas of Alternative 5, the alternatives utilize one-half to two maximum site potential tree heights[3] (90 ft or 27.4 m for cold forest, 120 ft or 36.6 m for dry forest, and 150 ft or 45.7 m for moist forest) depending on stream size, plus the flood-prone (11-year floodplain) area or the 100-year floodplain, whichever is greater, as a standard for defining riparian widths.

Conservatively managed RHCAs and RMAs of one maximum site potential tree height are likely adequate to maintain most key riparian functions (for example, stream shading, large woody debris recruitment, small organic litter inputs, and nutrient regulation) throughout several decades or 100 years. The width dimensions of RHCAs and RMAs in Pacific Anadromous Fish Strategy (PACFISH 1994) (Alternative 2) and the deviation from PACFISH in Alternatives 3, 4, 6, 7, and parts of Alternative 5 in general provide adequate protection and a margin for error for riparian processes critical for maintaining fish species in most instances (FEMAT 1993; Lee and others, in press; Murphy 1995; National Research Council 1995; PACFISH 1995). Alternatives 2, 3, and 7 use site potential tree height, 100-year floodplain width, or a specified distance (50-300 ft or 15.2-91.5 m depending on whether the stream is fish-bearing and intermittent or permanently flowing). Alternatives 4 and 6 use the same site potential tree height standards as Alternatives 2, 3, and 7 with a minimum of 90 feet (27.4 m) for cold forest intermittent streams, to 300 feet or 91.5 meters (2 tree heights) for larger fish-bearing streams in moist forests. The width is dependent on potential vegetation type or one tree height to two tree heights. In addition, the RMAs for Alternatives 4 and 6 can vary depending on the steepness of the adjacent slope; larger riparian widths are defined where steep slope influences occur. Generally, for slopes greater than 30 percent, RMAs will be wider than 300 feet (91.5 m).

Alternative 1 and the commodity-emphasis areas of Alternative 5 do not adequately protect riparian functions for several reasons. The existing forest plans (Alternative 1) are highly variable in providing riparian protection. They frequently provide no protection for intermittent streams, and generally do not fully protect riparian dependent functions (Lee and others, in press; Murphy 1995; PACFISH 1995). In Alternative 5 timber and livestock emphasis areas, which encompass nearly all of eastern Oregon and the northern third of the UCRB area, RMA widths vary from 20 feet (6.1 m), to a maximum of one site potential tree height, depending on the individual function or combined functions that require protection. RMA widths are the same as Alternatives 4 and 6 in non-timber or livestock emphasis areas of the Basin. While ecological functions of riparian areas would be protected under Alternative 5, the alternative does not provide enough information to evaluate whether a minimum or maximum width would be used. The maximum width of one site potential tree height leaves little margin for uncertainty, and less than one site potential tree height would not provide full, direct ecological protection or have the possibility to provide for other organisms with greater habitat requirements. The variable widths of riparian areas suggest a one-size-fits-all approach of a maximum of one site potential tree height will not accommodate all organisms (PACFISH 1995). PACFISH (1995) prescribed 90 meters (295 ft) minimum RHCA widths for fish-bearing streams to maintain stream function from non-channelized source sediment inputs. A review of the literature indicates that the minimum widths recommended by PACFISH would also be sufficient to provide for other riparian functions with a margin for error (Belt and

[3]Site potential tree height is defined as "the average maximum height of the tallest dominant trees (200 years or more) for a given site class."

others 1992; Beschta and others 1987; Brazier and Brown 1973; Gregory and others 1987; Lee and others, in press; McDade and others 1990; National Research Council 1995; Sedell and Beschta 1991; Steinblums and others 1984).

There is no provision in commodity-emphasis areas under Alternative 5 for protecting intermittent streams from which many disturbances originate (such as, landslides, sediment entry, and woody debris recruitment; Belt and others 1992). In addition, the watershed analysis procedure for the commodity-emphasis areas under Alternative 5 is concerned primarily with hydrologic and geomorphic functions, and not ecosystem functions of the landscape. In commodity-emphasis areas under Alternative 5, only site-specific analysis is required at the project scale, making it difficult to determine cumulative effects at a watershed level.

A major assumption made under Alternatives 4, 5, and 6 is that active management of RMAs is necessary to reduce fire severity. This would be accomplished by recreating a mosaic of stands in different conditions that offer natural firebreaks and less concentrated food sources for pests, mimicking historical forest conditions. The trade-off between fire risk and the risks associated with management activities is a watershed and site-specific issue, and no clear direction is given for the reconciliation of competing ecological needs in the preliminary draft EIS standards and guidelines (see appendix I, Vol. II). While productivity and fuel loading may be highest in the RMAs, these zones are generally moister and historically had longer fire return intervals (Agee 1994). Thus, in an ecological sense, fire management concerns are generally not a primary emphasis in riparian zones. Although riparian corridors sometimes experienced high-intensity fires, the more typical fire pattern was high-intensity fires that burned down to the riparian corridors, decreased in intensity, and often went out (Agee 1994). Given the importance of the riparian area to fish and aquatic habitat, a prudent course of treatment benefiting both RMAs and the entire landscape might be to treat the fire-prone portions of the landscape outside of riparian areas. By focusing treatment in areas adjacent to riparian zones, historical refuges within the RMAs would be protected, where activities occurring closer to the stream have a greater probability for adverse effects on the stream. Although break up of current continuity of fuels is a needed treatment over much of the landscape, little is known about the minimum threshold of treatment that would sufficiently reduce fuel loadings and thereby reduce the potential for and frequency of major catastrophic fire. Historically, almost all of the low-severity fire regimes were in a mosaic, "fire-safe" condition (Agee 1994). If the upland landscape can be restored to a more sustainable character through thinning and prescribed burning, wildfires can be largely controlled before they burn riparian zones.

For the purposes of this evaluation, we assumed that the large tree standard contained in the interim RMA objectives and standards for Alternatives 4, 5, and 6 (see appendix I) takes precedence over the fire regime and fire-severity standards applied directly to riparian zones. In other words, if in a dry forest type the RMAs were mostly composed of mixed-age firs, then the big firs would generally be of high ecological value and be in short supply along streams and the RMAs would meet the silviculture standard for mature or late-successional stage in zone 1. Thinning, from below (removing the smaller, younger, understory trees), would achieve the desired fire management goals (reducing fuel ladders) while also meeting the large tree standards near streams; this is different from converting the entire area to a dry forest composition.

Treatment of Strong and At-Risk Populations

Alternatives 3 through 6 do not specifically provide a mechanism for recognizing at-risk or critical habitats within subbasins other than those that require watershed/ecosystem analysis. Although conservation/restoration of strongholds for key salmonids is an important and logical priority, recognition and prioritization of other habitats

that support depressed populations of sensitive or narrowly-distributed species is also important in order to restore the condition of aquatic ecosystems.

We could not identify any scheme for prioritizing restoration activities in important but at-risk subwatersheds. For example, because the fringe distributions of several of the key salmonids are represented only by depressed populations and are not in Category 1 watersheds,[4] they would not require watershed analysis. There appears to be no mechanism in any of the alternatives outside of the intent to consider watersheds at risk. In guideline A-G26 (Aquatics-Guideline 26; see appendix I), it is suggested that managers (when prioritizing watershed restoration activities) consider threatened and endangered species, important life histories, and riparian dependent species. We assumed that there was no mechanism to prioritize protection of important and at-risk habitats or populations (such as depressed populations found in the fringe distributions) if they did not coincide with strong, Category 1, or priority watersheds. This may be particularly significant for the fringe distributions of several species. Although fringe areas may contribute a disproportionately large part of the genetic diversity or variability for some species, they are generally composed of depressed populations that are not considered under the strategies associated with any alternative.

Treatment of Priority Watersheds and Category Watersheds

Priority watersheds in Alternative 2 are replaced by watershed Categories 1[4], 2[5], and 3[6] in Alternatives 3 through 6. Although the ecosystem management alternatives require a mid-level (subbasin) analysis, the discussion does not clearly acknowledge the uncertainty and limited utility of the aquatic classification scheme. The classifications were intended to communicate broad-scale issues and opportunities regarding conservation and restoration potential of aquatic ecosystems, not to develop a prescription (Lee and others, in press). They are based on coarse data that have not been verified. Examination of new and finer-level information would likely result in many modifications. A process for designating water-

[4]Category 1 Watershed: These high integrity subbasins most closely resemble natural, fully functional aquatic ecosystems. In general they support large, often continuous blocks of high-quality habitat and watersheds with strong populations of multiple species. Connectivity among watersheds and through the mainstem river corridor is unimpeded, and all life histories, including migratory forms, are present and important. Native species predominate, though introduced species may be present. These subbasins provide a system of large, well-dispersed habitats resilient to large-scale disturbances. They provide the best opportunity for long-term persistence of native aquatic assemblages and may be important sources for refounding other areas.

[5]Category 2 Watershed: These moderate integrity subbasins support important aquatic resources, and often have watersheds classified as strongholds for one or more species scattered throughout. The integrity of the fish assemblage is high or moderate. The most important difference between Category 1 and Category 2 watersheds is increased fragmentation in Category 2 that has resulted from habitat disruption or loss. These subbasins have numerous watersheds where native species have been lost or are at risk. Connectivity among watersheds exists through the mainstem river system, or has the potential for restoration of life-history patterns and dispersal among watersheds. Because these subbasins commonly fall in some of the more intensively managed landscapes, they may have extensive road networks. Stronghold watersheds that require conservative protection are scattered rather than contiguous. These subbasins are more likely to provide opportunities to explore or experiment with watershed restoration through active manipulation, or through attempts to produce more episodic disturbance followed by long periods of recovery.

[6]Category 3 Watershed: These low integrity subbasins may support populations of key salmonids or have other important aquatic values, such as threatened and endangered species, narrow endemics, and introduced or hatchery supported sport fisheries. In general, however, these watersheds are strongly fragmented by extensive habitat loss or disruption throughout the component watersheds, and most notably through disruption of the mainstem corridor. Major portions of these subbasins are often associated with private and agricultural lands not managed by Forest Service or BLM. Although important and unique aquatic resources exist, they are usually localized. Opportunities for restoring connectivity among watersheds, full expression of life histories, or other large-scale characteristics of fully functioning and resilient aquatic ecosystems are limited or nonexistent in the near future. Because the remaining aquatic resources are often strongly isolated, risks of local extinction may be high. Conservation of the remaining productive areas may require a disproportionate contribution from federal management agencies, because these subbasins often include large areas of non-Federal land.

shed categories that can be amended through mid-level analysis, however, is not provided. In our evaluation we assumed that strongholds can be identified and verified with subbasin analysis. We also assumed that aquatic classification can be amended and verified as well.

Land Use and Management Activities

We assumed that harvest and thinning activities have potentially negative net effects on aquatic systems, and that prescribed burning, livestock management, watershed restoration, and riparian restoration have potentially positive net effects. We recognize that these generalizations are not true in all situations and within all subbasins. Effects of timber harvesting and thinning are difficult to determine at the broad scale. However, with the exception of helicopter logging, most timber harvest activities have an ecological downside and higher risk potentials. This risk potential stems from additional road, landing, and skid trail soil compaction. Megahan and others (1992) concluded that new Best Management Practices (BMPs) can reduce sediment yields compared to historical practices, but risks of increased sedimentation from forest management practices will continue to occur if road building and timber harvesting take place. Menning and others (1996) adapted a cumulative watershed effects accounting system to model forest stand response to fire and timber harvest activities. Their coefficients for different types of wildfires, timber harvest, grazing activities, and roads reflect the relative associated risk to watersheds from sedimentation and are consistent with our assumptions.

We assumed that prescribed burning would not require new roads or activities to effectively treat the landscape and would result in no soil compaction. In reviewing literature on watersheds from the western United States, Beschta (1990) concluded that where low-severity burns occur (as with prescribed burning), much of the organic matter comprising the forest floor may remain following burning. In these situations, the effects of burning are generally insignificant with regard to a wide range of hydrologic and water quality variables.

Restoration may include a variety of activities that influence aquatic habitats, but it is not possible to determine the relative significance of those activities from their allocation in the alternatives. Because restoration activities or the levels of those activities are not clearly defined, we assumed that restoration means significant progress in the restoration of the processes and functions relevant to aquatic habitats and species in the treatment area. We generally assumed that more restoration was better, and that moderate and high levels of restoration in terms of acres or hectares treated per decade (see "Major Assumptions and Information Used to Judge Alternatives" section later in this chapter) would produce positive trends in the status and distribution of a species. This assumption would hold true as long as those activities were subsequent to watershed/ecosystem analysis and were distributed across a portion of the species' range where they would be beneficial (for instance, where the species is still present and capable of responding). We also recognized that some risk is inherent in all forest management and restoration activities, and assumed that high restoration alternatives would be pursued with an approach that maximizes learning while minimizing risks.

Major Assumptions Needed to Determine Successful Evaluation Outcomes

As established in the preliminary draft EISs, standards represent required actions, and guidelines are suggestions for achieving objectives and are not required actions (see appendix I for details). Because we could not anticipate when guidelines would or would not be followed, our analyses represent the outcomes associated with the situation where they would generally not be followed. We recognized that in some circumstances and in some areas, guidelines would be implemented. Many of the standards and guidelines in the interim RMAs appeared decoupled from the aquatic conservation objectives. They referred to meeting

Riparian Management Objectives (RMOs) and protecting RMAs but did not refer back to the ecological objectives. We further assumed in our analysis that the interim standards would become final or long-term standards, since there was no time period specified for analyzing watersheds and the outcome of watershed analysis is unknown.

Ecosystem management standards

In Alternatives 3 through 7, ecosystem management planning is emphasized. As such, we assumed that it would be completed or there would be greater difficulty and uncertainty surrounding the management of landscapes and cumulative effects. Our assumptions regarding several important standards in the ecosystem management section of the preliminary draft EISs (see appendix I) are as follows:

- EM-S12[7] (Develop and implement a standardized road condition and risk inventory.) We assumed that it would be done within the first one to two years or that the guideline for effective watershed restoration (a key element in our evaluation) would be uncertain and the intent of Alternatives 3 through 7 would not be met.
- EM-S13 (Construct new road crossings to maintain fish passage.) We assumed an ecosystem management standard requires maintaining hydrologic processes not just fish passages. As such, the road's management standard in the Aquatic Strategies Interim Objectives and Standards section of the preliminary draft EISs was assumed, specifically in areas where new stream crossings would accommodate a 100-year flood.
- EM-S14 (Transportation plans should be developed in an integrated resource manner, supporting ecosystem analysis and prioritizing roads for rehabilitation, closure, or obliteration.) We assumed it would be done in the same timeframe or parallel to the above-mentioned Standard EM-S12.
- EM-S15 (There shall be no net increase in road density in any cluster. Road mileage increases will be offset by an equal or greater mileage decrease on a per cluster basis.) Subwatersheds [6th hydrologic unit code (HUC)] through subbasins (4th HUC) are the appropriate scales to relate the ecological and cumulative effects consistent with the ecosystem analysis requirements presented in Alternatives 3 through 7. This is the only place where a cluster is assigned a specific implementation requirement as opposed to a strategic basin view. We assumed that there was an ecological basis for reducing moderate- to high-density roaded watersheds, but there was no equal ecological basis for trading road reduction in these areas for more roads in very low-density or unroaded watersheds. Thus, we assumed that a reduction in roads in high-density areas would not offset the negative effects of increasing roads in low or unroaded areas.
- EM-S16[8] (Use adaptive management.) In order for there to be an effective adaptive management program, we assumed that resources would be allocated and priorities established, so that road inventories, watershed analysis, and design and implementation of inventory and monitoring programs would be in place within a two-year timeframe.

Aquatic strategies standards

Watershed and riparian restoration management:

- A-S3[9] (Attainment and process for assessing Proper Functioning Condition should be

[7]EM-S12 indicates Ecosystem Management - Standard, followed by the specific standard number cited (Chapter 3, Preliminary Draft EISs) (USDA and USDI 1996a, 1996b).

[8]EM-S16 indicates Ecosystem Management - Standard 15; Standard 15 was added to this evaluation of alternatives at a later date than the other standards cited in this discussion and is therefore found in the August 1996 version of the Draft EIS.

[9]A-S3 indicates Aquatics - Standard, followed by the specific standard cited (Chapter 3, Preliminary Draft EISs) (USDA and USDI 1996a, 1996b).

required.) We assumed the attainment of proper functioning condition (PFC) would be required and that if it were not, management activities would be modified to attain PFC. The PFC concept is an example of a poorly-defined condition that is directed to be met, but for which the preliminary draft EISs do not address the ecological elements directly or specifically. We have assumed that PFC addresses both the hydrologic and geomorphic aspects of channels, stream banks, and surface water as well as the vegetative characteristics. Further, we have assumed that PFC achieves hydrologic function first and that the manager's decision-making options are between achieving hydrologic function and attaining site-specific vegetation potential. For purposes of aquatic and terrestrial organism communities, we assumed that vegetation standards are specifically included. Conservation and restoration of PFC in riparian areas includes managing toward an advanced successional stage of riparian vegetation with multiple species and age classes of woody vegetation. This is ecologically necessary. We further assume that PFC is an interdisciplinary team process; similar to watershed analysis, it will likely require more than one person to complete the analysis.

The PACFISH Recommended Livestock Grazing Guidelines[10] lists specific attributes of PFC, recommendations for modifying current directions, and priorities for taking action. The specificity of the guidelines provides a credible basis for evaluating and monitoring, and increases their ability for implementation.

Monitoring and inventory:

- A-S7 (Regional and State offices shall develop monitoring frameworks.) We assumed a monitoring program would be developed.
- A-S8 (Regional and State offices should oversee, ensure, and report results of monitoring programs.) We assumed regional and state offices would oversee and ensure monitoring programs and report their results.
- A-S10 (Monitoring shall be conducted to determine if objectives are being met...If analysis indicates that Watershed or Riparian Management Objectives are not being met due to natural conditions or to processes or action outside of management control, then new objectives should be developed on the basis of new information.) We thought that this was a standard that implied a cumulative watershed effects (CWE) analysis. Currently only the Aquatics Guideline A-G25 directly addresses CWE: "Consider establishing qualitative and quantitative watershed disturbance (natural and management) levels or parameters for upland and riparian area zones to provide early indication of potential watershed cumulative effects and causal mechanisms for aquatic and riparian conditions." Alternative 7 is the only alternative that directly addresses CWE by calling for a consistent equivalent clearcut area (ECA) CWE method and setting a 15 percent ECA threshold which would trigger a watershed analysis (McCammon 1993). This threshold is at a watershed scale and does not distinguish near-stream disturbances from upslope disturbances or set a lower threshold near streams than for upslope areas. Alternatives 4 and 6 put forward a riparian zoning scheme which sets the foundation for CWE determination that could be sensitive to spatial variations in considering watershed disturbing effects (McGurk and Fong 1995, Menning and others 1996). However, only the vegetation management was directly required as a standard (directing more riparian forests toward mature and old forest condi-

[10]Personal communication. May 24, 1995 [revised July 31, 1995]. John Lowe, U.S. Forest Service. Internal document on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

tions). Developing disturbance limitation criteria for each zone within the first couple of years of a plan would help prorate CWE and spatially locate these away from streams. All of the alternatives would provide greater protection for aquatic systems if they had such criteria. Such a scheme would allow more creative solutions and proposed new activities to be developed for currently disturbed watersheds, because planning models could be used before implementation of a project as opposed to instream RMOs which are an after-the-project measure of past events.

Key watersheds and watershed categories:

- A-S12 (Ecosystem analysis should be performed in Category 2 and 3 watersheds before Environmental Assessment (EA) or EIS required activities, otherwise interims apply.) We assumed ecosystem analysis would be conducted in strongholds and high-priority watersheds in Category 2 and 3 watersheds for Alternatives 3, 4, parts of Alternative 5, and 6.

Non-Federal Lands

No alternative addressed the role of non-Federal lands in achieving the goals and objectives of the aquatic conservation strategy. In assessing the role of non-Federal land in the maintenance of fish habitat and water quality, we assumed that the federally managed lands would likely act as anchors, and that, as important as non-Federal land is to certain fishes and aquatic communities, improvements would not be systematic throughout the Basin and conditions would not likely improve substantially. We based this assumption on the following reasons: (1) the goals of the states' natural resource agencies generally are not specifically aimed at restoring aquatic ecosystems and biodiversity, but instead are aimed at meeting societal needs while disrupting ecological processes and structures as little as possible; (2) as one moves from the broad and uniform application of forest practice rules, which are themselves not fully protective of riparian function (FEMAT 1993, Murphy 1995, National Research Council 1995, Spence and others 1996) to rangelands and then to settlement areas at the urban/wildland interface, the outcomes of regulations and laws are variable, localized and often vague; and (3) adequate information about species in a site that will be affected by management activity is generally lacking, especially in terms of the biological condition and presence of rare species. While each State within the Basin has goals associated with their policies, the actual implementation of those goals through adherence to the requirements embodied in the standards remains less certain. For these reasons, we assumed the outcomes were highly uncertain and problematic for such policies to protect and restore riparian and aquatic resources through time. Private lands affect corridors, low- to mid-elevation watersheds, valleys, and meadows. All of these are important to different aquatic communities and to water quality. Private land ownership patterns afford Federal managers the opportunity to cooperate in maintaining and restoring of aquatic resources or to become more conservative to accommodate continued effects within the subbasins and the Basin.

Summary and Comparison

All of the alternatives lack specific performance measures. Performance measures would be quantifiable ecological goals in the sense that they measure a biological or physical process or state (such as, water quality and instream RMOs); they are not a measure of causal mechanisms. These would be measures from which one could determine the desired future conditions of the stream, watershed, or riparian vegetation. We do not view these performance measures as absolute thresholds or targets, but rather in the sense of relative health of the system, much like foresters view measures of mortality, growth rate, and so on. If the overall goal is to maintain and/or restore natural ecosystem processes and conditions, then some performance measures are needed that can be used to indicate if the current trend is moving in the desired direction. For example, the science literature supports that more ecological functions

and habitats along forest streams can be provided if the adjacent stand is in a mature or late-successional condition (FEMAT 1993, Murphy 1995, National Research Council 1995). Measures of this condition are the number and size classes of large trees for a given potential vegetation group (PVG). If this condition exists or could be attained, one could expect the instream conditions to eventually reflect the desired instream conditions. Likewise, with limits on disturbance in watersheds, the desired state could be maintained or potentially restored in a shorter period of time than if there were or had been no limits to watershed disturbance.

The instream RMOs are an attempt to quantitatively provide a measure of the current condition of a stream or streambank. They reflect causal mechanisms occurring recently or in the distant past. Changes in these measurable instream characteristics could be a result of decades of past degradation, a recent large flood, human disturbance, or multiple causes. In aggregate, RMOs are useful in determining trends and current watershed conditions, but are not well connected to planning and implementing ecosystem management within these alternatives.

Under Alternatives 2 through 6, RMO objectives are not expected to be met instantaneously, but rather would be achieved over time. While the RMOs vary somewhat, the timeframe for attainment of RMOs does not appear to vary with alternative except when concerning watershed restoration activity levels. This reduces our ability to use RMOs to evaluate their effectiveness within each alternative. In Alternatives 4 and 6, "all of the described features may not occur within a watershed, but all generally should occur at the watershed scale." We were given no guidance in any alternative as to how the condition of a watershed relative to RMOs would affect project implementation. If RMOs are below standard for the watershed, do projects continue that can further degrade habitat? We assumed not. We further assumed that if watershed analysis allowed one to make changes in standards and guidelines in Alternatives 3, 4, 6, and parts of Alternative 5, such changes would not result in degradation or halt restoration trends for habitats, populations, or riparian conditions.

The alternatives are very complex and do not vary systemically to allow a marginal evaluation of the effectiveness of their components. We were often required to evaluate them on the stated alternative approach rather than on the specific elements of an alternative. For example, the real difference between Alternatives 4 and 6 is that they will be implemented at different rates and that adaptive management will figure more prominently in Alternative 6. The difference between Alternatives 2 and 3 appears to be the immediate incorporation of new information gained through the science assessment.

In summary, five of seven alternatives articulated an aquatic conservation strategy sufficient to maintain and restore aquatic and riparian ecological processes through time (table 3.2), Alternative 7 gave the most direct and specific direction regarding performance measures coupled with its reserves and its passive approach. Alternative 6 with its emphasis on adaptive management and cautious approach and Alternative 4 with its aggressive restoration, had less-specific descriptions of processes and performance measures, but RMAs were to be slope adjusted. Alternatives 2 and 3, with the ability to change widths of RHCAs and RMOs with site-specific (not watershed-specific) analysis, rated lower. Finally, Alternatives 1 and 5 did not rate as ecologically satisfactory in their ability to meet the goals and objectives of the aquatic conservation strategy.

Table 3.2. Suitability of proposed alternatives for aquatic ecosystem protection.

Evaluation Questions	Alternative						
	1	2	3	4	5	6	7
Does the aquatic conservation strategy maintain and restore aquatic and riparian ecological processes through time?	No	Yes	Yes	Yes	Yes, in non-production emphasis areas No, in production emphasis areas	Yes	Yes
Is watershed or ecosystem analysis required for specifically identified watersheds?	No, except in FEMAT[1] key watersheds	Yes, but is site-specific, not ecosystem-specific except in FEMAT[1] key watersheds	Yes, but is site-specific, not ecosystem-specific except in FEMAT[1] key watersheds	Yes, watershed analysis in Category 1 and all strongholds, ecosystem analysis in high-priority watersheds and FEMAT[1] key watersheds	Yes, ecosystem analysis in Category 1 non-production emphasis areas; No, in production emphasis areas except FEMAT[1] key watersheds	Yes, watershed analysis in Category 1 and all strongholds, ecosystem analysis in high-priority watersheds and FEMAT[1] key watersheds	Yes, watershed analysis in high-priority watersheds, 1,000 acre roadless areas, and FEMAT[1] key watersheds
Can standards and guidelines be modified after ecosystem analysis?	Highly variable, No	No	Yes	Yes	Yes, in non-production emphasis areas; No, in production emphasis areas	Yes	No
What are the relative benefits of the proposed intensity of riparian and watershed restoration (road obliteration)?	Low	Moderate	Moderate	High	Moderate	High	Low-Moderate

[1]Forest Ecosystem Management Assessment Team (FEMAT). 1993. Forest ecosystem management: an ecological, economic, and social assessment. Portland, OR: U.S. Department of Agriculture; U.S. Department of Interior [and others]. [irregular pagination].

Step 2: Projected Effects on Widely-Distributed Salmonid Species

The "Broadscale Assessment of Aquatic Species and Habitats" (Lee and others, in press) identified seven widely-distributed salmonids that serve as indicators of environmental change. These seven key salmonids are bull trout, westslope cutthroat trout, Yellowstone cutthroat trout, redband trout, steelhead, ocean-type chinook salmon, and stream-type chinook salmon. In this exercise, we identified the expected effect of the seven alternatives on future distribution and status of each of these salmonids.

Major Assumptions and Information Used to Judge Alternatives

We followed the general assumptions identified by the SIT for evaluating alternatives.[11] Specific to salmonids, we assumed that during implementation of the alternatives the presence or absence of strong populations (strongholds), as defined by the SIT in Lee and others (in press), would be verified using local information when activity levels depended on such strongholds. For the purpose of our evaluation, however, we used known and projected status maps (Lee and others, in press) as a reasonable estimate of the current distribution and abundance of strongholds. In our analysis we relied strongly on the information regarding the distribution and status of fishes generated by the aquatic assessment (Lee and others, in press). We also used the spatial and temporal allocation of management activities and road densities developed in the preliminary draft EISs to describe the patterns of management with the potential to influence fishes under each of the alternatives. We developed four primary pieces of information as follows: (1) a series of classification trees to describe current patterns in fish distribution associated with landscape characteristics and to predict simple trends in distribution associated with changes in those characteristics, (2) a summary of anticipated road density changes across the current distribution of fishes, (3) a summary of the current ownership and management cluster for the current distribution of fishes, and (4) a summary of the anticipated intensity of management activities across the current distribution of fishes. Each informational piece provided some sense of where and how much of the anticipated management change was likely to influence each of the species we considered. Each has important limitations or inconsistencies and represents only a single element in a larger and more complex picture. Any conclusions must be drawn from the weight and consistency of trends anticipated from the models, from the patterns in allocation of roads and other land-disturbing activities, the allocation of restoration activities, and the mitigation of disturbance expected through the standards and specific direction of the alternatives.

Classification trees—In order to help track changes in population distribution and status that might result from each alternative, we developed a series of classification trees that linked population status of each species to physical landscape features and management activities. We followed the approach of Lee and others (in press), except that we used a smaller subset of landscape variables to describe the physical setting, and additional measures of road density that were calculated from the one-square-kilometer (0.39 mi^2) road-density data summarized for each subwatershed [8,000-20,000 acre (3,239-8,097 ha) watersheds, 6th HUC] (appendix 3-B). The resulting classification trees' probability distributions associated with each node are presented in appendix 3-B. Uncertainty in classifications can be evaluated through classifi-

[11]Personal communication. March 15, 1996. Sylvia J. Arbelbide, Minerals Area Management Director, U.S. Forest Service, Pacific Southwest Region, San Francisco, CA. Memo, on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

cation success tables (see Lee and others, in press). However, because we used the existing patterns of occurrence as estimates of the likelihood for a given species occurrence under similar conditions in the future, classification success is irrelevant. Confidence intervals for the proportions could be estimated but generally would be comparable in magnitude to the estimated change in distribution. We did not conclude, therefore, that significant changes are likely or unlikely based only on these simple models; we merely used them as an indication of the trends that would be consistent with changes in allocation of roads. The development and utility of classification trees with these data are covered in detail in Lee and others (in press).

The resultant classification trees consistently showed that the likelihood of a strong population decreased with increasing road density in many portions of the landscape for all of the resident species. We used classification trees to predict the likelihood of strong populations and/or depressed populations for each alternative, using the projected road densities in year 100. With the models, we predicted a range of responses that were interpreted for each species by comparison with the current condition. For example, Yellowstone cutthroat trout are currently classified as strong in about 34 percent (Alternative 0 = 0.341 = 34%) of the subwatersheds within the potential historical range (table 3.3). Under Alternative 1, the probability assignment was 0.325 or a change of -0.016 suggesting a declining trend in the occurrence of strong subwatersheds. The predicted loss represents about 4.7 percent of the current distribution of strong subwatersheds across the assessment area. The results also suggest a negative but less substantial change (0.9% of current) in the combined distribution (strong and depressed) for this subspecies (table 3.3).

From these results we could anticipate negative trends in both the status and complete distribution of Yellowstone cutthroat trout associated with the distribution of roads. We might further anticipate a larger change in status than in overall distribution. In other words, the changes from strong to depressed are more likely to occur than are changes from present to absent. Because the models were based on fish distributions and road density allocations by subwatershed, the predictions could also be summarized by subbasin (table 3.4) to provide a spatially explicit characterization of the anticipated changes. In this example, larger changes in status of subwatersheds should be expected in the Salt subbasin than in the Teton subbasin although both show a negative trend (table 3.4). This information was summarized by species and subbasin in a series of tables (tables 3.3-3.10) that were made available to the evaluation team.

The effects of increasing road densities include more than simply the total number of roads; there often are attendant landscape effects associated with roads which cannot be directly measured or projected (Lee and others, in press). Thus, we used road density as a general indicator of human disturbance. One could develop protracted arguments that future roads will not be as harmful as historical roads, or alternatively, that removing roads is not as favorable as having never built them at all—all of which makes evaluating future effects of roads problematic. To simplify, we assumed that future distributions of fish would be influenced by road-density patterns consistent with current relationships unless clearly mitigated by management. Therefore, the predicted changes in probability assignments from the classification trees are useful measures of relative changes that are based on empirical patterns.

Whether or not projected roads and their related effects will influence the status of fishes must be drawn from these empirical patterns, an understanding of the limitations, and the likely mitigative or exacerbating effects of each alternative. It is important to emphasize this point. Changes in road densities projected from the preliminary draft EIS may not reflect actual changes in road-related disturbance, but instead reflect the density of roads that are open and maintained.

Table 3.3. Projected changes in probability assignments for each alternative, Basin-wide and by species for four resident salmonids.

Probability that species status is strong (STR), or either strong or depressed (SR).

Alternative	Bull trout		Westslope cutthroat		Yellowstone cutthroat		Redband trout	
	STR	SR	STR	SR	STR	SR	STR	SR
current*	6.4%	28.3%	21.4%	75.8%	34.1%	62.4%	17.5%	54.3%
1	5.9%	26.8%	20.7%	75.7%	32.5%	61.9%	17.1%	54.3%
2	6.4%	27.6%	21.1%	75.8%	34.1%	62.4%	17.5%	54.3%
3	6.5%	27.9%	21.7%	76.0%	34.2%	62.4%	17.5%	54.3%
4	6.5%	28.0%	21.7%	76.0%	34.5%	62.5%	17.5%	54.3%
5	6.3%	27.6%	21.1%	75.8%	33.1%	61.9%	17.4%	54.3%
6	6.6%	28.3%	21.9%	76.0%	34.5%	62.5%	17.5%	54.3%
7	6.7%	29.1%	22.4%	76.0%	34.6%	62.6%	17.5%	54.3%

*Estimates for current condition.

Relative change* in STR and SR between current and each alternative (DSTR and DSR, respectively).

Alternative	Bull trout		Westslope cutthroat		Yellowstone cutthroat		Redband trout	
	DSTR	DSR	DSTR	DSR	DSTR	DSR	DSTR	DSR
1	-8.5%	-5.2%	-3.4%	-0.2%	-4.8%	-0.9%	-2.0%	—
2	-0.8%	-2.3%	-1.6%	0.0%	—	—	-0.1%	—
3	1.8%	-1.3%	1.2%	0.2%	0.2%	0.0%	0.1%	—
4	2.1%	-1.1%	1.2%	0.2%	1.2%	0.2%	0.2%	—
5	-2.0%	-2.4%	-1.4%	0.0%	-3.1%	-0.8%	-0.7%	—
6	2.8%	-0.1%	2.4%	0.2%	1.0%	0.2%	0.2%	—
7	4.3%	2.9%	4.4%	0.3%	1.4%	0.3%	0.2%	—

*Relative change is calculated as [(projected - current) / current].

Thus, reductions in projected road density may only equate to road closures and not necessarily to road obliteration. Reductions in road density projected through the preliminary draft EISs may not carry the full ecologic and hydrologic benefits associated with true road obliteration, while at the same time increases in density may still carry the full costs. The analysis must be based on trends and a more subjective interpretation of the likely mitigation or exacerbation of that trend as it is tied to watershed restoration activities (for example, true road obliteration and the associated standards under each alternative). Trends predicted with models also are not dramatic and may be understated. For example, relationships between current road densities and the distribution and status of anadromous fishes are weak. This does not imply that roads and their related effects are not important for anadromous fish habitats, rather that the effects of roads may be confounded by the resolution of available data, the limited sample size, and other causes of decline (Lee and others, in press). Other factors likely to influence fish populations are included only to the degree that they will be represented by roads as a surrogate measure of that disturbance.

Table 3.4. Projected changes in probability assignments for Alternative 1, by species.

Alternative 1		Bull Trout		Westslope Cutthroat		Yellowstone Cutthroat		Redband Trout	
EIS	Subbasin	DSTR*	DSR*	DSTR	DSR	DSTR	DSR	DSTR	DSR
EEIS	Methow	-1.1%	-4.5%	-0.6%	-0.3%	—	—	—	—
	Upper Columbia-Entiat	-1.1%	-4.5%	—	—	—	—	—	—
	Wenatchee	-0.4%	-1.5%	0.6%	0.4%	—	—	-0.6%	0.0%
	Naches	0.3%	-2.1%	—	—	—	—	—	—
	Upper Malheur	-0.2%	-2.6%	—	—	—	—	—	—
	Brownlee Reservoir	—	—	—	—	—	—	-1.3%	0.0%
	Imnaha	-1.6%	—	—	—	—	—	—	—
	Upper John Day	-0.1%	-0.9%	—	—	—	—	—	—
	North Fork John Day	-0.2%	-2.8%	—	—	—	—	—	—
	Middle Fork John Day	-0.5%	-5.1%	—	—	—	—	—	—
	Upper Klamath Lake	—	—	—	—	—	—	-3.7%	0.1%
UCRB	Upper Kootenai	-0.4%	-4.0%	-1.1%	-0.1%	—	—	—	—
	Fisher	-0.2%	-1.4%	—	—	—	—	—	—
	Yaak	-0.4%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	-0.3%	-2.4%	-3.1%	-0.3%	—	—	—	—
	Moyie	—	—	-1.9%	-0.4%	—	—	—	—
	Upper Clark Fork	0.1%	2.3%	-1.1%	-1.4%	—	—	—	—
	Flint-Rock	-3.1%	-7.0%	-7.9%	-3.0%	—	—	—	—
	Blackfoot	-0.7%	-3.0%	-2.7%	-0.1%	—	—	—	—
	Middle Clark Fork	-0.3%	-2.8%	-0.5%	-0.1%	—	—	—	—
	Bitterroot	-1.2%	-9.4%	0.0%	-0.6%	—	—	—	—
	Stillwater	-0.5%	-5.9%	—	—	—	—	—	—
	Swan	-1.3%	-15.2%	-3.0%	0.0%	—	—	—	—
	Lower Clark Fork	-0.3%	-3.1%	-1.0%	0.0%	—	—	—	—
	Priest	-0.1%	-1.0%	—	—	—	—	—	—
	St. Joe	-0.2%	-2.3%	-0.5%	-0.1%	—	—	—	—
	Palisades	—	—	—	—	-8.8%	-1.0%	—	—
	Salt	—	—	—	—	-16.5%	-9.1%	—	—
	Teton	—	—	—	—	-2.9%	-0.2%	—	—
	Big Lost	-8.0%	—	—	—	—	—	-3.8%	0.1%
	Big Wood	—	—	—	—	—	—	-6.0%	0.2%
	North & Middle Fork Boise	-3.9%	-0.2%	—	—	—	—	-8.0%	0.3%
	Boise-Mores	-1.2%	—	—	—	—	—	-2.8%	0.1%
	South Fork Boise	-8.6%	-4.7%	—	—	—	—	-11.3%	0.4%
	South Fork Payette	-0.6%	-0.7%	—	—	—	—	-6.7%	0.2%
	Middle Fork Payette	-1.4%	-16.3%	—	—	—	—	-2.3%	0.1%
	Payette	-0.1%	-1.2%	—	—	—	—	—	—
	North Fork Payette	-0.5%	-5.0%	—	—	—	—	-0.9%	0.0%
	Weiser	-0.1%	-0.8%	—	—	—	—	—	—
	Pahsimeroi	-1.6%	—	-7.6%	1.1%	—	—	—	—
	Middle Salmon-Panther	-1.7%	-2.7%	-0.6%	0.2%	—	—	—	—
	Lemhi	-1.0%	-0.3%	-0.7%	-0.1%	—	—	-1.2%	0.0%
	Middle Salmon-Chamberlain	-0.5%	-1.2%	-1.3%	-1.1%	—	—	—	—
	South Fork Salmon	-4.0%	-3.3%	-0.8%	0.0%	—	—	—	—
	Lower Salmon	-0.6%	-6.9%	—	—	—	—	—	—
	Little Salmon	-2.3%	-10.6%	—	—	—	—	—	—
	Upper Selway	-0.1%	-1.5%	—	—	—	—	—	—
	Lochsa	-0.1%	-0.9%	—	—	—	—	—	—
	South Fork Clearwater	-0.2%	-2.3%	—	—	—	—	—	—
	Upper N. Fork Clearwater	-0.4%	-4.1%	-6.4%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	-0.2%	-2.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong.

"Change" is the difference between the alternative and current.

Table 3.5. Projected changes in probability assignments for Alternative 2, by species.

Alternative 2		Bull Trout		Westslope Cutthroat		Yellowstone Cutthroat		Redband Trout	
EIS	Subbasin	DSTR*	DSR*	DSTR	DSR	DSTR	DSR	DSTR	DSR
EEIS	Upper Columbia-Entiat	-1.1%	-4.5%	—	—	—	—	—	—
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Upper John Day	0.5%	2.4%	—	—	—	—	—	—
	North Fork John Day	2.8%	2.8%	—	—	—	—	—	—
	Middle Fork John Day	1.1%	3.4%	—	—	—	—	—	—
	Williamson	—	—	—	—	—	—	1.1%	0.0%
	Upper Klamath Lake	—	—	—	—	—	—	-3.7%	0.1%
UCRB	Upper Kootenai	-0.3%	-3.1%	-0.7%	-0.1%	—	—	—	—
	Fisher	-0.2%	-1.4%	—	—	—	—	—	—
	Yaak	-0.4%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	-0.3%	-2.4%	-3.1%	-0.3%	—	—	—	—
	Moyie	—	—	-1.9%	-0.4%	—	—	—	—
	Blackfoot	-0.7%	-2.5%	-2.3%	0.0%	—	—	—	—
	Middle Clark Fork	-0.3%	-2.8%	-0.5%	-0.1%	—	—	—	—
	Bitterroot	-0.8%	-6.0%	-0.1%	-0.5%	—	—	—	—
	Stillwater	-0.5%	-5.9%	—	—	—	—	—	—
	Swan	-1.0%	-11.9%	-3.0%	0.0%	—	—	—	—
	Lower Clark Fork	-0.3%	-3.1%	-0.7%	-0.1%	—	—	—	—
	Priest	-0.1%	-1.0%	—	—	—	—	—	—
	St. Joe	-0.2%	-2.3%	-0.5%	-0.1%	—	—	—	—
	Boise-Mores	0.3%	2.4%	—	—	—	—	—	—
	Lower Salmon	-0.3%	-2.9%	—	—	—	—	—	—
	Little Salmon	-1.8%	-5.3%	—	—	—	—	—	—
	South Fork Clearwater	-0.2%	-2.3%	—	—	—	—	—	—
	Upper N. Fork Clearwater	-0.4%	-4.1%	-6.4%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	-0.2%	-2.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong. "Change" is between the alternative and current.

Road distributions—To examine potential patterns of road disturbance on aquatic habitats independent of the models, we also cross-tabulated current known status with current and projected road-density class for each species of interest (table 3.11). Interpretation of these tables was based on a comparison of distributions of road-density class with each alternative. For example, 46 subwatersheds supporting strong Yellowstone cutthroat populations are presently classified as "none" in mean road density (table 3.11). No change is projected for the number of currently strong watersheds in this road-density class under Alternative 1. Some decline in the number of subwatersheds classified as "very low" or "low" is projected while an increase in the number classified as "moderate" or "high" is also expected. The projected trend, then, is for an increase in road densities associated with watersheds currently supporting strong Yellowstone cutthroat trout. As discussed in the previous section, interpretations tied to road densities must be tempered by the understanding that projected reductions in road densities under each alternative do not necessarily equate to true road obliteration. Changes in road densities provide only trend information that may understate associated negative hydrologic and ecologic effects. Road-density changes must therefore be interpreted as trends and in light of the mitigating effects of each alternative.

Table 3.6. Projected changes in probability assignments for Alternative 3, by species.

Alternative 3 EIS	Subbasin	Bull Trout DSTR*	Bull Trout DSR*	Westslope Cutthroat DSTR	Westslope Cutthroat DSR	Yellowstone Cutthroat DSTR	Yellowstone Cutthroat DSR	Redband Trout DSTR	Redband Trout DSR
EEIS	Pend Oreille	0.3%	0.9%	2.6%	0.0%	—	—	—	—
	Kettle	0.5%	1.0%	—	—	—	—	—	—
	Sanpoil	0.5%	1.4%	—	—	—	—	—	—
	Methow	0.8%	2.1%	3.4%	1.6%	—	—	—	—
	Upper Columbia-Entiat	-1.1%	-4.5%	4.1%	2.1%	—	—	—	—
	Wenatchee	0.4%	—	1.6%	0.2%	—	—	—	—
	Naches	-0.4%	—	1.7%	0.9%	—	—	—	—
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Imnaha	0.1%	1.6%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Wallowa	0.2%	2.1%	—	—	—	—	—	—
	North Fork John Day	2.0%	—	—	—	—	—	—	—
	Middle Fork John Day	0.4%	-5.1%	—	—	—	—	—	—
	Upper Deschutes	2.9%	—	—	—	—	—	0.5%	0.0%
	Williamson	—	—	—	—	—	—	1.1%	0.0%
	Upper Klamath Lake	—	—	—	—	—	—	1.9%	-0.1%
UCRB	Upper Kootenai	0.6%	-2.3%	1.0%	-0.3%	—	—	—	—
	Fisher	0.3%	-1.4%	—	—	—	—	—	—
	Yaak	0.3%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	0.1%	0.3%	-3.1%	-0.3%	—	—	—	—
	Moyie	0.3%	—	-1.9%	-0.4%	—	—	—	—
	Upper Clark Fork	0.1%	2.2%	-1.1%	-1.4%	—	—	—	—
	Flint-Rock	-0.1%	-0.6%	2.6%	0.0%	—	—	—	—
	Blackfoot	-0.4%	-0.9%	-2.3%	0.0%	—	—	—	—
	Middle Clark Fork	0.2%	-2.8%	—	—	—	—	—	—
	Bitterroot	—	-4.4%	-0.7%	-0.1%	—	—	—	—
	Stillwater	0.1%	-4.8%	—	—	—	—	—	—
	Swan	-0.5%	-8.6%	-3.0%	0.0%	—	—	—	—
	Lower Clark Fork	-0.1%	-3.1%	0.1%	-0.2%	—	—	—	—
	Pend Oreille Lake	0.1%	0.9%	—	—	—	—	—	—
	Priest	0.7%	2.6%	1.1%	-0.2%	—	—	—	—
	Upper Coeur D.alene	0.9%	—	—	—	—	—	—	—
	St. Joe	-0.1%	-2.1%	-0.5%	-0.1%	—	—	—	—
	Palisades	—	—	—	—	1.2%	0.4%	—	—
	North & Middle Fork Boise	0.2%	0.6%	—	—	—	—	1.0%	0.0%
	Boise-Mores	-1.2%	—	—	—	—	—	-2.8%	0.1%
	South Fork Payette	0.1%	0.4%	—	—	—	—	1.1%	0.0%
	Middle Salmon-Chamberlain	0.1%	1.3%	0.7%	0.2%	—	—	—	—
	Lower Salmon	0.0%	-1.9%	—	—	—	—	—	—
	Little Salmon	-1.0%	-2.6%	—	—	—	—	—	—
	Lower Selway	0.1%	0.2%	1.4%	0.7%	—	—	—	—
	Lochsa	0.3%	-0.6%	2.5%	1.3%	—	—	—	—
	South Fork Clearwater	0.7%	-0.8%	—	—	—	—	—	—
	Clearwater	0.1%	—	2.8%	1.4%	—	—	—	—
	Upper N. Fork Clearwater	-0.1%	-4.0%	-5.0%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	0.1%	-2.0%	—	—	—	—	—	—

* DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong. "Change" is between the alternative and current.

Table 3.7. Projected changes in probability assignments for Alternative 4, by species.

Alternative 4		Bull Trout		Westslope Cutthroat		Yellowstone Cutthroat		Redband Trout	
EIS	Subbasin	DSTR*	DSR*	DSTR	DSR	DSTR	DSR	DSTR	DSR
EEIS	Pend Oreille	0.3%	0.9%	2.6%	0.0%	—	—	—	—
	Kettle	0.5%	1.0%	—	—	—	—	—	—
	Sanpoil	0.5%	1.4%	—	—	—	—	—	—
	Okanogan	0.0%	—	—	—	—	—	—	—
	Methow	0.8%	2.1%	3.4%	1.6%	—	—	—	—
	Upper Columbia-Entiat	-1.1%	-4.5%	4.1%	2.1%	—	—	—	—
	Wenatchee	0.4%	—	1.6%	0.2%	—	—	—	—
	Naches	-0.4%	—	1.7%	0.9%	—	—	—	—
	Brownlee Reservoir	0.3%	2.3%	—	—	—	—	—	—
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Imnaha	0.1%	1.6%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Wallowa	0.2%	2.1%	—	—	—	—	—	—
	Upper John Day	0.3%	0.5%	—	—	—	—	—	—
	North Fork John Day	2.0%	—	—	—	—	—	—	—
	Middle Fork John Day	0.4%	-5.1%	—	—	—	—	—	—
	Upper Deschutes	3.1%	—	—	—	—	—	0.5%	-20.0%
	Lower Crooked	—	—	—	—	—	—	0.8%	-30.0%
	Williamson	—	—	—	—	—	—	1.1%	-40.0%
	Upper Klamath Lake	—	—	—	—	—	—	1.9%	-60.0%
UCRB	Upper Kootenai	0.6%	-2.3%	1.0%	-0.3%	—	—	—	—
	Fisher	0.3%	-1.4%	—	—	—	—	—	—
	Yaak	0.3%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	0.1%	0.3%	-3.1%	-0.3%	—	—	—	—
	Moyie	0.3%	—	-1.9%	-0.4%	—	—	—	—
	Upper Clark Fork	0.1%	2.2%	-1.1%	-1.4%	—	—	—	—
	Flint-Rock	-0.1%	-0.6%	2.6%	0.0%	—	—	—	—
	Blackfoot	-0.5%	-1.4%	-1.9%	0.0%	—	—	—	—
	Middle Clark Fork	0.2%	-2.8%	—	—	—	—	—	—
	Bitterroot	—	-4.4%	-0.7%	-0.1%	—	—	—	—
	Stillwater	0.1%	-4.8%	—	—	—	—	—	—
	Swan	-0.5%	-8.6%	-3.0%	0.0%	—	—	—	—
	Lower Clark Fork	-0.1%	-3.1%	0.1%	-0.2%	—	—	—	—
	Pend Oreille Lake	0.1%	0.9%	—	—	—	—	—	—
	Priest	0.7%	2.6%	1.1%	-0.2%	—	—	—	—
	Upper Coeur D.alene	0.9%	—	—	—	—	—	—	—
	St. Joe	-0.1%	-2.1%	-0.5%	-0.1%	—	—	—	—
	Palisades	—	—	—	—	1.2%	0.4%	—	—
	Salt	—	—	—	—	0.9%	0.1%	—	—
	Lower Henrys	—	—	—	—	3.4%	2.4%	—	—
	Portneuf	—	—	—	—	1.8%	0.1%	—	—
	North & Middle Fork Boise	0.2%	0.6%	—	—	—	—	1.0%	0.0%
	Boise-Mores	-1.2%	—	—	—	—	—	-2.8%	0.1%
	South Fork Payette	0.1%	0.4%	—	—	—	—	1.1%	0.0%
	Middle Fork Payette	0.9%	4.0%	—	—	—	—	2.3%	-0.1%
	North Fork Payette	0.3%	1.6%	—	—	—	—	1.7%	-0.1%
	Weiser	0.3%	2.4%	—	—	—	—	—	—
	Middle Salmon-Chamberlain	0.1%	1.3%	0.7%	0.2%	—	—	—	—
	Lower Salmon	0.0%	-1.9%	—	—	—	—	—	—
	Little Salmon	-1.0%	-2.6%	—	—	—	—	—	—
	Lower Selway	0.1%	0.2%	1.4%	0.7%	—	—	—	—
	Lochsa	0.3%	-0.6%	2.5%	1.3%	—	—	—	—
	South Fork Clearwater	0.7%	-0.8%	—	—	—	—	—	—

Table 3.7 (continued)

Alternative 1 EIS	Subbasin	Bull Trout DSTR*	Bull Trout DSR*	Westslope Cutthroat DSTR	Westslope Cutthroat DSR	Yellowstone Cutthroat DSTR	Yellowstone Cutthroat DSR	Redband Trout DSTR	Redband Trout DSR
	Clearwater	0.1%	—	2.8%	1.4%	—	—	—	—
	Upper N. Fork Clearwater	-0.1%	-4.0%	-5.0%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	0.1%	-2.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong. "Change" is between the alternative and current.

Table 3.8. Projected changes in probability assignments for Alternative 5, by species.

Alternative 5 EIS	Subbasin	Bull Trout DSTR*	Bull Trout DSR*	Westslope Cutthroat DSTR	Westslope Cutthroat DSR	Yellowstone Cutthroat DSTR	Yellowstone Cutthroat DSR	Redband Trout DSTR	Redband Trout DSR
EEIS	Upper Columbia-Entiat	-1.1%	-4.5%	—	—	—	—	—	—
	Brownlee Reservoir	—	—	—	—	—	—	-1.3%	0.0%
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Upper John Day	0.3%	0.5%	—	—	—	—	—	—
	North Fork John Day	2.0%	—	—	—	—	—	—	—
	Middle Fork John Day	0.4%	-5.1%	—	—	—	—	—	—
	Williamson	—	—	—	—	—	—	1.1%	0.0%
	Upper Klamath Lake	—	—	—	—	—	—	1.9%	-0.1%
UCRB	Upper Kootenai	-0.4%	-4.0%	-1.1%	-0.1%	—	—	—	—
	Fisher	-0.2%	-1.4%	—	—	—	—	—	—
	Yaak	-0.4%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	-0.3%	-2.4%	-3.1%	-0.3%	—	—	—	—
	Moyie	—	—	-1.9%	-0.4%	—	—	—	—
	Upper Clark Fork	0.1%	2.2%	-1.1%	-1.4%	—	—	—	—
	Blackfoot	-0.4%	-0.9%	-2.3%	0.0%	—	—	—	—
	Middle Clark Fork	-0.3%	-2.8%	-0.5%	-0.1%	—	—	—	—
	Bitterroot	—	-4.4%	-0.7%	-0.1%	—	—	—	—
	Stillwater	-0.5%	-5.9%	—	—	—	—	—	—
	Swan	-0.5%	-8.6%	-3.0%	0.0%	—	—	—	—
	Lower Clark Fork	-0.3%	-3.1%	-1.0%	0.0%	—	—	—	—
	Priest	-0.1%	-1.0%	—	—	—	—	—	—
	St. Joe	-0.2%	-2.3%	-0.5%	-0.1%	—	—	—	—
	Salt	—	—	—	—	-16.5%	-9.1%	—	—
	Teton	—	—	—	—	-2.9%	-0.2%	—	—
	Big Lost	-8.0%	—	—	—	—	—	-3.8%	0.1%
	Big Wood	—	—	—	—	—	—	-6.0%	0.2%
	Boise-Mores	-1.2%	—	—	—	—	—	-2.8%	0.1%
	Middle Fork Payette	-1.4%	-16.3%	—	—	—	—	-2.3%	0.1%
	Payette	-0.1%	-1.2%	—	—	—	—	—	—
	North Fork Payette	-0.5%	-5.0%	—	—	—	—	-0.9%	0.0%
	Weiser	-0.1%	-0.8%	—	—	—	—	—	—
	Lower Salmon	0.0%	-1.9%	—	—	—	—	—	—
	Little Salmon	-1.0%	-2.6%	—	—	—	—	—	—
	South Fork Clearwater	0.7%	-0.8%	—	—	—	—	—	—
	Clearwater	0.1%	—	2.8%	1.4%	—	—	—	—
	Upper N. Fork Clearwater	-0.4%	-4.1%	-6.4%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	-0.2%	-2.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong. "Change" is the difference between the alternative and current.

Table 3.9. Projected changes in probability assignments for Alternative 6, by species.

Alternative 6 EIS	Subbasin	Bull Trout DSTR*	Bull Trout DSR*	Westslope Cutthroat DSTR	Westslope Cutthroat DSR	Yellowstone Cutthroat DSTR	Yellowstone Cutthroat DSR	Redband Trout DSTR	Redband Trout DSR
EEIS	Pend Oreille	0.3%	0.9%	2.6%	0.0%	—	—	—	—
	Kettle	0.5%	1.0%	—	—	—	—	—	—
	Sanpoil	0.5%	1.4%	—	—	—	—	—	—
	Methow	0.8%	2.1%	3.4%	1.6%	—	—	—	—
	Upper Columbia-Entiat	-1.1%	-4.5%	4.1%	2.1%	—	—	—	—
	Wenatchee	0.4%	—	1.6%	0.2%	—	—	—	—
	Naches	-0.4%	—	1.7%	0.9%	—	—	—	—
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Imnaha	0.1%	1.6%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Wallowa	0.2%	2.1%	—	—	—	—	—	—
	Upper John Day	0.5%	2.4%	—	—	—	—	—	—
	North Fork John Day	2.8%	2.8%	—	—	—	—	—	—
	Middle Fork John Day	1.1%	3.4%	—	—	—	—	—	—
	Upper Deschutes	2.9%	—	—	—	—	—	0.5%	0.0%
	Williamson	—	—	—	—	—	—	1.1%	0.0%
	Upper Klamath Lake	—	—	—	—	—	—	1.9%	-0.1%
UCRB	Upper Kootenai	0.6%	-2.3%	1.0%	-0.3%	—	—	—	—
	Fisher	0.3%	-1.4%	—	—	—	—	—	—
	Yaak	0.3%	-2.2%	—	—	—	—	—	—
	Lower Kootenai	0.1%	0.3%	-3.1%	-0.3%	—	—	—	—
	Moyie	0.3%	0.0%	-1.9%	-0.4%	—	—	—	—
	Flint-Rock	-0.1%	-0.6%	2.6%	0.0%	—	—	—	—
	Blackfoot	0.2%	1.3%	1.6%	-0.1%	—	—	—	—
	Middle Clark Fork	0.2%	-2.8%	—	—	—	—	—	—
	Stillwater	0.1%	-4.8%	—	—	—	—	—	—
	Swan	0.2%	-0.4%	1.1%	0.1%	—	—	—	—
	Lower Clark Fork	-0.1%	-3.1%	0.1%	-0.2%	—	—	—	—
	Pend Oreille Lake	0.1%	0.9%	—	—	—	—	—	—
	Priest	0.7%	2.6%	1.1%	-0.2%	—	—	—	—
	Upper Coeur D.alene	0.9%	—	—	—	—	—	—	—
	St. Joe	-0.1%	-2.1%	-0.5%	-0.1%	—	—	—	—
	Palisades	—	—	—	—	1.2%	0.4%	—	—
	Lower Henrys	—	—	—	—	3.4%	2.4%	—	—
	Portneuf	—	—	—	—	1.8%	0.1%	—	—
	North & Middle Fork Boise	0.2%	0.6%	—	—	—	—	1.0%	0.0%
	Boise-Mores	0.3%	2.4%	—	—	—	—	—	—
	South Fork Payette	0.1%	0.4%	—	—	—	—	1.1%	0.0%
	Middle Salmon-Chamberlain	0.1%	1.3%	0.7%	0.2%	—	—	—	—
	Little Salmon	0.6%	5.6%	—	—	—	—	—	—
	Lower Selway	0.1%	0.2%	1.4%	0.7%	—	—	—	—
	Lochsa	0.3%	-0.6%	2.5%	1.3%	—	—	—	—
	South Fork Clearwater	0.9%	1.6%	—	—	—	—	—	—
	Clearwater	0.1%	—	2.8%	1.4%	—	—	—	—
	Upper N. Fork Clearwater	-0.1%	-4.0%	-5.0%	0.1%	—	—	-0.6%	0.0%
	Lower N. Fork Clearwater	0.1%	-2.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong.

"Change" is the difference between the alternative and current.

Table 3.10. Projected changes in probability assignments for Alternative 7, by species.

Alternative 7 EIS	Subbasin	Bull Trout DSTR*	Bull Trout DSR*	Westslope Cutthroat DSTR	Westslope Cutthroat DSR	Yellowstone Cutthroat DSTR	Yellowstone Cutthroat DSR	Redband Trout DSTR	Redband Trout DSR
EEIS	Pend Oreille	0.3%	0.9%	2.6%	0.0%	—	—	—	—
	Kettle	0.7%	3.5%	—	—	—	—	—	—
	Sanpoil	0.5%	1.4%	—	—	—	—	—	—
	Methow	0.8%	2.1%	3.4%	1.6%	—	—	—	—
	Upper Columbia-Entiat	—	—	4.1%	2.1%	—	—	—	—
	Wenatchee	0.4%	—	1.6%	0.2%	—	—	—	—
	Naches	-0.4%	—	1.7%	0.9%	—	—	—	—
	Burnt	1.3%	6.8%	—	—	—	—	—	—
	Powder	0.6%	1.9%	—	—	—	—	—	—
	Imnaha	0.1%	1.6%	—	—	—	—	—	—
	Upper Grande Ronde	0.9%	4.9%	—	—	—	—	—	—
	Wallowa	0.2%	2.1%	—	—	—	—	—	—
	Upper John Day	0.5%	2.4%	—	—	—	—	—	—
	North Fork John Day	2.8%	2.8%	—	—	—	—	—	—
	Middle Fork John Day	1.1%	3.4%	—	—	—	—	—	—
	Upper Deschutes	3.1%	—	—	—	—	—	0.5%	0.0%
	Williamson	—	—	—	—	—	—	1.1%	0.0%
	Upper Klamath Lake	—	—	—	—	—	—	1.9%	-0.1%
UCRB	Upper Kootenai	1.1%	3.9%	3.7%	-0.2%	—	—	—	—
	Fisher	0.7%	2.9%	1.0%	0.1%	—	—	—	—
	Yaak	1.5%	13.5%	0.7%	0.2%	—	—	—	—
	Lower Kootenai	0.6%	6.1%	3.5%	-0.3%	—	—	—	—
	Moyie	1.3%	11.9%	—	—	—	—	—	—
	Flint-Rock	-0.1%	-0.6%	2.6%	0.0%	—	—	—	—
	Blackfoot	0.2%	1.3%	2.0%	-0.1%	—	—	—	—
	Middle Clark Fork	0.7%	2.1%	1.1%	0.0%	—	—	—	—
	Flathead Lake	0.5%	1.4%	—	—	—	—	—	—
	Stillwater	1.0%	5.6%	—	—	—	—	—	—
	Swan	0.2%	-0.4%	1.1%	0.1%	—	—	—	—
	Lower Clark Fork	0.9%	2.0%	1.8%	0.0%	—	—	—	—
	Pend Oreille Lake	0.4%	4.6%	—	—	—	—	—	—
	Priest	0.7%	2.6%	2.2%	-0.3%	—	—	—	—
	Upper Coeur D'Alene	1.1%	2.0%	—	—	—	—	—	—
	St. Joe	0.2%	0.8%	—	—	—	—	—	—
	Palisades	—	—	—	—	1.2%	0.4%	—	—
	Upper Henrys	—	—	—	—	2.4%	0.6%	—	—
	Lower Henrys	—	—	—	—	3.4%	2.4%	—	—
	Portneuf	—	—	—	—	1.8%	0.1%	—	—
	North & Middle Fork Boise	0.2%	0.6%	—	—	—	—	1.0%	0.0%
	Boise-Mores	0.3%	2.4%	—	—	—	—	—	—
	South Fork Payette	0.1%	0.4%	—	—	—	—	1.1%	0.0%
	North Fork Payette	0.1%	1.4%	—	—	—	—	—	—
	Middle Salmon-Chamberlain	0.1%	1.3%	0.7%	0.2%	—	—	—	—
	Little Salmon	0.6%	5.6%	—	—	—	—	—	—
	Lower Selway	0.1%	0.2%	1.4%	0.7%	—	—	—	—
	Lochsa	0.3%	-0.6%	2.5%	1.3%	—	—	—	—
	South Fork Clearwater	0.9%	1.6%	—	—	—	—	—	—
	Clearwater	0.1%	—	2.8%	1.4%	—	—	—	—
	Upper N. Fork Clearwater	0.3%	1.2%	0.8%	-0.1%	—	—	—	—
	Lower N. Fork Clearwater	0.3%	1.0%	—	—	—	—	—	—

*DSTR = Change in the probability that species status is strong; DSR = Change in the probability that species status is depressed or strong. "Change" is the difference between the alternative and current.

Table 3.11. Current known status (strong or depressed) for each of seven salmonids versus current (Alternative 0) mean road density class and the projected allocation and distribution of road density classes for each alternative.

Bull trout		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	60	24	134	238	352	4
	Strong	124	24	72	22	28	0
1	Depressed	54	20	112	241	381	4
	Strong	117	19	72	32	30	0
2	Depressed	59	25	137	256	333	2
	Strong	123	26	66	27	28	0
3	Depressed	59	29	188	403	133	0
	Strong	121	33	70	38	8	0
4	Depressed	59	30	192	403	128	0
	Strong	121	33	71	37	8	0
5	Depressed	59	27	141	301	283	1
	Strong	121	28	67	29	25	0
6	Depressed	60	29	205	387	131	0
	Strong	124	30	74	34	8	0
7	Depressed	60	31	221	370	130	0
	Strong	124	30	76	32	8	0

Westslope cutthroat trout		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	87	39	180	350	822	7
	Strong	192	34	109	110	139	3
1	Depressed	79	35	151	348	865	7
	Strong	185	31	98	117	153	3
2	Depressed	81	42	174	342	839	7
	Strong	191	34	102	115	142	3
3	Depressed	81	47	210	788	358	1
	Strong	191	40	136	194	24	2
4	Depressed	81	47	210	794	352	1
	Strong	191	40	136	195	23	2
5	Depressed	81	44	174	430	750	6
	Strong	191	35	105	129	125	2
6	Depressed	87	44	228	775	350	1
	Strong	191	41	140	189	24	2
7	Depressed	87	45	237	769	346	1
	Strong	192	40	154	175	24	2

Table 3.11 (continued)

Yellowstone cutthroat trout		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	4	8	19	51	91	0
	Strong	46	25	59	42	37	0
1	Depressed	2	2	20	51	98	0
	Strong	46	21	56	45	41	0
2	Depressed	4	8	19	50	92	0
	Strong	46	25	59	42	37	0
3	Depressed	4	8	20	52	89	0
	Strong	46	25	59	43	36	0
4	Depressed	4	8	28	49	84	0
	Strong	46	25	60	42	36	0
5	Depressed	4	7	17	47	98	0
	Strong	46	25	55	45	38	0
6	Depressed	4	8	23	51	87	0
	Strong	46	25	59	43	36	0
7	Depressed	4	8	23	51	87	0
	Strong	46	25	59	43	36	0

Redband trout		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	148	37	365	678	772	21
	Strong	49	24	114	188	428	13
1	Depressed	135	32	339	702	792	21
	Strong	34	20	115	200	434	13
2	Depressed	148	37	360	829	637	10
	Strong	49	25	118	282	339	3
3	Depressed	148	38	406	973	451	5
	Strong	47	36	121	343	266	3
4	Depressed	148	40	416	1025	388	4
	Strong	48	38	129	370	228	3
5	Depressed	141	39	364	911	557	9
	Strong	38	26	127	312	310	3
6	Depressed	148	39	417	987	425	5
	Strong	49	36	128	340	260	3
7	Depressed	148	40	425	982	422	4
	Strong	49	37	127	340	260	3

Table 3.11 (continued)

Steelhead trout		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	199	52	240	406	518	16
	Strong	0	0	3	7	12	1
1	Depressed	189	45	224	423	534	16
	Strong	0	0	2	7	13	1
2	Depressed	199	53	242	490	443	4
	Strong	0	0	5	13	5	0
3	Depressed	197	63	281	629	258	3
	Strong	0	0	4	16	3	0
4	Depressed	197	63	281	635	252	3
	Strong	0	0	4	16	3	0
5	Depressed	197	57	241	583	350	3
	Strong	0	0	4	14	5	0
6	Depressed	199	61	289	628	251	3
	Strong	0	0	5	15	3	0
7	Depressed	199	61	290	628	250	3
	Strong	0	0	5	15	3	0

Stream-type chinook salmon		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	101	30	129	153	247	8
	Strong	0	2	1	1	3	1
1	Depressed	97	31	110	164	258	8
	Strong	0	2	1	1	3	1
2	Depressed	101	31	131	193	210	2
	Strong	0	2	2	3	1	0
3	Depressed	100	34	161	275	97	1
	Strong	0	2	2	3	1	0
4	Depressed	100	34	161	276	96	1
	Strong	0	2	2	3	1	0
5	Depressed	100	32	131	248	156	1
	Strong	0	2	2	3	1	0
6	Depressed	101	33	167	270	96	1
	Strong	0	2	2	3	1	0
7	Depressed	101	33	168	270	95	1
	Strong	0	2	2	3	1	0

Table 3.11 (continued)

Ocean-type chinook salmon		Mean Road Density (miles of road / mi²)					
Alternative	Status	None < 0.02	Very Low 0.02 - 0.1	Low 0.1 - 0.7	Moderate 0.7 - 1.7	High 1.7 - 4.7	Extremely High > 4.7
0	Depressed	4	1	15	30	21	0
	Strong	0	0	7	12	6	0
1	Depressed	3	2	15	30	21	0
	Strong	0	0	7	12	6	0
2	Depressed	4	1	15	30	21	0
	Strong	0	0	7	12	6	0
3	Depressed	4	2	15	43	7	0
	Strong	0	0	7	15	3	0
4	Depressed	4	2	15	44	6	0
	Strong	0	0	7	15	3	0
5	Depressed	4	1	15	30	21	0
	Strong	0	0	7	12	6	0
6	Depressed	4	2	15	43	7	0
	Strong	0	0	7	15	3	0
7	Depressed	4	2	15	43	7	0
	Strong	0	0	7	15	3	0

Ownership and management class—We cross-tabulated the current known and predicted status of each key species with an ownership and management designation developed by the SIT Aquatics Team (Lee and others, in press) for each subwatershed (tables 3.12-3.18). Allocation of ownership and management designation was used to consider the relative significance of management activities on FS- and BLM-administered lands. For example, 139 subwatersheds known or predicted to support strong Yellowstone cutthroat trout are found on Forest Service-administered lands (for example, management clusters: FG, FH, FM, FW in table 3.14) but none are on BLM-administered lands (management cluster BR in table 3.14). Thus, approximately 66 percent of all the currently strong populations are associated with FS-administered lands and are likely to be influenced directly by the activities considered under these alternatives.

Management activities—The projected forest and range management activities vary in intensity under each alternative. They also vary spatially within and among the alternatives by forest and rangeland cluster. To further our evaluation of the potential influence of management activities on the distribution and status of the salmonid species, we summarized activities across species distributions and status classifications. We considered timber harvest, thinning, watershed restoration, prescribed burning, livestock management, and riparian restoration as potentially important management activities in our summary. All activities were not given equal importance. For example, livestock management is expected to have only a minor influence on aquatic habitats relative to active riparian restoration, which includes fencing and the potential to fully exclude livestock from critical habitats.

Management activities summary tables were generated in a four-step process. First, we tallied the number of subwatersheds for each species and status-class by forest and rangeland clusters and summarized as a proportion of the total occurrence in the entire assessment area (table 3.19). For example, 62 percent of the Yellowstone cutthroat trout subwatersheds currently considered strong occur in Forest Cluster 1 (table 3.19). Second, we used the assignment of activity levels and the midpoint of reported rates for each activity (see appendix I; tables 3 and 10 in the "Rule Sets for Management Activity Levels by Cluster by Alternative" section of the preliminary draft EIS)

to estimate the rate of implementation for each activity by cluster and alternative. Third, we multiplied the activity rate by the proportion of the species distribution occurring in the appropriate forest or range cluster. Finally, we summed across cluster by species occurrence, status, or class to estimate the total proportion of the distribution that would be influenced by a particular activity per decade (table 3.20). For example, under Alternative 1 we would anticipate that 2.8 percent of the current distribution of strong subwatersheds for Yellowstone cutthroat trout would be exposed to timber harvest per decade, 1.3 percent to thinning, 1.3 percent to watershed restoration (table 3.20), and so on.

We assumed that an activity would have the same effect in any watershed unless mitigating or exacerbating activities were clearly identified within the alternative. The summaries provided simple indices for comparisons across species distributions and among alternatives. Many land-use management activities have been generally associated with disruption of watershed function and negative effects on the processes that maintain and create high-quality habitats for fishes (Lee and others, in press). However, we had no method to weigh or model the effects of land use and management activities allocated under each alternative as we did with road allocation. Thus, we were forced to evaluate risks largely on the content and direction of each alternative and the allocation of activities across a species range.

Although the risks associated with land use can be mitigated by careful planning, analysis, and implementation, we generally assumed that increased levels of ground-disturbing activities associated with timber harvest and thinning increased risks for the species considered. We assumed that watershed and riparian restoration, and livestock management would have positive net effects and provide the greatest benefits for species in watersheds with the potential to respond. It was not clear, however, how effective those activities would be in restoring watershed and hydrologic processes.

Table 3.12. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Bull trout

Management cluster[1]	Absent[2]	Depressed[2]	Strong[2]	Total	Percent
BR	207	21	2	230	5.23
FG	203	86	46	335	7.62
FH	354	112	17	483	10.98
FM	428	294	34	756	17.19
FW	278	131	155	564	12.82
NP	33	8	2	43	0.98
PA	590	19	2	611	13.89
PF	752	108	7	867	19.71
PR	304	11	2	317	7.21
TL	167	23	3	193	4.39
Total	3316	813	270	4399	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.13. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Westslope cutthroat trout

Management cluster[1]	Absent[2]	Depressed[2]	Strong[2]	Total	Percent
BR	3	55	4	62	2.35
FG	32	89	68	189	7.16
FH	55	145	40	240	9.09
FM	44	504	154	702	26.59
FW	83	120	277	480	18.18
NP	2	40	0	42	1.59
PA	153	47	0	200	7.58
PF	138	413	38	589	22.31
PR	36	21	1	58	2.2
TL	23	50	5	78	2.95
Total	569	1484	587	2640	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.14. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Yellowstone cutthroat trout

Management cluster[1]	Absent[2]	Depressed[2]	Strong[2]	Total	Percent
BR	28	2	0	30	4.9
FG	4	44	55	103	16.83
FH	25	20	42	87	14.22
FM	7	4	3	14	2.29
FW	0	8	39	47	7.68
NP	1	1	22	24	3.92
PA	75	45	19	139	22.71
PF	10	35	25	70	11.44
PR	61	12	4	77	12.58
TL	19	2	0	21	3.43
Total	230	173	209	612	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.15. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Redband trout

Management cluster[1]	Absent[2]	Depressed[2]	Strong[2]	Total	Percent
BR	724	284	36	1044	19.59
FG	87	137	126	350	6.57
FH	110	318	202	630	11.82
FM	131	219	13	363	6.81
FW	191	178	75	444	8.33
NP	0	8	0	8	0.15
PA	614	347	13	974	18.28
PF	207	212	245	664	12.46
PR	370	290	19	679	12.74
TL	60	27	86	173	3.25
Total	2494	2020	815	5329	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.16. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Steelhead trout

Management cluster[1]	Absent[2]	Depressed[2]	Migration[2]	Strong[2]	Total	Percent
BR	729	31	10	0	770	20.66
FG	122	155	1	5	283	7.59
FH	231	214	7	8	460	12.34
FM	78	166	20	1	265	7.11
FW	69	277	46	2	394	10.57
NP	0	0	0	0	0	0
PA	216	205	107	2	530	14.22
PF	238	188	18	2	446	11.97
PR	268	142	40	0	450	12.07
TL	66	53	7	3	129	3.46
Total	2017	1431	256	23	3727	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.17. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Stream-type chinook salmon

Management cluster[1]	Absent[2]	Depressed[2]	Migration[2]	Strong[2]	Total	Percent
BR	721	10	18	0	749	21.72
FG	168	91	10	1	270	7.83
FH	291	117	9	3	420	12.18
FM	130	111	19	0	260	7.54
FW	165	168	47	3	383	11.11
NP	0	0	0	0	0	0
PA	332	45	105	0	482	13.98
PF	301	79	23	1	404	11.72
PR	316	28	49	0	393	11.40
TL	67	19	1	0	87	2.52
Total	2491	668	281	8	3448	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

Table 3.18. Summary of current known and predicted status of seven salmonid species versus ownership and land management designation for each subwatershed. The data represent a summary of the current status databases by management cluster as defined in Lee and others (1996).

Ocean-type chinook salmon

Management cluster[1]	Absent[2]	Depressed[2]	Migration[2]	Strong[2]	Total	Percent
BR	21	0	0	0	21	3.87
FG	19	2	0	1	22	4.06
FH	36	4	0	0	40	7.38
FM	12	3	0	2	17	3.14
FW	19	8	0	0	27	4.98
NP	0	0	0	0	0	0
PA	89	21	43	5	158	29.15
PF	68	14	11	8	101	18.63
PR	72	15	9	5	101	18.63
TL	50	4	1	0	55	10.15
Total	386	71	64	21	542	100

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

[2]Known + predicted.

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Table 3.19. Distribution of species status for the seven key salmonids by forest and range cluster. Estimates represent the percent of subwatersheds for that species and status associated with each cluster defined in the preliminary draft EISs.

Species Distributions by Cluster

Species Category	Forest Cluster						Range Cluster					
	1	2	3	4	5	6	1	2	3	4	5	6
Bull trout												
Present	15.8	29.3	16.1	20.3	9.2	4.5	3.0	18.2	31.1	4.2	16.4	2.1
Strong	45.2	33.0	8.5	7.8	3.3	0.4	0.4	33.0	20.7	1.1	17.0	3.3
Depressed	11.7	26.4	19.7	26.1	11.1	2.3	1.8	8.9	37.3	2.5	14.0	2.3
Westslope cutthroat trout												
Present	17.6	24.3	16.2	33.9	3.2	4.3	0.8	18.4	28.0	0.6	13.8	0
Strong	30.3	41.2	8.5	16.7	1.7	0.3	0	44.1	12.9	1.2	11.9	0
Depressed	12.8	15.5	17.2	44.0	4.0	6.2	1.3	5.7	33.9	0.5	12.9	0
Yellowstone cutthroat trout												
Present	30.3	9.4	0	2.3	6.0	20.9	0	11.5	12.4	0	24.8	51.4
Strong	61.7	12.0	0	0.0	0.0	14.4	0	23.4	19.6	0	41.1	15.8
Depressed	1.7	9.8	0	5.2	15.6	33.5	0	0.6	7.5	0	11.0	80.9
Redband trout												
Present	5.7	18.5	11.6	6.6	22.5	14.1	8.9	11.9	28.9	9.6	18.6	18.3
Strong	0.5	17.8	14.7	5.1	27.9	19.2	5.9	8.9	33.7	11.9	17.8	19.4
Depressed	8.3	14.6	9.8	6.3	24.0	10.2	11.2	8.0	25.6	10.5	18.9	19.1
Steelhead trout												
Strong	0	13.0	0	0	56.5	0	47.8	0	0	30.4	0	8.7
Depressed	13.1	33.1	21.4	1.7	20.8	0.6	10.7	21.9	28.7	7.8	19.0	5.7
Corridor	8.6	25.3	18.7	4.7	3.5	5.8	9.3	19.5	14.4	36.2	14.4	0
Stream-type chinook salmon												
Strong	0	0	0	0	100	0	12.5	0	50.0	0	0	37.5
Depressed	19.2	40.0	17.4	0.9	20.8	0.1	6.1	27.1	30.7	3.4	17.8	4.5
Corridor	10.6	29.8	19.1	6.0	6.4	2.1	9.9	20.6	13.8	25.2	22.0	2.8
Ocean-type chinook salmon												
Strong	0	36.0	20.0	0.0	28.0	0	36.0	36.0	16.0	8.0	4.0	0
Depressed	1.4	33.8	9.9	11.3	16.9	12.7	5.6	33.8	0	33.8	15.5	11.3
Corridor	0	0	24.6	15.4	0	9.2	0	0	20.0	64.6	15.4	0
Fringe Areas												
Bull trout	0	0	18.2	0	63.6	0	0	0	81.8	0	18.2	0
Westslope cutthroat trout	0	0	0	0	100	0	100	0	0	0	0	0
Redband trout	0	0	0	0	0	33.3	0	0	0	0	0	100
Ocean-type chinook salmon	0	48.0	20.0	0	24.0	0	0	44.0	0	28.0	4.0	24.0

Table 3.20. Forest and range management activities and distributions of seven key salmonids. Estimates represent the percentage of the species distribution for the specified status or category predicted to experience the activity per decade. Estimates are based on the allocation of activities by alternative in the preliminary draft EIS, and on the distribution and status of each species as defined in Lee and others (1996).

			Forest Activity				Range Activity	
Species	Status	Alt.	Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Bull trout								
	Strong							
		1	4.7	2.1	1.5	2.5	7.8	0.9
		2	2.6	1.8	3.6	2.5	10.6	0.9
		3	3.3	2.4	3.6	6.4	9.5	16.0
		4	3.3	3.6	4.9	9.3	10.6	28.7
		5	3.6	2.6	3.7	4.5	10.5	8.9
		6	2.8	3.3	3.9	7.0	11.8	21.1
		7	2.0	1.6	1.5	3.2	12.1	2.5
	Depressed							
		1	7.1	3.2	1.5	2.4	5.4	0.8
		2	3.8	2.6	2.9	2.4	9.2	0.8
		3	5.0	4.2	2.9	5.0	8.4	20.5
		4	5.0	5.5	4.6	8.3	9.2	25.4
		5	5.9	4.7	3.2	5.1	9.1	8.4
		6	3.6	5.0	3.8	7.1	10.2	11.7
		7	1.9	1.8	1.5	4.6	10.7	2.6
	Fringe							
		1	7.4	3.7	1.2	2.0	7.9	1.2
		2	2.4	3.1	1.7	2.0	14.7	1.2
		3	5.7	5.3	1.7	2.9	13.6	38.0
		4	5.7	5.7	3.3	7.6	14.7	38.0
		5	5.7	5.7	3.3	5.7	14.7	7.9
		6	2.0	5.3	3.3	7.6	16.0	7.9
		7	1.6	3.1	1.2	2.9	16.0	1.2
Westslope cutthroat trout								
	Strong							
		1	5.5	2.3	1.5	2.5	8.6	0.8
		2	3.0	2.0	3.5	2.5	10.3	0.8
		3	3.7	2.8	3.2	6.1	9.6	10.0
		4	3.7	4.2	5.2	9.1	10.3	26.7
		5	4.2	3.0	3.5	4.8	10.3	5.7
		6	3.2	4.0	3.9	7.0	11.1	21.9
		7	2.0	1.5	1.5	3.6	11.2	1.3
	Depressed							
		1	7.4	3.4	1.5	2.5	4.4	0.7
		2	4.4	2.9	2.6	2.5	7.7	0.7
		3	5.4	5.0	2.6	4.5	6.9	17.9
		4	5.4	5.9	4.3	7.9	7.7	20.6
		5	7.0	5.3	2.7	4.4	7.6	6.1
		6	4.5	5.5	3.8	7.1	8.6	8.1
		7	2.0	1.6	1.5	5.5	8.7	0.8

Table 3.20 (continued)

Species	Status	Alt.	Forest Activity				Range Activity	
			Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
	Fringe							
		1	9.0	4.5	1.5	2.5	3.0	1.2
		2	2.0	4.5	1.5	2.5	9.0	1.2
		3	7.0	7.0	1.5	2.5	9.0	1.2
		4	7.0	7.0	4.0	10.0	9.0	38.0
		5	7.0	7.0	4.0	7.0	3.0	38.0
		6	2.5	7.0	4.0	10.0	9.0	38.0
		7	2.0	4.5	1.5	2.5	16.0	1.2
Yellowstone cutthroat trout								
	Strong							
		1	2.8	1.3	1.3	2.2	7.2	1.2
		2	1.8	1.3	3.2	2.2	12.0	1.2
		3	2.2	2.1	3.2	5.5	9.5	29.4
		4	2.2	2.5	3.5	8.4	12.0	38.0
		5	2.8	1.8	3.2	3.4	12.0	22.2
		6	2.2	2.5	3.2	6.2	14.9	30.8
		7	1.8	1.3	1.3	2.8	16.0	7.0
	Depressed							
		1	3.7	1.3	0.8	1.4	2.9	1.0
		2	1.3	1.3	1.1	1.4	7.9	1.0
		3	2.1	3.3	1.1	1.8	7.4	31.3
		4	2.1	3.5	1.7	4.5	7.9	31.5
		5	3.5	2.6	1.4	3.6	7.9	29.0
		6	1.6	3.5	1.5	4.2	8.6	29.2
		7	1.1	1.2	0.8	2.8	13.2	25.6
Redband trout								
	Strong							
		1	6.5	2.7	1.3	2.1	6.1	1.2
		2	2.5	2.3	2.1	2.1	11.8	1.2
		3	4.3	4.6	2.1	3.6	10.7	27.2
		4	4.3	5.5	3.5	7.4	11.8	37.1
		5	5.3	4.5	2.8	5.7	11.4	21.4
		6	2.4	5.1	2.9	6.8	13.0	24.7
		7	1.7	2.1	1.3	3.9	15.6	12.7
	Depressed							
		1	5.3	2.3	1.1	1.8	5.4	1.1
		2	2.1	2.0	1.9	1.8	10.8	1.1
		3	3.6	3.6	1.9	3.3	9.6	24.5
		4	3.6	4.3	3.1	6.5	10.8	35.5
		5	4.3	3.6	2.5	4.5	10.1	23.1
		6	2.1	4.1	2.7	5.9	12.1	26.1
		7	1.5	1.8	1.1	3.0	14.9	12.0
	Fringe							
		1	2.0	0.5	0.5	0.8	3.0	1.2
		2	0.7	0.5	0.5	0.8	9.0	1.2
		3	0.8	2.3	0.5	0.8	9.0	38.0
		4	0.8	2.3	0.5	2.3	9.0	38.0
		5	2.3	1.5	0.5	2.3	9.0	38.0
		6	0.8	2.3	0.5	2.3	9.0	38.0
		7	0.7	0.5	0.5	2.3	16.0	38.0

Table 3.20 (continued)

Species	Status	Alt.	Forest Activity				Range Activity	
			Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Steelhead trout								
	Strong							
		1	5.9	2.7	1.0	1.7	2.6	1.0
		2	1.4	2.7	1.4	1.7	7.8	1.0
		3	4.3	4.2	1.4	2.3	7.8	4.2
		4	4.3	4.5	3.2	7.0	7.8	33.0
		5	4.3	4.2	2.8	4.9	5.0	33.0
		6	1.7	4.5	2.8	6.6	7.8	33.0
		7	1.4	2.7	1.0	1.7	13.9	15.4
	Depressed							
		1	6.2	2.7	1.4	2.3	7.4	1.1
		2	2.7	2.0	3.0	2.3	12.0	1.1
		3	4.2	3.3	3.0	5.3	10.8	20.7
		4	4.2	4.8	4.6	8.3	12.0	35.6
		5	4.3	3.8	3.6	5.7	11.3	17.0
		6	2.3	4.3	3.6	7.0	13.3	25.1
		7	1.8	2.0	1.4	3.3	15.0	6.1
	Corridor							
		1	4.5	1.8	1.0	1.7	6.2	1.1
		2	2.3	1.2	2.3	1.7	10.8	1.1
		3	2.9	2.3	0.0	0.0	9.9	11.7
		4	2.9	3.6	3.3	5.8	0.0	35.6
		5	3.3	2.6	2.4	4.1	10.2	23.2
		6	1.9	3.1	2.5	4.8	11.8	30.3
		7	1.3	0.0	1.0	3.0	15.0	14.4
Stream-type chinook salmon								
	Strong							
		1	9.0	4.5	1.5	2.5	6.0	1.2
		2	2.0	4.5	1.5	2.5	12.5	1.2
		3	7.0	7.0	1.5	2.5	12.5	33.4
		4	7.0	7.0	4.0	10.0	12.5	38.0
		5	7.0	7.0	4.0	7.0	11.8	19.6
		6	2.5	7.0	4.0	10.0	12.5	19.6
		7	2.0	4.5	1.5	2.5	16.0	15.0
	Depressed							
		1	6.3	2.6	1.5	2.5	8.1	1.1
		2	2.7	2.1	3.4	2.5	12.1	1.1
		3	4.2	3.2	3.4	5.9	11.0	20.6
		4	4.2	4.8	5.1	9.3	12.1	34.1
		5	4.3	3.6	3.9	6.0	11.7	12.8
		6	2.5	4.4	3.9	7.5	13.4	22.8
		7	2.0	2.1	1.5	3.3	14.3	4.0
	Corridor							
		1	5.0	2.1	1.1	1.9	6.3	1.1
		2	2.5	1.5	2.6	1.9	10.9	1.1
		3	3.3	2.5	2.9	5.1	9.6	15.4
		4	3.3	3.9	3.8	6.6	12.4	35.8
		5	3.5	2.9	2.8	4.4	10.3	23.2
		6	2.1	3.4	2.9	5.4	12.4	30.8
		7	1.5	2.1	1.1	3.1	15.1	11.4

Table 3.20 (continued)

Species	Status	Alt.	Forest Activity				Range Activity	
			Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Ocean-type chinook salmon								
	Strong							
		1	6.5	2.7	1.3	2.1	8.6	1.2
		2	2.5	2.1	2.7	2.1	12.6	1.2
		3	4.3	3.4	2.7	4.6	12.4	8.6
		4	4.3	5.0	4.4	7.8	12.6	38.0
		5	4.3	3.9	3.4	5.9	10.5	18.9
		6	2.1	4.5	3.4	6.7	12.9	32.1
		7	1.7	2.1	1.3	3.0	16.0	4.1
	Depressed							
		1	6.2	2.4	1.3	2.1	7.4	1.2
		2	2.6	2.1	2.4	2.1	11.4	1.2
		3	3.9	3.8	2.4	4.2	10.4	11.0
		4	3.9	5.1	4.1	7.6	11.4	38.0
		5	4.8	3.8	2.8	5.4	11.0	25.6
		6	2.7	4.8	3.1	6.5	12.5	38.0
		7	1.7	1.8	1.3	3.7	16.0	17.8
	Corridor							
		1	3.8	1.8	0.7	1.1	3.8	1.1
		2	2.4	1.1	1.2	1.1	9.5	1.1
		3	2.8	2.6	1.2	2.1	8.7	13.0
		4	2.8	3.2	1.6	3.2	9.5	34.8
		5	3.6	2.9	1.2	2.5	9.5	28.1
		6	1.8	2.6	1.6	3.2	10.5	28.1
		7	0.9	0.7	0.7	3.2	14.6	22.9
	Fringe							
		1	6.8	2.7	1.4	2.3	8.7	1.2
		2	2.6	2.1	3.1	2.3	12.1	1.2
		3	4.3	3.3	3.1	5.4	11.8	11.5
		4	4.3	5.2	5.1	8.6	12.1	38.0
		5	4.3	3.8	3.7	6.4	12.1	21.8
		6	2.3	4.7	3.7	7.2	12.4	38.0
		7	1.8	2.1	1.4	3.2	16.0	20.3

We assumed that risks were greatest and benefits least if activities were not clearly tied to the implementation of watershed/ecosystem analysis. Watershed and riparian restoration activities are more likely to be efficiently and effectively focused if they are associated with a broad-scale analysis and are not merely mitigation tacked onto site- and project-specific activities. We also assumed risks were greater if the associated riparian conservation strategy was inadequate as considered in the first step of this analysis.

We recognize the potential benefits of prescribed fire in restoring the structure and function of terrestrial ecosystems, but were not able to evaluate species benefits in our analyses. We generally assumed the effects of prescribed fire activities to be benign.

In our discussion of alternatives, we considered the magnitude of an activity relative to the range of activities projected across a species distribution and among alternatives. For example, combined

timber and thinning activities were considered low when less than 5 percent of the species/status distribution was potentially influenced per decade, and high when 10 percent or more was affected. The allocation of activities in sensitive areas was also considered. For example, high levels of timber harvest and low levels of restoration in the fringe distribution of species (largely represented by depressed and highly-fragmented populations) were viewed negatively.

Framework for Judging Alternatives

We used a series of eleven questions to explore the potential effect of each alternative on focal fish species (table 3.21). Questions 1 to 5 were addressed on a species-by-species basis. For Questions 6 to 11, however, the evaluation team decided that the answers applied to all species. We used the discussion generated by each question to formulate the findings discussed in the next section, but did not attempt to systematically craft an answer to each question for each species that reflected the range of opinions expressed in the discussion.

Findings by Species

We begin each of the following sections with a brief overview of the current status of each salmonid species, as described by Lee and others (in press). We then provide a synoptic report on the expected effect of each alternative, followed by a brief comparative summary of all the alternatives.

Table 3.21. General questions used to guide the discussion of possible effects from each of the seven proposed alternatives on widely-distributed salmonids.

Does the alternative:
(1) Conserve core areas of (relatively) high population density within the species' range?
(2) Identify at-risk areas and use those areas to prioritize restoration and management prescriptions?
(3) Decrease fragmentation of aquatic habitats and maintain/restore corridors as critical components of connectivity among populations?
(4) Maintain, protect, and/or restore proper functioning conditions of riparian habitats within the range of this species?
(5) Address other specific threats to this species?
(6) Emphasize the uncertainty of restoration treatments and provide a framework for adaptive management as better information is available to judge treatment results?
(7) Attempt to minimize the effects of introduced species?
(8) Adequately protect aquatic habitats within the range of this species from increased sedimentation associated with land-use activities?
(9) Maintain, protect, and/or restore water quality within the range of this species?
(10) Maintain, protect, and/or restore water quantity within the range of this species?
(11) Address the importance of non-Federal lands to conservation and restoration strategies?

Bull trout *(Salvelinus confluentus)*

Bull trout currently occur in approximately 45 percent of the subwatersheds comprising the potential historical range. Although they are distributed broadly throughout the potential range and the assessment area, the current distribution is patchy. Bull trout are classified as strong in 6 percent of the potential range. Approximately 50 percent of those strong populations are contained within or associated with wilderness areas. Many remaining populations are believed to be fragmented and relatively isolated, either through the loss of migration corridors or the disruption of suitable habitat networks (Lee and others, in press). These populations may be at risk even with no further habitat loss. Because approximately 93 percent of the strong subwatersheds and 76 percent of the depressed-status subwatersheds are on Federal land (table 3.12), and because bull trout appear to be particularly sensitive to land-use effects (Lee and others, in press), future management of FS- and BLM-administered lands will play a major role in the trends and distribution of bull trout within the assessment area.

Alternative 1—Under Alternative 1, we expect bull trout populations to decline throughout much of their current range. The strong populations associated with wilderness areas may be influenced relatively little, but the remaining distributions will be subject to moderate and high levels of timber harvest and thinning activities (table 3.20), and new road construction. The number of subwatersheds with low-road densities or no roads that support spawning and rearing are projected to decline, while the number of subwatersheds with high road densities should increase (table 3.11). Results of the classification tree analysis suggest a decline in the frequency of both strong and depressed populations (tables 3.3 and 3.4). Without adequate protection of riparian function (described in "Step 1" section of this chapter) and with relatively limited watershed restoration (table 3.20), we have little reason to believe that these negative trends will be mitigated. Declines in the status and distribution of bull trout should be most pronounced within areas which emphasize commodity production; these areas include portions of the Blue Mountains, the Southern Cascades, and the Upper Klamath reporting units of the EEIS planning area, and the Northern Glaciated Mountains, Lower Clark Fork and Upper Clark Fork units in the UCRB planning area. Continued declines in the fringe distributions are anticipated because activities in that area are expected to be as high or higher than in other portions of the range, and because these parts of the range are not represented by any strong populations. The loss of the fringe populations could represent a disproportionate loss of genetic variability for this species. Bull trout are most likely to persist within the Central Idaho Mountains, the South Fork Flathead subbasin with a conservation emphasis, and in wilderness areas in the Northern Cascades.

Alternative 2—Bull trout are provided increased protection under the Inland Native Fish Strategy (INFISH) (1995), the implementation of ecosystem analysis, and relatively low or moderate levels of timber harvest and thinning activity (table 3.20) under Alternative 2. Much of the high quality habitat associated with strong populations in priority watersheds should be protected by the standards that apply therein. Increased watershed restoration should also reduce the risk to some strong populations. The projected distribution of road densities associated with bull trout habitats (table 3.11), however, suggests little increase in the frequency of subwatersheds with no roads or very low road densities. The models also predict a minor decline in occurrence of strong, or of strong and depressed populations (tables 3.3 and 3.5). More limited watershed restoration, a relative lack of riparian restoration activity in the fringe portion of the existing range (table 3.20), and a production-conservation emphasis in the rangelands associated with the fringe distribution suggest potential decline of these populations. With the emphasis on bull trout in the INFISH conservation strategy, we expect bull trout to persist throughout much of the current distribution of strong populations. We do not anticipate extensive rebuilding of habitat networks, however.

Because of the existing fragmentation and isolation of some populations, particularly those outside central Idaho and in the fringe distributions, some populations may face elevated risk of extinction through natural disturbance events, even without further habitat loss.

Alternative 3—Under Alternative 3, much of the current distribution of strong populations of bull trout will likely be conserved. It is unclear whether significant rebuilding of the population will occur, however, and we are concerned that the fringe distribution will be further eroded. Road-density reductions are projected across the bull trout distributions (table 3.11), and model predictions suggest an increasing trend in the occurrence of strong subwatersheds (tables 3.3 and 3.6). Because of the emphasis on ecosystem analysis in Category 1 (see footnote 4 for definition) and strong subwatersheds, and a moderate level of watershed restoration in the strong distribution, we anticipate that the core of the bull trout distribution associated with the Central Idaho Mountains and eastern fringe of the Northern Glaciated Mountains in the UCRB area, and the Northern Cascades and Blue Mountains of the EEIS area will be conserved if not strengthened. Model projections, however, suggest a decline in the complete distribution (strong and depressed) that implies further declines in some portions of the range (tables 3.3 and 3.6). Because ecosystem analysis will not be required in depressed subwatersheds outside of Category 1 subbasins or priority areas, a general decline rather than rebuilding of habitat networks outside these core areas may occur. The risks could be exaggerated in the fringe distribution areas because of relatively high timber and thinning activity, and little watershed restoration (table 3.20). Relatively intensive riparian restoration activities could provide some benefits for bull trout populations in the rangeland portions of the fringe distributions. However, benefits are more likely in corridors than in spawning and rearing habitats. Because critical spawning and initial rearing habitats for bull trout tend to be limited to higher-elevation portions of the occupied watershed, particularly on the southern limits of the range associated with the fringe, activities on the forestlands are likely to be far more important compared to rangelands.

Alternative 4—The core distributions of bull trout associated with Category 1 watersheds will likely be conserved and perhaps strengthened under this alternative. Some rebuilding in more fragmented or depressed portions of the range is likely, but large improvements are not expected. The active restoration associated with this objective provides a relatively high level of watershed restoration and road-density reduction. Road-density projections show positive trends associated with both the strong and complete distribution of bull trout populations (table 3.11). Model predictions also suggest a relatively strong positive trend in the occurrence of strong subwatersheds (tables 3.3 and 3.7). Although timber and thinning activities are relatively high in the subbasins supporting strong populations, watershed restoration is also increased (table 3.20). Because of the emphasis on ecosystem analysis in Category 1 and stronghold watersheds, there should be an opportunity to prioritize forest and watershed restoration efforts in areas representing the least risk and greatest benefit for important bull trout populations. Projected and anticipated trends on the fringe and less prominent portions of the bull trout distributions are less encouraging. Model predictions suggest a moderate decline in the occurrence of the complete distribution of spawning and rearing subwatersheds (strong and depressed) (tables 3.3 and 3.7). Timber harvest and thinning activities are also anticipated to be higher in the depressed and fringe portions of the distribution than in the strong subwatersheds (table 3.20). Although watershed restoration activity is still projected to be relatively high in these latter subbasins, the lack of ecosystem analysis outside the Category 1 subbasins or strong subwatersheds suggests that prioritization of activities may not effectively mitigate the inherent risks associated with increased forest restoration and timber harvest activity.

Alternative 5—Under Alternative 5, we anticipate declines in the distribution and status of bull trout populations in major portions of both the

EEIS and UCRB areas. The core of the bull trout distributions associated with the Category 1 and aquatics-emphasis watersheds should fare well under this alternative. A substantial amount of wilderness, the emphasis on ecosystem analysis, and restoration focused to benefit strong populations (see Alternative 4), will likely sustain and perhaps expand the distribution of bull trout within these select subbasins (Category 1, and Forest Clusters 1 and 2). The emphasis on commodity production and the lack of ecosystem analysis in major portions of the species range, however, suggest that other populations will not do well. Although activity projections imply moderate or high levels of watershed restoration under this alternative (table 3.20), we anticipate inadequate protection or restoration of riparian function and aquatic ecological processes where riparian protection standards are relaxed (see "Step 1" section of this chapter). The model predictions of a general decline in the occurrence of both the strong and combined distributions (tables 3.3 and 3.8) are not likely to be mitigated in areas with increased activity and road construction. We anticipate a definite decline in the distributions in the northern Idaho and western Montana portions of the UCRB area and in the Blue Mountains and Upper Klamath regions of the EEIS area. The Upper Klamath represents a major portion of the fringe distribution of this species; losses here could mean a disproportionate loss of genetic variability for bull trout.

Alternative 6—Alternative 6 would probably conserve and perhaps strengthen the core of the bull trout distribution in strong populations. Decreasing trends in road density are predicted within the strong and depressed subwatersheds (table 3.11). The models also predict a relatively strong positive trend in the occurrence of strong populations (tables 3.3 and 3.9). Projected timber and thinning activities within the strong distributions are moderate, but an emphasis on watershed restoration is retained (table 3.20). The emphasis on ecosystem analysis within Category 1 and strong population areas and the additional emphasis on monitoring and adaptive management implied by this alternative also suggest a substantial opportunity to focus management activities in a manner that represents the least possible risk for many of these populations. We are unsure about the likely trends in bull trout populations in the remaining portions of the distribution. Subwatersheds supporting depressed populations of bull trout outside the Category 1 subbasins will not necessarily receive the consideration afforded by ecosystem analysis. Although some erosion of the current distribution of depressed and fringe populations might occur, lower levels of timber harvest and thinning activity and the moderate emphasis on watershed restoration in both the depressed and fringe distributions might allow successful restoration of some subwatersheds (table 3.20). Road density projections suggest substantial road reductions may occur in some of the depressed subwatersheds (table 3.11), while model projections suggest essentially no change in the combined distributions (tables 3.3 and 3.9).

Alternative 7—Alternative 7 provides a substantial opportunity for conservation and restoration of bull trout status and distributions throughout the EEIS and UCRB planning areas. Decreasing trends in road density are predicted within both the strong and depressed subwatersheds (table 3.11). Although watershed restoration activities are low, timber harvest and thinning activities are also low (table 3.20). Model predictions represent the strongest positive trends observed across any of the alternatives for both the strong and combined distributions (tables 3.3 and 3.10). Important caveats to these apparent positive responses include the risks represented by the lack of both forest and watershed restoration under this alternative. The legacy of historical management activities may place systems without active restoration at risk. These risks are likely to be most important in the more fragmented portions of the range where bull trout persist, and in relatively small and isolated remnants of the historical habitat network that will not be included in reserves. This would be a particularly relevant concern for the fringe portions of this species' range. We anticipate that the projected response in the core of the species distribution associated with strong subwatersheds would not be substan-

tially slowed by these problems. It is unclear whether these risks are enough to negate the apparent positive trend in the more depressed portions of the range.

Summary—Bull trout populations appear to be depressed throughout most of their current distribution. Despite the relatively poor condition, they retain a wide distribution. An important part of the remaining strong distribution is found within wilderness areas around the Basin and will likely persist under most alternatives. The largest, most secure portion of the distribution is found in the Central Idaho Mountains. Alternatives 2, 3, 4, 6, and 7 would likely conserve the cores of the bull trout distribution while Alternatives 1 and 5 would not (table 3.22). None of the alternatives provide for extensive rebuilding in the more depressed parts of the range. Alternatives 3, 4, 6, and 7 provides some potential for active restoration that could benefit depressed bull trout populations, but it is not clear that the analysis and planning necessary to effectively and efficiently prioritize those efforts will exist. None of the alternatives provides strong protection or emphasis for restoration of what may be a particularly important fringe distribution. Furthermore, none of the alternatives provides strong guidance or an opportunity for securing or restoring migratory corridors that exist outside of Federal lands, which may seriously isolate some populations.

Westslope cutthroat trout *(Oncorhynchus clarki lewisi)*

Westslope cutthroat trout are broadly distributed in the northern portion of the UCRB planning area, but are restricted to the Northern Cascades and a small portion of the Blue Mountains in the EEIS planning area. The latter area represents a relatively isolated group that is considered in the fringe of the distribution. This subspecies of cutthroat trout remains one of the most widely distributed salmonids in the assessment area; it is still found in approximately 85 percent of the potential historical range. Although they persist widely, most populations have declined in status. Strong populations are believed to exist in about 22 percent of the potential historical range, 40 percent of which is associated with wilderness. Introgression and competition with introduced salmonids, fishing, and habitat disruption are believed to be important factors contributing to the depressed condition of most populations. Road density and land management classification were useful variables in classification and prediction of westslope cutthroat trout distributions (Lee and others, in press). The broad distribution of westslope cutthroat trout within the historical range and the persistence of populations in some heavily managed watersheds demonstrate that local extinctions have not been widespread. Although populations may persist in the face of extensive, human-caused disturbance, many exist only in low numbers or as restricted, resident populations that reflect little of the diversity and production of historical populations. Because approximately 70 percent of the current distribution and 93 percent of the remaining strong distribution are found on FS- and BLM-administered lands (table 3.13), forest and rangeland management is likely to play an important role in the future distribution and status of this subspecies.

Alternative 1—Westslope cutthroat trout will likely persist throughout much of their current distribution under this alternative, but a continued decline in status throughout a major part of that distribution is anticipated. Some of the more restricted populations may disappear. High levels of timber harvest and thinning activities are projected throughout a major portion of the species range, with little emphasis on watershed or riparian restoration (table 3.20). Road densities are expected to increase across the species' range (table 3.11). The models predict a relatively strong declining trend in the occurrence of strong populations, and a lesser negative trend in the complete distribution (tables 3.3 and 3.4). Current Forest plans are likely to provide a variable level of protection for these populations. The general emphasis on timber production throughout much of the range, a lack of mid-scale analysis to focus activities and minimize risks in particularly important or sensitive populations, and the general lack of a consistent riparian protection strategy suggest that

the projected declines are unlikely to be mitigated (see "Step 1" section of this chapter). Because an important core of the remaining strong westslope cutthroat trout populations is associated with wilderness areas in the UCRB and to a lesser extent in the North Cascades portion of the EEIS planning areas, some strong populations will persist across the analysis area. Because westslope cutthroat trout tend to persist even in some heavily managed areas, they are likely to persist throughout much of their current distribution. More populations, however, may be limited to remnant status dominated primarily by resident forms, low densities, and potentially high levels of genetic introgression. A decline in status seems most likely in the timber-emphasis areas of the UCRB area, predominantly in northern Idaho and Montana. The fringe distribution in the Blue Mountains of the EEIS area may also be particularly vulnerable. Because relatively few productive subwatersheds remain in this area, further losses could represent an important loss of genetic variability for the subspecies.

Alternative 2—The INFISH strategy, focused in priority watersheds and low and moderate land-disturbing activities, could protect much of the core of the westslope cutthroat trout distribution under this alternative. We do not anticipate important rebuilding, but distributions and status should not decline dramatically outside of the species fringe in the EEIS planning area. In general, we anticipate that strong populations associated with wilderness and a conservation emphasis in the Central Idaho Mountains and northeastern Montana of the UCRB area, and in the North Cascades of the EEIS area will maintain their current condition. Increased activity, including both commodity production and increased efforts for restoration, may produce mixed results for the remaining populations scattered throughout much of northern Idaho and Montana in the UCRB. Road-density projections suggest little change in the overall distributions associated with strong subwatersheds outside of wilderness (table 3.11), but the models predict a moderate, declining trend in the frequency of occurrence for these same areas (tables 3.3 and 3.5). An emphasis on riparian protection associated with INFISH standards could mitigate this trend in priority watersheds. Because westslope cutthroat seem to persist even with moderate levels of disturbance, a significant opportunity for restoration of strong populations exists throughout much of the range. The moderate level of restoration associated with the distribution of strong subwatersheds (table 3.20) could work to secure watersheds that are at risk and might rebuild adjacent depressed systems. We are less optimistic that important restoration will occur in depressed portions of the range that are not associated with strong populations or priority subbasins. Relatively little watershed restoration activity is projected in association with the depressed or fringe distributions for this subspecies (table 3.20), and INFISH riparian protection standards would not result in rapid recovery of watershed conditions where disturbances have been extensive. Although a rapid loss of populations is not anticipated in the depressed and fringe portions of the range, any erosion of the fringe could be an important loss of genetic variability for the subspecies.

Alternative 3—Alternative 3 should conserve and perhaps slightly expand the distribution of subwatersheds supporting strong populations of westslope cutthroat trout. We do not anticipate strong rebuilding in the more fragmented and depressed portions of the subspecies range, although road-density projections show overall decreasing trends in both the strong and depressed distributions (table 3.11). Model predictions also suggest a positive trend in the frequency of strong populations (tables 3.3 and 3.6). Although timber harvest and thinning activities are moderate in the subbasins supporting strong subwatersheds, moderate watershed and riparian restoration (table 3.20) could secure some at-risk systems. Ecosystem analysis in Category 1 and all strong subwatersheds, and INFISH riparian standards, should protect sensitive watersheds. Those analyses should also provide an opportunity to prioritize timber harvest and restoration activities in a manner that secures or expands distributions by focusing activities in areas with the least risk and greatest potential gain through restoration.

Table 3.22. Projected effects of the seven proposed alternatives on bull trout.

Will the Alternative:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1. Conserve strong populations in the central or core portions of the species' range?	No	Yes	Yes	Yes	No	Yes	Yes
2. Prevent declines in habitats or populations throughout the entire species' range?	No	No	No	Uncertain	No	Uncertain	Uncertain
— if "no", where are declines most likely to occur (on FS/BLM lands)?	Outside wilderness and other protected areas	Forest Clusters 3 and 4, and fringe in rangeland	Mixed results across species' range	Category 2 and 3	Category 2 and 3; commodity-emphasis areas	Forest Cluster 4 and Flint Rock	Isolated remnants
3. Help rebuild depressed populations by restoring habitats?	No	Yes	Yes	Yes	Yes	Yes	Yes
— if "yes", where?		INFISH[1] Priority watersheds	Forest Clusters 2, 4, and 5	Mixed results across species' range	Category 1; Forest Cluster 1 and 2	Mixed results across species' range	
What is the role of factors other than habitat?	*Competition and introgression with introduced fishes can seriously threaten depressed populations, particularly in degraded habitats, and may undermine efforts to rebuild populations in good habitats. Highly-fragmented and isolated populations may risk extirpations even with no further habitat loss.*						

[1](INFISH) Inland Native Fish Strategy. 1995. Environmental Assessment: Decision Notice and Finding of No Significant Impact. Interim Strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, western Montana, and portions of Nevada. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service, Intermountain, Northern, and Pacific Northwest Regions. [irregular pagination].

We anticipate that any gains will be most prominent in the areas associated with the conservation and restoration emphasis in the Central Idaho Mountains and northeastern Montana within the UCRB planning area. We are less optimistic that positive changes in status will occur in the depressed subwatersheds for westslope cutthroat trout outside of the Category 1 subbasins. A positive trend in road densities (table 3.11) and a small but a positive trend in model predictions for the entire distribution suggests that there will not be extensive erosion of the current distribution. Increased timber harvest and thinning activity without a comparable increase in watershed restoration, however, suggests that large net gains are unlikely. For depressed populations, INFISH standards should provide protection but are unlikely to lead to rapid recovery in watershed and habitat conditions. No gain and some erosion of depressed populations can be anticipated in the fringe distribution associated with the Blue Mountains in the EEIS area because of relatively high levels of timber harvest and thinning, and low levels of watershed restoration (table 3.20).

Alternative 4—Alternative 4 proposes increased active management. This suggests both risks and important opportunities for management that will influence the distribution of westslope cutthroat trout. We anticipate that the core distributions of strong populations will be conserved and potentially strengthened. Moderate levels of timber harvest but also some of the highest allocations of watershed restoration are projected for the currently strong subwatersheds (table 3.20). The relative magnitude of watershed restoration coupled with implied protection in ecosystem analysis suggests an opportunity to secure important, but potentially at-risk systems. Decreasing trends in road densities (table 3.11) and model predictions for the occurrence of strong subwatersheds (tables 3.3 and 3.7) in Forest Clusters 2, 3, and 4 add support. The requirement for ecosystem analysis in Category 1 and strong subwatersheds provides a mechanism to prioritize restoration and to focus timber harvest and thinning activities where they pose the least risk. Ecosystem analysis and extensive restoration might also allow an extension of some strong populations by focusing work in systems with the greatest potential to respond. Conservation and strengthening of the depressed distribution outside Category 1 subbasins may be less likely. Although moderate levels of watershed and riparian restoration are expected in subbasins supporting depressed and fringe populations, high levels of timber harvest and thinning activity are also predicted for these systems (table 3.20). The riparian protection measures associated with this alternative should conserve much of the distribution, but restoration of depressed populations will be less likely without the planning and prioritization of activities implied by ecosystem analysis. Because that analysis is not required outside the Category 1 and strong systems, it is not likely to occur throughout the depressed or fringe distribution of this subspecies. Implementation will produce varied results in restoration that we cannot anticipate. The potential for important gains is present, but we are uncertain whether they will be realized. A failure to secure or strengthen the limited fringe distribution within the EEIS area could result in an important loss of genetic variability for this subspecies.

Alternative 5—Under Alternative 5, we anticipate both positive and negative effects on the distribution and status of westslope cutthroat trout across the assessment area. Many of the strong subwatersheds for westslope cutthroat trout are associated with Category 1 subbasins outside of the areas proposed for timber or livestock emphasis in this alternative. Where ecosystem analysis is required, it should produce results similar to Alternative 4. In that respect, we expect Alternative 5 to conserve and perhaps strengthen portions of the core of the range. In contrast, important areas that support both strong and depressed westslope cutthroat are found in the proposed timber and livestock emphasis subbasins, where declines in status are expected. High levels of timber harvest and thinning throughout much of northern Idaho and western Montana increase the risk to the remaining strong popula-

tions in that region. Although moderate levels of watershed restoration activities are implied, we anticipate that they will be less effective than the ecosystem analysis and more conservative riparian protection measures proposed under other alternatives and conservation emphasis areas (see "Step 1" section of this chapter). The predicted loss of strong subwatersheds is likely to be focused in this region and may not be mitigated through the less conservative protection measures. We expect little restoration of the already depressed populations for much of the range. The road projections do not show decreasing trends (table 3.11) and the model projections for the complete distribution suggest no change (tables 3.3 and 3.8). High levels of timber harvest and thinning activities are not compensated by similar increases in watershed restoration in either the depressed or fringe distributions (table 3.20). Because much of the depressed and all of the fringe distributions are associated with a timber and range management emphasis and less conservative riparian protection, we do not expect any substantial improvement in habitat conditions. Some erosion of the current distribution might occur without active watershed restoration, especially in some of the more seriously restricted populations.

Alternative 6—As in several of the preceding alternatives, we expect cores of strong subwatersheds for westslope cutthroat trout to be conserved and potentially strengthened under this alternative. Road density projections show positive trends in the strong subwatersheds (table 3.11) and model projections suggest a moderate increasing trend as well (tables 3.3 and 3.9). The projection of moderate timber and thinning activities and moderate levels of watershed restoration suggest an opportunity to focus work to secure at-risk systems and perhaps rebuild those with important potential. The requirement for ecosystem analysis throughout the Category 1 and all strong subwatersheds and the additional emphasis on adaptive management implied in this alternative provide a mechanism that should encourage progress. We remain uncertain about the trends for depressed populations outside the Category 1 subbasins. Subwatersheds that do not support strong populations may not have the benefit of ecosystem analysis. A moderate allocation of watershed restoration associated with the distribution of depressed populations provides an important opportunity for restoration of some populations. Positive changes in road densities (table 3.11) and predictions of modest but increasing trends in the complete distribution (tables 3.3 and 3.9) also suggest restoration of some populations. An effective and efficient prioritization of restoration activities may not occur, however, without the commitment to ecosystem analysis. This alternative also appears to provide the best opportunity for restoration of the depressed populations associated with the fringe of the range. Limited timber harvest activities and a strong emphasis on watershed and riparian restoration associated with these subwatersheds (table 3.20) provides a unique opportunity to protect these important fringe populations.

Alternative 7—Our analyses support positive trends in the distribution and status for westslope cutthroat trout under Alternative 7. There are strong positive trends projected in road densities (table 3.11) and similarly optimistic predictions in the occurrence of strong populations from the models (tables 3.3 and 3.10). These patterns, together with relatively low levels of land disturbing activities in strong subwatersheds, suggest that the core of strong populations throughout the assessment area should be conserved and strengthened under this alternative. These patterns suggest benefits for depressed populations as well, but the lack of active watershed restoration makes us less certain about those gains. Much of the depressed distribution for westslope cutthroat trout is associated with moderately and heavily roaded watersheds (table 3.11). Although strict riparian protection standards should minimize further degradation in these systems, many watersheds may not recover without active road obliteration or other efforts to restore the watershed, hydrologic, and riparian processes needed to create and maintain complex and productive habitats.

Summary—Westslope cutthroat trout are likely to persist throughout most of their current distribution under any of the alternatives. The distribution and status of healthy populations, however, could be strongly influenced by the management associated with the range of alternatives. We would anticipate further decline in the status of the species under Alternative 1. Although Alternative 5 would likely conserve much of the core of strong populations in the current range, we would expect declines of healthy populations in the UCRB area under this alternative. Alternatives 2, 3, 4, 6 and 7 all appear likely to conserve most of the strong populations across the assessment area (table 3.23). Alternatives 3, 4, 6, and 7 may offer some potential for strengthening those cores through expanded watershed restoration and the prioritization of restoration and conservation activities through ecosystem analysis and/or the reduction of land-disturbing activities. We do not anticipate restoration of many currently depressed populations under Alternatives 2 and 3. Increased emphasis on active restoration under Alternatives 4 and 6 provides an opportunity for some progress toward restoring depressed populations. A lack of commitment to the analysis necessary to effectively focus and prioritize conservation and restoration efforts, however, may limit that potential. None of the alternatives assure conservation and restoration of the depressed populations associated with the fringe of the subspecies range in the EEIS planning area.

Yellowstone cutthroat trout *(Oncorhynchus clarki bouvieri)*

Yellowstone cutthroat trout have the narrowest distribution of any of the key salmonids, having formerly occupied about 8 percent of the Basin. Their range is restricted to the UCRB planning area in the Snake River drainage upstream from Shoshone Falls, Idaho. Yellowstone cutthroat trout currently persist in about 66 percent of the potential historical range. Despite their narrow distribution, the species was judged to support the largest proportion of strong populations of any key salmonid. Within the potential historical range, 32 percent of the populations were listed as strong. Introgression with introduced rainbow trout and cutthroat trout poses serious threats, however, and may weaken some populations identified as strong.

Management of FS- and BLM-administered lands is key to the survival of Yellowstone cutthroat trout; 57 percent of strong populations and 48 percent of depressed populations occur on these lands (table 3.14). An additional 13 percent of the strong populations occur within Teton National Park, Wyoming. A total of 35 percent of the strong populations are within designated wilderness or National Parks. The current range of Yellowstone cutthroat trout includes both forest and rangelands. Activities in both land types will affect the species' persistence.

Alternative 1—Management under Alternative 1 will likely contribute to declines in Yellowstone cutthroat trout outside of designated wilderness areas and National Park Service-administered lands. Although individual Forest plans may provide some levels of site-specific protection and restoration for important local stocks, this alternative lacks a consistent conservation and restoration approach. Populations outside of National Parks and designated wilderness will be affected by increased timber harvest, thinning, and road construction (table 3.20). The number of subwatersheds with high road densities is expected to increase (table 3.11). Models predict a decline in the species distribution and in strong populations (tables 3.3 and 3.4), especially in the Palisades and Salt River subbasins. Very little watershed restoration is planned under this alternative. Within rangelands, Alternative 1 provides little improvement in livestock management and very little planned riparian restoration (table 3.20). Declines will likely be most pronounced in areas managed most intensively for timber and range commodity production.

Table 3.23. Projected effects of the seven proposed alternatives on westslope cutthroat trout.

Will the Alternative:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1. Conserve strong populations in the central or core portions of the species' range?	No	Yes	Yes	Yes	No	Yes	Yes
2. Prevent declines in habitats or populations throughout the entire species' range?	No	No	No	No	No	Uncertain	Yes
— if "no", where are declines most likely to occur (on FS/BLM lands)?	Outside wilderness and other protected areas	Outside INFISH[1] Priority watersheds; Forest Clusters 3, 4, and 5	Category 2 and 3; Forest Clusters 3 (western MT) and 4, and Upper Clark Fork	Category 2 and 3; Western MT	Category 2 and 3; commodity-emphasis areas		
3. Help rebuild depressed populations by restoring habitats?	No	No	Yes	Yes	No	Yes	Yes
— if "yes", where?			Forest Cluster 2 and some of 4	Category 1; Forest Clusters 2, 3, and 4		Mixed results across species' range	
What is the role of factors other than habitat?	Competition and introgression with introduced fishes can seriously threaten depressed populations, particularly in degraded habitats, and may undermine efforts to rebuild populations in good habitats.						

[1](INFISH) Inland Native Fish Strategy. 1995. Environmental Assessment: Decision Notice and Finding of No Significant Impact. Interim Strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, western Montana, and portions of Nevada. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service, Intermountain, Northern, and Pacific Northwest Regions. [irregular pagination].

Alternative 2—Alternative 2 will likely result in continued declines in Yellowstone cutthroat trout outside of designated wilderness areas and National Park Service-administered lands. Although some increased protection of watersheds may be afforded, land-disturbing activities will continue in important core areas and there is minimal emphasis on restoration of degraded areas. Increased protection is afforded under the application of INFISH guidelines that would require watershed analysis if standards were to be altered. Important core areas are not clearly identified under this alternative. Land-disturbing activities including harvest and thinning are relatively low (table 3.20), and minimal changes in road densities are expected (table 3.11). Models sensitive to road densities predict no change in the probability of populations (tables 3.3 and 3.5). The alternative identifies riparian areas and landslide-prone areas, but at-risk populations or habitats that may require added emphasis are not identified. There is little emphasis on restoration of depressed habitats. For depressed populations in rangelands, there is a high emphasis on livestock production, a low emphasis on riparian restoration, and moderate increases in livestock management (table 3.20). Consequently, currently degraded habitats may be degraded further and other areas may not receive the restoration effort needed to reverse population declines.

Alternative 3—It is uncertain whether Alternative 3 will improve overall conditions for Yellowstone cutthroat trout, although most important core areas should be protected. This alternative identifies important core areas by listing subbasins that support important strongholds under a Category 1 designation, and it applies emphasis to other strongholds outside Category 1 areas. There is little emphasis on prioritization of restoration in degraded areas. Similar to Alternative 2, some increased protection is afforded under the application of INFISH guidelines that would require watershed analysis for standards to be altered. Minor changes in road densities are anticipated (table 3.11) and the model predicts virtually no change in the occurrence of populations except for a small improvement in the Palisades subbasin (tables 3.3 and 3.6). Although thinning is projected in Clusters 5 and 6 as part of this alternative, most of this activity will be in forest types other than the cold forest which dominates the range of Yellowstone cutthroat trout. Within rangelands, riparian restoration is increased, livestock management improves moderately, and there are small Animal Unit Month (AUM) reductions for depressed populations (table 3.20).

Alternative 4—Alternative 4 should adequately protect core areas for Yellowstone cutthroat trout and provide modest improvement in depressed areas through watershed and riparian restoration. This alternative identifies important core areas by designating Category 1 subbasins that support important strongholds, and emphasizes other strongholds outside Category 1 areas. Road densities decrease in the more highly roaded subwatersheds within the range of depressed populations, and do not increase in watersheds supporting strong populations (table 3.11). The model predicts improved probabilities of all populations and strong populations in the Palisades, Salt, Lower Henrys, and Portneuf subbasins (tables 3.3 and 3.7). Thinning is projected in Clusters 5 and 6 as part of this alternative, again most of which will be outside the range of Yellowstone cutthroat trout. Within depressed populations in rangelands, restoration is emphasized in Range Cluster 6, livestock management improves moderately, and there are small AUM reductions (table 3.20).

Alternative 5—Alternative 5 is expected to exacerbate declines in the overall status of Yellowstone cutthroat trout in commodity-emphasis areas. Yellowstone cutthroat trout stocks overlap commodity-emphasis areas and will be subject to extensive land disturbance from timber harvest and livestock. Core areas outside of commodity-emphasis areas will be managed identically to Alternative 4. Areas with high road density would increase with this alternative (table 3.11) and the model predicts reductions in the distribution of the species and in strong populations (tables 3.3

and 3.8). High levels of harvest and thinning occur, especially in depressed population areas (table 3.20). Within commodity-emphasis areas, standards provide minimal protection of riparian areas, minimal ecosystem analysis, and there is no process to address cumulative watershed effects (see "Step 1" section).

Alternative 6—This alternative protects most core areas and applies a conservative and adaptive approach to restoration that should benefit Yellowstone cutthroat trout. Similar to Alternative 4, this alternative identifies most but not all important core areas by designating Category 1 subbasins that support important strongholds and emphasizing strongholds outside Category 1 areas. Timber harvest levels are low in all key areas, so risks are minimized. Road densities are reduced in some of the more highly roaded areas (table 3.11), which increases the likelihood of populations persisting in the Palisades, Lower Henrys, and Portneuf subbasins (tables 3.3 and 3.9). This alternative has a system of RMAs with stronger requirements for ecosystem analysis and whose widths are adjusted by slope. In rangelands, Alternative 6 has a moderate increase in livestock management and a large increase in riparian restoration (table 3.20).

Alternative 7—This alternative provides a system of reserves to conserve important core areas that, if extensive, would benefit Yellowstone cutthroat trout. Our analysis of Alternative 7 is incomplete because the EIS teams did not identify reserves within the Greater Yellowstone Ecosystem, which covers much of the range of Yellowstone cutthroat trout. We might assume that such reserves would build on existing National Parks and wilderness areas that harbor much of the core of the distribution. This alternative includes a combination of RHCAs, requirements for ecosystem analysis, and a cumulative-effects process that should protect core areas. This alternative has the lowest level of timber harvest and thinning (table 3.20). Road densities are expected to decline in the more highly roaded areas (table 3.11), which suggests a substantive increase in both species occurrence and strong populations (table 3.3). Increases would be expected in the Palisades, Upper and Lower Henrys, and Portneuf subbasins (table 3.10). Although restoration in forested areas is not emphasized, reduced human disturbance should benefit depressed populations. Within rangelands, this alternative includes a 50 percent reduction in AUMs, the largest increases in livestock management, and a moderate increase in active riparian restoration (table 3.20). These factors should benefit Yellowstone cutthroat trout in currently degraded rangeland habitats. As with other alternatives, it does not identify at-risk populations outside of strongholds. Unlike the other alternatives, it is much more comprehensive in addressing the influence of other factors such as mining, transport and storage of toxic materials, and water transfers.

Summary—Yellowstone cutthroat trout are likely to persist under all alternatives. All alternatives provide various levels of protection of core areas. The degree to which degraded habitats are restored best distinguishes the alternatives and leads to the more favorable ratings. Alternatives 4, 6, and 7 are expected to conserve core areas and move toward restoration of degraded habitats (table 3.24). Alternative 3 provides uncertain benefits to Yellowstone cutthroat trout; although some core areas are adequately conserved, many other areas will be affected by additional land-disturbing activities. Alternatives 1, 2 and 5 can be expected to exacerbate declines in Yellowstone cutthroat trout populations outside of specially protected areas.

Redband trout *(Oncorhynchus mykiss* ssp.*)*

Redband trout are the most widely distributed of the salmonids considered in this analysis. Redband trout occur in about 73 percent of the assessment area. Two general forms of redband were identified within the assessment area: one associated with the distribution of steelhead (sympatric redband) and a second outside the historical range of steelhead (allopatric redband).

Table 3.24. Projected effects of the seven proposed alternatives on Yellowstone cutthroat trout within the Basin.[1]

Will the Alternative:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1. Conserve strong populations in the central or core portions of the species' range?	No	No	Yes	Yes	No	Yes	Yes
2. Prevent declines in habitats or populations throughout the entire species' range?	No	No	Uncertain	Yes	No	Yes	Yes
— if "no", where are declines most likely to occur (on FS/BLM lands)?	Palisades, Salt River, and areas managed most intensively for timber and range commodities	Areas managed most intensively for timber and range commodities	Areas managed most intensively for timber and range commodities		Commodity-emphasis areas		
3. Help rebuild depressed populations by restoring habitats?	No	No	Yes	Yes	No	Yes	Yes
— if "yes", where?			Palisades	Palisades, Salt, Lower Henrys, and Portneuf		Palisades, Lower Henrys, and Portneuf	Palisades, Upper and Lower Henrys, and Portneuf
What is the role of factors other than habitat?	Competition and introgression with introduced fishes can seriously threaten depressed populations, particularly in degraded habitats, and may undermine efforts to rebuild populations in good habitats.						

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

Sympatric redband trout persist in about 69 percent of the potential historical range and allopatric forms persist in about 49 percent of the potential historical range.

Although the taxonomic status of redband trout is uncertain, studies suggest long-term isolation of allopatric forms with concomitant genetic differentiation among several populations in isolated basins (Behnke 1992, Berg 1987). Allopatric forms are distributed among a number of isolated subbasins that may represent several evolutionarily distinct lineages and thus important components of the genetic variability of the species. These groups are associated with the Wood and Kootenai Rivers in the UCRB area, and the Upper Klamath Basin and a complex of isolated subbasins in south central Oregon in the EEIS area (Goose Lake, Warner, Catlow Valley, and Harney) (Lee and others, in press). Because of their potentially unique characteristics, each of these groups may warrant identification as separate evolutionary units or subspecies (Williams and others 1989) and could be considered as part of the fringe distribution for the species. We consider the likely influences of alternatives on the broad distribution of redband trout in the next section. In later sections dealing with sensitive species, we also briefly consider effects specific to the Upper Klamath Basin and isolated subbasins in south-central Oregon.

Redband trout are generally believed to be resilient to disturbance and their persistence across the historical range supports this view. Most populations are believed to be depressed, however, and strong populations are thought to exist in only 9 to 17 percent of their historical range. About 55 percent of the current distribution occurs on Federal lands and 33 percent of that is found in subbasins dominated by rangelands (table 3.15). Management of FS- and BLM-administered lands and both timber harvest and grazing activities should play an important role in the distribution and status of this species. Because redband trout remain relatively widely distributed, active restoration of some habitats could play an important role in restoring or securing a stronger distribution.

Alternative 1—We anticipate further declines in the status and distribution of redband trout under this alternative. Moderate to high levels of timber harvest activities (table 3.20), and increasing road densities (table 3.11) are projected throughout the range. The model predictions suggest a declining trend in the distribution of strong populations (tables 3.3 and 3.4). Current Forest plans may provide varied levels of protection for both strong and depressed populations. The lack of a consistent riparian conservation strategy and the allocation of only low levels of watershed and riparian restoration activities (table 3.20), however, suggest increased disturbance and negative trends. Under this alternative there is an emphasis on commodity production for forestlands, rangelands, or both, in all of the subbasins supporting the fringe populations, suggesting a downward trend. Although redband trout are likely to persist and may even remain widely distributed under this alternative, we anticipate a significant loss in the status and distribution of strong populations, and a risk of compromising a significant part of the genetic variability for the species.

Alternative 2—Under Alternative 2 we anticipate that the status for much of the distribution of sympatric redband trout will be conserved in both the EEIS and UCRB planning areas. We expect that the distribution and status of the allopatric populations representing the species fringe will decline. Alternative 2 incorporates the INFISH strategy including watershed analysis and riparian conservation standards that should provide important protection for populations exposed to land management in priority watersheds. The distribution of sympatric redband populations overlaps strongly with bull trout and some west-slope cutthroat trout that were the focus of the INFISH strategy, and with anadromous salmonids emphasized in PACFISH and FEMAT. For that reason many of the priority watersheds will convey some protection to redband trout as well. The additional protection could reduce the threats

associated with moderate or low levels of timber harvest and thinning activities (table 3.20) in the central and northern portions of the species range. Within the priority watersheds, many of the strong populations of redband trout in both analysis areas should be conserved. With only limited watershed and riparian restoration, however, we do not expect any important rebuilding in the depressed part of this distribution. For redband trout outside the priority watersheds, further declines in status should be anticipated. Losses may be particularly significant for the allopatric form. Moderate levels of timber harvest and a production/conservation emphasis for all rangelands associated with the allopatric populations suggest a potential for significant watershed disturbance. Because many of the populations in the fringe distributions are already depressed, there is little riparian or watershed restoration anticipated. Many of these populations may fall outside the riparian protections afforded to the priority INFISH watersheds, and we cannot expect any significant restoration. Further losses in the fringe populations could represent major losses in the genetic diversity of this species.

Alternative 3—The cores of strong sympatric redband trout populations on Forest Service-administered lands should be conserved under this alternative. It is unclear what the trends will be in the remainder of the range, particularly the allopatric form outside of INFISH priority subwatersheds. The requirement for ecosystem analysis in Category 1 and all subwatersheds supporting strong populations should provide protection for much of the distribution of sympatric redband trout in both analysis areas. However, relatively little watershed restoration is projected for forested lands supporting depressed populations (table 3.20). The potential lack of ecosystem analysis (outside Category 1 and strong subwatersheds) to effectively prioritize activities that do occur, indicates that little restoration of depressed populations could be expected in this part of the range. A large portion of the redband distribution is found in rangelands. The projection of relatively high riparian restoration activities for depressed fringe and strong subwatersheds (table 3.20) indicates a potential to secure existing strongholds and restore other areas to a more productive condition. The lack of ecosystem analysis to effectively prioritize conservation and restoration efforts and the produce/conserve emphasis on all of the rangelands associated with the southern portion of the species distribution could negate overall species gains.

Alternative 4—The cores of strong sympatric redband populations should also be conserved and possibly extended under this alternative. Although moderate levels of timber harvest and thinning activities are associated with this alternative (table 3.20), the requirement for ecosystem analysis and more conservative riparian conservation standards in strong and Category 1 watersheds could mitigate much of the disturbance. Results are less certain for areas outside of Category 1 and strong subbasins. Strong trends were not evident in either the road density projections (table 3.11) or the modeled probabilities (tables 3.3 and 3.7) but moderate or high levels of watershed and riparian restoration activities are projected across the species range (table 3.20). Those restoration efforts coupled with the ecosystem analysis will provide some opportunity to secure and extend the strongholds. By effectively prioritizing both forest and aquatic restoration activities to minimize risk in important watersheds, some gains could be made. A similar opportunity exists across the distribution of depressed and fringe populations where high levels of both watershed and riparian restoration are projected (table 3.20). The lack of Category 1 or many strong watersheds in this part of the species range, however, suggests that ecosystem analysis will not be required and might be omitted across much of the area. Without the framework to effectively focus conservation and restoration efforts, it is uncertain if significant gains can be made across much of the range of depressed and fringe populations.

Alternative 5—Although the core of the strong sympatric redband trout distribution should be conserved or even strengthened in the UCRB

area, we would expect a large part of that distribution in the EEIS area to seriously decline under this alternative. All of the fringe distribution associated with the allopatric form would be expected to decline in status as well. The requirement for ecosystem analysis, an aquatic conservation emphasis, and moderate or high levels of watershed and riparian restoration activities (table 3.20) should benefit redband trout in the central region of Idaho that lies outside commodity-emphasis areas. The opportunity to secure and extend the distribution of strong subwatersheds should be similar to that discussed under Alternative 4. An emphasis on timber or livestock production extends over most of the remaining portion of the strong distribution and over all of the fringe distribution for the allopatric form. Within these portions of the redband range a lack of ecosystem analysis to prioritize restoration activities, a less conservative riparian protection standards (see "Step 1" section for details), and higher levels of disturbance can be expected to contribute to declines in the existing distributions. We would anticipate some decline in the status and distribution of redband trout throughout much of this area. Models predict a reduced probability of occurrence for allopatric redband trout in the Williamson and Upper Klamath subbasins (tables 3.3 and 3.8). Any declines in the fringe distributions could represent losses in the genetic variability for this species.

Alternative 6—Similar to Alternative 4, the cores of strong sympatric redband populations should be conserved and perhaps extended under this alternative. This alternative has low levels of timber harvest and thinning activities (table 3.20). The requirement for ecosystem analysis, and more conservative riparian conservation standards in strong and Category 1 watersheds should protect most core areas. Results are less certain for areas outside of Category 1 and strong subbasins. Although high road densities were projected to decrease (table 3.11), no trends were evident in the modeled probabilities (tables 3.3 and 3.9). Moderate or high levels of livestock management, watershed restoration, and riparian restoration activities are projected across the species range (table 3.20). Those restoration efforts coupled with ecosystem analysis will provide some opportunity to secure and extend the strongholds. Although this alternative places less emphasis on forest and aquatic restoration activities than does Alternative 4, it also has less risk from land-disturbing activities (table 3.20). A similar opportunity exists across the distribution of depressed and fringe populations where high levels of both watershed and riparian restoration are projected (table 3.20). The lack of Category 1 or many strong watersheds in this part of the species range, however, suggests that ecosystem analysis will not be required and might be omitted across much of the area. Without the framework to effectively focus conservation and restoration efforts it is uncertain if significant gains can be made across much of the range of depressed and fringe populations.

Alternative 7—This alternative provides a system of reserves which conserve core areas. These reserves should be adequate to protect most of the core areas for both sympatric and allopatric forms. Exceptions are the Harney and Goose Lake subbasins where reserves will not include core areas for allopatric redband trout. This alternative includes a combination of RHCAs, requirements for ecosystem analysis, and a cumulative effects process that should conserve most strongholds. The alternative has the lowest level of timber harvest and thinning (table 3.20). The road densities have reductions in current high-density areas and increases in low- and moderate-density areas (table 3.11). The models predict small changes in the probability of occurrence with slightly improved occurrence in the Williamson and Upper Klamath Lake subbasins (tables 3.3 and 3.10). Although restoration in forested areas is not emphasized, reduced human disturbance should benefit depressed populations. Within rangelands, this alternative includes a 50 percent reduction in AUMs, the largest increase in livestock management, and a large increase in riparian restoration (table 3.20). These factors should benefit redband trout in currently degraded rangelands. This alter-

native also has more comprehensive coverage of other factors including mining, transport and storage of toxic materials, and water transfers.

Summary—Although redband trout are likely to persist under all of the alternatives, the degree to which strongholds (especially isolated allopatric populations on the fringe of the species range) are conserved varies across alternatives. Alternatives 4 and 6 are expected to conserve most remaining core areas and move toward restoration of some degraded habitats, although benefits are uncertain for fringe populations. Alternative 7 does the most extensive job of conserving habitats for redband trout, including fringe populations in rangelands, although core areas in the Harney and Goose Lake subbasins may remain at risk (table 3.25). Alternatives 2 and 3 conserve sympatric strongholds, but declines are expected in the allopatric form comprising the fringe of the species. Alternatives 1 and 5 are anticipated to contribute to continued declines in status and distributions of redband trout populations.

Steelhead *(Oncorhynchus mykiss mykiss)*

Steelhead formerly occupied approximately 50 percent of the subwatersheds in the Basin and were found in Ecological Reporting Units (ERUs) within both the UCRB and EEIS planning areas. Steelhead are extinct in approximately 54 percent of the historical range, primarily as a result of blocked access to historical habitats. Few healthy populations persist within the current range; 1.3 percent of the subwatersheds support strong populations. Wild fish unaltered by hatchery stocks are likely rare, and expected in only 10 percent of the potential historical range (Lee and others, in press). Steelhead are currently a Federal Candidate species for listing under the Endangered Species Act. We evaluated these alternatives on their own merit, regardless of potential future requirements for consultation under the ESA. Any additional requirements through Section 7 of the ESA would be expected to provide added protection for critical habitats. Management of FS- and BLM-administered lands could strongly influence the status and distribution of steelhead, because 70 percent of strong subwatersheds and 59 percent of depressed ones are located on FS- or BLM-administered land (table 3.16). Approximately 19 percent of the depressed populations occur in wilderness areas. Because so few strong populations persist, virtually all subwatersheds that sustain wild and naturally reproducing steelhead should be considered critical habitats for biological reasons. Steelhead are dependent on habitats in both forested areas and rangelands and activities in both categories will affect populations.

Because of their extensive migrations and diverse life histories, steelhead and other anadromous fishes are influenced by Federal land management in spawning and rearing areas and migration corridors, and by a large number of other factors that operate outside of Federal lands in freshwater, estuaries, and the ocean environment. About 68 percent of the migration corridors between freshwater spawning and rearing habitats and the ocean lie on private or tribal lands (table 3.16). The quality and connectivity of habitats in both mainstem rivers and smaller watersheds will likely influence the strength and persistence of remaining steelhead populations (Lee and others, in press). Recent declines in steelhead stocks can be attributed primarily to the construction and operation of mainstem dams on the Columbia and Snake Rivers (CBFWA 1990, Raymond 1988). Because of mortalities associated with the dams (IDFG and others 1990; Raymond 1979, 1988), only the most productive populations may retain the resilience to persist in the face of natural and human caused disturbance (Lee and others, in press). Any changes in the environment that influence survival and productivity of remaining steelhead populations, including improvements in spawning and rearing habitats and reduced mortality from fishing, predation, and mainstem passage, will improve chances for persistence in variable environments (Emlen 1995). Simply put, under current conditions in migrant survival, many steelhead populations are at serious risk.

Table 3.25. Projected effects of the seven proposed alternatives on redband trout.

Will the Alternative:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1. Conserve strong populations in the central or core portions of the species' range?	No	Yes	Yes	Yes	No	Yes	Yes
2. Prevent declines in habitats or populations throughout the entire species' range?	No	No	Uncertain	Uncertain	No	Uncertain	No
— if "no", where are declines most likely to occur (on FS/BLM lands)?	Outside wilderness and other protected areas	Allopatric form outside INFISH[1] priority areas, and Range Cluster 6	Allopatric form outside INFISH[1] priority areas, and Range Cluster 6	Category 2 and 3, and Range Cluster 6	EEIS and Wood and Kootenai; Range Cluster 6	Category 2 and 3, and Range Cluster 6	Western portion of Range Cluster 6; Harney and Goose Lake subbasins
3. Help rebuild depressed populations by restoring habitats?	No	Yes	Yes	Yes	Yes	Yes	Yes
— if "yes", where?	Mixed results across species' range depending on intensity of riparian restoration and livestock management activities.						
What is the role of factors other than habitat?	Competition and introgression with introduced fishes can seriously threaten depressed populations, particularly in degraded habitats, and may undermine efforts to rebuild populations in good habitats.						

[1](INFISH) Inland Native Fish Strategy. 1995. Environmental Assessment: Decision Notice and Finding of No Significant Impact. Interim Strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, western Montana, and portions of Nevada. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service, Intermountain, Northern, and Pacific Northwest Regions. [irregular pagination].

The differences between populations that persist and those that are extirpated will be strongly influenced by the survival and productivity of the populations as they are influenced by freshwater spawning and rearing habitats. Without substantial improvement in migrant survival, conserving and restoring the quality of freshwater habitats may make an important difference in persistence for many of the remaining populations. In the short term, conservation and restoration of habitats directly associated with remaining populations will be most important. In the long term, assuming mainstem conditions are resolved, it will be necessary to conserve and restore broader networks to support the full expression of life histories and species (Lee and others, in press; Lichatowich and Mobrand 1995). To ensure persistence and rebuilding of stocks, conservation and restoration of habitat on Federal lands must work in concert with other factors affecting steelhead. Although conservation and restoration of freshwater habitats may make the critical difference in persistence of many stocks, such activities are not likely to substantially improve the distribution and abundance of steelhead without substantial improvements in survival outside of spawning and rearing areas.

In our analysis of alternatives for steelhead, we did not rely on the classification trees tied to road density to consider potential trends. As discussed earlier, the models were not as useful for predicting the likelihood of changes in the distribution of populations of anadromous salmonids as they were for resident salmonids (table 3.3). As Lee and others (in press) noted, there are several potential reasons why the models do not perform as well for the anadromous species. First, anadromous salmonids have extensive migrations and their widely-dispersed life stages, status, and distribution are influenced by factors within freshwater spawning and rearing areas, as well as by factors outside those areas. Although road density will influence the quality of freshwater spawning and rearing habitats, roads do not adequately reflect other factors (for example, mainstem passage, predation, harvest, and ocean conditions) that influence the survival of life stages that migrate from freshwater spawning and rearing habitats. Second, the model does not differentiate between wild and hatchery-supplemented anadromous fish stocks. In some heavily-disturbed subwatersheds with high road densities, remnant numbers of anadromous fish may be present only because of supplementation with hatchery-reared fish. Third, too few strong populations are present to relate their presence to road density. As a result, the classification trees do not adequately predict the influence of changes in road density across alternatives on the status of anadromous fish.

The scientific literature illustrates that the quality of freshwater spawning and rearing areas will influence the survival, condition, and distribution of juvenile anadromous salmonids (see for example Meehan 1991). There is little reason to anticipate that freshwater life stages of the anadromous forms will respond in substantively different ways than resident forms. Anadromous salmonids in many portions of the Basin overlap in distribution with resident salmonids including redband trout, bull trout, and westslope cutthroat trout. Consequently, models for resident salmonids may be useful surrogates for anadromous species during their freshwater spawning and rearing stages. We used results of the predictive models for these resident salmonids as additional information to consider the alternatives with regard to the status of steelhead.

Alternative 1—Management under Alternative 1 will likely contribute to continued declines in steelhead across their range. Although individual Forest plans may provide some levels of site-specific restoration and protection for important local steelhead stocks, this alternative lacks a consistent conservation and restoration approach. Steelhead populations within designated wilderness areas in central Idaho (UCRB area) should not be adversely affected by this alternative. Populations outside of wilderness areas, however, would likely be exposed to increased timber harvest and thinning activities (table 3.20) and road construction. The number of subwatersheds with

moderate and high numbers of roads is expected to increase and subwatersheds with no roads are expected to decrease (table 3.11). Results of the classification tree analysis for bull trout, redband trout, and westslope cutthroat trout suggest widespread declines in the frequency of both strong and depressed populations within the range of steelhead (table 3.4). Very little watershed restoration is planned under this alternative (table 3.20). Timber harvest and road construction would also increase within areas supporting what may be the last remaining genetically intact steelhead stocks in Forest Clusters 2 and 5. Within rangelands, Alternative 1 provides only modest improvements in livestock management and very little planned riparian restoration (table 3.20). Declines would likely be most pronounced in areas managed most intensively for timber and range commodity production.

Alternative 2—Important habitats currently supporting strong populations of steelhead are likely to be conserved under this alternative. Most populations would be provided increased protection through the maintenance of both the INFISH and PACFISH riparian strategies as well as relatively low levels of projected land-disturbing activities. In general, we anticipate that habitats for important remnant populations associated with Federal lands will be largely conserved in current conditions. Continued disruption of habitats may occur where land-disturbing activities are most concentrated in the commodity-emphasis areas of Forest Cluster 3 and are associated with portions of the northern and southern Cascades and the lower Snake and Salmon Rivers in the Columbia Plateau and Central Idaho Mountains. Reductions in some of the highest watershed road densities (table 3.11) and moderate levels of watershed restoration activity (table 3.20) should work to improve conditions for some of the depressed populations that may persist in degraded habitats outside of these areas. In general, we would not expect strong rebuilding of steelhead populations under this alternative. The projections of watersheds with low road densities (table 3.11) and the trends predicted by the classification models for bull trout and westslope cutthroat trout that tend to overlap distributions with steelhead, suggest little in the way of major habitat restoration that would lead to substantial rebuilding of depressed stocks in degraded environments.

Alternative 3—We anticipate mixed results for habitats supporting steelhead populations throughout the current distribution of this species under Alternative 3. The few strong populations remaining will benefit from the focus of ecosystem analysis and more restrictive riparian protection measures associated with PACFISH and INFISH. Those benefits may not translate widely in the remaining distribution. Moderate or high timber harvest and thinning activities are forecast for most of the range including both strong and depressed populations (table 3.20). An increase in watersheds with very low and low road densities and a reduction in watersheds with high or extreme road densities (table 3.11) indicate some mitigation of increased activity, but low or moderate levels of watershed restoration in spawning and rearing habitats and none in seasonal or corridor watersheds suggest that activities may be focused more heavily on road closures than on full restoration. Because so few strong steelhead populations remain, the application of ecosystem analysis (Category 1 or strong populations) may provide little benefit to many of the depressed populations. Steelhead habitats that overlap with the current strong distributions of bull trout and westslope cutthroat trout, or are found in the Section 7 watersheds (largely the Central Idaho Mountains and Northern Cascades) are likely to fair best under this alternative. We anticipate that the habitats supporting currently strong populations and perhaps an important portion of the depressed populations (primarily in Forest Categories 1 and 2) will be conserved or modestly strengthened under this alternative. The remaining part of the range is less likely to benefit under this alternative, and we would not anticipate a strong rebuilding of habitats that could support broadly increasing populations.

Alternative 4—We anticipate that this alternative will largely conserve the habitats for remaining strong populations of steelhead if watershed restoration and ecosystem analysis are effective at focusing and mitigating more intensive land management activities. Although combined timber harvest and thinning activities are anticipated to be moderate to high, positive changes in road densities (table 3.11) and some of the highest levels of watershed and riparian restoration across alternatives (table 3.20) could mitigate some of this risk. Additionally, the focus on ecosystem analysis in Category 1 watersheds and watersheds supporting strongholds for salmonids should allow activities to be focused with the least risk to critical habitats and perhaps with the benefit of extending and strengthening those distributions. Conservation or restoration of habitats across the distribution of depressed steelhead populations is less likely. Even though high levels of watershed and riparian restoration are predicted for much of the depressed distribution in watersheds that do not coincide with Category 1 or strongholds for other species, the lack of ecosystem analysis could mean that activities are focused ineffectively. The potential to benefit habitats through increased active restoration is important but we are uncertain whether it can be realized without detailed analysis and planning. The greatest benefits should be afforded to the strong populations found principally in the Blue Mountains and to depressed populations associated with Forest Cluster 1 in the Central Idaho Mountains. The greatest risks are likely associated with depressed populations in the Blue Mountains, Columbia Plateau, and Central Idaho Mountains associated with Forest Clusters 3, 4, and 5.

Alternative 5—Alternative 5 is not expected to conserve habitats supporting strong populations or prevent further declines in habitats for steelhead across much of the range. Although this alternative adequately conserves some remaining strongholds outside of commodity-emphasis areas, steelhead trout stocks that overlap commodity-emphasis areas in Forest Cluster 5 and Range Clusters 1 and 6 will be subject to land disturbance from timber harvest and livestock. Core areas outside of commodity-emphasis areas will be managed identically to Alternative 4. Within commodity-emphasis areas, standards provide little protection to riparian areas and minimal ecosystem analysis and there is no process to address cumulative watershed effects. High levels of harvest and thinning are not compensated by increased watershed restoration or road-density reductions (tables 3.11 and 3.20). Results of the predictive models suggest declines in the frequency of both strong and depressed populations of bull trout within the range of steelhead (table 3.8). Except for Alternatives 1 and 2, this alternative has the smallest reduction in high road densities (table 3.11).

Alternative 6—This alternative provides protection for the habitats supporting strong populations and much of the depressed distribution similar to that under Alternative 4. Because activity levels are lower and there is an emphasis on a more conservative and adaptive approach, we would anticipate similar benefits and perhaps fewer risks than under Alternative 4. Similar to Alternative 4, this alternative places special emphasis on subbasins that support strongholds or a Category 1 recognition. Because so few strongholds for steelhead remain, and because portions of the range may not overlap with other species or Category 1 watersheds, all remaining populations may not receive a conservation emphasis or the focus of ecosystem analysis. Timber harvest levels are generally low or moderate in most areas, so risks tend to be minimized and to some extent mitigated by positive changes in road densities, moderate levels of watershed restoration and high levels of riparian restoration (table 3.20). Some thinning in areas within Forest Clusters 2 and 6, supporting genetically intact populations, would occur. An emphasis on watershed restoration (table 3.20) and reduced road density (table 3.11) should particularly benefit Forest Clusters 2 and 5 that support all of the strong and most of the depressed populations. Results of the classification tree analysis for resident salmonids suggest a positive trend in the distribution of bull trout and westslope cutthroat trout in most subbasins within the range of steelhead (table 3.9).

Alternative 7—This alternative provides a system of reserves and very restricted management activities that should conserve much of the remaining distribution of steelhead. It may lead to some rebuilding of habitats in the reserve areas, but restoration of habitats in more degraded landscapes will be mixed, occurring more slowly in areas without active watershed restoration. This alternative identifies roadless reserves that will contain an important, but not dominant, part of the remaining, occupied steelhead habitats (table 3.11). With limited timber harvest and thinning activities (table 3.20), the combination of riparian habitat conservation requirements for ecosystem analysis and a cumulative effects process should conserve the current conditions of most habitats outside the reserves. The continued degradation of some watersheds with a legacy of past management, however, is unlikely to be mitigated with the limited watershed restoration activity. Results of the predictive models suggest positive trends in the frequency of both strong and depressed populations of bull trout and westslope cutthroat trout within the range of steelhead (table 3.10). Within rangelands, this alternative includes a major reduction (50%) in grazing, the largest increases in livestock management, and a moderate increase in active riparian restoration (table 3.20). These factors should benefit steelhead stocks in currently degraded rangeland habitats perhaps more strongly than those in degraded forest environments. Similar to the other alternatives, Alternative 7 does not identify depressed populations outside of strongholds for any special emphasis. Unlike the other alternatives, it is much more comprehensive in addressing the influence of other factors such as mining, transport and storage of toxic materials, and water transfers.

Summary—Steelhead have been extirpated from the majority of their historical range. Most remaining steelhead populations are depressed and the long-term persistence of remaining populations is highly uncertain. Because of high mortalities associated with dams and other factors in the ocean and migratory corridors, freshwater habitats may make the important difference between populations that persist and those that go extinct. Conservation or restoration of currently occupied habitats may be critical to the persistence of the remnant populations. All of the alternatives except Alternatives 1 and 5 are anticipated to conserve the habitats currently supporting strong populations (table 3.26). Although each of the alternatives will confer some protection for habitats supporting depressed populations, the results under all of the alternatives are likely to be mixed and uncertain. Alternatives 2 and 3 provide extended protection to steelhead habitats associated with the implementation of the PACFISH and INFISH conservation strategies but provide relatively little emphasis on habitat restoration. Alternatives 1, 3, 4 and 5 support high levels of timber harvest and thinning activities that represent increased risks for some populations. Although an increased emphasis on watershed restoration activities under these alternatives could mitigate much of the risk and provide important restoration of current and potential future habitats, the lack of a clear emphasis on ecosystem analysis outside of the Category 1 or stronghold watersheds makes that result uncertain. Alternative 6 is similar to Alternative 4 in this regard but the lower levels of land-disturbing activity, and the more conservative and adaptive approach could benefit populations across the range. Continuing declines are most likely under Alternatives 1 and 5 particularly in the commodity-emphasis areas outside Forest Clusters 1 and 2. Alternative 7 with the implementation of conservation reserves, reduced land-disturbing activities, and a restrictive riparian management strategy will likely conserve much of the remaining habitat. Some degraded habitats, however, may be restored more slowly or even decline further with limited emphasis on active restoration in Alternative 7. It is unlikely that any activities on Federal lands will result in strong rebuilding of steelhead populations without substantial improvements in other factors influencing these populations. If conditions outside spawning and rearing habitats remain poor, it is possible that many remaining stocks will continue to decline.

Table 3.26. Projected effects of the seven proposed alternatives on steelhead trout and stream-type chinook salmon.

Will the Alternative:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1. Conserve strong populations in the central or core portions of the species' range?	No	Yes	Uncertain	Yes	No	Yes	Yes
2. Prevent declines in habitats or populations throughout the entire species' range?	No	No	No	Uncertain	No	Yes	Uncertain
— if "no", where are declines most likely to occur (on FS/BLM lands)?	Outside of wilderness and other protected areas	Forest Cluster 3	Category 2 and 3 subbasins, Forest Cluster 5	Category 2 and 3 subbasins, Forest Clusters 3, 4, and 5	Category 2 and 3 subbasins, commodity-emphasis areas		Outside reserves in currently degraded watersheds
3. Help rebuild depressed populations by restoring habitats?	No	Yes	Yes	Yes	Yes	Yes	Yes
— if "yes", where?		*PACFISH*[1] priority watersheds	Category 1 subbasins, Forest Clusters 1 and 2			Mixed results across species' range	
What is the role of factors other than habitat?	The combined effects of hydropower operations, hatcheries, and harvest may limit increases in wild populations in areas where freshwater spawning and rearing habitats are restored. Similarly, protection of high-quality freshwater habitats will not guarantee population persistence without mitigation of other factors.						

[1](PACFISH) U.S. Department of Agriculture, Forest Service and U.S. Department of Interior, Bureau of Land Management. 1994. Draft environmental assessment. Interim strategies for managing anadromous fish-producing watersheds on Federal lands in eastern Oregon and Washington, Idaho, and portions of California. Washington DC: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior Bureau of Land Management. [irregular pagination].

Stream-type chinook salmon *(Oncorhynchus tshawytscha)*

Stream-type chinook salmon formerly occupied approximately 45 percent of the subwatersheds in the Basin and were found within both the UCRB and EEIS planning areas. Stream-type chinook salmon are extirpated in about 72 percent of the historical range, primarily as a result of blocked access to historical habitats. Remaining chinook salmon stocks are extremely depressed. Few healthy populations persist in the current range; less than 1 percent of the subwatersheds support strong populations. Wild fish, unaltered by hatchery introgression, are likely found in only 4 percent of the historical range. Snake River stocks of stream-type chinook salmon are currently listed as a threatened species under the Federal ESA. We evaluated these alternatives on their own merits, regardless of future requirements for consultation under the ESA. Additional requirements through Section 7 of the ESA would be expected to provide added protection for critical habitats. Management of FS- and BLM-administered lands affects 88 percent of subwatersheds with strong populations of stream-type chinook, and 72 percent of subwatersheds with depressed populations (table 3.17). Approximately 38 percent of the strong and 23 percent of the depressed populations occur in wilderness areas. Because so few strong populations persist, virtually all subwatersheds that sustain wild and naturally-reproducing stream-type chinook salmon should be considered critical habitats. Chinook salmon are dependent on habitats in both forestland and rangeland areas; activities in either category will affect populations.

Because of their anadromous life history, stream-type chinook salmon are affected by Federal land management in migration corridors and spawning and rearing areas, and by other factors that operate outside of Federal lands in freshwater, estuaries, and the ocean environment. Approximately 64 percent of the migration corridors between freshwater spawning and rearing habitats and the ocean lie on private or tribal lands. Restoration of habitats and habitat connectivity in both mainstem rivers and subbasins may be important for stream-type chinook salmon stocks to persist (Lee and others, in press). Recent declines in stream-type chinook salmon stocks can be attributed primarily to the construction and operation of mainstem dams on the Columbia and Snake Rivers (CBFWA 1990, Raymond 1988). Due to passage mortalities associated with the dams (IDFG and others 1990; Raymond 1979, 1988), only the most productive populations may retain the resilience to persist in the face of natural and human-caused disturbance. Any changes in the environment that influence survival and productivity of remaining stream-type chinook salmon stocks, including improvements in spawning and rearing habitats and reduced mortality from fishing, predation, and mainstem passage, will improve chances for persistence in stochastic environments (Emlen 1995). Simply put, under current conditions in migrant survival, many stocks are at serious risk. The differences between chinook populations that persist and those that are extirpated may depend on their survival and productivity in freshwater spawning and rearing habitats. Without substantial improvement in migrant survival, conserving and restoring the quality of freshwater habitats may make an important difference in persistence for many populations. In the longer term, assuming mainstem conditions are resolved, it will be necessary to conserve and restore broader habitat networks to support the full expression of life histories and species (Lee and others, in press; Lichatowich and Mobrand 1995).

To ensure population persistence and rebuilding, conservation and restoration of Federal-land habitat must work in concert with other factors affecting stream-type chinook salmon. Although conservation and restoration of freshwater habitats may be critical to stock persistence, such efforts are unlikely to improve the distribution and abundance of stream-type chinook salmon without substantial improvements in survival outside of spawning and rearing areas.

As described previously for steelhead trout, classification trees for predicting the likelihood of changes in the distribution of strong populations of chinook salmon were not sensitive to changes in road density as they were for resident salmonids. Similar to steelhead, models for resident salmonids may be useful surrogates for stream-type chinook salmon during their freshwater spawning and rearing stages. We used results of the classification trees for redband trout, bull trout, and westslope cutthroat trout to provide additional information when considering the effects of each alternative on stream-type chinook salmon. Results of the alternative evaluation for chinook are similar to those for steelhead. Stream-type chinook salmon tend to occupy larger streams and are more depressed than are most steelhead stocks.

Alternative 1—Alternative 1 will likely contribute to continued declines in stream-type chinook salmon within spawning and rearing areas and migration corridors across their range. Although individual Forest plans may provide some levels of site-specific restoration and protection for local stocks, this alternative lacks a consistent conservation and restoration approach. Stream-type chinook salmon populations within designated wilderness in central Idaho (UCRB area) should not be adversely affected by this alternative. Populations outside of wilderness, however, will be affected by increased timber harvest and thinning activities and increased road construction (table 3.20). The number of subwatersheds with moderate and high numbers of roads is expected to increase (table 3.11). Very little watershed restoration is planned under this alternative (table 3.20). Timber harvest and road construction will also increase within areas supporting what may be the last remaining genetically intact stocks in Forest Clusters 2 and 5. Within rangelands, Alternative 1 has only modest improvements in livestock management and very little planned riparian restoration (table 3.20). Declines will likely be most pronounced in areas managed most intensively for timber and range commodity production.

Alternative 2—Alternative 2 will likely protect the few remaining strong populations of stream-type chinook salmon, but is unlikely to prevent declines in other portions of the species's range or to help rebuild depressed populations in areas with degraded habitat outside of PACFISH priority watersheds. Although increased protection of watersheds may be provided, land-disturbing activities will continue throughout much of the range and there is little emphasis on restoration of degraded areas. Increased protection is included under the application of PACFISH guidelines that would require watershed analysis if standards were to be altered. Land-disturbing activities including harvest and thinning are relatively low (table 3.20). Low levels of timber harvest and moderate thinning activities would occur in Forest Cluster 5, which supports all of the remaining strong stream-type chinook salmon populations and offsets some by moderate levels of road reduction (reducing high and extremely high road densities). Basin-wide, there is essentially no expected change in the number of unroaded to low road-density subwatersheds (table 3.11). Alternative 2 identifies riparian areas and landslide-prone areas, but populations or habitats that may require special emphasis are not identified. There is also a lack of emphasis on restoration of depressed habitats. In rangelands, there is little emphasis on riparian restoration and increases in livestock management would occur (table 3.20). Consequently, currently degraded habitats may not receive the restoration effort needed to reverse population declines.

Alternative 3—We are uncertain whether Alternative 3 will conserve remaining strong populations, and do not expect it to prevent further declines in populations of stream-type chinook salmon. Limited restoration of degraded habitats in some areas is expected. Since Forest Cluster 5 supports all of the remaining strong populations (table 3.19) and many of the wild populations without hatchery influence, activities within this cluster are particularly important. Moderate levels of timber harvest and high levels of thinning are planned for Forest Cluster 5 under this alternative.

These activities are offset some by moderate levels of road reduction, but only a low level of watershed restoration is planned. While increased watershed protection is provided under the application of PACFISH guidelines and ecosystem analysis in subwatersheds with strong populations, it is uncertain whether there will be sufficient emphasis on restoring and protecting habitats across entire subbasins within Forest Cluster 5 to prevent further declines of population strongholds. We are concerned that subwatersheds which currently support strong populations may become more isolated and fragmented by activities occurring upstream and in adjacent subwatersheds that are not provided the same level of protection. Because chinook tend to spawn in larger streams, spawning conditions may be influenced by the cumulative effect of activities in multiple watersheds. In Forest Clusters 1 and 2, which represent much of the best remaining habitats for stream-type chinook, low levels of harvest and moderate levels of watershed restoration should help to protect high-quality habitats and restore degraded conditions on Federal lands within central Idaho and the northern Cascades.

Alternative 4—Alternative 4 can conserve strong populations, prevent further declines in habitats and populations, and help rebuild depressed populations in degraded areas—but only if watershed restoration is effective in improving habitat conditions. Although this alternative emphasizes active management to restore degraded areas, there are risks associated with land-disturbing activities. Levels of timber harvest and thinning are higher than in most other alternatives (table 3.20). There are moderate timber harvest and thinning activities in Forest Clusters 3 and 5, which are offset by moderate levels of watershed restoration and moderate and high levels of road reduction. This alternative has a system of RMAs with stronger requirements for ecosystem analysis and slope-adjusted RMA widths. Increased emphasis on watershed restoration and reduced road densities (table 3.11) potentially could improve habitat conditions throughout most of the species' range. Restoration activities could negatively affect habitats and negate the benefits, however, if not closely monitored to ensure effectiveness. Benefits seem most assured in Forest Clusters 1 and 2, which have lower levels of harvest and thinning activities. In rangelands, Alternative 4 has a moderate increase in livestock management and a large increase in riparian restoration (table 3.20).

Alternative 5—Alternative 5 is not expected to conserve strong populations or prevent further declines in habitats or populations of stream-type chinook salmon stocks. Although this alternative adequately protects populations outside of commodity-emphasis areas, stream-type chinook salmon overlap commodity-emphasis areas in Forest Cluster 5 and Range Clusters 1 and 6 and will be subject to moderate to high land disturbance from timber harvest and livestock. Areas outside of commodity-emphasis areas, such as Forest Clusters 1 and 2, will be managed similarly to Alternative 4 and will see similar benefits. Within commodity-emphasis areas, standards provide little protection of riparian areas and minimal ecosystem analysis and there is no process to address cumulative watershed effects. High levels of harvest and thinning are not compensated by increased watershed restoration or road-density reductions (table 3.20). Except for Alternatives 1 and 2, this alternative has the smallest reduction in high road densities (table 3.11).

Alternative 6—Alternative 6 protects strong populations and applies a conservative and adaptive approach to restoration that should benefit stream-type chinook salmon stocks throughout their range. Similar to Alternative 4, this alternative places special emphasis on Category 1 subbasins and subwatersheds that support strong populations. Because so few strongholds for stream-type chinook salmon remain, however, many core areas that support depressed populations do not receive a conservation emphasis. Timber harvest levels are low in most areas so risks are minimized (table 3.20). Under Alternative 6 there would be some thinning in areas within Forest Clusters 2 and 6 that support genetically intact populations. This alternative has a system of RMAs with

stronger requirements for ecosystem analysis, and requirements are adjusted based on slope. Moderate levels of watershed restoration and extensive reductions in road densities (table 3.11) should benefit stream-type chinook throughout their range. In rangelands, Alternative 6 has increased livestock management and a large increase in riparian restoration (table 3.20).

Alternative 7—Alternative 7 provides a system of reserves to conserve core areas and restrictive RMAs that should protect strong populations, but depressed populations in currently degraded habitats outside of reserves may continue to decline. Although restoration activities are low, land-disturbing activities are also minimal. Alternative 7 identifies special-emphasis areas as 1,000-acre (405 ha) roadless reserves that will contain the best remaining habitats and strongest populations. This approach will overlook some core populations in degraded habitats. Despite this problem, the combination of RHCAs, requirements for ecosystem analysis, and a cumulative effects process should conserve most core areas. This alternative has the lowest level of timber harvest and thinning (table 3.20). However, some thinning would occur within areas of high genetic integrity in Forest Cluster 5. Although restoration is not emphasized, reduced human disturbance coupled with reductions in road densities (table 3.11) should benefit depressed populations. Within rangelands, this alternative includes a 50 percent reduction in AUMs, the largest increases in livestock management, and a moderate increase in active riparian restoration (table 3.20). These factors should benefit stream-type chinook salmon stocks in currently degraded rangeland habitats. Similar to other alternatives, it does not identify at-risk populations outside of strongholds. Unlike the other alternatives, it is much more comprehensive in addressing the influence of other factors such as mining, transport and storage of toxic materials, and water transfers.

Summary—Most remaining stream-type chinook salmon populations are depressed and strong populations are rare. In the absence of strong populations, subwatersheds that retain high genetic integrity and those supporting naturally reproducing populations should be considered critical habitats. As with steelhead trout, until passage mortalities associated with the hydroelectric system in the mainstem migration corridors and other factors outside Federal lands are resolved, the resilience and persistence of stream-type chinook salmon stocks will be largely dependent on the quality of freshwater habitats (Lee and others, in press). High-quality spawning and rearing habitats can increase the likelihood that stocks will persist in stochastic environments (Emlen 1995). As a result, aggressive and extensive protection and restoration of spawning and rearing habitat will be needed to retain stock resilience. Alternative 1 will likely contribute to continued declines in stream-type chinook salmon within spawning and rearing areas and migration corridors across their range (table 3.26). Alternative 2 will likely protect the few remaining strong populations, but is unlikely to prevent declines in other portions of the species' range or to help rebuild depressed populations in areas with degraded habitat. We are uncertain whether Alternative 3 will conserve remaining strong populations, and do not expect it to prevent further declines. Alternative 4 can conserve strong populations, prevent further declines in habitats and populations, and help rebuild depressed populations in degraded areas—but only if watershed restoration is effective in improving habitat conditions. Alternative 5 is not expected to conserve remaining strong populations or prevent further declines in populations, though they may help rebuild some depressed populations. Alternative 6 is similar to Alternative 4, but applies a more conservative and adaptive approach to restoration that should benefit stream-type chinook salmon stocks throughout their range. Alternative 7 provides a system of reserves to conserve core areas and restrictive RMAs that should protect strong populations, but depressed populations in currently degraded habitats outside of reserves may continue to decline. With the exception of Alternative 7, none of the alternatives address effects other than timber and livestock-based activities. Moreover, none of the alternatives address the needs and

opportunities for restoring habitat conditions outside Federal lands, nor do they address the need for a comprehensive approach to restoring stream-type chinook salmon habitat and alleviating causes of mortality in freshwater spawning and rearing areas, migration corridors, estuaries, and the ocean. Without a comprehensive approach, even those alternatives that most benefit stream-type chinook salmon could not be expected to ensure persistence.

Ocean-type chinook *(Oncorhynchus tshawytscha)*

Ocean-type chinook salmon formerly occupied about 7 percent of the subwatersheds in the Basin and were found primarily in mainstem reaches of the Snake and Columbia Rivers within the UCRB and EEIS planning areas. The species occurred in six ERUs and was present in the fewest subwatersheds of any of the seven key salmonids. Ocean-type chinook salmon are extinct in approximately 70 percent of the historical range, primarily as a result of blocked access to historical habitats. Remaining ocean-type chinook salmon stocks are depressed and at risk. Few healthy populations persist in the current range; 15 percent of the subwatersheds support strong populations and all of these are within the lower mainstem and mid-Columbia Rivers. Wild fish, unaltered by hatchery stocks, are rare and present in 5 percent of the historical range. Ocean-type chinook salmon stocks in the UCRB area are severely depressed and stocks in the Snake River are listed as a threatened species under the Endangered Species Act. As with steelhead and stream-type chinook salmon, we evaluated the alternatives on their own merits, regardless of future requirements for consultation under the ESA. Additional requirements under Section 7 of the Endangered Species Act would be expected to provide added protection of critical habitats. Management of FS- and BLM-administered lands will have a relatively minor influence on ocean-type chinook salmon populations; 14 percent of strong populations and 22 percent of depressed populations are on federally administered land (table 3.18). Approximately 10 percent of the depressed populations are in wilderness areas.

The effects of Federal land management on ocean-type chinook salmon are less direct than on steelhead trout and stream-type chinook, because ocean-type chinook depend on lower-elevation, mainstem river habitats. The species is proportionally more affected by a large number of other factors that operate outside of Federal lands in freshwater, estuaries, and the ocean environment. All of the migration corridors between freshwater spawning and rearing habitats and the ocean lie on private or tribal lands. Restoration of habitats and habitat connectivity in mainstem rivers will be necessary for ocean-type chinook salmon stocks to persist. Recent declines in ocean-type chinook salmon stocks can be attributed primarily to the construction and operation of mainstem dams on the Columbia and Snake Rivers (CBFWA 1990). With some exceptions, the resilience and persistence of ocean-type chinook salmon stocks will be largely dependent on the quality and diversity of mainstem habitats outside of Federal lands. For ocean-type chinook salmon to persist, the combination of factors that influence stocks over space and time needs to be addressed simultaneously.

Within the UCRB area, wild and naturally spawning stocks of ocean-type chinook salmon will require aggressive and extensive protection and restoration of mainstem spawning and rearing habitat and migration corridors to improve the likelihood of persistence. Management of Federal lands does not unilaterally influence the quality of most mainstem habitats, primarily because mainstem areas are profoundly influenced by activities outside of Federal lands. Mainstem areas might benefit from land management activities that substantially reduce sediment and ensure an abundant supply of water with suitable chemical and physical characteristics during key life history stages. In many cases, however, waters from Federal lands are obstructed and altered by dams and impoundments in their lower elevations. Federal land management does influence mainstem river conditions where tributaries enter mainstems directly.

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In contrast, ocean-type chinook salmon stocks in the lower and mid-Columbia River areas of the EEIS area are relatively strong, though much of their range has been lost due to hydroelectric development and many stocks are heavily influenced by hatcheries.

As a result of the considerations described above, none of the alternatives would be expected to meet the habitat needs of the ocean-type chinook salmon, manage perceived threats, nor ensure persistence of the populations. Alternatives 6 and 7 have the most conservative approach to conserving and restoring watersheds. These alternatives might result in some benefit to ocean-type chinook salmon if actions tend to improve water quality and quantity on Federal lands through reductions in road densities, reduced timber harvest, reduced grazing, and adequate protection of RHCAs and RMAs (tables 3.11 and 3.20). It is uncertain if these effects would be sufficient to improve population persistence, however. The remainder of the alternatives (that is, Alternatives 1-5) would likely not benefit ocean-type chinook salmon because these alternatives continue land-disturbing activities and do not emphasize restoration of degraded mainstem habitats. In summary, none of the alternatives can be expected to ensure the persistence of ocean-type chinook salmon, and two have uncertain benefits. To ensure persistence, a comprehensive approach is needed that addresses the myriad factors that affect the species, both on and off of Federal lands.

Step 3: Evaluation of Effects on Sensitive Species

General Assumptions and Information Base

We made three general assumptions in addition to those mentioned above:

1. Management strategies for sensitive fishes with restricted, narrowly endemic distributions are more appropriately described at a fine scale involving site-specific agreements and local land-use planning. Analyses of strategies at the broader scale, such as the ICBEMP preliminary draft EIS alternatives, are inappropriate for such species.
2. Nothing is designed or implied in the preliminary draft EIS alternatives that precludes or nullifies management agreements, recovery plans, biological opinions, or other documents that provide site-specific or species-specific strategies for sensitive, endemic taxa. In other words, whatever protections that are in place for sensitive species at local planning levels will remain in effect and applicable provisions contained in preliminary draft EIS alternatives will only add to existing measures, not substitute for them.
3. Species listed as threatened or endangered pursuant to the Endangered Species Act receive protection through Section 7 requirements, existing biological opinions, and critical habitat designations despite which preliminary draft EIS alternative is chosen.

To aid in our evaluation, we prepared summary tables, similar to those prepared for the key salmonids, that show levels of activity within the reported range of each species (table 3.27), mean values for selected variables across the historical and current range (table 3.28), and ownership and management designations (table 3.29). The effects of alternatives on 18 rare and sensitive fishes are summarized in table 3.30 by rating their ability to provide sufficient protection to halt further declines.

Pacific lamprey *(Lampetra tridentata)*

The distributional data for Pacific lamprey spawning and rearing areas are lacking in some regions. In general, our knowledge of this species precludes evaluation except that we believe juvenile steelhead approximate the distribution and habitat requirements of Pacific lamprey. We assume that the evaluation of alternatives for steelhead would serve as an appropriate proxy for Pacific lamprey.

Table 3.27. Forest and range management activities and distribution of select sensitive species. Estimates represent the percentage of the reported distribution predicted to experience the activity per decade. Estimates are based on the allocation of activities for alternatives in the preliminary draft EISs, and on the distributions of sensitive species as defined in Lee and others (1996).

		Forest Activity				Range Activity	
Species	Alt.	Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Pacific lamprey	1	6.6	3.0	1.2	2.0	6.4	1.2
	2	2.7	2.3	2.3	2.0	12.0	1.2
	3	4.8	4.0	2.3	4.0	11.7	18.2
	4	4.8	5.1	3.7	7.3	12.0	37.2
	5	4.8	4.6	3.2	5.5	10.5	20.6
	6	2.0	4.5	3.2	6.7	12.3	24.7
	7	1.6	2.3	1.2	3.3	15.7	10.2
Pit-Klamath brook lamprey	1	9.0	4.5	1.5	2.5	7.3	1.2
	2	2.3	4.3	1.7	2.5	14.0	1.2
	3	7.0	6.8	1.7	2.8	14.0	27.5
	4	7.0	7.0	4.0	9.8	14.0	38.0
	5	7.0	7.0	4.0	7.0	12.3	11.7
	6	2.5	6.8	4.0	9.8	14.0	11.7
	7	2.0	4.3	1.5	2.8	16.0	1.2
Lahontan cutthroat trout	1	0.0	0.0	0.0	0.0	3.0	1.2
	2	0.0	0.0	0.0	0.0	9.0	1.2
	3	0.0	0.0	0.0	0.0	3.0	38.0
	4	0.0	0.0	0.0	0.0	9.0	38.0
	5	0.0	0.0	0.0	0.0	9.0	38.0
	6	0.0	0.0	0.0	0.0	16.0	38.0
	7	0.0	0.0	0.0	0.0	16.0	1.2
Pygymy whitefish	1	6.6	3.3	1.5	2.5	8.1	0.8
	2	4.4	2.7	2.8	2.5	11.1	0.8
	3	5.2	4.8	2.8	4.8	11.1	16.8
	4	5.2	5.3	3.8	7.9	11.1	26.4
	5	6.8	5.1	2.8	3.9	11.1	0.8
	6	4.3	4.8	3.8	7.0	11.1	10.4
	7	2.0	1.5	1.5	5.6	11.1	0.8
Oregon Lakes tui chub	1	9.0	4.5	1.5	2.5	3.0	1.2
	2	2.0	4.5	1.5	2.5	9.0	1.2
	3	7.0	7.0	1.5	2.5	9.0	38.0
	4	7.0	7.0	4.0	10.0	9.0	38.0
	5	7.0	7.0	4.0	7.0	9.0	38.0
	6	2.5	7.0	4.0	10.0	9.0	38.0
	7	2.0	4.5	1.5	2.5	16.0	38.0
Leatherside chub	1	0.9	0.2	0.2	0.4	3.9	1.2
	2	0.3	0.2	0.2	0.4	10.1	1.2
	3	0.4	1.1	0.2	0.4	7.8	38.0
	4	0.4	1.1	0.2	1.1	10.1	38.0
	5	1.1	0.7	0.2	1.1	10.1	32.3
	6	0.4	1.1	0.2	1.1	12.8	32.3
	7	0.3	0.2	0.2	1.1	16.0	18.2

Table 3.27 (continued)

Species	Alt.	Forest Activity				Range Activity	
		Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Lost River sucker	1	9.0	4.5	1.5	2.5	8.3	1.2
	2	4.0	3.0	2.8	2.5	15.1	1.2
	3	7.0	5.8	2.8	4.8	15.1	33.4
	4	7.0	7.0	4.0	8.5	15.1	38.0
	5	7.0	7.0	4.0	7.0	14.4	5.8
	6	2.5	5.8	4.0	8.5	15.1	5.8
	7	2.0	3.0	1.5	4.8	16.0	1.2
Warner sucker	1	0.0	0.0	0.0	0.0	3.0	1.2
	2	0.0	0.0	0.0	0.0	9.0	1.2
	3	0.0	0.0	0.0	0.0	9.0	38.0
	4	0.0	0.0	0.0	0.0	9.0	38.0
	5	0.0	0.0	0.0	0.0	9.0	38.0
	6	0.0	0.0	0.0	0.0	9.0	38.0
	7	0.0	0.0	0.0	0.0	16.0	38.0
Goose Lake sucker	1	9.0	4.5	1.5	2.5	3.0	1.2
	2	2.0	4.5	1.5	2.5	9.0	1.2
	3	7.0	7.0	1.5	2.5	9.0	1.2
	4	7.0	7.0	4.0	10.0	9.0	38.0
	5	7.0	7.0	4.0	7.0	3.0	38.0
	6	2.5	7.0	4.0	10.0	9.0	38.0
	7	2.0	4.5	1.5	2.5	16.0	1.2
Shortnose sucker	1	9.0	4.5	1.5	2.5	8.1	1.2
	2	3.0	3.8	2.1	2.5	15.0	1.2
	3	7.0	6.4	2.1	3.6	15.0	32.5
	4	7.0	7.0	4.0	9.3	15.0	38.0
	5	7.0	7.0	4.0	7.0	14.1	6.7
	6	2.5	6.4	4.0	9.3	15.0	6.7
	7	2.0	3.8	1.5	3.6	16.0	1.2
Klamath largescale sucker	1	9.0	4.5	1.5	2.5	6.6	1.2
	2	2.6	4.0	1.9	2.5	13.2	1.2
	3	7.0	6.6	1.9	3.2	13.2	23.1
	4	7.0	7.0	4.0	9.5	13.2	38.0
	5	7.0	7.0	4.0	7.0	10.7	16.2
	6	2.5	6.6	4.0	9.5	13.2	16.2
	7	2.0	4.0	1.5	3.2	16.0	1.2
Wood River bridgelip sucker	1	2.4	0.6	0.6	1.0	3.0	1.2
	2	0.8	0.6	0.6	1.0	9.0	1.2
	3	1.0	2.8	0.6	1.0	9.0	38.0
	4	1.0	2.8	0.6	2.8	9.0	38.0
	5	2.8	1.8	0.6	2.8	9.0	38.0
	6	1.0	2.8	0.6	2.8	9.0	38.0
	7	0.8	0.6	0.6	2.8	16.0	38.0

Table 3.27 (continued)

Species	Alt.	Forest Activity				Range Activity	
		Harvest	Thinning	Watershed Restoration	Prescribed Burning	Livestock Management	Riparian Restoration
Torrent sculpin	1	7.3	3.6	1.2	2.1	3.4	0.8
	2	4.1	3.2	1.6	2.1	7.5	0.8
	3	5.7	5.4	1.6	2.7	7.0	15.5
	4	5.7	5.8	3.2	6.3	7.5	24.1
	5	7.2	5.7	2.0	3.6	7.0	14.7
	6	4.2	5.4	3.2	6.3	8.0	14.7
	7	1.6	1.8	1.2	5.0	10.1	8.9
Shorthead sculpin	1	6.3	3.1	1.4	2.3	3.9	0.8
	2	3.2	2.9	2.2	2.3	7.8	0.8
	3	4.8	4.7	2.2	3.7	6.8	20.2
	4	4.8	5.0	3.6	7.8	7.8	24.3
	5	6.0	4.7	2.7	4.1	7.3	13.5
	6	3.6	4.9	3.4	7.0	9.0	14.6
	7	1.8	2.0	1.4	4.1	10.2	4.3
Slender sculpin	1	9.0	4.5	1.5	2.5	9.0	1.2
	2	3.3	3.5	2.3	2.5	16.0	1.2
	3	7.0	6.2	2.3	4.0	16.0	38.0
	4	7.0	7.0	4.0	9.0	16.0	38.0
	5	7.0	7.0	4.0	7.0	16.0	1.2
	6	2.5	6.2	4.0	9.0	16.0	1.2
	7	2.0	3.5	1.5	4.0	16.0	1.2
Margined sculpin	1	3.5	1.8	0.6	1.0	3.0	1.2
	2	0.8	1.8	0.6	1.0	9.0	1.2
	3	2.7	2.7	0.6	1.0	9.0	1.2
	4	2.7	2.7	1.6	3.9	9.0	38.0
	5	2.7	2.7	1.6	2.7	9.0	38.0
	6	1.0	2.7	1.6	3.9	9.0	38.0
	7	0.8	1.8	0.6	1.0	16.0	38.0
Wood River sculpin	1	3.4	0.8	0.8	1.4	3.0	1.2
	2	1.1	0.8	0.8	1.4	9.0	1.2
	3	1.4	3.9	0.8	1.4	9.0	38.0
	4	1.4	3.9	0.8	3.9	9.0	38.0
	5	3.9	2.5	0.8	3.9	9.0	38.0
	6	1.4	3.9	0.8	3.9	9.0	38.0
	7	1.1	0.8	0.8	3.9	16.0	38.0
Malheur sculpin	1	2.7	1.4	0.5	0.8	3.0	1.2
	2	0.6	1.4	0.5	0.8	9.0	1.2
	3	2.1	2.1	0.5	0.8	9.0	38.0
	4	2.1	2.1	1.2	3.0	9.0	38.0
	5	2.1	2.1	1.2	2.1	9.0	38.0
	6	0.8	2.1	1.2	3.0	9.0	38.0
	7	0.6	1.4	0.5	0.8	16.0	38.0

Table 3.28. Means for landscape variables associated with the historical range of 17 select sensitive species. The species' distributions and the summary of landscape variables are as defined in Lee and others (1996).

Species	Range	Number of watersheds	Variables								
			anadac[1]	dampass[2]	drnden[3]	elev[4]	mtemp[5]	pprecip[6]	rdmean07	slope[8]	hucorder[9]
Goose Lake sucker	historical	11	0	0	1.15	5400	6.59	531	2.4	12.1	4.1
	current absent	4	0	0	0.98	5240	6.74	519	1.7	10.9	8.4
	current present	7	0	0	1.22	5476	6.53	536	2.8	12.6	2.1
Klamath largescale sucker	historical	39	0	0	0.61	4912	6.41	565	2.9	9.0	19.1
	current absent	7	0	0	0.78	5184	5.83	520	3.2	8.6	7.3
	current present	32	0	0	0.57	4846	6.55	577	2.9	9.0	22.0
Warner sucker	historical	20	0	0	1.09	5321	6.84	431	1.3	8.9	7.4
	current absent	12	0	0	1.11	5371	6.64	446	1.3	8.1	2.6
	current present	8	0	0	1.07	5259	7.07	411	1.2	10.0	13.4
Short nose sucker	historical	26	0	0	0.58	4837	6.61	538	2.8	9.3	25.5
	current absent	7	0	0	0.26	4535	7.75	394	2.6	8.8	24.9
	current present	19	0	0	0.64	4885	6.43	561	2.9	9.3	25.6
Lost River sucker	historical	13	0	0	0.48	4674	7.08	488	2.5	9.8	27.1
	current absent	6	0	0	0.44	4718	7.53	419	2.6	8.1	15.9
	current present	7	0	0	0.51	4641	6.73	542	2.4	11.0	35.7
Malheuer sucker	historical	43	0	0	1.09	4924	6.52	386	1.8	8.2	12.1
	current absent	10	0	0	1.01	5006	7.05	418	1.4	9.0	14.9
	current present	33	0	0	1.13	4885	6.27	370	2.0	7.8	10.7
Shorthead sculpin	historical	784	0.49	3.11	1.23	4718	5.24	753	1.5	20.1	49.6
	current absent	712	0.53	3.35	1.24	4697	5.30	744	1.4	20.1	53.2
	current present	72	0.15	0.77	1.18	4915	4.73	840	1.9	20.6	15.1
Wood River sculpin	historical	34	0	0	1.27	5724	4.58	441	1.2	15.3	12.9
	current absent	9	0	0	1.14	4725	5.64	348	1.7	7.4	18.4
	current present	25	0	0	1.32	6183	4.24	484	1.0	18.9	10.3
Margined sculpin	historical	37	0.81	4.25	1.28	2178	9.22	536	1.2	13.1	80.8
	current absent	19	0.82	3.93	1.27	1891	9.75	487	1.0	12.5	158.4
	current present	18	0.81	4.55	1.29	2441	8.74	580	1.4	13.6	9.7
Torrent sculpin	historical	459	0.53	3.29	1.17	3890	6.34	680	1.7	17.8	258.3
	current absent	369	0.57	3.68	1.19	3947	6.31	673	1.6	17.8	259.5
	current present	90	0.38	1.95	1.11	3689	6.43	703	2.0	17.7	253.9

Table 3.28 (continued)

Species	Range	Number of watersheds	Variables								
			anadac[1]	dampass[2]	drnden[3]	elev[4]	mtemp[5]	pprecip[6]	rdmean0[7]	slope[8]	hucorder[9]
Slender sculpin	historical	13	0	0	0.63	4830	6.33	542	2.9	9.8	30.9
	current absent	5	0	0	0.65	4729	6.66	282	3.4	9.7	15.1
	current present	8	0	0	0.62	4873	6.20	650	2.7	9.8	37.5
Oregon Lakes tui chub	historical	3	0	0	0.96	4835	7.41	389	1.2	10.3	14.7
	current absent	0	—	—	—	—	—	—	—	—	—
	current present	3	0	0	0.96	4835	7.41	389	1.2	10.3	14.7
Leatherside chub	historical	115	0	0	1.25	6026	5.02	512	0.9	13.4	53.6
	current absent	102	0	0	1.25	6124	4.93	529	0.9	13.8	58.3
	current present	13	0	0	1.21	5285	5.95	389	1.3	10.8	17.5
Pit-Klamath brook lamprey	historical	14	0	0	0.93	5146	6.01	618	3.1	9.3	15.8
	current absent	0	—	—	—	—	—	—	—	—	—
	current present	14	0	0	0.93	5146	6.01	618	3.1	9.3	15.8
Pacific lamprey	historical	1317	0.53	3.27	1.23	4295	6.46	588	1.4	17.1	156.9
	current absent	1132	0.46	2.99	1.25	4440	6.35	593	1.4	16.7	91.2
	current present	185	0.91	4.78	1.13	3511	7.06	562	1.5	19.2	512.3
Lahontan cutthroat trout	historical	8	0	0	1.23	5286	7.82	305	0.6	11.2	5.3
	current absent	6	0	0	1.18	5153	7.90	300	0.7	10.7	6.1
	current present	2	0	0	1.44	5853	7.47	326	0.3	13.1	2.2
Pygmy whitefish	historical	34	0	0	0.96	3558	5.57	809	1.7	19.2	321.0
	current absent	11	0	0	0.86	2772	6.81	542	1.7	18.2	714.4
	current present	23	0	0	1.02	3953	4.94	943	1.8	19.8	123.4

[1]anadac – access for anadromous fish (0 = no; 1 = yes).

[2]dampass – number of intervening dams.

[3]drnden – drainage density (mi/mi^2).

[4]elev – mean elevation (ft).

[5]mtemp – mean annual temperature.

[6]pprecip – mean annual precipitation.

[7]rdmean0 – mean road density.

[8]slope – area weighted average midslope.

[9]hucoder – number of upstream 6th-code hydrologic units.

Table 3.29. Summary of current reported distributions of 17 select sensitive species versus ownership and land management designation for each watershed. The data represent a summary of the assemblage database by management cluster as defined in Lee and others (1996).

Species	Range	Number of watersheds	Management Clusters[1]									
			BR	FG	FH	FM	FW	NP	PA	PF	PR	TL
Goose Lake sucker	historical	11	0	0	0.320	0	0	0	0.140	0.520	0.027	0
	current absent	4	0	0	0.310	0	0	0	0.430	0.250	0.000	0
	current present	7	0	0	0.320	0	0	0	0.000	0.640	0.040	0
Klamath largescale sucker	historical	39	0.027	0.006	0.300	0.037	0.016	0	0.052	0.54	0.019	0
	current absent	7	0	0	0.440	0	0	0	0.036	0.52	0	0
	current present	32	0.033	0.008	0.270	0.046	0.020	0	0.056	0.54	0.024	0
Warner sucker	historical	20	0.690	0	0.056	0	0	0	0	0.019	0.210	0
	current absent	12	0.800	0	0.100	0	0	0	0	0.035	0.063	0
	current present	8	0.550	0	0	0	0	0	0	0	0.400	0
Shortnose sculpin	historical	26	0.039	0.009	0.180	0.047	0.023	0	0.076	0.600	0.028	0
	current absent	7	0	0	0	0.025	0	0	0.250	0.670	0.050	0
	current present	19	0.045	0.011	0.210	0.051	0.027	0	0.048	0.580	0.025	0
Lost River sculpin	historical	13	0.071	0	0.085	0.011	0.042	0	0.088	0.650	0.052	0
	current absent	6	0.160	0	0.160	0	0	0	0.120	0.440	0.120	0
	current present	7	0	0	0.026	0.020	0.075	0	0.064	0.810	0	0
Malheur sculpin	historical	43	0.500	0	0.240	0	0	0	0.019	0.031	0.220	0
	current absent	10	0.570	0	0.046	0	0	0	0.044	0	0.340	0
	current present	33	0.460	0	0.330	0	0	0	0.007	0.045	0.160	0
Shorthead sculpin	historical	784	0.083	0.077	0.090	0.170	0.140	0.014	0.130	0.18	0.083	0.041
	current absent	712	0.083	0.071	0.085	0.170	0.140	0.011	0.130	0.18	0.086	0.041
	current present	72	0.085	0.13	0.140	0.190	0.110	0.047	0.051	0.13	0.054	0.044
Wood River sculpin	historical	34	0.300	0.190	0.031	0	0	0	0.088	0	0.290	0
	current absent	9	0.230	0	0	0	0	0	0.21	0	0.260	0
	current present	25	0.340	0.280	0.045	0	0	0	0.032	0	0.310	0
Margined sculpin	historical	37	0	0.036	0.036	0.013	0	0	0.730	0.080	0.110	0
	current absent	19	0	0.033	0	0	0	0	0.760	0.080	0.120	0
	current present	18	0	0.039	0.068	0.026	0	0	0.690	0.080	0.093	0
Torrent sculpin	historical	459	0.041	0.033	0.076	0.150	0.100	0	0.240	0.220	0.089	0.043
	current absent	369	0.025	0.033	0.069	0.130	0.120	0	0.270	0.220	0.088	0.051
	current present	90	0.098	0.034	0.100	0.260	0.026	0	0.160	0.220	0.091	0.015

Table 3.29 (continued)

Species	Range	Number of watersheds	Management Clusters[1]									
			BR	FG	FH	FM	FW	NP	PA	PF	PR	TL
Slender sculpin	historical	13	0	0	0.210	0.029	0.041	0	0.035	0.680	0	0
	current absent	5	0	0	0.170	0.043	0	0	0	0.790	0	0
	current present	8	0	0	0.230	0.023	0.058	0	0.050	0.640	0	0
Oregon Lakes tui chub	historical	3	0.650	0	0	0	0	0	0	0.089	0.26	0
	current absent	0	0	0	0	0	0	0	0	0	0	0
	current present	3	0.650	0	0	0	0	0	0	0.089	0.26	0
Leatherside chub	historical	115	0.440	0.085	0.056	0	0.065	0.086	0.072	0.041	0.099	0.023
	current absent	102	0.460	0.079	0.056	0	0.074	0.097	0.078	0.032	0.097	0.026
	current present	13	0.350	0.130	0.055	0	0	0	0.022	0.1	0.12	0
Pit-Klamath brook lamprey	historical	14	0	0	0.280	0.015	0.048	0	0.063	0.6	0	0
	current absent	0	0	0	0	0	0	0	0	0	0	0
	current present	14	0	0	0.280	0.015	0.048	0	0.063	0.6	0	0
Pacific lamprey	historical	1317	0.200	0.068	0.110	0.058	0.090	0	0.170	0.130	0.130	0.037
	current absent	1132	0.240	0.077	0.110	0.055	0.081	0	0.150	0.120	0.130	0.042
	current present	185	0.003	0.022	0.120	0.072	0.140	0	0.290	0.190	0.150	0.010
Lahontan cutthroat trout	historical	8	0.900	0	0	0	0	0	0	0	0.097	0
	current absent	6	0.880	0	0	0	0	0	0	0	0.120	0
	current present	2	1	0	0	0	0	0	0	0	0	0
Pygmy whitefish	historical	34	0	0.035	0.010	0.240	0.024	0.019	0.100	0.400	0	0.170
	current absent	11	0	0.100	0.029	0.038	0	0	0.240	0.330	0	0.260
	current present	23	0	0	0	0.340	0.037	0.029	0.036	0.430	0	0.120

[1]BR = BLM rangelands; FG = FS forest and rangeland, moderate impact, grazed; FH = FS forest, high impact, grazed; FM = FS forest, high-moderate impact, no grazing; FW = FS-managed wilderness; NP = NPS forestland; PA = Private agriculture; PF = Private land and FS forestland; PR = Private and BLM rangeland; TL = Tribal lands.

Table 3.30. Evaluation of effects of alternatives on rare and sensitive fishes. The table answers the question, "Will the alternative provide sufficient protection to prevent declines in habitats and populations of 18 rare and sensitive fish species?"

Species	Proxy for Analysis	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Pygmy whitefish	None	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shortnose sucker, Lost River sucker, Klamath largescale sucker, Slender sculpin[1]	None	No	Yes	Yes	Yes	No	Yes	Yes
Warner sucker, Redband trout[2]	None	No	No	U[3]	U[3]	No	U[3]	U[3]
Wood River sculpin, Wood River bridgelip sucker[4]	None	No	Yes	Yes	Yes	No	Yes	Yes
Malheur sculpin, Redband trout[5]	None	No	No	U[3]	U[3]	No	U[3]	U[3]
Pacific lamprey	Juvenile steelhead trout	No	No	No	U[3]	No	Yes	U3
Pit-Klamath brook lamprey	Goose Lake sucker, Redband trout[1]	No	U[3]	UV	U[3]	No	U[3]	U[3]
Goose Lake sucker	Redband trout	No	No	U[3]	U[3]	No	U[3]	U[3]
Torrent sculpin	Westslope cutthroat	No	No	No	No	No	U[3]	Yes
Shorthead sculpin	Bull trout	No	No	No	U[3]	No	U[3]	U[3]
Margined sculpin	Redband trout	No	No	U[3]	U[3]	No	U[3]	Yes
Lahontan cutthroat trout	Protected under the ESA, Section 7, regardless of the alternative.							
Oregon Lakes tui chub	Information on current distributions and status of these species was insufficient for analysis.							
Leatherside chub								

[1] Klamath Basin Rare and Sensitive Fishes.
[2] Occur in the Warner Basin.
[3] U = Uncertain.
[4] Wood River Sensitive Fishes.
[5] Occur in the Harney Basin.

Refer to "Findings by Species, Steelhead" section of this chapter for a discussion of how alternatives would affect Pacific lamprey. Within the assessment area, Pacific lamprey and steelhead are believed to spawn in many of the same streams and the young of both species utilize similar rearing streams and would respond similarly to management activities. Strongholds for steelhead also are believed to be important areas for lamprey. As both species are anadromous, both are affected by dams and hydroelectric operations. Both species are harvested, although lampreys are taken as ammocoetes for bait and by Native Americans for ceremonial purposes. The fringe population of Pacific lampreys noted in the Klamath Basin may represent Klamath lampreys *(Lampetra similis)* or a land-locked form of Pacific lamprey. Moyle and others (1995) noted substantial confusion regarding lamprey taxonomy and identification in the Klamath Basin.

Pit-Klamath brook lamprey *(Lampetra lethophaga)*

The Pit-Klamath brook lamprey is a non-parasitic lamprey native to the Upper Klamath Basin and

upper Pit River (such as the Goose Lake Basin). This non-anadromous species completes its life cycle in small streams and moderate-size rivers. Relatively little is known about its distribution and life history requirements, but we assume them to be similar to other native, stream-dwelling fishes within this area. Based on distribution, two proxies would be appropriate for this species: Klamath Basin sensitive fishes for that portion of the Pit-Klamath brook lamprey's range in the Klamath Basin, and the Goose Lake sucker and redband trout for that portion of the lamprey's range in the Goose Lake Basin. Refer to "General Assumptions and Information Base", "Klamath Basin rare and sensitive fishes", and "Goose Lake sucker and redband trout in the Goose Lake basin" sections for a discussion of how alternatives would affect the Pit-Klamath brook lamprey. It is uncertain whether any alternative would prevent declines in populations and habitats of this species; Alternatives 1 and 5 would not prevent declines.

Lahontan cutthroat trout *(Oncorhynchus clarki henshawi)*

Populations of Lahontan cutthroat trout within the assessment area comprise the northern fringe of the distribution of this subspecies. Populations in Willow and Whitehorse Creeks within the assessment area were long-considered to comprise a separate subspecies and should be accorded special emphasis because of their long isolation from other Lahontan cutthroat trout and their occurrence in the most northerly native habitats of the subspecies. Populations in Washington, and in Oregon's Mann Lake are introduced, are of uncertain genetic purity, and are not considered further for purposes of this analysis. The subspecies is listed as threatened pursuant to the ESA throughout its range. Populations within the assessment area have received special emphasis through ESA Section 7 consultation, particularly as pertaining to effects of livestock grazing, which comprises the principal threat in addition to non-native trout introductions. Because the preliminary draft EIS alternatives would provide little protection beyond that already stipulated in Section 7 biological opinions and recovery planning documents, and because Section 7 requirements would remain in place regardless of the alternative selected, we believe that the Lahontan cutthroat trout in the assessment area would not be adversely affected by the selection of a preliminary draft EIS alternative.

Pygmy whitefish *(Prosopium coulteri)*

Pygmy whitefish are widely distributed in deep lakes and coldwater streams in the northern, glaciated portions of the Columbia River Basin. They often occur in lakes, but may move to smaller tributary streams for spawning. Water quality and maintenance of instream flows in tributary streams are the primary factors needed to maintain the species. Unlike many of the sensitive fishes in our analysis, we believe that the lake habitats of pygmy whitefish are less likely to be negatively impacted by management activities on FS- or BLM-administered lands. Only 33 percent of existing populations occur on FS- or BLM-administered lands (table 3.29). In general, we believe that all alternatives offer at least minimal protections needed by this species. Alternatives 1 and 5 would offer less protection than other alternatives because of greater timber harvests and road construction associated with these alternatives (table 3.27). Nonetheless, we believe that populations can persist with implementation of any alternative.

Oregon Lakes tui chub *(Gila bicolor oregonensis)*

The Oregon Lakes tui chub is endemic to Oregon's Abert Lake Basin, including the Chewaucan River and XL Spring. Agricultural practices, livestock grazing, and introductions of non-native species are the primary factors affecting this species. Unfortunately, no recent information is available on population status. Tui chubs in nearby Summer Lake Basin have hybridized with chubs from outside the basin, which were presumably introduced as bait fish for introduced rainbow trout. The Summer Basin tui chub, therefore,

is considered to be at high risk of extinction. As tui chub populations in the Chewaucan River occur below trout fisheries, the possibility exists for genetic contamination from introduced fish. The population at XL Spring is on private land and its status is unknown, but we presume it would not be affected by the preliminary draft EIS alternatives. With so little information available, we concluded that an evaluation of alternatives for the Oregon Lake tui chub was not possible at this time.

Leatherside chub *(Gila copei)*

Within the assessment area, the leatherside chub has been reported from the 1940s to the 1970s in widely-scattered areas of the Upper Snake and Big Wood drainages in Idaho. More recent surveys conducted in 1995 (Belk and Wilson 1995) found leatherside chubs in the Goose Creek drainage south of Burley, Idaho, but otherwise no recent collections are known. Because of the scarcity of distribution data and habitat-requirement data, we did not believe that there was sufficient information to perform an analysis of alternatives for this species.

Klamath Basin rare and sensitive fishes

Because of similar distributions, habitat requirements, and/or threats, the following Klamath Basin fishes were considered as one group for our analysis: shortnose sucker *(Chasmistes brevirostris)*, Lost River sucker *(Deltistes luxatus)*, Klamath largescale sucker *(Catostomus snyderi)*, and slender sculpin *(Cottus tenuis)*. The endangered shortnose and Lost River suckers are restricted primarily to Upper Klamath and Agency Lakes except for spawning runs into tributary streams. The Klamath largescale sucker occupies Upper Klamath and Agency Lakes, but also may occur in a resident stream form, inhabiting larger streams such as the Sprague, Sycan, Wood, and Williamson Rivers. The slender sculpin occurs in the same habitats as the catostomids as well as some smaller streams in the Upper Klamath Basin. For considerations of land management activities, all of these taxa are affected by deteriorating water quality in streams and downstream lake habitats. Timber harvesting and associated road-building activities, livestock grazing, and riparian area management are among the primary factors influencing water quality in streams and lakes of the Klamath Basin.

Alternatives 1 through 7—Under Alternative 1 we believe that the Klamath Basin sensitive fishes would continue to decline and would face increasing deterioration of water quality throughout the basin. Timber harvesting and livestock grazing, both of which contribute to deterioration of water quality in the basin, would remain at relatively high levels under Alternative 1. Alternative 2 would tend to maintain existing conditions with little deterioration of habitat quality, but also with little improvement because of low emphasis on restoration efforts. The net impacts of Alternative 3 would be similar to Alternative 2, although Alternative 3 proposes moderate tree harvest and high emphasis on restoration activities. Alternative 4 was rated as the best for the sensitive Klamath Basin fishes because this alternative included the highest levels of restoration activities. Aquatic and riparian habitats in the Klamath Basin have deteriorated substantially from overgrazing by livestock and high levels of timber harvest and road construction. Increased protection and restoration activities are both vital for long-term persistence of sensitive fish species. Restoration efforts would likely provide benefits for endangered and sensitive fishes in the Klamath Basin. Under Alternative 5, we would anticipate continued decline and deterioration of water quality because of moderate to high levels of resource use and low emphasis on restoration programs. For Alternative 5, activities such as livestock grazing, road building, and timber harvesting would be more likely to contribute to the deterioration of water quality given the protection of narrower riparian zones under this alternative. For Alternative 6, we would anticipate results similar to Alternatives 2 and 3 because of lower resource use. Alternative 6 also includes low levels of restoration activities, which results in a lower rating than Alternative 4. Alternative 7 would

result in increased protection of existing habitats and would include a higher level of livestock management as well as a 50 percent reduction in AUMs which should result in a significant reduction in grazing impacts. Overall, Alternative 7 was rated quite high because the broader riparian zones within this alternative's aquatic conservation strategy would provide substantial protection against sediment entering streams and contribute to deterioration of water quality in the Klamath Basin.

Goose Lake sucker (*Catostomus occidentalis lacusanserinus*) and redband trout (*Oncorhynchus mykiss* ssp.) in the Goose Lake Basin

Redband trout in the Goose Lake Basin are a good proxy for the Goose Lake sucker. Both sensitive fishes occur in Goose Lake, tributary streams, and to a lesser extent, in reservoirs in the Goose Lake Basin. Historically, populations of the Goose Lake sucker and redband trout ascended larger streams tributary to Goose Lake in the spring during spawning runs. Both fishes are impacted by livestock grazing, riparian management, and overall water quality. Habitats for both fishes are highly degraded compared to historical conditions. Rangeland management issues are of primary concern for both taxa. Redband trout in the Goose Lake Basin also occur in slightly higher elevation streams than do the Goose Lake suckers and, therefore, may be adversely affected by timber harvest and road construction as well.

Alternatives 1 through 7—Under Alternative 1, conditions would continue to deteriorate. This alternative offers the least protection for rangeland riparian habitats because AUMs would remain relatively high compared to that of other alternatives. Timber harvest levels in Alternative 1 would remain high, negatively affecting headwater populations and downstream water quality (table 3.27). Existing riparian management zones and buffer widths have not proven to be adequate in reducing disturbances from livestock grazing, road building, and timber harvesting. Alternative 2 was rated fair because of increased riparian area protection, but still below most alternatives. Riparian habitat conservation areas for Alternative 2 offer improved protection from adverse impacts associated with livestock grazing when compared to existing conditions. The strength of Alternative 2 is in protection with little emphasis on restoration activities. Alternative 3 also would result in a gradual improvement over existing conditions because of more emphasis on restoration activities and improved riparian zone management through the aquatic conservation strategy. Alternatives 4 and 6 were rated the same and considerably above existing conditions. The higher ratings were warranted because of slightly lower AUMs and slightly higher levels of restoration. For both of these alternatives, improved riparian zone management would decrease impacts associated with livestock grazing. Alternative 5 was rated poorly because of high livestock grazing and little restoration. For Alternative 5, activities such as livestock grazing, road building, and timber harvesting would be more likely to contribute to deterioration of water quality given the narrower protection of riparian zones described for this alternative. Although Alternative 7 would result in greatest reduction in AUMs and most restrictive riparian management standards and guidelines, the effect on the Goose Lake sucker is uncertain as the models for redband trout indicate declines in the Goose Lake Basin. In general, riparian areas would receive the greatest protection under this alternative and have the potential to quickly respond with improved habitat conditions.

Warner sucker (*Catostomus warnerensis*) and redband trout (*Oncorhynchus mykiss* ssp.) in the Warner Basin

The Warner sucker, a threatened species pursuant to the ESA, occupies lake and stream habitats in Oregon's Warner Basin. A small portion of the species range also extends into the California portion of the basin. All remaining populations of the species primarily occur at lower elevations in the basin (table 3.28), and are affected by livestock grazing, riparian area management, and agricul-

tural practices. Approximately 55 percent of the current populations are on BLM-administered rangelands (table 3.29). Lake habitats are dominated by introduced species, which pose additional problems by preying on larval and juvenile Warner suckers. Historical and current distributions of the Warner sucker are largely sympatric with the redband trout native to the Warner Basin, although in one or two localities, redband trout extend their distribution further into headwater areas. We believe that the Warner sucker and Warner Basin form of redband trout can be analyzed together for the purposes of this panel.

Alternatives 1 through 7—Alternative 1 would continue declines of the Warner sucker and redband trout because of relatively high levels of livestock grazing, less emphasis on livestock management, and little riparian restoration. While the number of AUMs would decrease in all alternatives, the least declines are associated with Alternatives 1 and 5, with the greatest decrease in AUMs occurring with Alternative 7. According to our analysis (table 3.27), the treatment level for livestock management is smallest for Alternative 1, moderate for Alternatives 2 to 6, and highest for Alternative 7. A higher level of livestock management should result in better management of grazing and therefore result in fewer impacts to critical riparian habitats. Our analysis of riparian restoration activities (table 3.27) indicates that Alternatives 1 and 2 include very little emphasis on riparian restoration, with high levels of riparian restoration occurring in Alternatives 3 to 7. Overall, Alternative 2 rated slightly higher than current conditions because of improved riparian management and a higher level of livestock management. Alternative 3 also rated higher than existing conditions because of a much greater emphasis on riparian restoration. Riparian areas quickly improve in condition with better protection and restoration programs. Alternatives 4 and 6 were rated the same and considerably above existing conditions. The higher ratings were warranted because of slightly lower AUMs and slightly higher levels of restoration. Alternative 5 was rated poorly because of high livestock grazing. As noted in other discussions, narrower riparian management zones associated with this alternative would be more likely to result in loss of riparian function given higher livestock use. We believe that Alternative 7 would result in the best conditions for the Warner sucker and redband trout in the Warner Basin because this alternative would result in the greatest reduction in AUMs and the most restrictive riparian management standards and guidelines. As a result, riparian areas would receive the greatest protection under this alternative and should quickly respond with improved habitat conditions. Still, we are uncertain that this alternative would prevent declines in habitats and populations of the Warner sucker.

Wood River sensitive fishes

The Wood River sculpin (*Cottus leiopomus*) and Wood River bridgelip sucker (*Catostomus columbianus hubbsi*) are endemic to rivers and streams in Idaho's Big Wood and Little Wood drainages. Although precise distribution information is lacking for the suckers, both species appear to prefer fast-flowing stream and river habitats of high quality. Their ranges are believed to be sympatric over much of the Wood River Basin. Key factors influencing their status include diversions and channelization, loss of riparian habitats, development of floodplains, overgrazing by livestock, and reduced water quality. Approximately 67 percent of existing populations of both fishes occur on FS- or BLM-administered lands (table 3.29). Because of similar ranges, habitat requirements, and threats, we considered both taxa to be subject to the same evaluation of alternatives.

Alternatives 1 through 7—For all alternatives, activities that substantially improve riparian habitat conditions will do the most for persistence of these fishes on Federal lands. Timber harvest and roads will influence water quality, but will not be as important as grazing and riparian management practices for these species that occur in lower-elevation portions of the drainages. Under Alternative 1, we believe that many of the factors that have resulted in declines of these taxa would

continue. Timber harvest levels and grazing levels would be highest under this alternative, which would contribute to continued loss of riparian function and reduced water quality. For Alternative 2, timber harvest would be the lowest of any alternatives (only Alternative 7 is equally low) and levels of livestock management would be moderate (Alternatives 2 through 6 would have equal levels of livestock management activities, see table 3.27). Riparian restoration activities would be low for Alternative 2. Overall, conditions for Wood River sensitive fishes should improve under Alternative 2 compared to existing conditions. Habitat conditions under Alternative 3 also should improve compared to existing conditions, but with slightly more timber harvest and riparian restoration activities. Management under Alternatives 4 and 6 also should improve conditions compared to existing habitat quality. Both Alternatives 4 and 6 should result in improvements for these sensitive fishes. We believe that under Alternative 5, impacts of livestock grazing and timber harvest would continue to cause problems and loss of habitat quality. The combination of narrow riparian management zones with relatively high levels of livestock grazing and timber harvest would be detrimental to these fishes. Overall, trends of sensitive fishes would be similar between Alternative 5 and existing conditions. Alternative 7 would have lowest AUMs and highest levels of livestock management activities of any alternative, which would result in the highest relative improvement of riparian conditions. Alternative 7 also would have the lowest timber harvest levels. Overall, Alternative 7 would be the most beneficial for these species, although their status also should improve under Alternatives 2, 3, 4, and 6.

Malheur sculpin (*Cottus bairdi* ssp.) and redband trout (*Oncorhynchus mykiss* ssp.) in the Harney Basin

The Malheur sculpin is endemic to streams in Oregon's Harney Basin. This sculpin requires coolwater streams of high quality. High levels of sediments are not tolerated. Within Harney Basin, the distribution of the Malheur sculpin is sympatric with that of the redband trout. Both the Malheur sculpin and redband trout are adversely affected by activities that increase water temperature, turbidity, and sediment loads. Livestock grazing, road building, and timber harvesting are primary activities affecting these taxa on FS- and BLM-administered lands. Because of similarity in distribution, habitat requirements, and threats, we considered both taxa to be subject to the same evaluation of alternatives. The form of redband trout in Harney Basin is often considered to be distinct because of its extended isolation from other stocks.

Alternatives 1 through 7—Under Alternative 1 we believe that conditions for the Malheur sculpin and redband trout would continue to deteriorate and that this alternative offers the least protection for rangeland riparian habitats because AUMs would only decrease slightly compared to that of other alternatives. Alternative 1 also includes the highest level of timber harvest of any alternative within the range of the Malheur sculpin (table 3.27). Alternative 2 is rated higher than existing conditions because of increased riparian area protection and reduced timber harvest. We believe that Alternative 3 also would result in improvements from existing conditions because of more emphasis on riparian restoration activities. Alternatives 4 and 6 were rated the same and much above existing conditions. The higher ratings were warranted because of slightly lower AUMs and slightly higher levels of restoration. Alternative 5 was rated lower because of higher levels of livestock grazing. As noted in discussions of other sensitive fishes, the narrower riparian management areas associated with Alternative 5 coupled with relatively high levels of livestock grazing would decrease proper functioning condition of riparian areas. We believe that Alternative 7 would result in the best conditions for the Harney Basin sensitive fishes because it would result in the greatest reduction in AUMs, lowest timber harvest levels, highest level of livestock management, and most restrictive riparian management standards and guidelines. As a result, riparian areas would receive the

greatest protection under this alternative and should quickly respond with improved habitat conditions. All Alternatives except 1 and 5 should improve conditions for these sensitive fishes, yet the ability of even the most protective alternatives to prevent declines in habitats and populations remains uncertain.

Torrent sculpin (*Cottus rhotheus*)

Historically, torrent sculpin were widely distributed within the Columbia River drainage. Many of the cold, clear waters preferred by the torrent sculpin and other species (such as, shorthead sculpin, bull trout, westslope cutthroat trout, and redband trout) have been degraded by timber harvest and associated road construction. Although the current distribution of torrent sculpin clearly has declined, our knowledge is limited because in much of the assessment area, sculpins often are reported generically as *Cottus* sp. with little attention paid to specific identification. The species prefers coldwater streams and smaller rivers, and typically occurs at lower elevations than the shorthead sculpin. Approximately 52 percent of the existing populations occur on FS- or BLM-administered lands (table 3.29). We believe that westslope cutthroat trout are an appropriate proxy for torrent sculpin in that they occupy many of the same habitats and have similar requirements for cold, high-quality habitat conditions. There is a strong association between the distributions of westslope cutthroat trout and torrent sculpin (chi-square test of independence, $P < 0.01$). Refer to section "Projected Effects on Widely-Distributed Salmonid Species" on westslope cutthroat trout for a discussion of how alternatives would affect torrent sculpin. Unlike westslope cutthroat or redband trout, however, torrent sculpin have less vagility (that is, less capacity or tendency to become widely dispersed). Once eliminated from a river system, they are unlikely to recolonize without artificial assistance. Alternatives with high riparian zone protection would be most advantageous for this species. For restoration efforts to be successful, transplants of the torrent sculpin into restored areas would likely be necessary.

Shorthead sculpin (*Cottus confusus*)

Historically, shorthead sculpin were widely distributed within the Columbia River drainage. In the lower Columbia River drainage, they are known from the Deschutes, Yakima, Wenatchee, and John Day River drainages. In the mid and upper Columbia River drainage, shorthead sculpin are known from the Snake, Spokane, Pend Oreille, Kootenai, Coeur d'Alene, and St. Joe River drainages. Many of the cold, clear waters preferred by this species have been degraded by timber harvest and associated road construction. Although the current distribution of shorthead sculpin clearly has declined, our knowledge is limited because in much of the assessment area, sculpins often are reported generically as *Cottus* sp. with little attention paid to specific identification. The species prefers coldwater streams and smaller rivers, and typically occurs at higher elevations than the torrent sculpin. Approximately 66 percent of existing populations occur on FS- or BLM-administered lands (table 3.29). We believe that bull trout are an appropriate proxy for shorthead sculpin in that they occupy many of the same habitats and have similar requirements for cold, high-quality habitat conditions. There is a strong association between the distributions of bull trout and shorthead sculpin (chi-square test of independence, $P < 0.01$). Refer to "Findings by Species, Bull trout" section of this chapter for a discussion of how alternatives would affect shorthead sculpin. Unlike bull trout, however, shorthead sculpin have low vagility. Once eliminated from a river system, they are unlikely to recolonize without artificial assistance. Alternatives with high riparian zone protection would be most advantageous for this species. For restoration efforts to be successful, transplants of the shorthead sculpin into restored areas likely would be necessary.

Margined sculpin (*Cottus marginatus*)

The margined sculpin is restricted to streams in the Blue Mountains portion of the middle Columbia River drainage. Like many sculpins,

they are relatively poorly known and subjected to lumping as *Cottus* sp. in collections. Current information indicates that only about 13 percent of existing populations occur on FS- or BLM-administered lands (table 3.29). Within their range, they occur sympatrically with redband trout. Redband trout should be a good proxy for this species because both occupy similar habitats and are adversely affected by increases in water temperature, turbidity, and stream sedimentation. There is a strong association between the distributions of redband trout and margined sculpin (chi-square test of independence, $P < 0.01$). Therefore, we used redband trout as a proxy for margined sculpin in this analysis. Refer to "Findings by Species, Redband trout" section for a discussion of how alternatives would affect the margined sculpin. Unlike redband trout, however, margined sculpin have less vagility. Once eliminated from a river system, they are unlikely to recolonize without artificial assistance. Alternatives with high riparian zone protection would be most advantageous for this species. For restoration efforts to be successful, transplants of the margined sculpin into restored areas would likely be necessary.

Aquatic Mollusk Species

There are five federally listed (status, endangered) aquatic snails that are found in the Basin (Frest and Johannes 1995). They are:

Lanx n. sp. 1 (Banbury Springs lanx)
Physa natricina (Snake River physa)
Pyrgulopsis idahoensis (Idaho springsnail)
Taylorconcha serpenticola (Bliss Rapids springsnail)
Valvata utahensis (desert valvata)

According to Frest and Johannes (1995), the Banbury Springs lanx, Bliss Rapids springsnail, and desert valvata may occur on federally administered lands in Idaho (specifically, BLM). For each of these three species, we provide a brief summary of the reasons that we did not complete a viability analysis for the UCRB planning area.

Banbury Springs lanx (*Lanx* n. sp. 1)

This species occurs in only three known populations in the Snake River drainage in Gooding County, Idaho. It is considered a very local endemic that is threatened primarily by agricultural and fish-farm runoff and water diversions. Because of the very local distribution of the species, the alternatives in the UCRB preliminary draft EIS will not be site specific (fine scale) enough to determine the effect on viability. This analysis and determination should be done on a site-specific, project basis rather than on a landscape scale.

Bliss Rapids springsnail (*Taylorconcha serpenticola*)

The current distribution of this species is limited to very few sites within the original range. The original range was a limited reach of the middle Snake River, from Indian Cove Bridge to Twin Falls, Idaho. Most spring and river populations have been extirpated or are much reduced. Threats to this species have been the diversion or capping of springs and surface water and groundwater pollution from agricultural runoff. Because of the very limited distribution of this species, as with the Banbury Springs lanx, it is not appropriate to look at viability at the landscape scale. This should be done at a site-specific, project level.

Desert valvata (*Valvata utahensis*)

The distribution of this species has become very limited and has been extirpated in much of its original range. It is currently found in a "couple of Snake River sites" and spring-fed pools with no outlets (Frest and Johannes 1995). It is considered a local endemic. The pollution of surface and groundwater from agricultural runoff and the impoundments of rivers continue to threaten the species. The taxon is continuing to decline. The very limited number and distribution of the species make it inappropriate to do a viability

analysis at the landscape scale. The assessment of viability needs to be done at a site-specific, project level.

All three of these species are local endemics with very limited distribution and numbers. The science assessments and preliminary draft EISs are focused on a landscape or a large watershed scale. Direction in the alternatives is unlikely to be so specific that effects on these species would be identifiable or predictable. The major threats to these species are linked primarily to agriculture and river impoundments, and are outside of the management authority of the BLM. Therefore, we feel it is not valid to attempt to do a viability analysis given the scale of our data and the scale of the decisions to be made. Local administrative units have the opportunity to analyze the effects of proposed projects on these species and determine management needs to protect them from potential activities.

Summary of Aquatic Habitats and Native Species Evaluation of Alternatives

Evaluation of the ICBEMP aquatic conservation strategies and the expected effect of each alternative on the future habitats, population status, and distribution of 7 key salmonids and 18 rare and sensitive fishes are very complex. Each piece of information used in our evaluation provided some sense of where and how much of the anticipated change in management is likely to influence each of the species considered. Each piece of information has important limitations, and represents only a single element in this larger and very complex picture. Our conclusions are drawn from the strength and consistency of trends adapted from the models, the patterns in allocation of roads and other land disturbing activities, the allocation of restoration activities, and the mitigation of disturbance expected through riparian and ecosystem objectives and standards, as well as specific direction given in each alternative.

The evaluation by species centered on each alternatives' ability to conserve core and fringe areas, prevent declines in habitat and populations, and rehabilitate habitats and depressed populations. Core areas are concentrations of strong populations, and are areas where the species is well distributed among adjacent watersheds. Fringe areas are where comparatively few occupied watersheds are isolated and fragmented from the larger portions of the species range, but have high genetic integrity or potentially unique genetic characteristics which aid the robustness of the species.

The expected response of a species to any alternative is complex, and the answer to each of a set of evaluation questions for every alternative represents a judgment on our part given the weight of the evidence presented. For example, with Alternative 5, the answer to the question "will strong populations in the central or core areas for bull trout be conserved?" was "no", yet strongholds associated with Category 1 watersheds should fare well under this alternative. The proportion of wilderness and emphasis on ecosystem analysis and restoration are focused to benefit strong populations under this alternative, and will likely sustain and even expand the distribution of bull trout within these select subbasins. However, areas which emphasize commodity production (for example, eastern Oregon and the northern one-third of the UCRB planning area) occupy larger areas of the species range, and our data suggest that populations here will not fare well, leading us to a negative conclusion. Exceptions are found within all of our summary determinations. If we could not assign a "yes" or "no" answer because of insufficient information or multiple factors leading to uncertainty, we responded with "uncertain."

Our summary is based on professional interpretation of both quantitative and qualitative information collected for the purpose of the alternative evaluation or generated as part of the broader scientific assessment (Lee and others, in press). From table 3.31, it is clear that Alternatives 1 and 5 would not sustain aquatic and riparian ecosystem structure and function through time, nor would they adequately protect the key salmonid species or the rare and sensitive species. Alternatives 2, 3,

4, 6, and 7 would sustain and restore aquatic and riparian ecosystems through time, but would have mixed results for both key salmonids and rare and sensitive species. The response of the key salmonids to Alternatives 2, 3, 4, 6, and 7 would be more complex, yet consistent with the ratings for the aquatic conservation strategies. More species would fare better under Alternatives 4, 6, and 7 than under Alternatives 2 and 3. The aquatic conservation strategy ratings, based on combined evaluation of interim RMA widths, specific direction regarding performance measures, and whether an ecosystem analysis is required in strongholds and high-priority watersheds, are highest for Alternatives 4, 6, and 7. Alternatives 2 and 3 do not include major restoration efforts or an ecosystem analysis requirement. They appeared to provide little more than a comprehensive project analysis and therefore, rate somewhat lower.

It is uncertain whether any of the alternatives would conserve fringe populations and habitats for the anadromous salmonids (such as, steelhead trout, stream-type chinook, and ocean-type chinook). Uncertainty also exists concerning preventing population declines and rebuilding depressed areas for these species. Most of these populations are depressed or federally listed and are significantly influenced by hydroelectric dams, ocean conditions, hatcheries, and land management activities outside of Federal lands. Ocean chinook are proportionately more affected by a large number of factors that operate outside of Federal lands in freshwater, estuaries, and the ocean environment. All of their migration corridors between freshwater spawning and rearing habitats and the ocean lie on private or tribal lands. The most conservative approach to conserving and restoring watersheds would be provided by Alternatives 6 and 7. Given the effects of non-Federal land conditions and activities, the halting of declines and rebuilding of anadromous fish populations requires focused and coordinated efforts by several national, regional, and state agencies and institutions.

Table 3.31. Summary of aquatic habitats and native fishes evaluation of preliminary draft alternatives.

Number of key salmonid species and rare and sensitive fishes given sufficient protection to:	Alternative 1			Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6			Alternative 7		
6 Key Salmonid Species[1]	**Y**	**N**	**U**	**Y**	**N**	**U**	**Y**	**N**	**U**	**Y**	**N**	**U**	**Y**	**N**	**U**	**Y**	**N**	**U**	**Y**	**N**	**U**
Conserve strong populations	0	6	0	5	1	0	4	0	2	6	0	0	0	6	0	6	0	0	6	0	0
Prevent declines	0	6	0	0	6	0	0	4	2	1	1	4	0	6	0	3	0	3	2	1	3
Rebuild depressed populations	0	6	0	4	2	0	6	0	0	6	0	0	4	2	0	6	0	0	6	0	0
15 Rare and Sensitive Species[2]																					
Prevent declines	1	14	0	7	7	1	7	3	5	7	1	7	1	14	0	8	0	7	9	0	6
Does the aquatic conservation strategy maintain and restore aquatic and riparian ecological processes through time?	No			Yes			Yes			Yes			No, in commodity-emphasis areas			Yes			Yes		

[1]Ocean-type chinook are minimally impacted by FS and BLM lands and no core strongholds exist on FS or BLM lands. They are, therefore, not included in this summary.

[2]Three of the 18 rare and sensitive fishes addressed in the evaluation were not included in this summary because one species is protected under the ESA, Section 7, regardless of the alternative, and two species have insufficient information to conduct an analysis. Also of note, pygmy whitefish are large, lake-dwelling fish that would be minimally impacted by any alternative.

U = Uncertain; Y = Yes; N = No

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Appendix 3-A.

Aquatic/Riparian Evaluation of Alternatives Workshop participants. Workshop was held in Boise, Idaho, from March 6 to 13, 1996.

ICBEMP Science Integration Team Members:

Jim Sedell - USFS, Corvallis, Oregon
Danny Lee - USFS, Boise, Idaho
Bruce Rieman - USFS, Boise, Idaho
Russ Thurow - USFS, Boise, Idaho
Kerry Overton - USFS, Boise, Idaho
Kristine Lee - USFS, Ogden, Utah
Jack Williams - BLM, Boise, Idaho
Bob House - BLM, Boise, Idaho

ICBEMP EIS Team Members:

Trish Carroll - USFS, Boise, Idaho
Jim O'Connor - USFS, Portland, Oregon

Invited Agency Participants:

Sandy Noble - USFWS, Leavenworth, Washington
Mike Murphy - NFMS, Juneau, Alaska
Don Martin - EPA, Boise, Idaho
Doug Young - USFWS, Klamath Falls, Oregon
Peter Bisson - USFS, Olympia, Washington

Agency Observers:

Patricia Zenone - USFWS, Boise, Idaho
Jeff Lockwood - NMFS, Portland, Oregon
Steve Bauer - for EPA, Boise, Idaho

Support:

Scott Leonard - USFS, Emmett, Idaho
Tracy Noel - USFS, Corvallis, Oregon
Venetia Gempler - USFS, Boise, Idaho
Susie Henry - BLM, Boise, Idaho

Appendix 3-B

Classification trees used for predicting species status.

Classification trees were developed using the approach outlined by Lee and others (in press) in order to project status under each of the alternatives. Table B.1 describes the variables used in tree development. The remaining sections summarize tree structure. Figures B.1 to B.8 graphically show tree structure. All classification trees except that developed for ocean-type chinook were sensitive to road-density measures. Future predictions were made using the projected road-density layers.

Table B.1. Descriptions of landscape variables used in the abbreviated analysis of fish distribution. All values expressed as percents refer to the percent area of the subwatershed.

Variable Name	Description
eru	Ecological Reporting Unit
Physiographic and Geophysical Variables	
slope	area weighted average midslope
pprecip	mean annual precipitation (PRISM)
elev	mean elevation (ft)
mtemp	mean annual temperature
solar	mean annual solar radiation
drnden	drainage density (mi/mi2)
anadac	access for anadromous fish (0 = no, 1 = yes)
dampass	number of intervening dams
hucorder	number of upstream 6th-code hydrologic units
hk	soil texture coefficient
baseero	base erosion index
ero	surface erosion hazard
bank	streambank erosion hazard
Ownership and Management Variables	
rdmean0	mean road density
rdmed0	median road density class
rdgeo0	geometric mean road density
mgclus	management classification

Bull trout presence/absence, two-step model

Summary

Variables used in tree construction: "mtemp" "rdgeo0" "hucorder" "pprecip" "eru"
Number of terminal nodes: 7
Residual mean deviance: 0.9658 = 2617 / 2710
Misclassification error rate: 0.2172 = 590 / 2717

Figure B.1. Tree structure

Node) Split criterion	Sample size	Deviance	Mode	Absent	Present	
1) root	2717	3279.00	A	(0.7085	0.2915)	
2) mtemp<5.08	1475	2024.00	A	(0.5586	0.4414)	
4) rdgeo0<0.893289	951	1314.00	P	(0.4669	0.5331)	
8) hucorder<16.5	842	1145.00	P	(0.4181	0.5819)	
16) pprecip<593.731	116	142.10	A	(0.6983	0.3017)	*
17) pprecip>593.731	726	959.30	P	(0.3733	0.6267)	*
9) hucorder>16.5	109	94.38	A	(0.8440	0.1560)	*
5) rdgeo0>0.893289	524	616.20	A	(0.7252	0.2748)	
10) hucorder<0.5	296	252.30	A	(0.8480	0.1520)	*
11) hucorder>0.5	228	312.10	A	(0.5658	0.4342)	
22) eru<7.5	104	121.20	A	(0.7308	0.2692)	*
23) eru>7.5	124	169.30	P	(0.4274	0.5726)	*
3) mtemp>5.08	1242	878.90	A	(0.8865	0.1135)	*

* denotes terminal node

Bull trout status

Summary

Variables used in tree construction: "rdgeo0" "solar" "baseero" "drnden" "bank" "rdmean0" "eru"
Number of terminal nodes: 8
Residual mean deviance: 0.723 = 566.8 / 784
Misclassification error rate: 0.1427 = 113 / 792

Figure B.2. Tree Structure

Node) Split criterion	Sample size	Deviance	Mode	Depressed	Present	
1) root	792	821.20	D	(0.7866	0.2134)	
2) rdgeo0<0.027454	198	274.30	S	(0.4848	0.5152)	
4) solar<242.706	20	0.00	D	(1.0000	0.0000)	*
5) solar>242.706	178	242.900	S	(0.4270	0.5730)	
10) baseero<59.6157	145	201.000	D	(0.5034	0.4966)	
20) drnden<1.30505	95	123.900	D	(0.6421	0.3579)	*
21) drnden>1.30505	50	55.110	S	(0.2400	0.7600)	*
11) baseero>59.6157	33	20.110	S	(0.0909	0.9091)	*
3) rdgeo0>0.027454	594	418.600	D	(0.8872	0.1128)	
6) bank<51.8028	109	124.200	D	(0.7431	0.2569)	*
7) bank>51.8028	485	271.400	D	(0.9196	0.0804)	
14) rdmean0<2.87869	411	257.900	D	(0.9051	0.0949)	
28) eru<2.5	5	5.004	S	(0.2000	0.8000)	*
29) eru>2.5	406	238.500	D	(0.9138	0.0862)	*
15) rdmean0>2.87869	74	0.000	D	(1.0000	0.0000)	*

* denotes terminal node

Westslope cutthroat trout status

Summary

Variables used in tree construction: "anadac" "mngclus" "rdgeo0" "hk" "solar" "rdmean0" "bank" "pprecip" "mtemp" "hucorder" "xisq0" "slope"
Number of terminal nodes: 19
Residual mean deviance: 1.165 = 1888 / 1621
Misclassification error rate: 0.214 = 351 / 1640

Figure B.3. Tree structure

Node) split criterion	Sample size	Deviance	Mode	Absent	Depressed	Strong	
1) root	1640	3108.00	D	(0.19630	0.60240	0.20120)	
2) anadac<0.5	1057	1511.00	D	(0.07852	0.75210	0.16930)	
4) mngclus:FG,FH,FM,FW	631	908.40	D	(0.03645	0.70210	0.26150)	
8) rdgeo0<0.276237	207	320.90	S	(0.01932	0.48790	0.49280)	
16) hk<0.207	33	20.11	D	(0.00000	0.90910	0.09091)	*
17) hk>0.207	174	269.10	S	(0.02299	0.40800	0.56900)	
34) solar<234.838	43	50.92	D	(0.00000	0.72090	0.27910)	*
35) solar>234.838	131	194.00	S	(0.03053	0.30530	0.66410)	
70) rdmean0<0.486637	68	70.25	S	(0.05882	0.08824	0.85290)	*
71) rdmean0>0.486637	63	86.94	D	(0.00000	0.53970	0.46030)	*
9) rdgeo0>0.276237	424	505.20	D	(0.04481	0.80660	0.14860)	
18) bank<59.4293	31	65.08	D	(0.19350	0.41940	0.38710)	*
19) bank>59.4293	393	413.90	D	(0.03308	0.83720	0.12980)	*
5) mngclus:NP,PA,PF,PR,TL	426	465.20	D	(0.14080	0.82630	0.03286)	
10) pprecip<527.034	106	142.00	D	(0.31130	0.67920	0.00943)	
20) solar<296.847	98	121.90	D	(0.25510	0.73470	0.01020)	*
21) solar>296.847	8	0.00	A	(1.00000	0.00000	0.00000)	*
11) pprecip>527.034	320	291.60	D	(0.08438	0.87500	0.04063)	*
3) anadac>0.5	583	1261.00	A	(0.40990	0.33100	0.25900)	
6) mtemp<5.809	434	940.50	D	(0.26040	0.40090	0.33870)	
12) rdmean0<0.0484976	136	260.00	S	(0.30880	0.13240	0.55880)	
24) hucorder<26	117	212.30	S	(0.21370	0.15380	0.63250)	*
25) hucorder>26	19	12.79	A	(0.89470	0.00000	0.10530)	*
13) rdmean0>0.0484976	298	609.30	D	(0.23830	0.52350	0.23830)	
26) solar<265.875	41	59.42	S	(0.12200	0.12200	0.75610)	
52) rdmean0<2.75627	30	17.47	S	(0.03333	0.03333	0.93330)	*
53) rdmean0>2.75627	11	23.98	A	(0.36360	0.36360	0.27270)	*
27) solar>265.875	257	488.90	D	(0.25680	0.58750	0.15560)	
54) xisq0<360.367	103	127.20	D	(0.04854	0.79610	0.15530)	*
55) xisq0>360.367	154	313.00	D	(0.39610	0.44810	0.15580)	
110) solar<325.618	62	106.40	A	(0.64520	0.25810	0.09677)	*
111) solar>325.618	92	179.20	D	(0.22830	0.57610	0.19570)	
222) slope<34.3295	84	152.00	D	(0.22620	0.63100	0.14290)	*
223) slope>34.3295	8	8.997	S	(0.25000	0.00000	0.75000)	*
7) mtemp>5.809	149	149.50	A	(0.84560	0.12750	0.02685)	
14) mngclus:FH,FW,PA,PF,PR	129	65.28	A	(0.93020	0.06977	0.00000)	*
15) mngclus:FG,FM,TL	20	41.19	D	(0.30000	0.50000	0.20000)	*

* denotes terminal node

Yellowstone cutthroat trout status

Summary

Variables used in tree construction: "rdgeo0" "drnden" "mtemp" "mngclus" "hucorder"
Number of terminal nodes: 7
Residual mean deviance: 1.031 = 399.1 / 387
Misclassification error rate: 0.2208 = 87 / 394

Figure B.4. Tree structure

Node) split criterion	Sample size	Deviance	Mode	Absent	Depressed	Strong
1) root	394	846.30	S	(0.26900	0.29190	0.4391)
2) rdgeo0<0.140255	161	160.50	S	(0.00621	0.17390	0.8199)
4) drnden<0.99565	87	10.92	S	(0.01149	0.00000	0.9885)*
5) drnden>0.99565	74	98.16	S	(0.00000	0.37840	0.6216)*
3) rdgeo0>0.140255	233	481.30	A	(0.45060	0.37340	0.1760)
6) mtemp<6.1345	180	378.00	D	(0.29440	0.47780	0.2278)
12) mngclus:FG,PF	58	94.75	D	(0.03448	0.51720	0.4483)
24) hucorder<10.5	45	64.63	D	(0.02222	0.66670	0.3111)*
25) hucorder>10.5	13	7.05	S	(0.07692	0.00000	0.9231)*
13) mngclus:BR,FH,FM,PA,PR,TL	122	239.10	D	(0.41800	0.45900	0.1230)
26) drnden<1.55755	66	120.20	A	(0.62120	0.24240	0.1364)*
27) drnden>1.55755	56	88.18	D	(0.17860	0.71430	0.1071)*
7) mtemp>6.1345	53	9.92	A	(0.98110	0.01887	0.0000)*

* denotes terminal node

Redband trout status

Summary

Variables used in tree construction: "mngclus" "mtemp" "hucorder" "eru" "elev" "anadac" "rdgeo0"
Number of terminal nodes: 14
Residual mean deviance: 1.471 = 2577 / 1752
Misclassification error rate: 0.3596 = 635 / 1766

Figure B.5 Tree Structure

Node) split criterion	Sample size	Deviance	Mode	Absent	Depressed	Strong	
1) root	1766	3530.00	A	(0.46720	0.39130	0.14160)	
2) mngclus:BR,FM,PA,PR1243	1243	2085.00	A	(0.60180	0.33950	0.05873)	
4) mtemp<6.822	365	696.50	D	(0.40000	0.49320	0.10680)	
8) hucorder<1.5	258	486.70	A	(0.47290	0.43020	0.09690)	*
9) hucorder>1.5	107	189.20	D	(0.22430	0.64490	0.13080)	
18) eru<11.5	95	153.10	D	(0.25260	0.67370	0.07368)	*
19) eru>11.5	12	16.30	S	(0.00000	0.41670	0.58330)	*
5) mtemp>6.822	878	1299.00	A	(0.68560	0.27560	0.03872)	
10) mtemp<10.1465	775	1203.00	A	(0.65160	0.30580	0.04258)	
20) elev<5493.5	731	1072.00	A	(0.67170	0.29820	0.03010)	
40) hucorder<0.5	383	442.90	A	(0.77280	0.21670	0.01044)	
80) mngclus:FM,PA	106	146.30	A	(0.53770	0.46230	0.00000)	*
81) mngclus:BR,PR	227	247.10	A	(0.86280	0.12270	0.01444)	*
41) hucorder>0.5	348	588.20	A	(0.56030	0.38790	0.05172)	
82) hucorder<144	308	537.80	A	(0.50320	0.43830	0.05844)	
164) mtemp<7.126	46	60.39	A	(0.78260	0.15220	0.06522)	*
165) mtemp>7.126	262	457.00	D	(0.45420	0.48850	0.05725)	*
83) hucorder>144	40	0.00	A	(1.00000	0.00000	0.00000)	*
21) elev>5493.5	44	94.47	D	(0.31820	0.43180	0.25000)	*
11) mtemp>10.1465	103	51.17	A	(0.94170	0.04854	0.00971)	*
3) mngclus:FG,FH,FW,PF,TL	523	1036.00	D	(0.14720	0.51430	0.33840)	
6) anadac<0.5	404	680.90	D	(0.05446	0.57920	0.36630)	
12) elev<3188	34	55.70	S	(0.23530	0.08824	0.67650)	*
13) elev>3188	370	580.60	D	(0.03784	0.62430	0.33780)	
26) rdgeo0<0.118466	89	148.50	S	(0.04494	0.40450	0.55060)	*
27) rdgeo0>0.118466	281	408.00	D	(0.03559	0.69400	0.27050)	*
7) anadac>0.5	119	252.40	A	(0.46220	0.29410	0.24370)	*

* denotes terminal node

Steelhead status

Summary

Variables used in tree construction: "hucorder" "dampass" "elev" "eru" "rdgeo0"
Number of terminal nodes: 17
Residual mean deviance: 0.8778 = 1175 / 1338
Misclassification error rate: 0.1528 = 207 / 1355

Figure B.6 Tree structure

Node) Split criterion	Sample size	Deviation	Mode	Absent	Depressed	Migration	Strong
1) root	1355	2400.00	D	(0.13140	0.68710	0.16680	0.01476)
2) hucorder<21.5	1064	1419.00	D	(0.16730	0.78480	0.02914	0.01880)
4) hucorder<0.5	563	809.20	D	(0.26110	0.70870	0.00888	0.02131)
8) dampass<3.5	144	104.60	D	(0.03472	0.90970	0.00000	0.05556)
16) elev<4935.5	116	41.22	D	(0.04310	0.95690	0.00000	0.00000)*
17) elev>4935.5	28	33.50	D	(0.00000	0.71430	0.00000	0.28570)*
9) dampass>3.5	419	628.30	D	(0.33890	0.63960	0.01193	0.00955)
18) elev<3432.5	66	92.16	A	(0.66670	0.31820	0.01515	0.00000)*
19) elev>3432.5	353	499.30	D	(0.27760	0.69970	0.01133	0.01133)
38) eru<6.5	152	150.80	D	(0.13160	0.84870	0.00658	0.01316)
76) eru<5.5	54	85.38	D	(0.35190	0.61110	0.00000	0.03704)*
77) eru>5.5	98	22.30	D	(0.01020	0.97960	0.01020	0.00000)*
39) eru>6.5	201	317.00	D	(0.38810	0.58710	0.01493	0.00995)
78) rdgeo0<0.0206938	71	83.25	D	(0.21130	0.77460	0.01408	0.00000)*
79) rdgeo0>0.0206938	130	215.90	A	(0.48460	0.48460	0.01538	0.01538)
158) elev<6237.5	70	121.50	D	(0.32860	0.61430	0.02857	0.02857)*
159) elev>6237.5	60	76.38	A	(0.66670	0.33330	0.00000	0.00000)*
5) hucorder>0.5	501	513.70	D	(0.06188	0.87030	0.05190	0.01597)
10) elev<1427	19	29.11	M	(0.05263	0.26320	0.68420	0.00000)*
11) elev>1427	482	422.50	D	(0.06224	0.89420	0.02697	0.01660)*
3) hucorder>21.5	291	369.00	M	(0.00000	0.32990	0.67010	0.00000)
6) hucorder<121	127	170.30	D	(0.00000	0.60630	0.39370	0.00000)
12) elev<1053.5	9	0.00	M	(0.00000	0.00000	1.00000	0.00000)*
13) elev>1053.5	118	152.40	D	(0.00000	0.65250	0.34750	0.00000)
26) eru<6.5	51	28.04	D	(0.00000	0.92160	0.07843	0.00000)*
27) eru>6.5	67	92.15	M	(0.00000	0.44780	0.55220	0.00000)
54) hucorder<65	54	74.19	D	(0.00000	0.55560	0.44440	0.00000)
108) elev<4564.5	24	26.99	M	(0.00000	0.25000	0.75000	0.00000)*
109) elev>4564.5	30	30.02	D	(0.00000	0.80000	0.20000	0.00000)*
55) hucorder>65	13	0.00	M	(0.00000	0.00000	1.00000	0.00000)*
7) hucorder>121	164	117.60	M	(0.00000	0.11590	0.88410	0.00000)
14) dampass<2.5	16	19.87	D	(0.00000	0.68750	0.31250	0.00000)*
15) dampass>2.5	148	62.24	M	(0.00000	0.05405	0.94590	0.00000)*

* denotes terminal node

Ocean-type chinook salmon status

Summary

Variablesused in tree construction: "hucorder" "elev" "dampass" "eru"
Number of terminal nodes: 11
Residual mean deviance: 0.5208 = 116.1 / 223
Misclassification error rate: 0.07265 = 17 / 234

Figure B.7. Tree structure

Node) Split criterion	Sample size	Deviation	Mode	Absent	Depressed	Migration	Strong
1) root	234	585.00	A	(0.4444	0.21790	0.25210	0.08547)
2) hucorder<1080	171	365.00	A	(0.6082	0.20470	0.07602	0.11110)
4) hucorder<5.5	90	81.49	A	(0.8667	0.02222	0.11110	0.00000)
8) elev<2113	23	31.490	A	(0.5652	0.00000	0.43480	0.00000)
16) dampass<3.5	9	6.279	M	(0.1111	0.00000	0.88890	0.00000)*
17) dampass>3.5	14	11.48	A	(0.8571	0.00000	0.14290	0.00000)*
9) elev>2113	67	17.99	A	(0.9701	0.02985	0.00000	0.00000)*
5) hucorder>5.5	81	193.20	D	(0.3210	0.40740	0.03704	0.23460)
10) dampass<7.5	34	75.77	S	(0.2353	0.14710	0.05882	0.55880)
20) eru<3.5	14	11.48	S	(0.0000	0.00000	0.14290	0.85710)*
21) eru>3.5	20	43.22	A	(0.4000	0.25000	0.00000	0.35000)
42) dampass<2.5	11	14.42	S	(0.0000	0.36360	0.00000	0.63640)
84) elev<1888.5	6	0.000	S	(0.0000	0.00000	0.00000	1.00000)*
85) elev>1888.5	5	5.004	D	(0.0000	0.80000	0.00000	0.20000 *
43) dampass>2.5	9	6.279	A	(0.8889	0.11110	0.00000	0.00000)*
11) dampass>7.5	47	71.26	D	(0.3830	0.59570	0.02128	0.00000)
22) elev<3145.5	30	28.06	D	(0.1000	0.86670	0.03333	0.00000)*
23) elev>3145.5	17	12.32	A	(0.8824	0.11760	0.00000	0.00000)*
3) hucorder>1080	63	81.08	M	(0.0000	0.25400	0.73020	0.01587)
6) elev<2103.5	46	9.635	M	(0.0000	0.00000	0.97830	0.02174)*
7) elev>2103.5	17	7.606	D	(0.0000	0.94120	0.05882	0.00000)*

* denotes terminal node

Stream-type chinook salmon status

Summary

Variables used in tree construction: "hucorder" "mtemp" "elev" "rdgeo0" "dampass" "rdmean0" "eru"
Number of terminal nodes: 17
Residual mean deviance: 1.107 = 1399 / 1264
Misclassification error rate: 0.2272 = 291 / 1281

Figure B.8. Tree structure

Node) Split criterion	Sample size	Deviation	Mode	Absent	Depressed	Migration	Strong
1) root	1281	2756.00	A	(0.44420	0.35910	0.19050	0.00625)
2) hucorder<29.5	1006	1670.00	A	(0.55670	0.40760	0.02783	0.00795)
4) hucorder<0.5	509	627.30	A	(0.76230	0.21810	0.01965	0.00000)
8) mtemp<5.7595	340	454.30	A	(0.69120	0.29710	0.01176	0.00000)*
9) mtemp>5.7595	169	127.00	A	(0.90530	0.05917	0.03550	0.00000)
18) elev<1537.5	16	17.99	A	(0.75000	0.00000	0.25000	0.00000)*
19) elev>1537.5	153	94.94	A	(0.92160	0.06536	0.01307	0.00000)*
5) hucorder>0.5	497	854.40	D	(0.34610	0.60160	0.03622	0.01610)
10) mtemp<7.461	365	545.30	D	(0.22190	0.72880	0.02740	0.02192)
20) rdgeo0<0.8215135	211	289.40	D	(0.16110	0.78200	0.03791	0.01896)
40) dampass<3.5	17	29.71	D	(0.11760	0.64710	0.00000	0.23530)*
41) dampass>3.5	194	237.50	D	(0.16490	0.79380	0.04124	0.00000)
82) hucorder<11.5	166	191.50	D	(0.19280	0.78920	0.01807	0.00000)
164) rdgeo0<0.0645532	97	83.42	D	(0.10310	0.87630	0.02062	0.00000)*
165) rdgeo0>0.0645532	69	96.07	D	(0.31880	0.66670	0.01449	0.00000)
330) elev<5682.5	31	28.34	D	(0.09677	0.87100	0.03226	0.00000)*
331) elev>5682.5	38	52.68	A	(0.50000	0.50000	0.00000	0.00000)*
83) hucorder>11.5	28	26.28	D	(0.00000	0.82140	0.17860	0.00000)*
21) rdgeo0>0.8215135	154	243.40	D	(0.30520	0.65580	0.01299	0.02597)*
11) mtemp>7.461	132	204.00	A	(0.68940	0.25000	0.06061	0.00000)
22) eru<3.5	19	31.34	D	(0.21050	0.68420	0.10530	0.00000)*
23) eru>3.5	113	150.00	A	(0.76990	0.17700	0.05310	0.00000)*
3) hucorder>29.5	275	336.40	M	(0.03273	0.18180	0.78550	0.00000)
6) hucorder<57.5	77	141.90	M	(0.09091	0.37660	0.53250	0.00000)
12) mtemp<8.8675	63	86.05	M	(0.00000	0.42860	0.57140	0.00000)*
13) mtemp>8.8675	14	27.78	A	(0.50000	0.14290	0.35710	0.00000)*
7) hucorder>57.5	198	155.80	M	(0.01010	0.10610	0.88380	0.00000)
14) dampass<2.5	16	19.87	D	(0.00000	0.68750	0.31250	0.00000)*
15) dampass>2.5	182	99.26	M	(0.01099	0.05495	0.93410	0.00000)*

* denotes terminal node

Notes

List of Acronyms

ASQ	Allowable Sale Quantity
AUM	Animal Unit Month
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
BMPs	Best Management Practices
BTUs	British Thermal Units
CFR	Code of Federal Regulations
CRBSUM	Columbia River Basin SUccession Model
EIS	Environmental Impact Statement
EEIS	Eastside EIS Planning/Management Area
EPA	Environmental Protection Agency
ERU	Ecological Reporting Units
ESI	Existing Scenic Integrity
FACA	Federal Advisory Committee Act
FEMAT	Forest Ecosystem Management Assessment Team
FIRE	BEA designation; Finance, Insurance and Real Estate industries
FS	Forest Service
FSH	Forest Service Handbook
GIS	Geographic Information System
GPM	General Planning Model
GSP	Gross State Product
HUCs	Hydrologic Unit Codes
LWD	Large Woody Debris
ICBEMP	Interior Columbia Basin Ecosystem Management Project
ICRB	Interior Columbia River Basin
INFISH	Inland Native Fish Strategy
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWFP	Northwest Forest Plan
PACFISH	Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and portions of California
PILT	Payments in Lieu of Taxes
RAC	Resource Advisory Committee
RHCA	Riparian Habitat Conservation Area
RMA	Riparian Management Area
ROS	Recreation Opportunity Spectrum
PVG	Potential Vegetation Group
PVT	Potential Vegetation Type
RVD	Recreation Visitor Day
SER	Species-Environment Relations (database)
SIC	Standard Industrial Code
SIT	Science Integration Team
TES	Threatened and Endangered Species
UCRB	Upper Columbia River Basin EIS Planning/Management Area
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Metric Conversion

Mile (mi)=1.61 Kilometers (km)

Kilometer (km)=.62 Miles (mi)

Square Kilometers (km^2)=.39 Square Miles (mi^2)

Centimeter (cm)=.3937 Inches (in)

Meter (m)=3.28 Feet (ft)

Hectare (ha)=10,000 Square Meters (m^2)

Hectare (ha)=2.47 Acres (ac)

Acre (ac)=43,560 Square Feet (ft^2)

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The Evaluation of EIS Alternatives by the Science Integration Team describes the outcomes, interactions, effects, and consequences likely to result from implementing seven different management strategies on Forest Service (FS) and Bureau of Land Management (BLM) administered lands within the Interior Columbia Basin and portions of the Klamath and Great Basins. Two environmental impact statement teams developed seven alternative approaches to the management of forest, rangeland, aquatic, and watershed systems of FS- and BLM- administered lands. The alternatives varied from continuation of current management, to managing biodiversity within a network of large reserves, to actively managing to restore ecosystem health and integrity. Continuing with current management direction, in the absence of interim protection measures, results in continued declining trends in ecological integrity and increasing risk to species. No single alternative was found to result in improved outcomes for all species, reduced risk to ecological integrity, and improved resiliency for social and economic systems. Alternatives that prioritize activities to restore and/or maintain ecological integrity and simultaneously provide desired goods and services within the capability of the ecosystem appear to have favorable trends in most species outcomes, landscape functions, and resiliency in social and economic systems. The Draft and Final Environmental Impact Statements are expected to differ to some extent from the preliminary Draft Environmental Impact Statement analyzed for this evaluation.

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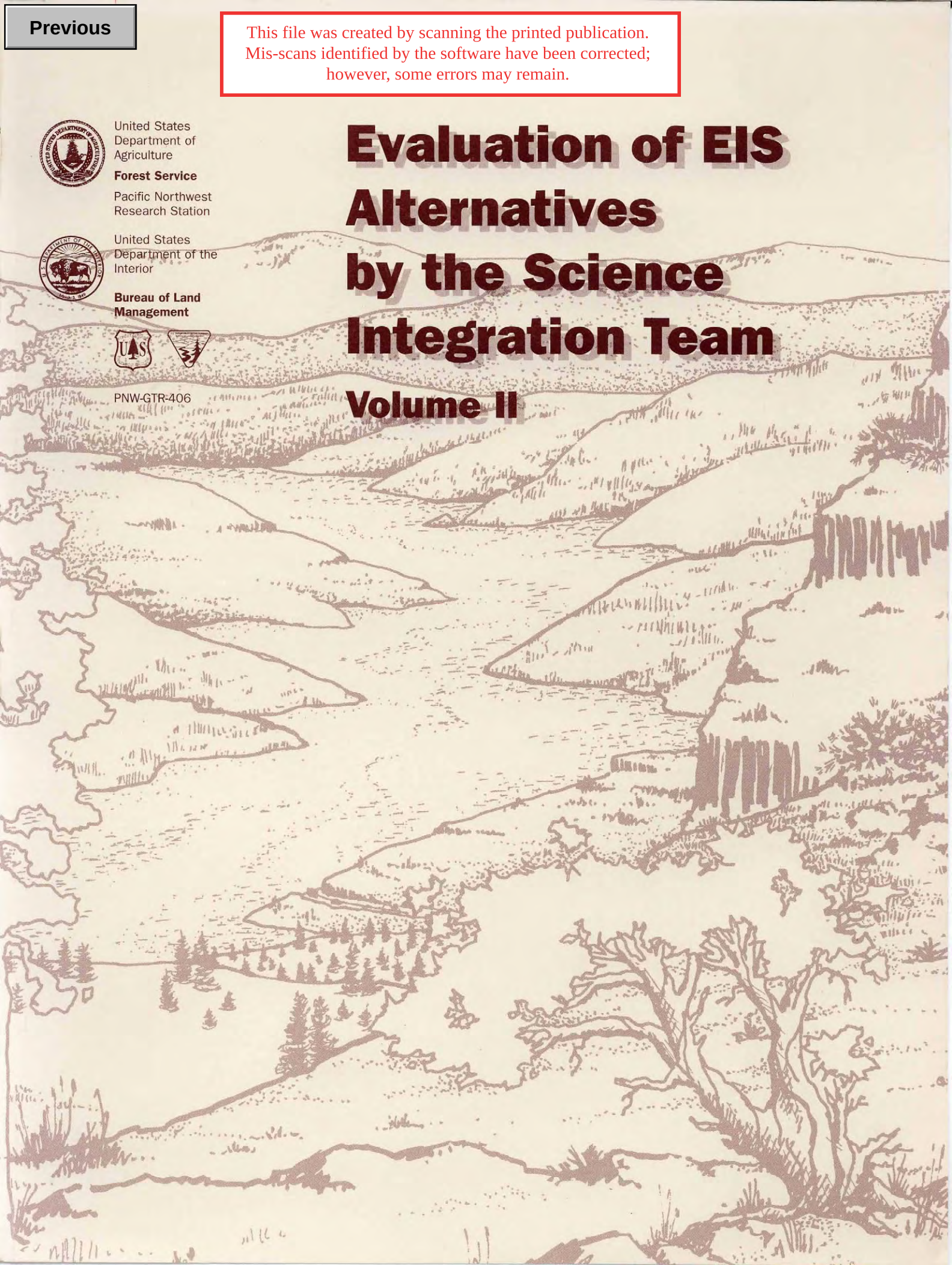
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Volume II



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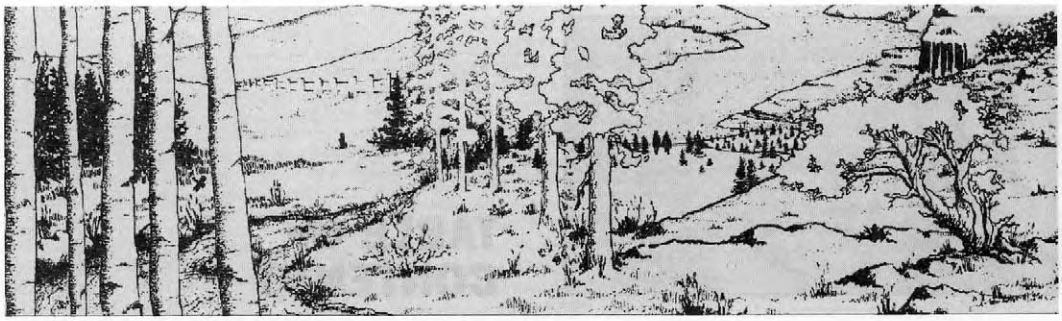
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Thomas M. Quigley, Kristine M. Lee,
and Sylvia J. Arbelbide
Technical Editors

Thomas M. Quigley is a range scientist/economist with the USDA Forest Service, Pacific Northwest Research Station, Walla Walla, WA 99362

Kristine M. Lee is a biologist with the USDA Forest Service, Intermountain Region, Ogden, UT 84401

Sylvia J. Arbelbide is a geologist with the USDA Forest Service, Pacific Southwest Region, San Francisco, CA 94111

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United States Department of Agriculture
Forest Service
Pacific Northwest Research Station
Portland, Oregon

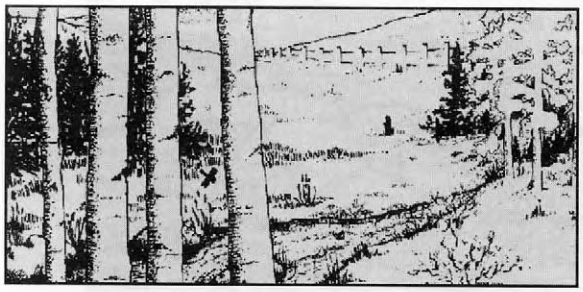


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CHAPTER 4

Historical and Current Status of Terrestrial Species and the Effects of Proposed Alternatives

John F. Lehmkuhl
Martin G. Raphael
Richard S. Holthausen
J. Randal Hickenbottom
Robert H. Naney
J. Stephen Shelly



John F. Lehmkuhl is a wildlife ecologist with the USDA Forest Service, Pacific Northwest Research Station, Wenatchee, WA.

Martin G. Raphael is a research wildlife biologist with the USDA Forest Service, Pacific Northwest Research Station, Olympia, WA.

Richard S. Holthausen is a wildlife ecologist with the USDA Forest Service, Rocky Mountain Research Station, Flagstaff, AZ.

J. Randal Hickenbottom is a wildlife biologist with the USDA Forest Service, Pacific Northwest Region, Portland, OR.

Robert H. Naney is a wildlife biologist with the USDA Forest Service, Okanogan National Forest, Okanogan, WA.

J. Stephen Shelly is a regional botanist with the USDA Forest Service, Northern Region, Missoula, MT.

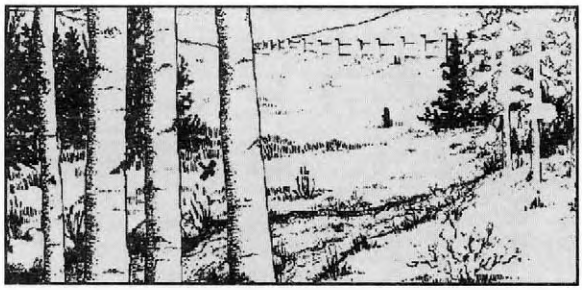


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Methods for Assessing Effects on Terrestrial Species

The purpose of this analysis is to provide an assessment of the degree to which habitat conditions on lands administered by the Forest Service (FS) and Bureau of Land Management (BLM) within the Basin[1] contribute to long-term persistence (at least 100 years) of plants and animals. Secondarily, we examine the extent to which other lands and other influences might affect populations of species over and above the influences of habitat conditions on federally administered lands. This assessment is not a quantitative population viability analysis as it does not employ an explicit model of genetic or demographic risk to species persistence. Rather, we view our assessment as a structured and reasoned series of judgments about projected amounts and distributions of habitat and the likelihood that such habitat would allow populations of selected species to persist over the long run. The assessment meets the essential criterion of a population viability analysis, to provide an estimate of the likelihood that a population will persist to some arbitrarily chosen future time (Boyce 1992). However, it does so through the use of structured professional judgment rather than through the use of population projection models. The methodology and its limitations are discussed below.

Methods for Assessing Species and Habitat Outcomes Under the Preliminary Draft EIS Alternatives

The process for assessing species and habitat outcomes in the Columbia River Basin drew on previous efforts, such as that conducted by the Forest Ecosystem Management Assessment Team (FEMAT) in 1993, and also drew substantially on efforts made as part of the Interior Columbia Basin Ecosystem Management Project (ICBEMP) assessment during 1994 and 1995. The objective of this assessment was to provide decision makers with as much information as possible about the expected effects of the preliminary draft Environmental Impact Statement (EIS) alternatives on species habitats and populations (appendix I). This assessment does not provide a quantified measure of viability, but instead, provides information needed to assess alternatives relative to the National Forest Management Act, the Endangered Species Act, the National Environmental Policy Act, and other decision criteria.

Overview of the assessment process — Assessments were based on expert opinion concerning the likely outcome for species and their habitats under a variety of possible management alternatives. Expert judgments were solicited from eight expert panels (appendix 4-A). The panels were provided with the following information:

(A) Species information

- Maps of species' ranges within the Basin.[2]
- Maps of vascular plant species' locations.[2]
- Tables of species' habitat associations.[2]

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Source: Species-Environment Relations (SER) database. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

- Information on documented population declines or increases.[3]
- Information on general species' abundance.[3]
- Information on species' demographic characteristics, where known.[3]

(B) Information on the alternatives

- Extent of species' habitats, as defined by vegetation communities, at three points in time (under historic conditions, under current conditions, and under conditions projected 100 years into the future) under each of the alternatives.[4]
- Maps of management prescription allocations by alternative.[4]
- Maps and tables of vegetative community types projected over the next 100 years.[4]
- Information on types of land management activities planned under each of the alternatives.[4]
- Tables showing the amount of area that would be affected by activities under each alternative.[4]
- Qualitative estimates of grazing effects, fire effects, and the extent of silvicultural activities under each of the land management prescriptions which were made by the Landscape Team. These estimates would be used to implement the alternatives.
- Maps of biological reserves for alternatives where new reserves would be designated.[5]
- Descriptions of riparian management strategies for each alternative.[5]
- Specific standards under which activities will be conducted.[5]

Species' habitat area tables, provided to the panels, were developed using (1) the habitat relations contained within the SER database, and (2) the vegetation projections completed for the landscape analysis (see footnote 4). The SER database was used to determine which vegetation types are suitable habitat for the species. The areas of suitable vegetation types (that is, within the species' ranges) were then summed. The projections made for the landscape analysis and used for this assessment incorporated management effects, successional processes, and stochastic effects such as insect irruptions and large-scale wildfires.

Based on the above information, the experts were asked to make judgments about the likely distribution of each species and its habitat. Judgments were made for each of the three timeframes (historic, current, and future) under each preliminary draft EIS alternative (see appendix I). These judgments were made separately for each of the two EIS areas, eastern Oregon/Washington EIS (EEIS), and the Upper Columbia River Basin (UCRB) EIS. For each timeframe and EIS area, the experts were asked to make two distinct judgments. The first judgment rated the likelihoods of species' distribution, based only on habitat conditions on Federal lands and the natural history characteristics of the species. The second judgment was a cumulative effects analysis of the likely condition of species' populations across all ownerships in each of the two EIS areas. This took into account habitat conditions across all ownerships, natural history of the species, and all other influences on the species (for example, water pollution

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[3]Sources: SER database and species-specific literature reviews. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[4]Source: Chapter 2. Landscape Ecology, Landscape Team projections of vegetation.

[5]Source: (Chapter 3, Description of Alternatives). U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management. February 1996. Interior Columbia Basin Ecosystem Management Project; Upper Columbia River Basin Preliminary Draft Environmental Impact Statements. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

and trapping). Thus, the first judgment was based on the likely effect that Federal land habitat conditions would have on the species; whereas, the second judgment was directed toward the actual population, and considered all lands and other influences.

Expert judgments were registered through a process of likelihood voting, using a structured outcome scale. The outcome scale depicted five distinct possible outcomes for each species and/or its habitat, described in detail in the "Outcome scale" section below. The individual outcomes represented points along a gradient ranging from a broadly-distributed condition with a high likelihood of persistence, to a poorly-distributed condition with a high likelihood of extirpation. For each judgment, each expert spread 100 likelihood votes across these five outcomes. Any distribution of the votes was considered legitimate, as long as all 100 votes were used. Placing 100 votes on a single outcome indicated much certainty in that outcome. Spreading the votes among several outcomes indicated less certainty in any one outcome.

The uncertainty reflected in the likelihood voting technique stemmed from different sources in the historic, current, and future judgments. In the historic judgment, sources of uncertainty included the historic habitat projection and the knowledge of the relationship of species to that habitat. In the judgment of current condition, sources of uncertainty included the habitat maps, the current distribution and condition of species' populations, and the relationship of species to habitats. In future judgments, sources of uncertainty included the habitat projection, the relationship of species to habitat, and the unforeseen future events that might influence land management and the habitat response to that management.

Experts made their judgments independently after reviewing the information presented in the panel. Then, having made their initial independent judgments, the experts discussed the basis for their decisions. Following this discussion, final judgments were made which sometimes differed from the initial judgments. Consensus was not an objective of the process and was not sought.

Outcome scales —The following are the distinct outcomes that were used in the likelihood voting process to describe the likely species status that could be supported by habitat conditions. The first set of outcomes are those habitat conditions found on FS- and BLM-administered lands.

Outcome 1. Habitat is broadly distributed across the planning area with opportunity for continuous or nearly continuous occupation by the species and little or no limitation on population interactions.

Outcome 2. Habitat is broadly distributed across the planning area, but gaps exist within this distribution. Disjunct patches of habitat are typically large enough and close enough to other patches to permit dispersal among patches and to allow species to interact as a metapopulation.

Outcome 3. Habitat exists primarily as patches, some of which are small or isolated to the degree that species interactions are limited. Local subpopulations in most of the species' range interact as a metapopulation, but some patches are so disjunct that subpopulations in those patches are essentially isolated from other populations.

Outcome 4. Habitat is typically distributed as isolated patches, causing strong limitations for population interactions among patches and limited opportunity for dispersal among patches. Some local populations may be extirpated and rate of recolonization will likely be slow.

Outcome 5. Habitat is very scarce throughout the area with little or no possibility of interactions among local populations, strong potential for extirpations, and little likelihood of recolonization.

The second set is the cumulative effects outcome scale. The outcome scale for cumulative effects judgments is similar to the previously described scale, but differs in that it emphasizes actual conditions of populations. Outcomes are as follows:

Outcome 1. Populations are broadly distributed across the analysis area with little or no limitation on population interactions.

Outcome 2. Populations are broadly distributed across the analysis area but gaps exist within this distribution. Disjunct populations are typically large enough and close enough to other populations to permit dispersal among populations and to allow species to interact as a metapopulation.

Outcome 3. The species is distributed primarily as disjunct populations, some of which are small or isolated to the degree that species interactions are limited. Local subpopulations in most of the species' range interact as a metapopulation but some populations are so disjunct that they are essentially isolated from other populations.

Outcome 4. Populations are typically distributed as isolated sub-populations with strong limitations in interactions of sub-populations and limited opportunity for dispersal among patches. Some local populations may be extirpated, and rate of vacant habitat recolonization will likely be slow.

Outcome 5. Populations are highly isolated throughout the area with little or no possibility of interactions among local populations, strong potential for extirpations, and little likelihood of vacant habitat recolonization.

Panelists were instructed to consider these outcomes in an absolute way when making their judgments. For example, if habitat for a species on Forest Service- or BLM-administered land existed as two large patches separated by non-Federal land, and the species' natural history would limit interchange among those patches, the Federal land judgment would describe the resulting condition as Outcome 2. Similarly, if a species and its habitat existed in a naturally patchy condition, its historic condition would be described as Outcome 3 or 4, depending on the species' natural histories. Its current and future condition might decline to Outcomes 4 and 5, depending on past and proposed management. Some outcomes may not be applicable to all taxa. For example, many amphibians occur naturally in a localized or patchy distribution, and thus, never would occur in the conditions described in Outcomes 1, 2, or 3. This point was emphasized to the panelists in order to avoid the tendency to consider the "best possible" outcome for each taxon to be Outcome 1.

The term "habitat" in the outcome descriptions was defined as primary habitat capable of supporting a self-replacing population. Thus, the assessment was intended to focus on the pattern of source habitat, rather than mixing source and secondary habitats.

Factors considered in judgments—As noted earlier, the experts were asked to make a judgment based on Federal habitat and a cumulative effects judgment. They were instructed to base the Federal habitat judgment on species' response to the following factors:

1) amount and distribution of Federal habitat,

2) severe population decline associated with habitat, and

3) environmental stochasticity and natural catastrophes.

They were instructed to base the cumulative effects judgment on likely population response to all of the following factors:

1) Federal habitat,

2) severe population decline associated with habitat,

3) environmental stochasticity and natural catastrophes,

4) non-Federal habitat, and

5) non-habitat effects.

The following definitions of each of these factors were provided to the experts to help assure consistent interpretation.

Federal habitat: the amount and distribution of source habitat available to the species on BLM- or Forest Service-administered lands, within the EIS area, and at the specified time of the judgment.

Non-Federal habitat: the amount and distribution of source habitat available to the species on lands other than those administered by the BLM or Forest Service, within the EIS area, and at the specified time of the judgment.

Range outside plan area: that part of the species range that falls completely outside of the EIS area, and the associated influences stemming from that area. Ranges outside of the EIS area were only considered in judgments for species on the periphery of each EIS area. In these cases, failure to consider ranges outside the EIS area would have produced misleading judgments about population isolation.

Non-habitat effects: all influences on the species population that are not the direct result of habitat management. Examples would include hunting, illegal taking, pesticide effects, air pollution effects, fishing, and water pollution effects.

Severe population decline associated with habitat: this factor is included to reflect any bottleneck events caused by habitat reduction that are likely to occur prior to the specified time of the judgment, and which would influence the likelihood that the species population would still respond (in a predictable way, and at the specified time of the judgment), to habitat availability.

Environmental stochasticity and natural catastrophes: this factor is included to reflect random environmental variation that would influence the likelihoods of species attaining the specified outcomes. Such random variation could result from variations in climate and random effects of disturbance (such as, fire, insect activity, or wind).

The experts' judgment involved the way that a species would respond to these factors based on its life history characteristics. Life history characteristics include demographic characteristics, responses to varying qualities of habitat for specific life functions, types and ranges of seasonal and permanent movements, genetic characteristics, and biotic interactions (such as, competition, predation, and herbivory).

Analysis of the judgments—There were two primary analyses performed on the data derived from the expert panels. First, we calculated the mean likelihood scores for all experts for each of the outcomes. For example, if there were four experts on a panel, and their likelihood votes for Outcome 2, for a particular species were: 30, 30, 60, and 40, then the mean likelihood score would be 40. These mean likelihood scores were calculated for each of the judgments described above, and tables displaying these species means are included in the "Results" sections of this chapter.

To summarize mean likelihoods for each species, we also calculated a weighted mean outcome. This was calculated by assigning a value to each of the outcome categories (Outcome 1, value = 1; Outcome 2, value = 2; etc.), multiplying the mean likelihood of that outcome by its assigned value, adding these products for all outcomes, and then dividing by 100. The resulting weighted mean can be compared across time periods and across alternatives.

To display the weighted mean outcomes for groups of species, we developed simplified displays of the number of species that fell into each of five classes. These weighted mean outcome classes are used on many of the figures that accompany the text in this document.[6] The five classes are:

Outcome 1 includes weighted means from 1.00 to < 1.50

Outcome 2 includes weighted means from 1.50 to < 2.50

Outcome 3 includes weighted means from 2.50 to < 3.50

Outcome 4 includes weighted means from 3.50 to < 4.50

Outcome 5 includes weighted means from 4.50 to 5.00.

[6]The number of species that fell into each of these classes was determined from unrounded data. Data was rounded to the nearest tenth in the accompanying tables, and so can not be used to exactly replicate the outcome class information shown in the figures.

We also developed figures showing numbers of species for which outcomes improved, stayed the same, or declined under each of the alternatives, compared to the current outcomes. For these figures, species were only tallied as improving or declining if their weighted mean outcome changed by a value of at least 0.5, a value generally corresponding to one standard deviation of the mean outcome.

We assessed uncertainty around the weighted mean outcome scores by calculating the standard deviation (S.D.) of the distribution of likelihood points among the outcome classes for each species and each alternative:

$$S.D. = [\{\Sigma f_i x_i^2 - [(\Sigma f_i x_i)^2/n]\}/(n - 1)]^{-1/2}$$

where, f_i = likelihood in Outcome i,
i = 1, 2, 3, 4, or 5;
x_i = numerical outcome i ;
n = 100 (likelihood points).

Uncertainty of the results includes two components, variation of likelihood distributions among panelists and spread of likelihood points among outcomes by each panelist. Uncertainty would be low if panelists provided similar ratings, and if likelihoods were assigned to one outcome. We considered one standard deviation as a good measure of uncertainty in outcome scores. Assuming an approximately normal distribution of mean outcome scores, a range defined by mean outcome plus or minus one standard deviation would include about 68 percent of the expected distribution of scores. It should be recognized that the distribution of outcomes is on five discrete values, and therefore, is not continuous, and that standard deviations will be smaller when outcome likelihoods are distributed at the extremes of the distribution (that is, Outcomes 1 or 5).

We considered data gathered from the panels as input for the final results to be displayed in this chapter. When analyses had been completed, we reviewed them to insure that they reflected an adequate understanding of the alternatives and of the landscape being analyzed. Most of the final judgments reported here are identical to the results of the expert panels. However, there were a number of species (25) for which expert panel judgments proved to be inconsistent with projected habitat trends, or with the standards and guidelines of the alternatives. Such findings may have resulted from an unclear understanding of the management proposals, incomplete information on the effects of proposed management, or incomplete understanding of the species status within one or both EIS areas. In these situations, we provided final results different from the expert panels. The process of providing these final results involved a complete review of the data pertinent to the alternatives, a review of the panel notes and scores, a review of background literature on the species, consultation within the team, and, in some cases, consultation with additional species experts. These occurrences are footnoted in the results, discussed in the results for each species group, and displayed later in this chapter. Further documentation of the process of providing final results is on file with the ICBEMP.

The outcomes are projections of conditions for species and habitats at the specified points in time (historic, current, and 100 years in the future) under each alternative. In some cases, panelists chose to extend the period of the assessment beyond 100 years in order to fully account for the rate at which ecological processes would bring about changes in the landscape. Judgments were not made about trends in habitat or species' populations. Information about trends can be inferred through review of the judgments. The change from historic to current, and from current to future, under each alternative was determined by comparing the likelihoods or means of outcomes at each of those points in time.

Interpretation, Limitations, and Assumptions of the Analysis

Interpretation of results—This analysis does not provide a simple determination of what does and does not constitute a "viable" population. We consider this to be a strength of the process rather than a weakness. Previous experience has shown

that there are not simple thresholds for viability, particularly when assessments are done on a broad array of taxa. Rather than providing a simple determination, this analysis is intended to describe likely future conditions for species and habitats and to provide for comparison of those conditions to current and historic conditions.

Lack of a simple determination, however, adds complexity to the job of interpreting the results and using them in a decision-making framework. We recommend that interpretation of the results emphasizes a comparison of the projected future conditions under the alternatives to the historic and current conditions. Projected future conditions that produce outcomes similar to historic conditions should generally be considered as favorable. Similarly, projected future conditions that result in improvements from current conditions should be considered favorable, especially where current conditions are below historic conditions. Projected future conditions that result in declines from current conditions may be viewed as unfavorable, particularly if they indicate a significant increase in the likelihood that local populations will be isolated. For example, a change in weighted mean outcome from 3 to 4 should be considered a significant decrease. Any projected change that would result in a strong likelihood of species extirpation from a large portion of its range should be viewed as a serious concern. A change to a weighted mean outcome of 5 would indicate such a change. Changes in outcomes on Federal lands may weigh most heavily in consideration of the preliminary draft EIS alternatives. However, changes in cumulative effects should also be considered, particularly where there are opportunities for Federal lands to compensate for some level of the cumulative effect.

Uncertainty—Interpretation of results throughout this report must include a consideration of uncertainty. One measure of this uncertainty is indexed by the standard deviation of the frequency distribution of likelihoods among the outcome classes for each species. Based on analyses presented in detail in the "Summary" section of this chapter, we believe that variations of about plus or minus 0.5 weighted mean outcome units are most meaningful in comparisons of outcomes among single-species scenarios. Changes less than 0.5 are well within expected variation given the uncertainty in the outcome scores. For comparisons of mean outcomes computed from sets of species (such as amphibians or forest birds) much smaller differences may be meaningful and warrant consideration.

Limitations of the analysis—A variety of cautions must be applied to the interpretation of this analysis. These cautions fall into four areas: (1) broad geographic and time scale of the analysis, (2) resolution of the data and planning guidance, (3) limitations on ability to infer population results from habitat analysis, and (4) gaps in knowledge. These are briefly discussed below.

The scope of this analysis covers the entire ICBEMP assessment area. Habitat projections used in the analysis represent the summarized conditions found within species ranges in each of the EIS areas. For some species, it is possible, and even likely, that conditions within some smaller areas will be much better than the composite, and in others they will be much worse. This could have negative effects on species distribution that could not be predicted from the data reviewed here. Similarly, in making future projections we looked only at vegetation conditions at 10, 50, and 100 years, and did not review intermediate time periods. It is possible that conditions during intermediate times could be much worse, thus influencing the pattern of persistence of populations. This is most likely to happen in alternatives where aggressive actions are proposed over the short term, to begin returning systems to historic conditions.

The second caution relates to the resolution of data and the resolution of planning guidance. Habitat data reviewed for this assessment were broad in scope and represented only the macrohabitats with which each species is associated. Habitats that are distributed at finer scales (such as, riparian habitats) or are within stand microhabitat features (such as, snags and logs) were not

well represented by these data. As a consequence, assessment was difficult for species for which such habitats and features are important. Resolution of the planning guidance (that is, standards and guidelines, and prescriptions) given under each of the alternatives also limited the reliability of the analysis. In many areas, the planning guidance did not contain detailed prescriptions for management actions, or detailed information on how management actions and habitats would be distributed geographically across the landscape. As a consequence, much of this analysis had to be based on the intent of the alternatives, rather than on specific provisions. If one of these alternatives is implemented, additional analyses and guidance will be needed to design management actions that are consistent with the intent of the alternative and that would achieve the outcomes projected here.

The third caution relates to our ability to infer population consequences from habitat assessments. This caution is particularly strong for species whose populations are small and/or poorly distributed across the landscape. Conclusions on trends of habitats, particularly when extended to inferring potential effects on species, must be treated as tentative working hypotheses. The lack of specific data on population size, structure, and functional and numerical responses, requires that much inference has to be made from changes in habitat abundance and gross distribution patterns. Actual population response might differ.

The final caution relates to gaps in knowledge. Many of the species assessed here are poorly studied and inadequately understood. Their distribution, habitat associations, biotic interactions, and demographic statuses and characteristics are not well known. Likewise, successional dynamics and system interactions are incompletely understood for many vegetation types, and natural, large-scale disturbances cannot be accurately predicted. Projection reliability is reduced by these gaps in knowledge.

Assumptions used in analysis—As explained in the preceding "Limitations of analysis" section, many facets of the preliminary draft EIS alternatives were either not clear, or not explicit at the time that this analysis was conducted. In some situations, the Science Integration Team (SIT) had to make reasonable assumptions about the intent of the proposals. The following are the major assumptions used for the terrestrial species analysis:

1) Activities scheduled for the first 10 years of plan implementation would result in trends toward the desired future condition. This is especially important for roads under alternatives that call for both accelerated management activity and a reduction in road density.

2) Snag standards (both default and locally developed) will address snag number, diameter, height, decay class, species, distribution and replacement through time. Standards will be patterned after historic conditions for vegetation communities, but will include consideration of animal species' needs and current conditions (for example, landscapes that are currently deficient in snags, or that currently contain an abundance of snags). Standards will clearly specify how snags are to be treated under all types of prescriptions (such as, harvest, thinning, salvage, prescribed fire, etc.).

3) Down wood standards will address number and size (diameter and length) of pieces, species, distribution, and replacement through time. Standards will be patterned after historic conditions for vegetative communities, but will include consideration of animal species' needs and current conditions (for example, landscapes that are currently deficient in logs or that currently contain abundant logs). Standards will clearly specify how logs are to be treated under all types of prescriptions (such as, harvest, thinning, salvage, prescribed fire, etc.).

4) Consideration of plant and animal species will be a key component of the ecosystem analysis process used to implement the selected alternative. Habitat needs of species will be used to

help shape specific prescriptions and the scheduling and location of activities. Such considerations will be part of all prescriptions, including those designed to accomplish restoration objectives. A key consideration of ecosystem analysis will be projected changes in the availability of specific habitats through time. Actions that could reduce currently scarce or poorly distributed habitats will be carefully analyzed to insure that they will still allow species objectives to be met.

5) Appropriate vegetation patterning should be a key objective of restoration activities. Historic patterns of vegetative fragmentation and areas in juxtaposition will be used to establish stand and landscape objectives for vegetative restoration. Such considerations are particularly important where historic forest conditions included a fine-scale mix of different forest seral stages and tree densities, including small openings.

6) Restoration activities will be directed at all vegetation types, with priorities based on ecosystem analysis. Specific restoration activities should include aspen regeneration, cottonwood and willow regeneration and planting, and regeneration of all shrub species that were historically associated with upland and riparian shrub types, including juniper woodlands.

7) Restoration activities that are well studied and well understood will be pursued as aggressively under Alternative 6 as they are under Alternative 4.

8) Plant conservation strategies that have been approved will be applied in any alternative.

9) Standards will be applied in all alternatives to protect caves, cliffs, mines, and other bat roost sites and hibernacula.

Selection of Species for Analysis

The assessments described in this chapter were made for species for which some regional conservation concern existed or might exist in the future under any of the preliminary draft EIS alternatives. This focus was necessary due to time constraints. The criteria used to select species for assessment were:

1) Habitat for the species has declined historically or might decline in the future under any of the alternatives.

or

2) The species is associated with a specific habitat feature (such as, snags) that has declined in the past or might decline under any of the management alternatives.

or

3) The species' population has undergone a significant decline based either on data or on expert opinion.

and

4) The species is sufficiently widespread within the study area that it can be legitimately assessed at the scale of a regional plan.

Species were assessed if any of the first three criteria were true and Criterion 4 was true. The specific process used to select species within major taxonomic groups is discussed in subsequent sections. In these discussions, a clarification is needed on the status of species termed as "candidates" under the Endangered Species Act of 1973. Recent changes (Federal Register, February 28, 1996) have been made to the list of plant and animal species that are regarded as candidates (U.S. Government 1996). These changes dropped the classifications of Category 1 (C1), Category 2 (C2), and Category 3 (C3) candidates in favor of simply listing species as candidates for listing. Most of the species that were classified as Category 2 or 3 candidates, and 303 taxa that were Category 1 candidates are no longer included in the list of candidate species. A number of species discussed in this assessment are termed Category 2 because that was their status when our database was assembled. Of those species only two, mountain plovers and spotted frogs, were designated as can-

didates in the Federal Register notice. All others were dropped from the list of candidates. These changes are mentioned here only to clarify legal status. Change in status had no influence on our assessment process.

Non-vascular plants and allies—No regional viability analyses were done for non-vascular plants or allies (bryophytes, fungi, or lichens) under the preliminary draft EIS alternatives, and it is recommended that taxa in these species groups be considered for further analyses at finer geographic scales. The regional scale of the preliminary draft EIS alternatives, combined with a lack of detailed knowledge on the distribution of numerous non-vascular plants and allies, makes viability analysis problematic. Furthermore, the general nature of the alternatives and the standards and guidelines make it inappropriate to judge the fine-scale, site-specific effects of the alternatives on the taxa in these species groups.

There are no non-vascular plants or allies in the assessment area that are federally listed as endangered or threatened. Similarly, no non-vascular plants or allies in the assessment area are currently designated by the U.S. Fish and Wildlife Service (USFWS) as candidates for federal listing, although one lichen species, *Texosporium sancti-jacobi*, was formerly designated as a Category 2 candidate. This lichen is also the only non-vascular plant in the Basin that is designated as sensitive by the FS and the BLM. Contract reports specific to bryophytes (Christy and Harpel 1995), fungi (Castellano 1994, Fogel 1994, Miller 1994, Miller and Miller 1994, Weber 1994) and lichens (Eversman 1994, Hammer 1995, Kaltenecker and Wicklow-Howard 1994, McCune 1994, Rosentreter 1995, Ryan 1994, Wicklow-Howard 1994, Wicklow-Howard and Kaltenecker 1994) summarize the status of these species groups, and potentially rare taxa are discussed in each.

Vascular plants—During the compilation of information on vascular plants for the ICBEMP in 1994 and 1995, 164 plant taxa of rangewide conservation concern were evaluated with respect to their vegetation cover type associations, natural and human-caused threats to populations, and ecological characteristics (appendix 4-B). Each of these taxa was also categorized into one of five geographic distribution categories based on the nature of its distribution pattern within the Basin; these are defined as follows:

Local endemic (80 taxa): populations are restricted to a very small geographic area (such as, a single mountain range, a localized set of bedrock outcrops, etc.). These taxa are often also confined to highly specialized habitats.

Regional endemic (66 taxa): populations inhabit a larger geographic area than do local endemics (such as, southeast Washington and adjacent Idaho for certain Palouse endemics). These taxa may also be closely associated with certain habitats, but many of them are not ecologically specialized.

Scattered distribution (14 taxa): populations are sparsely distributed over a wide geographic area within the Basin. Their ranges often extend outside the Basin, but nowhere are they common elements on the landscape.

Disjunct (3 taxa): populations within the Basin are substantially separated geographically from the remainder of the taxon's range.

Peripheral (1 taxon): populations within the Basin lie on the margin of the taxon's range, but are geographically contiguous with that range.

The majority of these 164 vascular plant taxa are either locally endemic in their distribution pattern, or have broader distributions that are associated with highly specialized habitats. Outcomes for such taxa could not be appropriately analyzed at the broad scale of our evaluation, owing to the general nature of the alternatives and associated prescriptions. The viability and conservation of these narrowly distributed or ecologically restricted taxa are best addressed at the local or subregional level, that is, on the pertinent National Forest(s) or BLM unit(s), or by Ecological Reporting Units (ERU). Appropriate approaches in these cases include the development of species

conservation strategies or the incorporation of specific standards and guidelines into the management plans for those planning areas.

Thirty-seven of the rare vascular plant taxa were selected for possible assessment. Some of these species have a broad geographic distribution pattern in the Basin (such as, species of scattered distribution that are not habitat specialists). Other species were included regardless of their distribution pattern because they occur in two or more of the broad community groups that were ultimately used to combine the original vegetation cover types (such as, local or regional endemics that are not highly specialized with respect to habitat requirements). These taxa could appropriately be addressed across larger landscape areas, and with respect to the general alternatives proposed in the preliminary draft EISs. Exceptions to this approach included the assessment of three federally listed species. They were evaluated even though their geographic distribution pattern or highly specialized ecological relationships would have otherwise precluded rating them at the broad scale. These federally listed taxa included: *Howellia aquatilis* (threatened), an ecologically highly specialized species of scattered distribution; *Mirabilis macfarlanei* (threatened), a local endemic; and *Stephanomeria malheurensis* (endangered), a local endemic.

During the assessment process, 9 of the 37 taxa were dropped from further consideration for the reasons discussed below:

Antennaria arcuate has a scattered distribution, but only one occurrence in the Basin; species is not appropriately analyzed at the regional scale.

Aster mollis has a scattered distribution, but only one occurrence in the Basin; species is not appropriately analyzed at the regional scale.

Aster jessicae has no occurrences on BLM- or FS-administered lands.

Astragalus applegatei is federally listed as endangered, and is probably the most imperiled plant in Oregon, but, it has no occurrences on BLM- or FS-administered lands.

Lesquerella carinata var. carinata has no occurrences on BLM- or FS-administered lands in the Basin assessment area.

Lesquerella pulchella has no occurrences within the Basin.

Lupinus biddlei is no longer of rangewide conservation concern.

Mimulus patulus has specialized habitat requirements; species is not appropriately analyzed at the assessment scale.

Oryzopsis contracta is no longer of rangewide conservation concern.

Thus, 28 plant taxa of rangewide conservation concern that could appropriately be analyzed at the broad scale of the assessment were ultimately selected for outcome analysis. The remaining 127 taxa, including numerous more highly imperiled endemic or ecologically specialized plants, could not be meaningfully analyzed at this broad scale. These include many globally rare plant taxa designated as sensitive by either the Forest Service or the BLM. Appendix 4-B lists all 164 plant taxa and indicates those that were analyzed in this evaluation, those that were recommended for analysis at finer scale, and those that were dropped from consideration because they are not of conservation concern.

Detailed information on all taxa in five large vascular plant genera in the Basin is available in separate contract reports. These genera include Allium (McNeal 1995), *Botrychium* (Zika 1995), Carex (Brainerd and others 1995), *Mimulus* (Meinke 1995a) and *Penstemon* (Meinke 1995b). These reports provide detailed data on the biogeography, ecological relationships and status of both rare and common taxa in these genera.

The taxonomic status of one of the federally listed plant taxa, *Stephanomeria malheurensis*, has recently been changed in the literature. It is most currently treated as a synonym of a more common, wide-ranging species, *S. exigua* (Cronquist 1994). This taxonomic change may have a

bearing on the federal listing of the former taxon, but until the USFWS formally recognizes this change, the species will be addressed in the ICBEMP assessment as a federally listed taxon.

Invertebrates—No regional viability analysis was done for invertebrate species under the alternatives for the Basin assessment, and it is recommended that invertebrates be considered for analysis at finer scales. The regional scale of the EIS alternatives combined with a basic lack of knowledge of invertebrate species' distributions and habitat use makes viability analysis problematic. Moreover, the general nature of the alternatives and the standards and guidelines would make it inappropriate to judge the fine-scale, site-specific effects of the alternatives on invertebrates.

There are no terrestrial invertebrates that are federally listed as endangered or threatened in the assessment area. No terrestrial invertebrates are listed as Federal C1 Candidate species, although 19 terrestrial species are listed as Federal C2 Candidate species (table 4.1). The Forest Service does not list any terrestrial invertebrates in their regional sensitive species lists. BLM regional offices list six sensitive invertebrate species (table 4.1). Experts have identified additional unlisted species as rare or endemic in the assessment area. These species are listed and discussed in the Terrestrial Ecology chapter of the *Assessment of Ecosystem Components* (Marcot and others, in press), and in ICBEMP detailed contract reports.[7]

Vertebrates—The Species-Environment Relations (SER) database developed for the Basin analysis lists 548 vertebrate species that occur within the assessment area during some part of their life history. We followed a step-wise process to determine which of these should be analyzed in this evaluation. The selection process used information gathered in the SER database (species range, status, and habitat relationships), and the results of a preliminary evaluation of habitat and population changes for all species both historically and under the preliminary alternatives done in October and November 1995.[8]

We initially placed species in four groups: group 1 included species for which analysis should be conducted at finer scale; group 2 included species whose outcomes appear secure and for which analysis was not deemed necessary; group 3 included species for which analysis was clearly appropriate; and, group 4 included species which did not fall in any of the other three categories. We then examined species in the fourth group individually. Appendix 4-C displays the judgments made about analysis of each of the vertebrate species contained in the SER database.

The first group consisted of species that are locally endemic within the Basin and for which analysis at finer scales was considered most appropriate. Locally endemic populations restricted to a very small area (for example, one portion of a mountain range, or canyon) may also be restricted to very specialized habitats and have distributions entirely within the Basin evaluation area.

The second group, species for which no further analysis was considered necessary, included widely distributed species that are common or abundant, have had no recorded population or habitat declines during the historical period, and are not expected to experience habitat declines under the preliminary draft EIS alternatives (preliminary analysis of alternatives[9]). These widespread and abundant species are typically habitat generalists and are considered unlikely to be affected by federal land management alternatives on a regional scale.

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[7]Contract reports, on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[8]On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

[9]Preliminary Draft EIS alternatives, on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

Table 4.1. U.S. Fish and Wildlife Service Federal Category 2 Candidate and BLM sensitive invertebrate species.

Class/Order	Genus & Species	USFWS C2	BLM Sensitive
Arachnida, Pseudoscorpionida			
Gastropoda	*Apochtonius malheuri*	C[1]	
	Acroloxus coloradensis	C	
	Cryptomastix magnidentata	C	
	Discus marmorensis	C	
	Megomphix lutarius		C
	Monadenia felis minor	C	C
	Oreohelix idahoensis idahoensis	C	
	Oreohelix jugalis	C	
	Oreohelix nevadensis	C	
	Oreohelix strigosa delicata		C
	Oreohelix strigosa honiogyra	C	
	Oreohelix vortex	C	
	Oreohelix waltoni	C	
Insecta, Coleoptera	*Agonum belleri*	C	
	Cicindela arenicola	C	
	Glacicavicola bathyscoides	C	
	Nebria gebleri fragariae		C
	Nebria vandykei wyeast		C
Insecta, Lepidoptera	*Charidryas acastus dorothyea*		C
	Euphilotes rita mattonii	C	
	Limenitis archippus lahontani	C	
	Polites sabuleti sinemaculata	C	
	Polites mardon	C	
Insecta, Orthopera	*Acrolophitus pulchellus*	C	

[1]C = currently listed

In addition, no analysis was considered necessary for bird species that are irregular visitors within the Basin and do not depend on habitats within the evaluation area for key life functions. Federal habitat management within the Basin was considered to have little effect on viability of these species.

The third group, species for which analysis was considered mandatory, included federally listed or candidate species, or species that have been the subject of lawsuits. Species listed as sensitive by the Forest Service or BLM were also designated for analysis unless deemed most suitable for fine-scale analysis or considered to be little affected by Federal habitat management.

Species that did not fall in any of the first three groups were examined individually to determine if there were sufficient concerns about their outcomes in the Basin to warrant detailed analysis. Information used in this assessment included published reports, the SER database, the initial evaluation of alternatives conducted in 1995, and any existing data on population trends. Species were generally selected for analysis if they were known or expected to have experienced significant habitat or population declines in the past, or were associated with habitats expected to decline under one or more alternatives. Species were generally not selected for analysis if they were common, abundant, or associated with habitats considered to be secure. Some species whose ranges are predominantly outside the Columbia River Basin were

not further analyzed because actions within the Basin were considered of little consequence to their viability. These species were generally placed in the category of those requiring finer-scale assessments.[10]

No special consideration was given to socially or economically important species (such as, big game mammals and game birds), or to tribal-emphasis species that were not selected for the previously mentioned ecological reasons. In many cases, such species are widespread and relatively common or abundant, and there is little concern for their viability within the Basin. Issues of harvestability were outside the scope of our outcome analysis and would require a different evaluation process.

Table 4.2 shows the number of vertebrate species in each class that were deemed appropriate for regional or fine-scale analysis and for no further analysis. There were 173 vertebrate species selected for analysis in this evaluation. Species not selected for viability analysis numbered 335. Forty species were recommended for analysis in finer-scale planning processes.

Effects of Options on Terrestrial Species

Vascular Plants

Introduction—The 28 vascular plants that were selected for analysis include 19 regionally endemic species, 4 locally endemic species, and 5 species with scattered distributions. Twenty-five of these taxa were selected because of rangewide conservation concerns, and because they could be reasonably analyzed on a broad scale with respect to the general nature of the alternatives, as discussed in the methods section immediately below. The remaining three taxa were selected because they are federally listed.

Four of the regional endemics (*Astragalus mulfordiae, A. oniciformis, A. solitarius, A. yoder-williamsii*) were selected because they occur in upland shrub habitats, especially *Artemisia* (sagebrush) shrublands, and are known either to have suffered population declines or are expected to decline under some of the draft alternatives. Four regional endemics (*Calochortus nitidus, Haplopappus liatriformis, Polemonium pectinatum, Silene spaldingii*) are associated with the Palouse grasslands, and are also known to have suffered severe population losses throughout all or a significant portion of their historic range as these grasslands were largely

Table 4.2. Tally of vertebrate species showing those selected for detailed analysis; those for which analysis at finer scale is most appropriate; and, those for which detailed analysis was not considered necessary.

	Analysis			
Vertebrate Class	EIS	Fine	No Analysis	Grand Total
Amphibians	7	3	17	27
Birds	133	9	220	362
Mammals	20	25	87	132
Reptiles	13	3	11	27
Grand Total	173	40	335	548

[10]Narratives describing the reasons for selection or rejection of species for analysis (ones not initially categorized by the rule sets) are on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

converted for agricultural use. The remaining 11 regional endemics (*Astragalus paysonii, Calochortus longebarbatus* var. *longebarbatus, Castilleja chlorotica, Collomia mazama, Grindelia howellii, Hackelia cronquistii, Lomatium suksdorfii, Mimulus pygmaeus, Mimulus washingtonensis* var. *washingtonensis, Penstemon glaucinus, Penstemon lemhiensis*) were selected because they are associated with common vegetation types and could thus be appropriately analyzed with respect to the general nature of the alternatives and associated prescriptions.

Two of the local endemics, (*Mirabilis macfarlanei, Stephanomeria malheurensis*) which otherwise would not have been analyzed because of their limited geographic ranges, were selected because they are federally listed. The other two local endemics (*Calochortus longebarbatus* var. *peckii, Trifolium thompsonii*) were selected, despite their restricted geographic ranges, because they occur in common community types that could potentially be affected by implementation of one or more of the alternatives.

One of the taxa (*Howellia aquatilis*) with a scattered distribution, would normally not have been analyzed because it is only found in a highly specialized habitat; however, it was selected because it is federally listed. The other four scattered taxa (*Botrychium ascendens, B. crenulatum, B. paradoxum, Cypripedium fasciculatum*) were selected because of their rangewide rarity, and because they occurred in common community types that could potentially be affected by implementation of one or more of the general alternatives.

Methods—The assessment panel consisted of three members of the Science Integration Team (appendix 4-A). Adequate information on the status and viability of the 28 taxa being assessed had been compiled during the extensive expert panels held in 1994 and 1995. This information was usually sufficient to assign ratings without having to convene an additional, larger panel. The earlier panels involved numerous botanists from all physiographic provinces in the Basin. During this evaluation, many of these experts were again consulted as questions arose regarding land ownership, or the ecological relationships of these taxa.

Methods used for vascular plant analysis were those described above in "Methods for Assessing Effects on Terrestrial Species." Population distribution data, available from the state-level network of Natural Heritage Programs and Conservation Data Centers, were used to create distribution maps. Spatial layers depicting management prescriptions for each EIS alternative were superimposed over the occurrence distribution maps of the plant taxa. For each species, tallies of the number of occurrences (by prescription and alternative) were then made in order to assess likely outcomes for each species under each alternative. In addition, vegetation community group changes (as predicted for the historical and current conditions, and for 100-year outcomes for each of the seven EIS alternatives) were taken into consideration in assessing species outcomes.

Because of their intrinsic geographic distributions, some of the five habitat and population outcomes used for this evaluation are not applicable to the rare vascular plants. Outcome 3 was found to be the most favorable outcome for most of the rare vascular plants. This was based on their evolutionary history and intrinsically patchy or limited distribution patterns (both ecologically and spatially) on the landscape. Outcome 1 was never found to apply to these rare vascular plant taxa, and Outcome 2 was thought to apply only for one species (*Cypripedium fasciculatum*) where the associated community types and broad distribution pattern of the populations suggested that a larger, contiguous set of habitats and populations could occur on the landscape.

In assigning outcomes to plant species on both Federal lands (FS and BLM) and for all ownerships (cumulative effects), habitat and population trends were considered only within the ranges of these rare plant taxa (as opposed to including suitable but unoccupied habitat that might occur outside these ranges, across a broader portion of the EIS areas). This is again related to the intrinsically restricted geographic ranges of most of these taxa.

Their evolutionary history and past climatic and geological influences have played a larger role in determining their distributions than has the presence of suitable habitat.

In assigning outcomes for certain species, it was assumed that conservation agreements that have been adopted by the Federal agencies would be implemented under all alternatives. These strategies would apply to populations and habitat on Federal lands only. Conservation agreements have been adopted for seven of the plant species analyzed here: *Astragalus mulfordiae, Calochortus longebarbatus* var. *longebarbatus, Castilleja chlorotica, Howellia aquatilis, Mimulus pygmaeus, Penstemon glaucinus, and Stephanomeria malheurensis.* In addition, it was assumed that appropriate National Environmental Protection Act (NEPA) analysis and mitigation would continue, for all species of conservation concern, during project analysis and implementation under all of the alternatives.

Results—Twenty-two of the vascular plant taxa analyzed occur on Forest Service- or BLM-administered lands in the EEIS area, and 15 of them occur on Federal lands in the UCRB EIS area. The number of these taxa in each outcome class, for historic and current conditions, and for each alternative after 100 years, is summarized for each EIS area in figure 4.1. Most taxa are in Outcome classes 3 and 4 for historic and current conditions, as well as for the expected outcomes for all alternatives.

Mean outcomes for each of the species are shown in table 4.3. The weighted mean outcomes, for both Federal lands and for the cumulative effects analysis, are summarized in table 4.4 and figure 4.2. The general trend for the 28 vascular plants

Figure 4.1 Vascular Plants

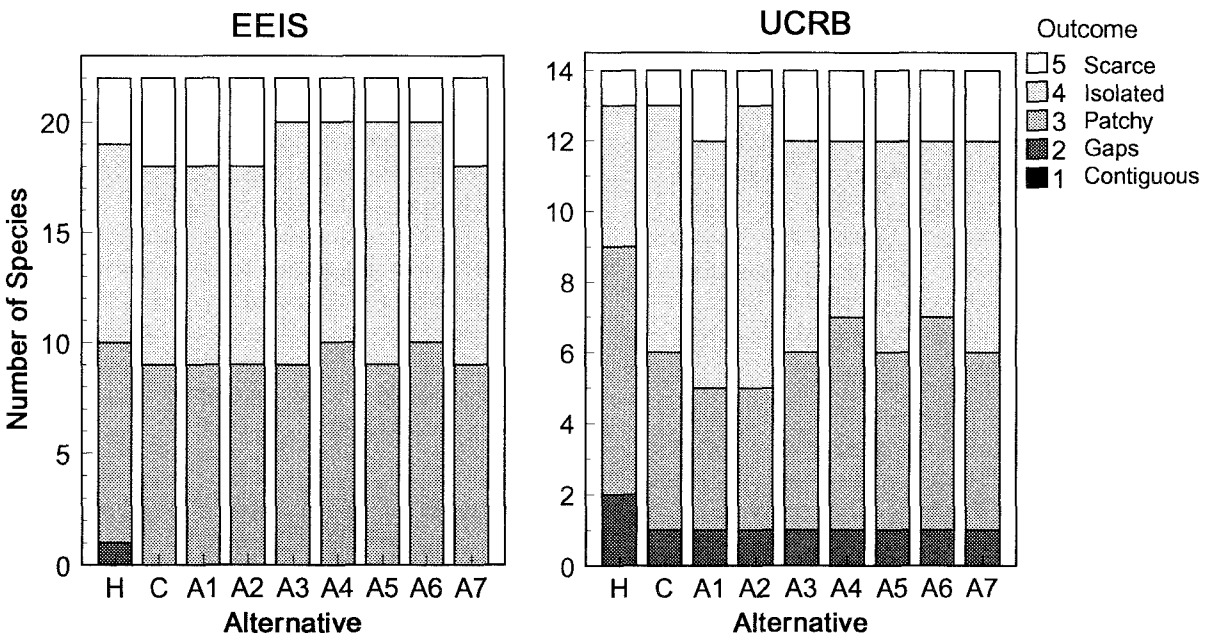


Figure 4.1. Frequency distribution of mean habitat outcome scores for 22 taxa of vascular plants in the EEIS planning area, and 14 taxa in the UCRB planning area, on Federal lands for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.2 Vascular Plants

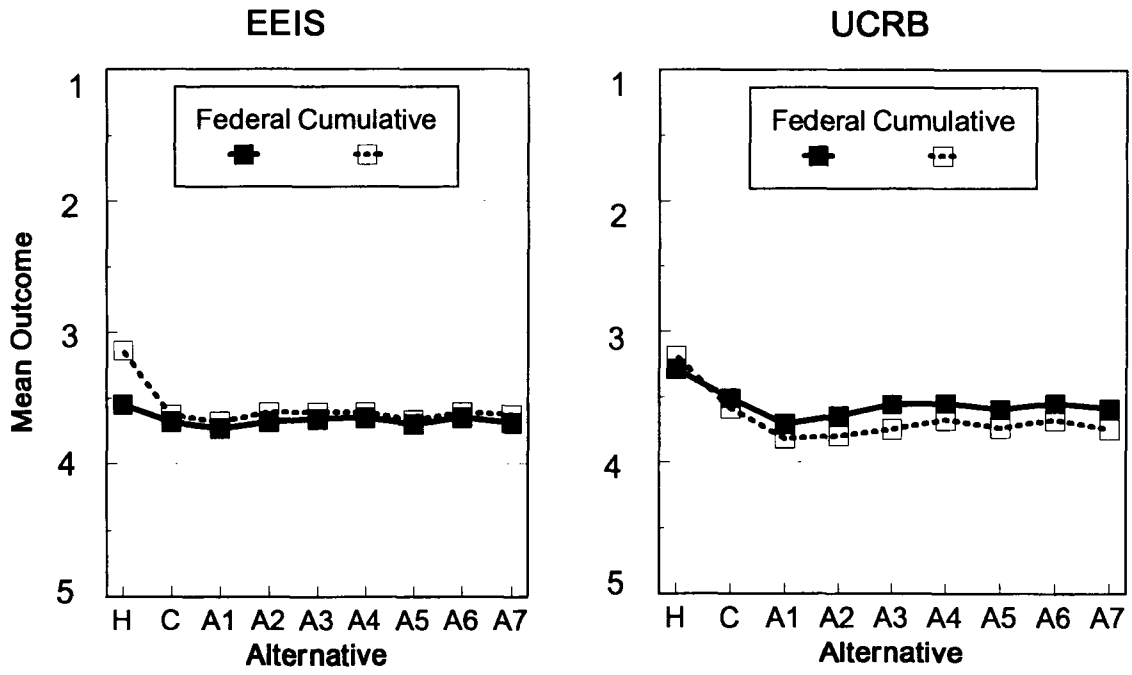


Figure 4.2. Mean outcome scores averaged over 28 vascular plant taxa in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

that were analyzed, on both Federal land and all ownerships, has been a decline in habitat and population integrity from the historical condition to the present. With respect to future conditions under all alternatives, however, the habitat and population integrity of these taxa is predicted to remain relatively unchanged at these reduced levels, but with some modest improvement predicted under Alternatives 2, 4, and 6.

The weighted mean outcomes are presented for seven individual plant taxa in figures 4.3 through 4.9. The specific outcomes for these are included because they exemplify general ecological and response characteristics of the vascular plants analyzed. These are discussed below.

Discussion—The declines from historic to current conditions for the 28 rare vascular plant taxa analyzed have generally resulted from habitat conversion or shifts in habitat suitability. Altered habitats are the result of successional changes, which can be attributed to fire suppression and other land management activities (such as, grazing, timber harvest). Projected change under the alternatives is expected to be smaller for plants than for animals, owing to the intrinsically patchy distributions and slower, more stochastic nature of dispersal that is typical of plants. Implementation of the ecosystem restoration approaches emphasized in Alternatives 4 and 6 is expected to provide more suitable conditions for these taxa over the next 100 years (fig. 4.1), but differences among alternatives for all plant species combined are slight (fig. 4.2).

Table 4.3. Mean likelihood scores of viability outcomes for selected species of vascular plants for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Astragalus mulfordiae	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	60	30	50	50	65	50	65	50
		4	20	40	60	40	40	25	40	25	40
		5	0	0	10	10	10	10	10	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	30	50	50	60	40	60	50
		4	20	20	60	40	40	30	40	30	40
		5	0	10	10	10	10	10	20	10	10
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	30	50	50	65	50	65	50
		4	20	30	60	40	40	25	40	25	40
		5	0	0	10	10	10	10	10	10	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	60	20	40	40	55	40	55	40
		4	20	40	60	40	40	30	40	30	40
		5	0	0	20	20	20	15	20	15	20
Astragalus oniciformis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	60	40	40	55	60	55	60	70
		4	10	40	40	40	40	30	40	30	20
		5	0	0	20	20	5	10	5	10	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	60	50	50	60	60	60	60	50
		4	10	40	45	45	30	30	30	30	40
		5	0	0	5	5	10	10	10	10	10
Astragalus paysonii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	60	85	90	85	90	85
		4	20	30	30	40	15	10	15	10	15
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	60	85	90	85	90	85
		4	20	30	30	40	15	10	15	10	15
		5	0	0	0	0	0	0	0	0	0
Astragalus solitarius	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	70	70	80	70	80	70
		4	20	30	30	30	30	20	30	20	30
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	70	70	70	80	70	80	70
		4	20	30	30	30	30	20	30	20	30
		5	0	0	0	0	0	0	0	0	0
Astragalus yoder-williamsii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	70	80	70	70	90	80	90	80
		4	10	20	10	20	20	5	10	5	10
		5	0	10	10	10	10	5	10	5	10
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	70	80	70	70	90	80	90	80
		4	10	20	10	20	20	5	10	5	10
		5	0	10	10	10	10	5	10	5	10
Botrychium ascendens	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	80	80	70	70	70	70	80
		4	50	50	20	20	30	30	30	30	20
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	0	0	0	0	0	0	0
		4	50	50	40	60	30	40	30	40	30
		5	0	0	60	40	70	60	70	60	70
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	0	0	0	0	0	0	0
		4	50	50	40	40	40	40	40	40	40
		5	0	0	60	60	60	60	60	60	60
Botrychium crenulatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	30	60	60	40	20	40	60
		4	50	50	30	30	30	40	40	40	30
		5	0	0	40	10	10	20	40	20	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	30	60	60	40	20	40	60
		4	50	50	30	30	30	40	40	40	30
		5	0	0	40	10	10	20	40	20	10
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	40	10	40	40	20	10	20	40
		4	60	60	40	40	40	40	40	40	40
		5	0	0	50	20	20	40	50	40	20
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	40	0	0	0	0	0	0	0
		4	60	60	40	40	40	40	40	40	40
		5	0	0	60	60	60	60	60	60	60

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
Botrychium paradoxum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	40	40	40	40	40
		4	50	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	40	40	40	40	40
		4	50	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0
Calochortus longebarbatus var. *longebarbatus*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	70	55	65	65	60	55	60	65
		4	20	30	45	35	35	40	45	40	35
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	65	50	60	60	55	50	55	60
		4	20	35	50	40	40	45	50	45	40
		5	0	0	0	0	0	0	0	0	0
Calochortus longebarbatus var. *peckii*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	80	80	90	90	80	70	80	90
		4	0	20	20	10	10	20	30	20	10
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	75	80	90	90	80	70	80	90
		4	0	25	20	10	10	20	30	20	10
		5	0	0	0	0	0	0	0	0	0
Calochortus nitidus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	30	30	30	50	50	50	50	20
		4	40	70	70	70	50	50	50	50	80
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	25	25	25	45	45	45	45	20
		4	40	75	75	75	55	55	55	55	80
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	10	10	20	10	25	25	25	25	20
		4	90	90	80	90	75	75	75	75	80
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	10	5	5	5	5	5	5	0
		4	30	30	20	20	20	20	20	20	10
		5	0	60	75	75	75	75	75	75	90

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
Castilleja chlorotica	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	90	90	90	90	90	90	70
		4	10	20	10	10	10	10	10	10	30
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	90	90	90	90	90	90	65
		4	10	20	10	10	10	10	10	10	35
		5	0	0	0	0	0	0	0	0	0
Collomia mazama	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	90	90	80	90	80	90	90
		4	10	10	10	10	20	10	20	10	10
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	90	90	80	90	80	90	90
		4	10	10	10	10	20	10	20	10	10
		5	0	0	0	0	0	0	0	0	0
Cypripedium fasciculatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	70	10	10	10	10	10	10	10	0
		3	30	60	60	60	80	80	80	80	70
		4	0	30	30	30	10	10	10	10	30
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	70	10	10	10	10	10	10	10	10
		3	30	60	60	60	70	70	70	70	70
		4	0	25	25	25	15	15	15	15	15
		5	0	5	5	5	5	5	5	5	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	70	80	70	70	85	90	85	90	80
		3	30	10	20	20	15	10	15	10	20
		4	0	10	10	10	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	60	70	70	80	70	90	65	90	85
		3	40	20	20	10	20	5	25	5	15
		4	0	10	10	10	10	5	10	5	0
		5	0	0	0	0	0	0	0	0	0
Grindelia howellii	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	50	60	75	80	70	80	70	70
		4	0	50	40	25	20	30	20	30	30
		5	100	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	60	85	85	85	85	85	85	85
		4	60	40	15	15	15	15	15	15	15
		5	40	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
Hackelia cronquistii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	40	30	35	30	50	35	45	45
		4	50	60	60	60	65	45	60	45	45
		5	0	0	10	5	5	5	5	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	30	30	30	30	40	30	35	40
		4	50	70	70	70	70	60	70	65	60
		5	0	0	0	0	0	0	0	0	0
Haplopappus liatriformis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	20	10	10	10	10	10	10	10
		5	0	80	90	90	90	90	90	90	90
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	15	10	10	10	10	10	10	10
		5	0	85	90	90	90	90	90	90	90
Howellia aquatilis	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	80	75	75	75	75	75	75	75	75
		5	20	25	25	25	25	25	25	25	25
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	60	60	60	50	50	50	50	50
		4	40	20	20	20	30	30	30	30	30
		5	0	20	20	20	20	20	20	20	20
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	85	85	85	85	85	85	90
		4	10	5	10	10	10	10	10	10	5
		5	0	5	5	5	5	5	5	5	5
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	90	80	80	80	80	80	80	90
		4	10	5	10	10	10	10	10	10	5
		5	0	5	10	10	10	10	10	10	5
Lomatium suksdorfii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	50	50	50	50	50	50	50	50	50
		5	50	50	50	50	50	50	50	50	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	50	40	40	40	40	40	40	40
		4	40	50	60	60	60	60	60	60	60
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
Mimulus pygmaeus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	80	85	80	85	80	85	80
		4	10	20	20	15	20	15	20	15	20
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	80	80	85	80	85	80	85	80
		4	10	20	20	15	20	15	20	15	20
		5	0	0	0	0	0	0	0	0	0
Mimulus washingtonensis var. *washingtonensis*	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	30	20	20	30	30	30	30	30	20
		4	70	80	80	70	70	70	70	70	80
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	30	20	20	30	30	30	30	30	20
		4	70	80	80	70	70	70	70	70	80
		5	0	0	0	0	0	0	0	0	0
Mirabilis macfarlanei	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	5	5	10	10	10	10	10	20
		4	10	90	90	80	80	80	80	80	70
		5	0	5	5	10	10	10	10	10	10
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	0	10	10	10	10	10	10	10
		4	10	50	50	60	60	60	60	60	70
		5	0	50	40	30	30	30	30	30	20
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	25	25	30	30	30	30	30	30
		4	10	70	70	65	65	65	65	65	70
		5	0	5	5	5	5	5	5	5	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	90	10	10	20	20	20	20	20	20
		4	10	80	80	70	70	70	70	70	70
		5	0	10	10	10	10	10	10	10	10
Penstemon glaucinus	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	70	80	80	80	80	80	80	75
		4	60	30	20	20	20	20	20	20	25
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	70	80	80	80	80	80	80	75
		4	60	30	20	20	20	20	20	20	25
		5	0	0	0	0	0	0	0	0	0

Table 4.3 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
Penstemon lemhiensis	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	40	40	40	80	90	80	90	40
		4	30	50	50	50	20	10	20	10	60
		5	0	10	10	10	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	30	30	30	70	80	70	80	40
		4	30	60	60	60	30	20	30	20	60
		5	0	10	10	10	0	0	0	0	0
Polemonium pectinatum	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	60	50	50	50	55	55	55	55	50
		5	40	50	50	50	45	45	45	45	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	10	5	5	5	5	5	5	5
		5	0	90	95	95	95	95	95	95	95
Silene spaldingii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	10	10	10	10	0
		4	50	50	50	50	50	50	50	50	50
		5	50	50	50	50	40	40	40	40	50
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	0	0	0	0	0	0
		3	20	0	0	0	0	0	0	0	0
		4	0	20	10	10	10	10	10	10	10
		5	0	80	90	90	90	90	90	90	90
Stephanomeria malheurensis	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	0	0	0	0	0	0	0	0	0
		5	100	100	100	100	100	100	100	100	100
Trifolium thompsonii	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	40	40	45	50	45	50	45
		4	50	50	60	60	55	50	55	50	55
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	50	45	45	50	55	50	55	50
		4	50	50	55	55	50	45	50	45	50
		5	0	0	0	0	0	0	0	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Table 4.4. Mean viability outcomes for habitat and populations of vascular plants for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Name	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Astragalus mulfordiae	EEIS BLM/FS	3.2	3.4	3.8	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.2	3.4	3.8	3.6	3.6	3.5	3.8	3.5	3.6
	UCRB BLM/FS	3.2	3.3	3.8[3]	3.6	3.6	3.5	3.6	3.5	3.6
	UCRB CumEff	3.2	3.4	4.0[3]	3.8	3.8	3.6	3.8	3.6	3.8
Astragalus oniciformis	UCRB BLM/FS	3.1	3.4	3.8	3.8	3.5	3.5	3.5	3.5	3.4
	UCRB CumEff	3.1	3.4	3.6	3.6	3.5	3.5	3.5	3.5	3.6
Astragalus paysonii	UCRB BLM/FS	3.2	3.3	3.3	3.4	3.2	3.1	3.2	3.1	3.2
	UCRB CumEff	3.2	3.3	3.3	3.4	3.2	3.1	3.2	3.1	3.2
Astragalus solitarius	EEIS BLM/FS	3.2	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.3
	EEIS CumEff	3.2	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.3
Astragalus yoder-williamsii	UCRB BLM/FS	3.1	3.4	3.3	3.4	3.4	3.2	3.3	3.2	3.3
	UCRB CumEff	3.1	3.4	3.3	3.4	3.4	3.2	3.3	3.2	3.3
Botrychium ascendens	EEIS BLM/FS	3.5	3.5	3.2	3.2	3.3	3.3	3.3	3.3	3.2
	UCRB BLM/FS	3.5	3.5	4.6[3]	4.4[3]	4.7[3]	4.6[3]	4.7[3]	4.6[3]	4.7[3]
	UCRB CumEff	3.5	3.5	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]
Botrychium crenulatum	EEIS BLM/FS	3.5	3.5	4.1[3]	3.5	3.5	3.8	4.2[3]	3.8	3.5
	EEIS CumEff	3.5	3.5	4.1[3]	3.5	3.5	3.8	4.2[3]	3.8	3.5
	UCRB BLM/FS	3.6	3.6	4.4[3]	3.8	3.8	4.2[3]	4.4[3]	4.2[3]	3.8
	UCRB CumEff	3.6	3.6	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]	4.6[3]
Botrychium paradoxum	EEIS BLM/FS	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	UCRB BLM/FS	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Calochortus longebarbatus var. *longebarbatus*	EEIS BLM/FS	3.2	3.3	3.5	3.4	3.4	3.4	3.5	3.4	3.4
	EEIS CumEff	3.2	3.4	3.5	3.4	3.4	3.5	3.5	3.5	3.4
Calochortus longebarbatus var. *peckii*	EEIS BLM/FS	3.0	3.2	3.2	3.1	3.1	3.2	3.3	3.2	3.1
	EEIS CumEff	3.0	3.3	3.2	3.1	3.1	3.2	3.3	3.2	3.1
Calochortus nitidus	EEIS BLM/FS	3.4	3.7	3.7	3.7	3.5	3.5	3.5	3.5	3.8
	EEIS CumEff	3.4	3.8	3.8	3.8	3.6	3.6	3.6	3.6	3.8
	UCRB BLM/FS	3.9	3.9	3.8	3.9	3.8	3.8	3.8	3.8	3.8
	UCRB CumEff	3.3	4.5	4.7	4.7	4.7	4.7	4.7	4.7	4.9
Castilleja chlorotica	EEIS BLM/FS	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.3
	EEIS CumEff	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.4
Collomia mazama	EEIS BLM/FS	3.1	3.1	3.1	3.1	3.2	3.1	3.2	3.1	3.1
	EEIS CumEff	3.1	3.1	3.1	3.1	3.2	3.1	3.2	3.1	3.1
Cypripedium fasciculatum	EEIS BLM/FS	2.3	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.3
	EEIS CumEff	2.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2
	UCRB BLM/FS	2.3	2.3	2.4	2.4	2.2	2.1	2.2	2.1	2.2
	UCRB CumEff	2.4	2.4	2.4	2.3	2.4	2.2	2.5	2.2	2.2
Grindelia howellii	UCRB BLM/FS	5.0	3.5	3.4	3.3	3.2	3.3	3.2	3.3	3.3
	UCRB CumEff	4.4	3.4	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Table 4.4 (continued)

Name	Area[1]	Period / Alternative[2] H	C	A1	A2	A3	A4	A5	A6	A7
Hackelia cronquistii	EEIS BLM/FS	3.5	3.6	3.8	3.7	3.8	3.6	3.7	3.7	3.7
	EEIS CumEff	3.5	3.7	3.7	3.7	3.7	3.6	3.7	3.7	3.6
Haplopappus liatriformis	UCRB BLM/FS	2.2	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	UCRB CumEff	2.2	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Howellia aquatilis	EEIS BLM/FS	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	EEIS CumEff	3.4	3.6	3.6	3.6	3.7	3.7	3.7	3.7	3.7
	UCRB BLM/FS	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	UCRB CumEff	3.1	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.2
Lomatium suksdorfii	EEIS BLM/FS	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	EEIS CumEff	3.4	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Mimulus pygmaeus	EEIS BLM/FS	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	EEIS CumEff	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Mimulus washingtonensis var. *washingtonensis*	EEIS BLM/FS	3.7	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.8
	EEIS CumEff	3.7	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.8
Mirabilis macfarlanei	EEIS BLM/FS	3.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.9
	EEIS CumEff	3.1	4.5	4.3	4.2	4.2	4.2	4.2	4.2	4.1
	UCRB BLM/FS	3.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.7
	UCRB CumEff	3.1	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
Penstemon glaucinus	EEIS BLM/FS	3.6	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.3
	EEIS CumEff	3.6	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.3
Penstemon lemhiensis	UCRB BLM/FS	3.3	3.7	3.7	3.7	3.2[3]	3.1[3]	3.2[3]	3.1[3]	3.6
	UCRB CumEff	3.3	3.8	3.8	3.8	3.3[3]	3.2[3]	3.3[3]	3.2[3]	3.6
Polemonium pectinatum	EEIS BLM/FS	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	EEIS CumEff	2.2	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Silene spaldingii	EEIS BLM/FS	4.5	4.5	4.5	4.5	4.3	4.3	4.3	4.3	4.5
	EEIS CumEff	2.2	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Stephanomeria malheurensis	EEIS BLM/FS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Trifolium thompsonii	EEIS BLM/FS	3.5	3.5	3.6	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.5	3.5	3.6	3.6	3.5	3.5	3.5	3.5	3.5

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Rare taxa that were evaluated varied in their successional relations, which substantially influenced the projected outcomes. Some of the regional endemic taxa are associated with early-seral habitats (for example, *Astragalus paysonii, Grindelia howellii, Penstemon glaucinus*). This response is best exemplified by *Grindelia howellii*, for which it is believed that moderate habitat disturbance (from historic to current conditions) has led to an increase in abundance (fig. 4.3). Such species

are nonetheless often considered of rangewide conservation concern, despite their occurrence in disturbed settings. This is because of their limited geographic ranges and the typically low number of populations that occur in more stable habitats. Their affinity to ephemeral, frequently disturbed habitats renders them more susceptible to frequent local extirpations. In these cases, prescriptions that include maintenance or creation of canopy openings, via silvicultural treatment or prescribed burning, were rated as more likely to produce favorable habitat and population conditions.

Mid-seral species include such taxa as *Cypripedium fasciculatum* (scattered distribution) and *Castilleja chlorotica* (regional endemic). As illustrated for the former species in figure 4.4, the alternatives that include prescriptions involving thinning or prescribed burning, such that partial shade or small openings might be enhanced, were rated as likely to produce more favorable outcomes.

Figure 4.3 *Grindelia howellii*

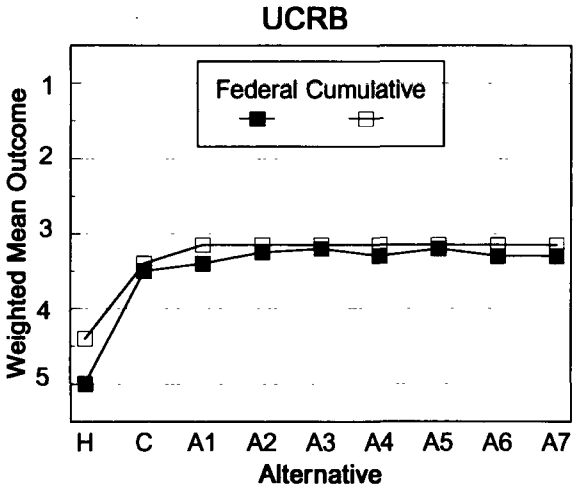


Figure 4.3. Weighted mean outcome scores for *Grindelia howellii* in the UCRB planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Species that are essentially confined to late-seral community types include those affiliated with the Palouse grasslands throughout all, or a significant portion, of their ranges. The Palouse prairie vegetation type is estimated to have been eliminated from 98 percent of its original acreage (Risser 1981) owing primarily to agricultural conversion of non-Federal lands. Four of the rare plant taxa analyzed are associated with this community type, and have some of their occurrences on Federal lands; these include *Calochortus nitidus, Haplopappus liatriformis, Polemonium pectinatum,* and *Silene spaldingii.* All of these have suffered extensive historical losses of habitat and populations in the non-Federal portions of their ranges. In addition, one species that occurs exclusively on non-Federal lands (*Aster jessicae*) is also associated with this community type; its viability has been even more seriously and adversely affected. Extant populations of these taxa are found only in high-quality remnants of such habitats. While the preliminary draft EISs do not include proposed alternatives that would directly affect these species on non-Federal lands, the species are all of serious conservation concern within the Basin, as is the remaining extant Palouse grassland in general. The outcomes for *C. nitidus* and *S. spaldingii* exemplify this group of regional endemic species, and are indicated in figures 4.5 and 4.6, respectively. The cumulative effects of extreme loss of habitat and population integrity on non-Federal lands are clearly evident, especially for *S. spaldingii* in the EEIS area, and for *C. nitidus* in the UCRB area. Any prescriptions that would reduce the habitat on the Federal portions of these species' ranges are expected to have more serious, negative effects on them. These results also strongly indicate the critical role that Federal lands play as refugia for the extant habitats and populations of these, and many other, plant taxa of rangewide conservation concern.

The upland shrub group is another plant community group of major importance in providing habitat for vascular plants of rangewide conservation concern in the Basin, specifically the sagebrush region of the upper Snake and Columbia River plains. Five regional endemic species,

including *Penstemon lemhiensis* and four taxa in the genus Astragalus (*A. mulfordiae, A. oniciformis, A. solitarius, and A. yoder-williamsii*), are primarily associated with such upland shrub communities. The outcomes for *A. mulfordiae* and *P. lemhiensis* exemplify these species, and are summarized in figures 4.7 and 4.8, respectively. Suitable habitat for all of these taxa was historically more abundant, but has decreased in quantity, quality, and contiguity, producing less favorable current out-

Figure 4.4 *Cypripedium fasciculatum*

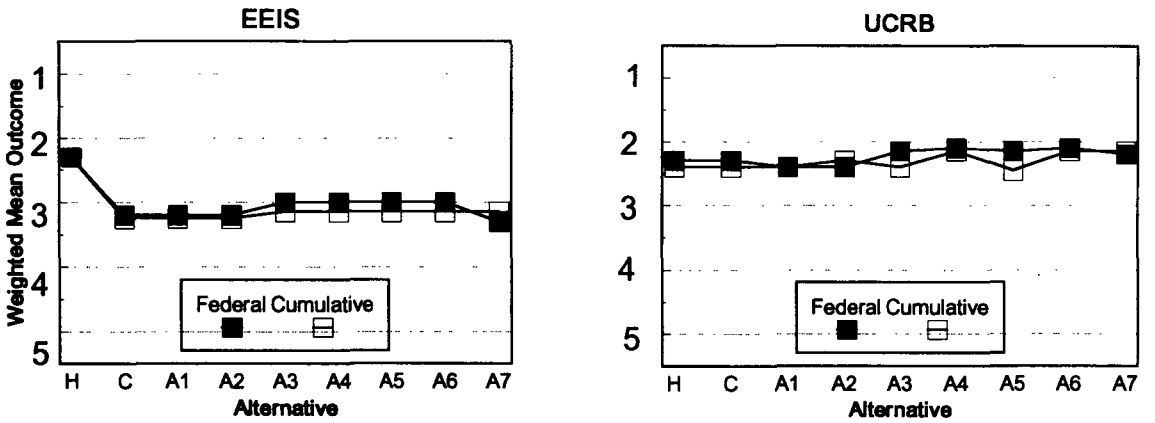


Figure 4.4. Weighted mean outcome scores for *Cypripedium fasciculatum* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.5 *Calochortus nitidus*

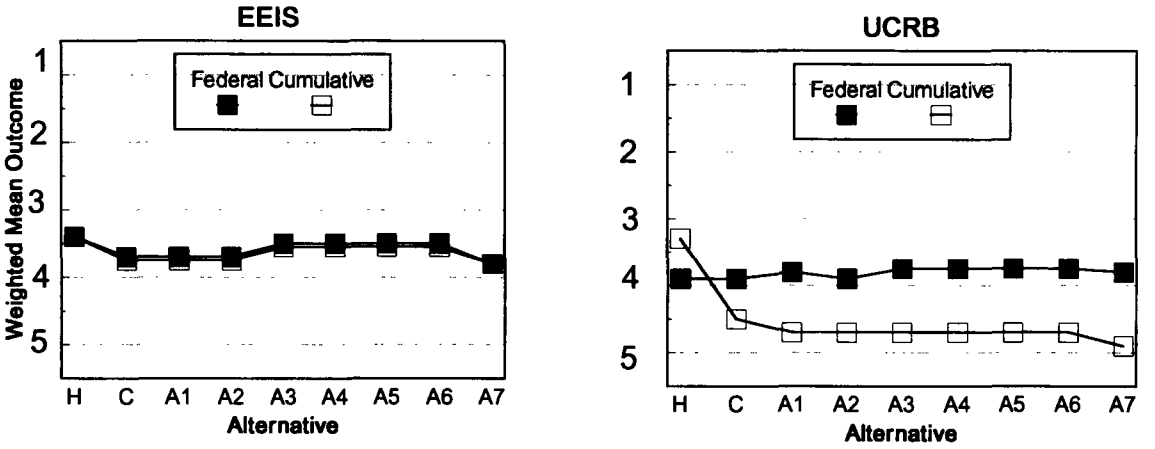


Figure 4.5. Weighted mean outcome scores for *Calochortus nitidus* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.6 *Silene spaldingii*

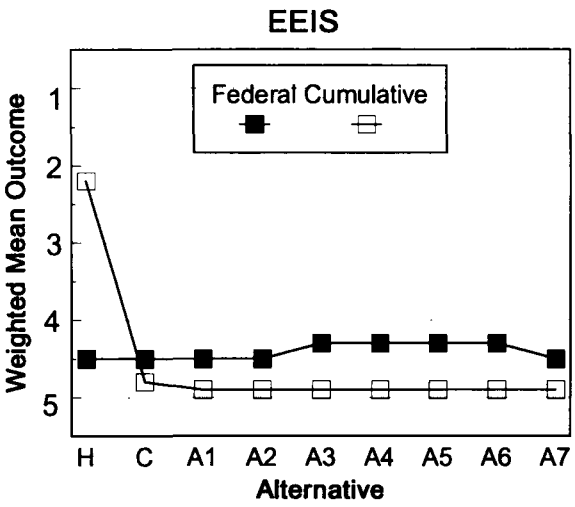


Figure 4.6. Weighted mean outcome scores for *Silene spaldingii* in the EEIS planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

comes. Such habitats would be largely unaffected by the screens or aquatic buffers instituted under Alternative 2, so that for many of these taxa the outcome ratings for Alternatives 1 and 2 were often essentially the same. Restoration prescriptions under Alternatives 4 and 6, specifically those that would restore the natural fire regime and reduce grazing, have the possibility of returning some habitat to historic conditions, especially for *Penstemon lemhiensis*. Such prescriptions would be favorable to all of these species, although for some, much of their former habitat has been converted by range seedings, and will be difficult to restore. Conversely, Alternatives 3, 5, and 7 are projected to result in less favorable habitat conditions due to the spread of exotic species, habitat conversion to non-native grass seedings, grazing, and changes in the fire regime.

Three *Botrychium* species with scattered distributions were assessed. These widespread taxa occur sparsely on Federal lands across both planning areas, although their distributions and status are not as well understood as the other vascular plants analyzed. *Botrychium crenulatum*, a species that is often associated with moist old-growth forest

Figure 4.7 *Astragalus mulfordiae*

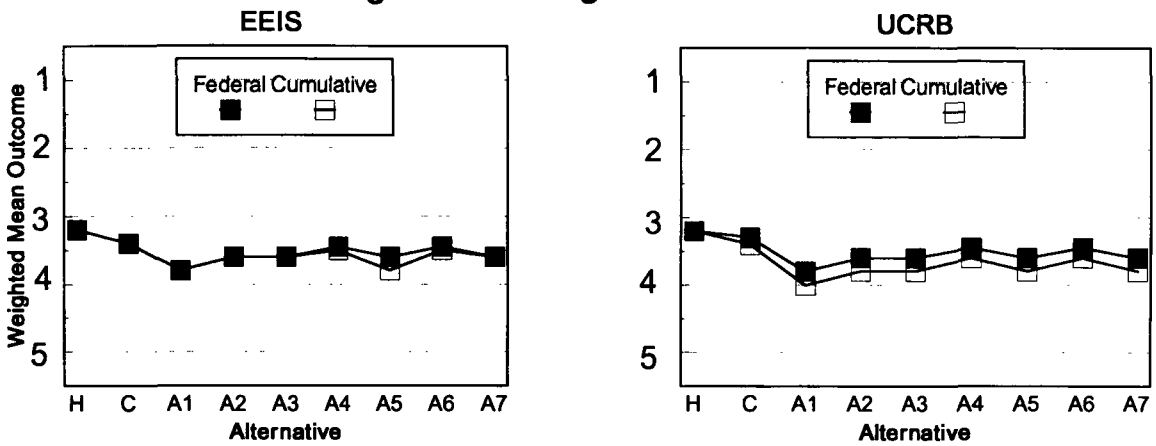


Figure 4.7. Weighted mean outcome scores for *Astragalus mulfordiae* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

stands of western red cedar, would benefit from the aquatic buffers proposed in Alternatives 2, 3, and 7 (fig. 4.9). The implementation of the riparian habitat management standards under Alternatives 2, 3, and 7 would be expected to slightly benefit habitat for two other taxa in addition to *B. crenulatum;* they are *Calochortus longebarbatus* var. *longebarbatus* and *C. longebarbatus* var. *peckii.*

As noted previously, conservation agreements have been adopted for seven of the plant species that we analyzed. In these cases, the existence of specific standards and guidelines from the conservation strategies was considered in the rating process. The standards would protect occupied habitats, and thus the long-term viability of such species, regardless of the prescriptions applied to their general locations in the alternatives. In addition, numerous other plant taxa that were not analyzed, of both rangewide and State conservation concern, have conservation agreements or strategies either approved or in preparation. These strategies will provide a critical means of conserving habitat and population integrity at the local and subregional scales.

Because many of the taxa analyzed are either associated with early- or mid-seral successional stages,

Figure 4.8 *Penstemon lemhiensis*

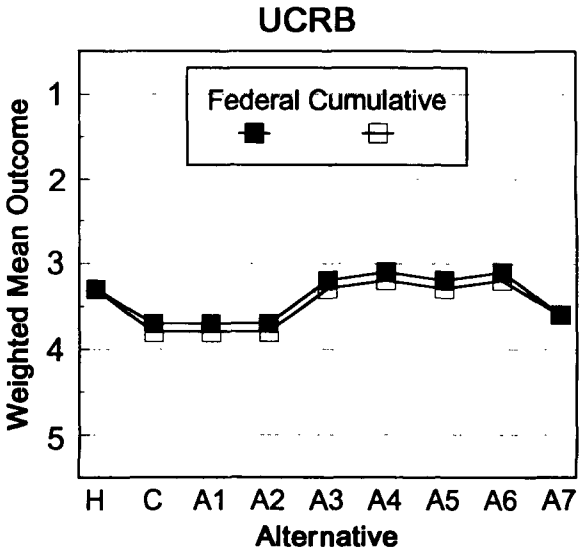


Figure 4.8. Weighted mean outcome scores for *Penstemon lemhiensis* in the UCRB planning area for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid line indicates scores for habitat conditions on Federal lands only; open line indicates projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.9 *Botrychium crenulatum*

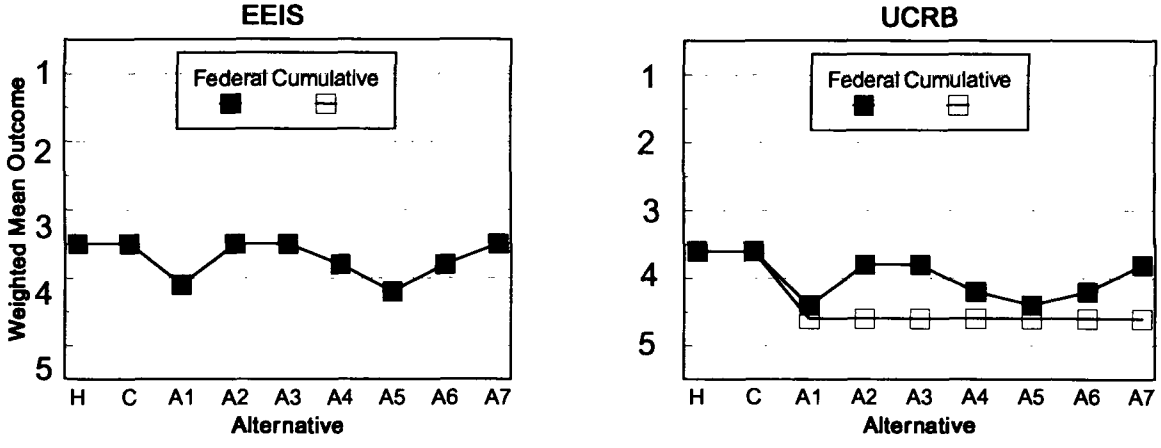


Figure 4.9. Weighted mean outcome scores for *Botrychium crenulatum* in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; open lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives. Weighted mean scores were equal in the EEIS planning area for the Federal habitat and the cumulative effects assessments.

or would benefit from restoration prescriptions emphasized under Alternatives 4 and 6, Alternative 7 was generally rated as less favorable (fig. 4.2). The reserve strategy of Alternative 7 was judged to be less effective in maintaining the dynamic habitat conditions favorable to these species.

In conclusion, a key limitation of the analysis of effects on plants should be reiterated. The majority of the plant taxa of greatest rangewide conservation concern in the Basin have not been addressed here, because they could not be meaningfully assessed at this broad scale. Assessed species include only those that, by virtue of their broader distributions or habitat associations, could be analyzed at the scale of the preliminary draft EIS areas. In addition, there are many plant taxa that, while secure on a rangewide level, are rare at the state level in one or more states in the Basin. Conservation of these species of local concern is also an important consideration, as their populations often occur largely or wholly on Federal lands. These peripheral or disjunct populations may also be genetically divergent from those within the main range of the species. Many such taxa of state or sub-regional concern are currently designated as sensitive by the Forest Service or BLM, along with those that are of concern on a rangewide scale.

Amphibians and Reptiles

Introduction—The overall "Methods for Assessing Effects on Terrestrial Species" section outlines the process used to select the amphibian and reptile species that were assessed. The list of selected amphibian species includes the Cascades frog, Coeur d'Alene salamander, northern leopard frog, red-legged frog, rough-skinned newt, spotted frog, tailed frog, tiger salamander, western toad, and Woodhouse's toad (scientific names of vertebrate species are in appendix 4-C). At the time of our assessment, the Cascades frog, red-legged frog, spotted frog, tailed frog, and western toad were identified as USFWS C2 Candidate species, and the Coeur d'Alene salamander and rough-skinned newt were BLM and/or Forest Service sensitive species. The northern leopard frog, tiger salamander, and Woodhouse's toad were initially selected because of past population declines, because their habitat has declined from historic levels, or because possible habitat declines were projected under at least one preliminary draft EIS alternative.

The list of reptilian species initially presented to the panel for assessment included the desert horned lizard, longnose leopard lizard, Mojave black-collared lizard, night snake, painted turtle, ringneck snake, rubber boa, sagebrush lizard, sharptail snake, short-horned lizard, striped whipsnake, and western pond turtle. The sagebrush lizard was included because it was a USFWS C2 species, as was the western pond turtle because it was a USFWS C3 species and was considered a sensitive species by the FS or BLM. The painted turtle, night snake, and ringneck snake were included because they are considered sensitive species by the Forest Service or BLM. The desert horned lizard, longnose leopard lizard, Mojave black-collared lizard, short-horned lizard, rubber boa, sharptail snake, and striped whipsnake were initially included because of past population declines, because their habitat has declined from historic levels, or because possible habitat declines were projected under at least one of the preliminary draft EIS alternatives.

Methods—During panel discussions, we dropped the rough-skinned newt from further consideration because the Idaho and Montana populations may not be native and the species is not considered sensitive in Idaho. The Cascades and red-legged frogs were dropped from further consideration because the species' ranges within the Basin fall entirely within the area of the Northwest Forest Plan (NFP). The EEIS and UCRB preliminary draft EIS alternatives are not designed to reduce the habitat provided by the NFP. The NFP was considered to sufficiently address these species' habitat requirements on Federal land. Therefore, additional analysis was considered unnecessary. The panel concluded that

the tiger salamander would not be affected by management practices on Federal lands, and that ranching and farming may have increased the species' distribution. Thus, the tiger salamander was not considered further. The spotted frog was split into two species for evaluation by the panel—spotted frog species A and spotted frog species B (Green and others 1996). The final list of amphibian species evaluated included the Coeur d'Alene salamander, western toad, Woodhouse's toad, tailed frog, spotted frog species A, spotted frog species B, and northern leopard frog.

Changes were also made in the list of reptilian species that we assessed. During panel discussions, the ringneck snake was deleted from further consideration because there are very few locality records within the Basin and the panelists had insufficient information about the species to evaluate effects of the preliminary draft EIS alternatives. The panel added the common garter snake to the list because the panel concluded that the species is declining in Idaho.

Results—Following the assessment panel, we adjusted the species outcomes in the Forest Service and BLM habitat evaluation for the Coeur d'Alene salamander, northern leopard frog, Oregon spotted frog, Woodhouse's toad, and sharptail snake. These adjustments addressed the tendency of panelists to reflect cumulative effects in the Federal habitat assessment. The adjustments also reflected improved riparian habitat retention/restoration provisions for some alternatives that were obtained after the panel discussion had concluded. Results are shown in table 4.5, the mean outcomes for each species (following any adjustments), and table 4.6, the weighted mean species outcomes. Standard deviations of these outcomes are shown in appendix 4-D. The weighted means for each alternative are shown in figures 4.10 and 4.11. The number of species whose weighted mean fell into each outcome under each alternative is shown in figures 4.12 and 4.13, and the numbers of species whose weighted mean outcome changed by more than 0.5 outcome units between current and the projected future under each preliminary draft EIS alternative are shown in figures 4.14 and 4.15.

Discussion—Habitat on lands outside of BLM- and FS-administered land has declined due to conversion to agricultural and urban uses. Habitat for amphibians on BLM- and FS-administered land, although reduced from historic conditions, is less modified than habitat on non-Federal land and plays an important role in providing for these species. Restoring historic habitat conditions across the Federal landscape is a critical step toward re-establishment or retention of amphibian and reptilian populations throughout the ICBEMP planning area. Some alternatives would begin to restore habitat on Federal lands.

The amphibian and reptilian assessment panel identified specific attributes that were key for evaluating habitat on Federal lands. These included: riparian habitat retention and restoration, grazing intensity on rangelands, management of wetlands, percentage of land reserved from ground-disturbing activities, restoration efforts, levels of timber harvest, amounts of forest fragmentation, restoration of upland native plant communities, and conversion to non-native vegetation.

The most important attributes for evaluating cumulative effects on species populations, in addition to those listed above, included pollution (agricultural chemical runoff), introduction of non-native predators (bullfrogs, crappie, bluegill, and bass), conversion to agriculture, fungal disease, wetland development, water diversion, global climate change, effects of glaciers receding resulting in fragmented populations, ultraviolet radiation, water control at major dams, lack of enforcement of reptile collection by commercial collectors, predation (especially by skunks and raccoons), and development/urbanization.

Amphibians—The results for habitat on BLM- and FS-administered lands were generally similar for the amphibians and riparian-associated reptiles indicating that current habitat on these lands has declined from its historic distribution (table 4.5

and fig. 4.10). Habitat conditions for most riparian-associated species have declined on BLM- and FS-administered lands by one outcome level (table 4.6 and fig. 4.12). Habitat that had historically broad or patchy distribution, with at least limited interactions between populations, has been reduced to habitat that is now distributed as isolated patches. This has resulted in strong limitations on interactions between populations, some local extirpations, and slow recolonization. For these species, Federal land habitat declines from historic conditions are primarily tied to increased human disturbance, fragmentation of habitat, and reduced riparian area acreage and quality.

Further decline in habitat conditions for the riparian-associated amphibian species is generally projected under Alternatives 1 and 5 (fig. 4.12). Alternatives 2, 3, 4, 6, and 7 provide habitat quality, quantity, and distribution that are similar to current habitat conditions, or slightly increased, for most amphibians and riparian-associated reptiles (figs. 4.12 and 4.14). Cumulative effects on populations of these species generally result in more isolated populations and, in some cases, contribute to higher risks of extirpation.

Coeur d'Alene salamander. The Coeur d'Alene salamander occurs in northeastern Idaho, northwestern Montana, and British Columbia. There are currently about 120 known populations. About 80 percent of the habitat within the UCRB EIS area is managed by the Forest Service and much of the remainder is on private industrial land. Coeur d'Alene salamander is found in springs, seeps, spray zones, and wet talus slopes in forested areas below 5,000 feet. The species generally does not move far from the riparian zone.

We considered the size of riparian buffers around intermittent streams and small wetlands, and levels of harvest in currently undisturbed forest as the most important attributes when evaluating the effects of the alternatives on habitat on Federal land. We estimated historic conditions for Coeur d'Alene salamander as 40 percent likelihood of Outcome 3 (habitat primarily as patches, limited species interactions, and subpopulations interact as a metapopulation), 50 percent likelihood of Outcome 4 (habitat typically distributed as isolated patches, limited dispersal among patches, and some local extirpations), and 10 percent likelihood of Outcome 5 (scarce habitat, little or no population interactions, and strong potential for extirpations). Current conditions were estimated to have increased likelihood of Outcomes 4 and 5, and this trend was projected to continue under Alternatives 1 and 5 (table 4.5). Slight improvements in habitat or no change would occur under Alternatives 2, 3, 4, 6, and 7. These outcomes reflect our estimation of increases in ground disturbing activity near sites inhabited by Coeur d'Alene salamander. We suggest a need for continued surveys and site-specific protection, avoiding hydrologic disturbance during road building, and restricting insecticide spraying near suitable habitat. The evaluation of cumulative effects on populations suggests an increased likelihood of Outcome 5 under the alternatives, with all alternatives having a likelihood of 50 or more points in Outcome 5. This reflects effects of past management and disturbance, and a likelihood of increased fragmentation and isolation of populations due to global warming.

Western toad. The range of the western toad encompasses most of the Basin, with gaps in rangelands in the Columbia Plateau, the Northern Great Basin, Upper Snake and Owyhee Uplands. The panel suggested that the range perimeter for the western toad has not changed, but that populations within the range have declined in some locations (Blaustein and others 1994). Nussbaum and others (1983) described the breeding habitat of western toads as spring pools, ponds, lake shallows, and slow moving portions of streams. Much of the species' habitat within the Basin is on Federal land.

Timber harvest, size of riparian buffers, grazing intensity, and restoration of habitat were important considerations in evaluating the effects of the alternatives on habitat on Federal land. The UCRB EIS area generally has lower overall outcomes under all timeframes and EIS alternatives.

Figure 4.10 Amphibians

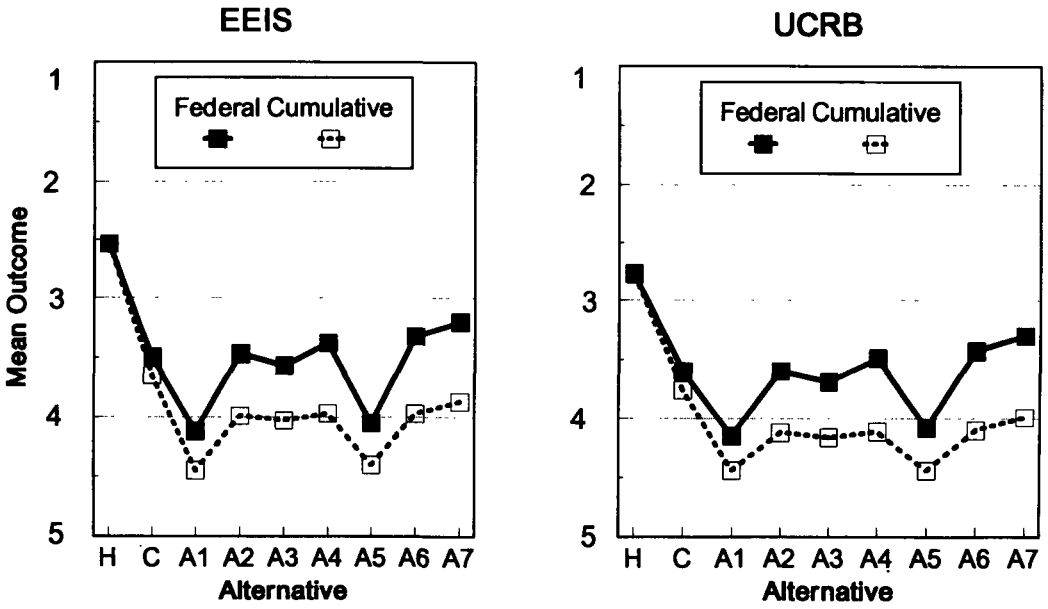


Figure 4.10. Mean outcome scores averaged over six species of amphibians in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.11 Reptiles

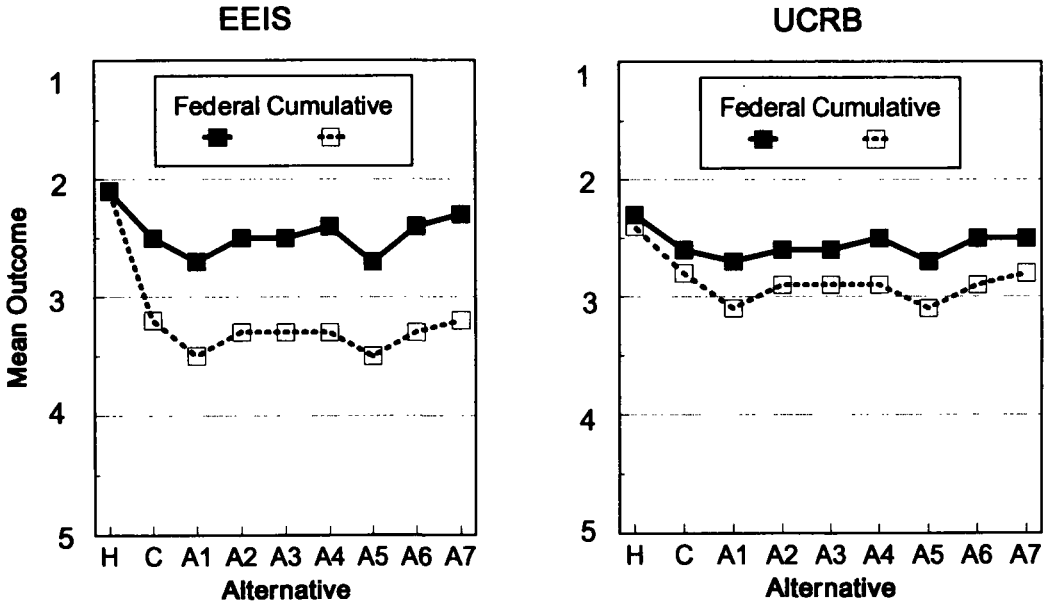


Figure 4.11. Mean outcome scores averaged over 11 species of reptiles in the EEIS planning area and nine species in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.12 Amphibians

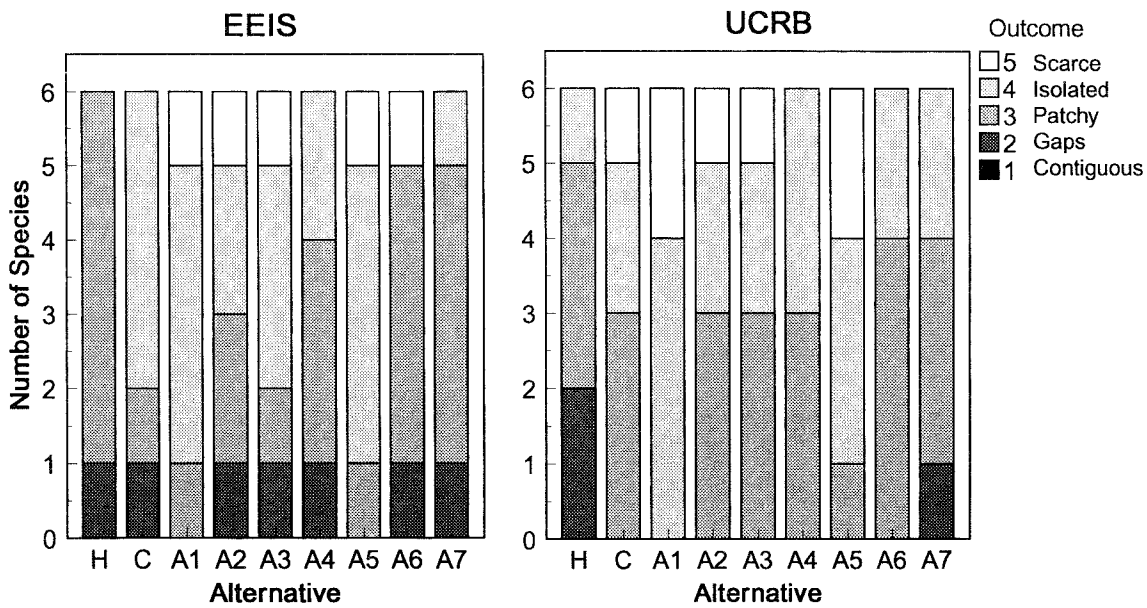


Figure 4.12. Frequency distribution of mean habitat outcome scores for six species of amphibians on Federal lands in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.13 Reptiles

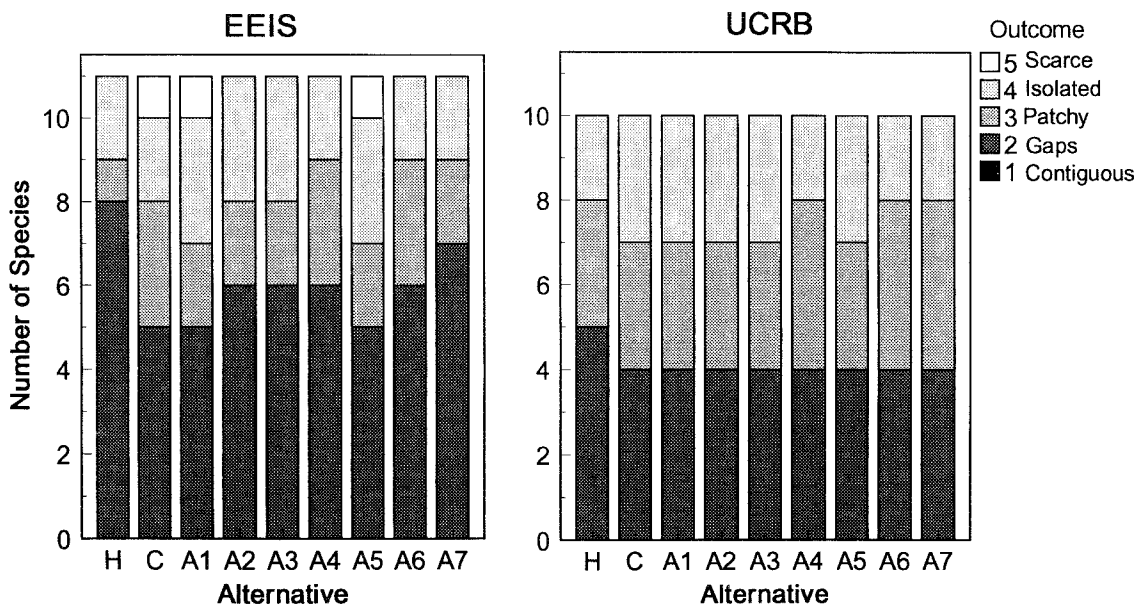


Figure 4.13. Frequency distribution of mean habitat outcome scores for 11 species of reptiles on Federal lands in the EEIS planning area and 10 species in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.14 Amphibians
Change from Current to Future

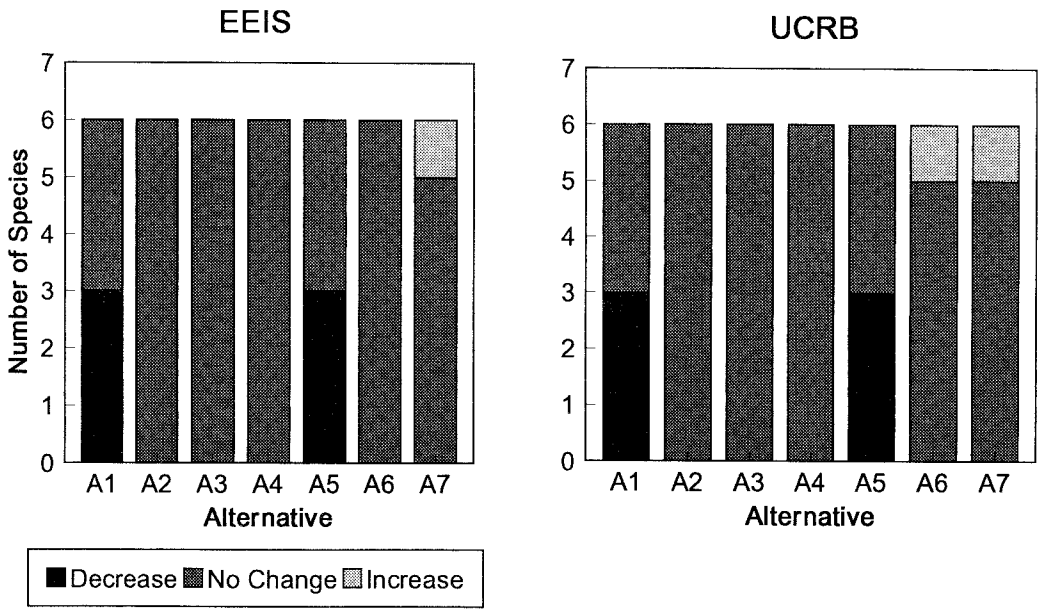


Figure 4.14. Departure of habitat outcomes on Federal lands from current conditions to each alternative for six species of amphibians in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Figure 4.15 Reptiles
Change from Current to Future

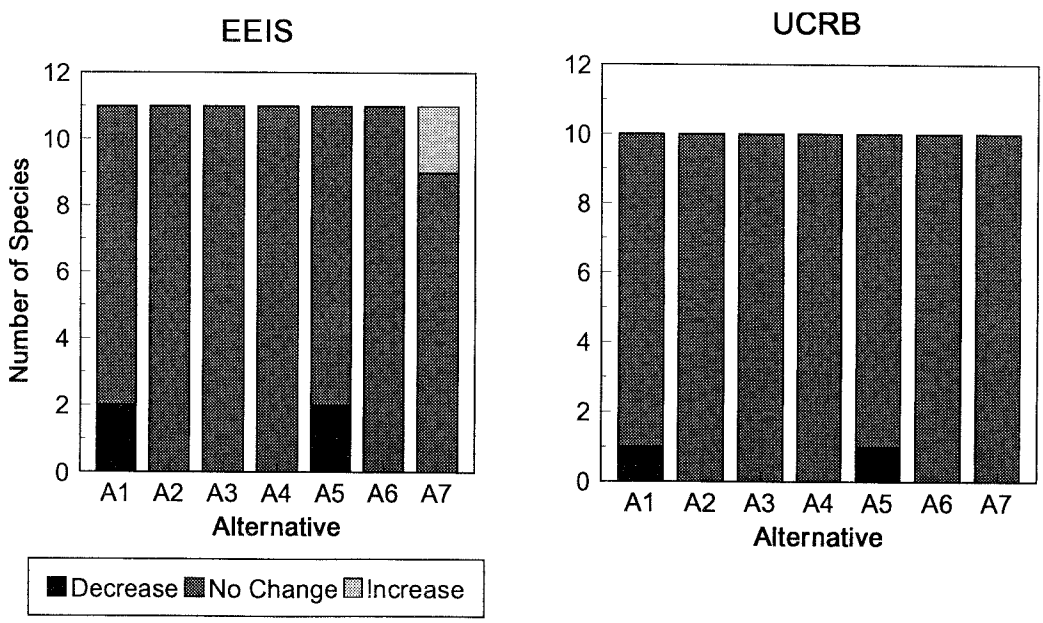


Figure 4.15. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 11 species of reptiles in the EEIS planning area and 10 species in the UCRB planning area. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

The spread of points across three or more outcomes suggests some uncertainty about the effects of the alternatives on the species' habitat (appendix 4-D). The analysis of cumulative effects indicates that there is some likelihood of extirpation (Outcome 5) of western toad populations under all alternatives, due to the poorly understood, ongoing decline of amphibian populations, even when suitable habitat is present.

Woodhouse's toad. Woodhouse's toad occurs within the Basin in two disjunct populations, in southern Washington along the Columbia and Snake Rivers and in southeastern Oregon and southwestern Idaho near the Snake River. Nussbaum and others (1983) reported that in the Pacific Northwest these toads are at least partially terrestrial during the non-breeding season. They forage at night near water in arid regions and dig burrows or use rodent burrows during the day. Breeding occurs in irrigation ditches and canals, pools in streams, ponds, lake margins, and reservoirs (Nussbaum and others 1983). Vegetation around breeding sites is not critical. Shallower, ephemeral ponds that hold water into July are suitable for breeding habitat. Little of the species' range in Washington is on Federal land and approximately 30 percent of the range in southern Oregon and Idaho is on Federal land (BLM).

The important factors for evaluating the effects of alternatives on habitat on BLM- and FS-administered lands were riparian management, grazing intensity, and conversion to exotic vegetation. Declines in habitat on Federal lands from historic to current levels reflect these three factors (table 4.5). Habitat on Federal lands was considered important because it supplies the least altered conditions for these toads, but some panelists indicated that Federal management alone could not improve or affect overall populations. Historic habitat conditions are estimated at greater than 90 percent likelihood of Outcomes 1, 2, or 3, whereas current conditions were estimated at 88 percent likelihood of Outcomes 2, 3, or 4 (EEIS) or 95 percent likelihood of Outcome 3 or 4. Further isolation of habitat is predicted under Alternatives 1, 3, and 5, whereas Alternatives 2, 4, 6, and 7 are projected to somewhat reduce habitat fragmentation. Cumulative effects strongly affect woodhouse's toad populations as all alternatives have high (45 to 70%) likelihoods of Outcome 5 (highly isolated populations having little or no population interactions and strong potential for extirpations). Most of the historic population loss is associated with agricultural conversion, pollution, conversion of habitat to non-native vegetation, and non-native predator introductions (bullfrog and fish).

Tailed frog. The range of the tailed frog within the Basin is primarily within the forested land on the eastern slope of the Cascades, southeastern Washington, Hells Canyon National Recreation Area, northern Idaho, and northwestern Montana. Welsh (1990) reported that tailed frogs occur in isolated populations in and along streams in the Pacific Northwest and are highly specialized for life in cold, clear, fast-flowing, mountain streams. Tailed frogs inhabit streams with continuous flow and cold, well-aerated waters and are not found in intermittent streams (Brown 1990). Daugherty and Sheldon (1982) reported that no adults moved more than 40 meters from first capture sites during their study, although when air temperatures are low and humidity is high, adults may move into woods near creeks to forage. Bury and Corn (1988) captured some adults 100 to 300 meters from water. Welsh (1990) reported that tailed frogs are found primarily in mature and old-growth habitats. Panelists stated that logging near streams is presumed to cause habitat degradation due to siltation.

Timber harvest, riparian buffers, and levels of restoration activities were important factors in evaluating the effects of the alternatives on habitat on BLM- and FS-administered lands. All preliminary draft EIS alternatives have some likelihood of Outcome 5. Cumulative effects analysis for the tailed frog populations projects higher likelihoods of Outcome 5 under Alternatives 1 and 5 largely due to the projected losses in Federal habitat under those alternatives.

Table 4.5. Mean likelihood scores of viability outcomes for amphibians and reptiles for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
AMP	Coeur d'Alene salamander	UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	3	0	5	0	5	0	5	10
			4	50	63	45	65	70	70	45	70	75
			5	10	33	55	30	30	25	55	25	15
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	3	0	0	0	0	0	0	3
			4	50	57	15	22	23	28	15	32	45
			5	10	40	85	78	77	72	85	68	52
AMP	Spotted frog species B	EEIS BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	35	60	30	65	60	65	33	65	73
			4	10	30	50	25	30	25	50	25	20
			5	5	10	20	10	10	10	18	10	8
		EEIS CumEff	1	20	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	35	60	25	58	53	58	28	58	65
			4	10	30	55	30	35	30	55	30	25
			5	5	10	20	13	13	13	18	13	10
		UCRB BLM/FS	1	25	0	0	0	0	0	0	0	3
			2	50	20	5	18	18	20	5	20	23
			3	15	50	40	55	50	55	43	55	58
			4	10	30	50	28	33	25	50	25	18
			5	0	0	5	0	0	0	3	0	0
		UCRB CumEff	1	25	0	0	0	0	0	0	0	0
			2	50	20	0	18	18	18	3	18	20
			3	15	50	40	50	45	50	40	50	55
			4	10	30	55	33	38	33	55	33	25
			5	0	0	5	0	0	0	3	0	0
AMP	Northern leopard frog	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	0	0	0	0	0	0
			3	50	17	0	10	0	15	0	15	20
			4	33	20	27	30	40	30	35	30	30
			5	0	63	73	60	60	55	65	55	50
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	0	0	0	0	0	0
			3	50	17	0	0	0	0	0	0	0
			4	33	20	3	5	5	8	3	8	15
			5	0	63	97	95	95	92	97	92	85

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS[5]	1	3	0	0	0	0	0	0	0	0
			2	33	0	0	0	0	0	0	0	5
			3	33	0	0	10	0	20	0	25	30
			4	30	30	7	27	37	33	30	35	35
			5	0	70	93	63	63	47	70	40	30
		UCRB CumEff	1	3	0	0	0	0	0	0	0	0
			2	33	0	0	0	0	0	0	0	0
			3	33	0	0	0	0	0	0	0	0
			4	30	23	3	5	5	5	3	5	15
			5	0	77	97	95	95	95	97	95	85
AMP	Spotted frog species A	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	5	0	10	0	15	20
			3	30	50	20	45	50	50	25	50	55
			4	10	40	50	40	40	35	50	30	20
			5	0	10	30	10	10	5	25	5	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	30	50	20	45	45	45	25	45	50
			4	10	40	50	40	40	40	50	40	40
			5	0	10	30	15	15	15	25	15	10
AMP	Tailed frog	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	25	0	25	15	30	0	30	38
			3	25	45	13	45	45	40	20	40	35
			4	20	18	65	20	30	18	60	18	18
			5	5	13	23	10	10	13	20	13	10
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	25	0	0	0	0	0	0	0
			3	25	45	8	48	33	45	10	45	55
			4	20	18	25	38	43	38	30	38	33
			5	5	13	68	15	25	18	60	18	13
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	47	23	3	25	18	27	3	27	35
			3	28	43	18	45	45	42	25	42	37
			4	22	22	57	22	27	22	55	23	22
			5	3	12	22	8	10	10	17	8	7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	47	23	3	5	5	5	3	5	7
			3	28	43	20	47	37	45	20	45	50
			4	22	22	27	37	42	37	32	37	32
			5	3	12	50	12	17	13	45	13	12
AMP	Western toad	EEIS BLM/FS	1	40	10	0	13	10	15	0	15	25
			2	45	50	20	55	58	53	20	53	50
			3	15	35	20	33	33	33	25	33	25
			4	0	5	60	0	0	0	55	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	40	0	0	0	0	0	0	0	0
			2	45	20	5	13	13	18	8	18	23
			3	15	45	15	45	45	40	15	40	40
			4	0	25	20	35	35	35	20	35	30
			5	0	10	60	8	8	8	58	8	8
		UCRB BLM/FS	1	27	7	0	8	7	10	0	10	17
			2	43	45	15	42	43	40	15	40	40
			3	23	33	23	35	33	33	28	35	30
			4	7	13	55	12	13	13	52	12	12
			5	0	2	7	3	3	3	5	3	2
		UCRB CumEff	1	27	0	0	0	0	0	0	0	0
			2	43	18	3	8	8	12	5	12	17
			3	23	40	20	40	38	35	17	37	35
			4	7	30	23	37	37	37	27	37	33
			5	0	12	53	15	17	17	52	15	15
AMP	Woodhouse's toad	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	5	2	10	0	15	15
			3	40	25	5	20	15	25	5	30	35
			4	5	65	45	50	50	50	50	50	45
			5	0	10	50	25	33	15	45	5	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	40	25	0	0	0	0	0	0	0
			4	5	65	30	45	45	50	35	50	55
			5	0	10	70	55	55	50	65	50	45
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	5	2	10	0	15	15
			3	50	30	5	20	15	25	5	30	35
			4	25	65	55	50	50	50	55	50	45
			5	0	5	40	25	33	15	40	5	5
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	0	0	0	0
			3	50	30	0	0	0	0	0	0	0
			4	25	65	30	35	35	43	30	43	45
			5	0	5	70	65	65	58	70	58	55
REP	Common garter snake	EEIS BLM/FS	1	50	0	0	0	0	0	0	0	0
			2	50	50	0	50	50	50	0	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	50	0	0	0	50	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	0	0	0	0
			3	0	50	0	50	50	50	0	50	50
			4	0	50	50	50	50	50	50	50	50
			5	0	0	50	0	0	0	50	0	0

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Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	50	0	0	0	0	0	0	0	0
			2	50	50	23	50	50	50	23	50	53
			3	0	40	40	40	40	40	40	40	43
			4	0	10	38	10	10	10	38	10	5
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	25	20	23	23	23	20	23	25
			3	0	40	18	43	43	43	18	43	40
			4	0	35	38	35	35	35	38	35	35
			5	0	0	25	0	0	0	25	0	0
REP	Desert horned lizard	EEIS BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Longnose leopard lizard	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	30	20	30	30	30	20	30	35
			4	50	60	60	60	60	60	60	60	55
			5	0	10	20	10	10	10	20	10	10
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	25	20	25	25	25	20	25	30
			4	50	60	55	60	60	60	55	60	60
			5	0	15	25	15	15	15	25	15	10
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	30	20	30	30	30	20	30	35
			4	50	60	60	60	60	60	60	60	55
			5	0	10	20	10	10	10	20	10	10

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	25	20	25	25	25	20	25	30
			4	50	60	55	60	60	60	55	60	60
			5	0	15	25	15	15	15	25	15	10
REP	Mojave-collared lizard	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	30	20	30	30	30	20	30	35
			3	50	60	60	60	60	60	60	60	55
			4	0	10	20	10	10	10	20	10	10
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	40	20	25	25	25	20	25	30
			4	20	40	40	60	60	60	40	60	60
			5	30	20	40	15	15	15	40	15	10
REP	Night snake	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	45	40	45	45	45	40	45	50
			2	50	55	60	55	55	55	60	55	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	40	35	40	40	40	35	40	45
			2	50	60	65	60	60	60	65	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Painted turtle	EEIS BLM/FS	1	5	0	0	0	0	0	0	0	5
			2	50	40	15	35	35	45	15	45	50
			3	45	55	50	40	40	50	50	50	45
			4	0	5	35	25	25	5	35	5	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	5	0	0	0	0	0	0	0	0
			2	50	20	10	20	20	20	13	20	20
			3	45	35	20	30	30	40	20	40	45
			4	0	45	40	30	30	40	40	40	35
			5	0	0	30	20	20	0	28	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	35	18	33	30	40	18	43	50
			3	50	65	58	48	50	60	58	58	50
			4	0	0	25	20	20	0	25	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	15	10	15	13	13	10	15	18
			3	50	35	20	30	30	40	20	40	45
			4	0	50	45	35	38	48	45	45	38
			5	0	0	25	20	20	0	25	0	0
REP	Rubber boa	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	10	0	10	30
			3	50	50	10	50	50	50	10	50	50
			4	0	50	90	50	50	40	90	40	20
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	50	0	0	0	0	0	0	0	0
			3	50	50	0	0	0	10	0	10	30
			4	0	50	10	50	50	50	10	50	50
			5	0	0	90	50	50	40	90	40	20
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	5	0	5	15
			3	50	48	25	48	48	48	25	48	50
			4	25	53	75	53	53	48	75	48	35
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	0	0	0	0
			3	50	45	15	20	20	25	15	25	38
			4	25	55	40	55	55	55	40	55	53
			5	0	0	45	25	25	20	45	20	10
REP	Sagebrush lizard	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	40	35	40	40	40	35	40	45
			2	50	60	65	60	60	60	65	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	30	20	25	25	25	20	25	30
			2	50	40	35	40	40	40	40	40	40
			3	0	30	45	35	35	35	40	35	30
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
REP	Sharptail snake	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	5	5	10	0	20	30
			4	50	50	30	45	45	45	40	40	50
			5	0	50	70	50	50	45	60	40	20
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	50	0	10	10	10	0	10	50
			5	0	50	100	90	90	90	100	90	50
REP	Short-horned lizard	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	50	40	30	40	40	40	30	40	45
			2	50	60	70	60	60	60	70	60	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	50	35	30	35	35	35	30	35	45
			2	50	65	70	65	65	65	70	65	55
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
REP	Striped whipsnake	EEIS BLM/FS	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	50	0	0	0	0	0	0	0	0
			2	50	50	50	50	50	50	50	50	50
			3	0	50	50	50	50	50	50	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	35	30	35	35	35	30	35	40
			4	50	55	55	55	55	55	55	55	50
			5	0	10	15	10	10	10	15	10	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	35	30	30	30	30	30	30	35
			4	50	55	55	60	60	60	55	60	55
			5	0	10	15	10	10	10	15	10	10

Table 4.5 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
REP	Western pond turtle	EEIS BLM/FS	1	40	10	0	20	20	20	0	20	20
			2	30	30	30	40	40	40	30	40	40
			3	30	50	50	40	40	40	50	40	40
			4	0	10	10	0	0	0	20	0	0
			5	0	0	10	0	0	0	0	0	0
		EEIS CumEff	1	40	0	0	0	0	0	0	0	0
			2	30	0	0	0	0	0	0	0	0
			3	30	10	0	10	10	10	0	10	10
			4	0	20	10	20	20	20	10	20	20
			5	0	70	90	70	70	70	90	70	70

[1]Group: AMP - amphibian; REP -reptile.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Spotted frog species B. The taxonomy of the spotted frog is uncertain. Green and others (1996) conducted a genetic study on spotted frog populations throughout the species' range. Although they did not name any new species, evidence indicates that the spotted frog is really a complex of species and that at least the western part of the range is populated by a species distinct from populations in the eastern part of the range. We are calling the western species "spotted frog species A" and the eastern species "spotted frog species B" for purposes of this analysis. Spotted frog species A is only known from western Oregon to southwestern Washington. In western Oregon, it is found at Gold Lake, Paulina Lake, Crane Prairie Reservoir, and Klamath Forest Refuge. In southwestern Washington, it has been documented at Conboy Lake and Trout Lake (Green and others 1996). The general range of spotted frog species B within the Basin includes patches within the Northern Great Basin and Owyhee Uplands Provinces, within central Oregon, the Blue Mountains, northeastern Washington, the northern two-thirds of Idaho, northwestern Montana, and northwestern Wyoming. Some populations in southwestern Idaho, southeastern Oregon, and northern Nevada are listed by the USFWS as C1 Candidate species (Green and others 1996). Populations of species B in this area are isolated at high altitudes or in desert springs and have been subject to restricted gene flow between populations and, consequently, high inbreeding within populations. Licht (1986) reported that spotted frogs were rarely found more than one meter away from water and were normally found floating in aquatic vegetation. Munger and others (1995), in southwestern Idaho, found spotted frogs between 1,500 and 1,900 meters elevation in oxbows, pools or ponds with sandy substrate, and in surrounding areas with low amounts of sagebrush cover. Data collected at the point of capture indicated that spotted frog microhabitat tended to contain higher amounts of sandy substrate,

submerged vegetation, and algae and lower amounts of grass, sagebrush, and rock substrate. Even temporary water is used for breeding. The main population of spotted frog species B is doing well and can improve with riparian habitat improvement. The bulk of the population in the UCRB EIS area is still intact and breeding is occurring in a variety of areas. Isolation of some populations is severe in some EEIS areas. There are documented cases of extirpation of some local populations in Oregon and fragmentation of populations and habitat due to past activities.

We focused on riparian standards and grazing intensity in assessing effects of alternatives on habitat on Federal lands. Historic outcomes were somewhat uncertain, with likelihood points distributed across all five outcomes within the EEIS area (table 4.5). Under current conditions within the EEIS area, there are no likelihood points in Outcomes 1 or 2. This habitat decline is projected to continue under Alternatives 1 and 5 (the majority of likelihood points are in Outcomes 4 and 5). Alternatives 2, 3, 4, 6, and 7 would increase or maintain habitat conditions relative to current. Within the UCRB EIS area, the decline in habitat from historic to current is less extreme than in the EEIS area (the majority of likelihood points for historic conditions is in Outcome 2 or higher and, under current conditions, in Outcome 3 or higher). Alternatives 1 and 5 are projected to result in continued decline from current conditions on the UCRB EIS area. Alternatives 2, 3, 4, 6, and 7 are projected to maintain current levels. Cumulative effects results were similar to outcomes for habitat on Federal lands.

Spotted frog species A. Because of similar habitat associations, our assessment for this species parallels that of spotted frog species B. Species A is found only in the EEIS area. Outcomes within the EEIS area are similar to those described for species B in the EEIS area.

Northern leopard frog. The range of the northern leopard frog is scattered throughout the five states in the ICBEMP assessment area. The range map indicates sites in the Northern Glaciated Mountains, Lower Clark Fork, Upper Clark Fork, Columbia Plateau, Owyhee Uplands, Upper Snake, and Snake Headwaters Ecological Reporting Units. There is little overlap of the northern leopard frogs' range with Federal land in the EEIS area. Information is lacking on historic range and populations. However, population declines have been noted throughout the western United States (Blaustein and others 1994, Carey 1993, Corn and Fogleman 1984, Cousineau and Rogers 1991, Hammerson 1982). Most populations have likely been eliminated in Oregon and Washington, except in the Columbia River Gorge and the potholes area in Washington. Northern leopard frogs may also have been eliminated from most of the UCRB EIS area. This species is found in still water and pond habitats deep enough to have some open water, which is often warm. Panelists indicated that population levels fluctuate widely over a large area, and with isolated populations the effect is compounded, causing local extirpation. The current isolation of populations limits resilience and the ability to recolonize. Even pristine areas have lost populations.

Jennings and Hayes (1994) stated that this species requires tall, dense grass bordering aquatic habitats. Past grazing practices have reduced habitat through removal of pond bank vegetation and have altered pond hydrology. We considered grazing intensity as an important factor in evaluating the effects of the preliminary draft EIS alternatives on federally administered habitat. The outcomes for the northern leopard frog indicate large habitat shifts from historic to current conditions, to more isolation and less population interaction across both planning areas. The spread of points across four or more outcomes under historic conditions suggests some uncertainty about the historic distribution of this species across the Federal lands (appendix 4-D). Further isolation and fragmentation are projected under Alternatives 1, 3, and 5 (table 4.5). Alternatives 2, 4, 6, and 7 would tend to maintain current habitat conditions for this species. All alternatives have high likelihoods (30 to 95 likelihood points) of Outcome 5

(scarce habitat, little or no population interactions, strong potential for extirpations, and little likelihood of recolonization). Similar and more extreme cumulative effect trends have resulted in severe population declines within the Basin. We projected 67 percent or higher likelihood that species populations met Outcome 3 or higher historically, whereas current populations have 63 percent or higher likelihood of Outcome 5 within EEIS and UCRB EIS areas. Populations under all preliminary draft EIS alternatives are projected at 85 percent or higher likelihood of Outcome 5 across the Basin.

Reptiles—Results for habitat on BLM- and FS-administered lands were generally similar for five rangeland-associated reptiles (desert horned lizard, sagebrush lizard, short-horned lizard, night snake, and striped whipsnake), indicating that current habitat on these lands has declined only slightly from the historic range of conditions. The effects on habitat also do not vary greatly by alternative for these five species (table 4.6 and fig. 4.13). These species were historically either broadly distributed (Outcome 1), or distributed with gaps as in Outcome 2. Cumulative effects on populations of these five species generally trend toward more isolated populations, though among these five species, only the outcome rating for the striped whipsnake in the UCRB EIS area has any points in Outcome 5 (table 4.5). These five reptiles are not further addressed.

Results for other reptiles suggest a greater decline from historic habitat conditions (tables 4.5 and 4.6, and figs. 4.13 and 4.15) for some rangeland-associated species on BLM- and FS-administered lands (Mojave black-collared lizard, longnose leopard lizard, rubber boa, and sharptail snake). These declines are generally related to past conversion of rangeland to agricultural use or non-native plant introductions.

Painted turtle. The range of the painted turtle within the Basin includes the Columbia River Gorge, northern Oregon, Washington east of the Cascades, northern Idaho, and northwestern Montana. The painted turtle uses wetlands, ponds, and slow moving streams at lower elevations. Most of its habitat is likely on private land. Painted turtles nest some distance away from ponds.

Riparian buffers and wetland protection were the primary factors we considered in evaluating the effects of alternatives on habitat on federally administered lands. The outcomes for the painted turtle did not vary strongly from historic to current or under Alternatives 2, 3, 4, 6, and 7 (tables 4.5 and 4.6). Alternatives 1 and 5 were projected to result in more isolated habitat. Larger riparian buffers under Alternatives 2, 3, 4, 6, and 7 would likely conserve habitat on Federal land by encompassing nesting sites, adjusting grazing regimes, and providing dead trees in ponds for basking. The cumulative effects on populations also follow the pattern for the Federal habitat assessment, with some risk of extirpation noted for Alternatives 1, 2, 3, and 5 in each EIS area. Panelists suspect populations are declining, partly as a result of factors not greatly influenced by the alternatives. Pesticide accumulations, private land modification, and skunk predation were noted as specific factors contributing to population declines.

Western pond turtle. The western pond turtle is known to persist in the Klamath Lake region in Oregon and the Columbia River Gorge near The Dalles, Oregon, within the Basin. The western pond turtle does not occur in the UCRB EIS area. Nussbaum and others (1983) reported that western pond turtles inhabit marshes, sloughs, moderately deep ponds, and slow-moving portions of creeks and rivers from sea level to about 1,830 meters elevation. They require basking sites, such as, partially submerged logs, vegetation mats, rocks, and mud banks. The majority of nesting sites are within 200 meters of the aquatic habitat, but may be as much as 402 meters away. Many populations show an increasing bias toward older individuals, indicating that little or no recruitment is taking place. Disturbance of nest sites by cattle and agricultural practices is believed to have eliminated reproduction in many populations (Jennings and Hayes 1994).

Riparian buffers and wetland protection were the primary factors considered in evaluating the effects of alternatives on habitat on federally administered land. The outcomes for the western pond turtle have been reduced from historic to current from 70 percent in Outcomes 1 and 2 to 80 percent in Outcomes 2 and 3. Alternatives 2, 3, 4, 6, and 7 (table 4.5) would result in higher likelihoods in Outcome 2 than current. Alternatives 1 and 5 would result in further isolation of habitat. Larger riparian buffers under Alternatives 2, 3, 4, 6, and 7 would likely conserve habitat on Federal land by encompassing nesting sites, adjusting grazing regimes, and providing dead trees in ponds for basking. The cumulative effects on populations also follows the general pattern for the Federal habitat assessment, but with higher risks of extirpation noted under all alternatives. The available evidence suggests that populations are declining for reasons not strongly influenced by the alternatives and Federal land management. The extensive habitat loss from historic conditions in the former range (mainly outside the assessment area), predation by non-native species, and continued loss of habitat on private land (especially in the Willamette Valley) contribute to the expected continued decline.

Mojave black-collared lizard. The range of the Mojave black-collared lizard within the Basin includes northern Nevada, southeastern Oregon near the Snake River and Owyhee Reservoir in southeastern Oregon, southwestern Idaho, and near Idaho Falls, Idaho. The majority of the range is on BLM-administered land. Distribution within this area is generally discontinuous (Axtell 1972). Whitaker and Maser (1981) reported that collared lizards inhabit talus in areas of low, sparse vegetation and that talus is the main habitat component. Rock outcrops and sparse vegetation are important habitat for dispersal (Sanborn and Loomis 1979).

The evaluation of habitat in southeastern Oregon and southwestern Idaho of the Mojave black-collared lizard is displayed in the ratings for the UCRB EIS area ratings (table 4.5). Within this area, habitat has become more fragmented from historic to current due to habitat loss associated with agriculture, non-native vegetation invasion, and reservoir development. Further decline of habitat on BLM-administered lands is projected under Alternatives 1 and 5 due to invasion of non-native plants. Other alternatives were projected to maintain current conditions. The cumulative effects assessment projected a historic decline in populations of the Mojave black-collared lizard (table 4.5). Further decline is projected under Alternatives 1 and 5 (tending toward more isolated populations), whereas Alternatives 2, 3, 4, 6, and 7 are expected to retain populations similar to current. Declines would result from additional conversion of native vegetation to non-native species on Federal and non-Federal land. This species is also very susceptible to population reduction as a result of commercial collection for the pet trade.

Longnose leopard lizard. The range of the longnose leopard lizard in the Basin includes rangelands in southeastern Oregon, southwestern Idaho, two areas north and south of Idaho Falls, and two small sites near the Columbia River in northern Oregon. Federal lands (primarily those administered by the BLM) constitute about 40 percent of the species range in the Basin. The longnose leopard lizard generally inhabits sandy, desert shrub areas (Nussbaum and others 1983). They are especially common in the islands of sand that accumulate around scattered greasewood shrubs. Whitaker and Maser (1981) studied leopard lizards in a shrub-steppe community of the Owyhee Upland Province. They reported that leopard lizards are widely distributed in southeastern Oregon, in Wyoming big sagebrush/bunchgrass, and in black greasewood/grass and shadescale saltbush/bunchgrass communities. The species tends to occupy areas with sparse vegetation.

Table 4.6. Mean viability outcomes for habitat and populations of amphibians and reptiles for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
AMP	Coeur d'Alene salamander	UCRB BLM/FS[4]	3.7	4.3	4.6	4.3	4.3	4.2	4.6	4.2	4.1
		UCRB CumEff	3.7	4.4	4.9	4.8	4.8	4.7	4.9	4.7	4.5
AMP	Spotted frog species B	EEIS BLM/FS	2.5	3.5	3.9	3.5	3.5	3.5	3.9	3.5	3.4
		EEIS CumEff	2.5	3.5	4.0	3.6	3.6	3.6	3.9	3.6	3.5
		UCRB BLM/FS	2.1	3.1	3.6	3.1	3.2	3.1	3.5	3.1	3.0
		UCRB CumEff	2.1	3.1	3.7[5]	3.2	3.2	3.2	3.6[5]	3.2	3.1
AMP	Northern leopard frog	EEIS BLM/FS[4]	3.2	4.5	4.7	4.5	4.6	4.4	4.7	4.4	4.3
		EEIS CumEff	3.2	4.5	5.0[5]	5.0	5.0	4.9	5.0[5]	4.9	4.9
		UCRB BLM/FS[4]	2.9	4.7	4.9	4.5	4.6	4.3	4.7	4.2[5]	3.9[5]
		UCRB CumEff	2.9	4.8	5.0	5.0	5.0	5.0	5.0	5.0	4.9
AMP	Spotted frog species A	EEIS BLM/FS[4]	2.5	3.6	4.1	3.6	3.6	3.4	4.0	3.3	3.1[5]
		EEIS CumEff	2.5	3.6	4.1	3.7	3.7	3.7	4.0	3.7	3.6
AMP	Tailed frog	EEIS BLM/FS	2.8	3.2	4.1[5]	3.2	3.4	3.2	4.0[5]	3.2	3.0
		EEIS CumEff	2.8	3.2	4.6[5]	3.7	4.0[5]	3.8[5]	4.5[5]	3.8[5]	3.6
		UCRB BLM/FS	2.8	3.2	4.0[5]	3.1	3.3	3.2	3.9[5]	3.1	3.0
		UCRB CumEff	2.8	3.2	4.2[5]	3.6	3.7[5]	3.6	4.2[5]	3.6	3.5
AMP	Western toad	EEIS BLM/FS	1.8	2.4	3.4[5]	2.2	2.3	2.2	3.4[5]	2.2	2.0
		EEIS CumEff	1.8	3.3	4.4[5]	3.4	3.4	3.4	4.3[5]	3.4	3.3
		UCRB BLM/FS	2.1	2.6	3.5[5]	2.6	2.6	2.6	3.5[5]	2.6	2.5
		UCRB CumEff	2.1	3.4	4.2[5]	3.6	3.6	3.6	4.3[5]	3.6	3.5
AMP	Woodhouse's toad	EEIS BLM/FS[4]	2.5	3.9	4.5[5]	4.0	4.1	3.7	4.4[5]	3.5	3.4
		EEIS CumEff	2.5	3.9	4.7[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.5[5]	4.5[5]
		UCRB BLM/FS[4]	3.0	3.8	4.4[5]	4.0	4.1	3.7	4.4[5]	3.5	3.4
		UCRB CumEff	3.0	3.8	4.7[5]	4.7[5]	4.7[5]	4.6[5]	4.7[5]	4.6[5]	4.6[5]
REP	Common garter snake	EEIS BLM/FS	1.5	2.5	3.5[5]	2.5	2.5	2.5	3.5[5]	2.5	2.5
		EEIS CumEff	1.5	3.5	4.5[5]	3.5	3.5	3.5	4.5[5]	3.5	3.5
		UCRB BLM/FS	1.5	2.6	3.2[5]	2.6	2.6	2.6	3.2[5]	2.6	2.6
		UCRB CumEff	1.5	3.1	3.7[5]	3.2	3.2	3.2	3.7[5]	3.2	3.1
REP	Desert horned lizard	EEIS BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		EEIS CumEff	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB CumEff	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
REP	Longnose leopard lizard	EEIS BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		EEIS CumEff	3.5	3.9	4.1	3.9	3.9	3.9	4.1	3.9	3.8
		UCRB BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		UCRB CumEff	3.5	3.9	4.1	3.9	3.9	3.9	4.1	3.9	3.8
REP	Mojave black-collared lizard	UCRB BLM/FS	3.5	3.8	4.0	3.8	3.8	3.8	4.0	3.8	3.8
		UCRB CumEff	3.8	3.8	4.2	3.9	3.9	3.9	4.2	3.9	3.8
REP	Night snake	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
		UCRB CumEff	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6

Table 4.6 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
REP	Painted turtle	EEIS BLM/FS	2.4	2.7	3.2[5]	2.9	2.9	2.6	3.2[5]	2.6	2.4
		EEIS CumEff	2.4	3.3	3.9[5]	3.5	3.5	3.2	3.9[5]	3.2	3.2
		UCRB BLM/FS	2.5	2.7	3.1[5]	2.9	2.9	2.6	3.1[5]	2.6	2.5
		UCRB CumEff	2.5	3.4	3.9[5]	3.6	3.7	3.4	3.9[5]	3.3	3.2
REP	Rubber boa	EEIS BLM/FS	2.5	3.5	3.9	3.5	3.5	3.3	3.9	3.3	2.9[5]
		EEIS CumEff	2.5	3.5	4.9[5]	4.5[5]	4.5[5]	4.3[5]	4.9[5]	4.3[5]	3.9
		UCRB BLM/FS	3.0	3.6	3.8	3.6	3.6	3.5	3.8	3.5	3.2
		UCRB CumEff	3.0	3.6	4.3[5]	4.1	4.1	4.0	4.3[5]	4.0	3.8
REP	Sagebrush lizard	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6
		UCRB CumEff	1.5	2.0	2.3	2.1	2.1	2.1	2.2	2.1	2.0
REP	Sharptail snake	EEIS BLM/FS[4]	3.5	4.5	4.7	4.5	4.5	4.4	4.6	4.2	3.9[5]
		EEIS CumEff	3.5	4.5	5.0[5]	4.9	4.9	4.9	5.0[5]	4.9	4.5
REP	Short-horned lizard	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.6	1.6
		UCRB CumEff	1.5	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6
REP	Striped whipsnake	EEIS BLM/FS	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		EEIS CumEff	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		UCRB BLM/FS	3.5	3.8	3.9	3.8	3.8	3.8	3.9	3.8	3.7
		UCRB CumEff	3.5	3.8	3.9	3.8	3.8	3.8	3.9	3.8	3.8
REP	Western pond turtle	EEIS BLM/FS	1.9	2.6	3.0	2.2	2.2	2.2	2.9	2.2	2.2
		EEIS CumEff	1.9	4.6	4.9	4.6	4.6	4.6	4.9	4.6	4.6

[1]Group: AMP - amphibian; REP - reptile

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

The Federal habitat assessments for each EIS area were similar. Within each EIS area, the habitat has become more fragmented from historic to current due to habitat loss associated with agriculture, non-native vegetation invasion, and reservoir development (table 4.5). The primary factor considered in ratings was conversion of native vegetation to non-native species. Further decline in habitat on BLM-administered land is projected under Alternatives 1 and 5. Other alternatives are expected to maintain current conditions. There is some likelihood of Outcome 5 under each alternative (scarce habitat with little interaction among populations and strong potential of extirpation). Results of cumulative effects assessments were similar to those of the Federal habitat assessment.

Rubber boa. The range of the rubber boa within the Basin encompasses most of the assessment area with the exception of south central Washington and north central Oregon. Panelists suggest it is common where found, but is distributed in scattered locations.

Fragmentation and connectivity of rubber boa habitat was the primary factor considered in evaluating outcomes of preliminary draft EIS alternatives. The outcomes for habitation on Federal land for each EIS area were similar. Within each EIS area, the habitat became more fragmented from historic to current due to habitat loss associated with agriculture, invasions of non-native vegetation, loss of riparian vegetation, and reservoir development (table 4.5). Further decline of habitat on BLM-administered land is projected under Alternatives 1 and 5. Other alternatives would be expected to maintain or improve habitat from current conditions. There was no likelihood of Outcome 5 under any alternative. Results of cumulative effects assessments were similar to those of the Federal habitat assessments, but with likelihoods of Outcome 5 ranging from 10 to 90 percent under the alternatives (highly isolated populations with little or no possibility of interactions and strong potential of extirpations).

Common garter snake. The range of the common garter snake encompasses the Basin. It is most frequently associated with riparian vegetation and wetter forested areas.

Federal habitat assessments, and cumulative effect assessments parallel the general outcomes for amphibians and riparian-associated reptiles discussed above (table 4.5). Alternatives 2, 3, 4, 6, and 7 are projected to generally maintain current habitat conditions, whereas Alternatives 1 and 5 are projected to result in a decline in riparian habitat from current conditions. Alternatives 1 and 5 have 25 (UCRB EIS) or 50 (EEIS EIS) likelihood points in Outcome 5 (scarce habitat with little interaction among populations and strong potential of extirpation).

Sharptail snake. Within the Basin, the sharptail snake is known from two isolated locations in the EEIS area. One site is from central Washington, near Yakima, and the other location is on both sides of the Columbia River Gorge, near The Dalles, Oregon. Sharptail snakes occupy moist habitats, rotting logs, oak woods, riparian woodlands, and stable talus. The species may be undergoing continued declines resulting from increasing isolation associated with long-term global climate change.

Historically, the sharptail snake was found in a patchy or isolated distribution (table 4.5). Under current conditions and under all preliminary draft EIS alternatives, the sharptail snake habitat is very isolated and there is a high likelihood of Outcome 5 (scarce habitat with little interaction among populations and strong potential of extirpation). Somewhat higher outcomes for Alternative 7 are predicted as some reserves fall within range of the sharptail snake. Cumulative effects of increased urbanization and agriculture would result in high likelihoods of extirpation of populations within the Basin.

Birds

One hundred and thirty-three bird species were assessed in four separate expert panels. Information derived from those panels was the basis for the assessment discussed below.

Waterbirds and Shorebirds

Introduction—Fifty-six waterbirds and shorebirds initially were selected for evaluation from 102 bird species associated with wetlands and streams in the assessment area. One species is a federally endangered species (whooping crane), six species are listed as Federal C2 Candidate species, and seven species are on sensitive species lists. The remaining species have had habitat decline historically, or habitat might decline under one or more proposed alternatives.

Methods—The waterbird and shorebird panel altered that initial list. Eleven species were not analyzed further or were recommended for fine-scale analysis based on peripheral, common, or insignificant distributions within the assessment area. The whooping crane was removed from the list because only a few individuals remain in experimental populations within the Basin.[11]

[11]Personal communication. March 7, 1996. G. Ivey, wildlife biologist, Malheur National Wildlife Refuge, Princeton, OR. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA. 99362.

Mountain plover, a sensitive species, was considered to have an insignificant distribution in the Basin. Another sensitive species, the yellow rail, was designated for fine-scale analysis.

Twenty species were added to the list of which 19 were designated for evaluation by the panel and one (Caspian tern) was designated for fine-scale analysis. Several species of grebes, the dabbling and diving ducks, two species of herons, and two species of sandpipers were added because of concerns for loss of wetland habitats, past population declines, and susceptibility to land use, disturbance, or contaminants. In the final analysis, historical, current, and future outcomes under the alternatives were judged for 65 species of waterbirds and shorebirds. A complete list of waterbirds and shorebirds and their final designation for analysis is provided in appendix 4-C.

The relatively large number of species that were evaluated and the similarity of habitats used by these species prompted the panel to group species. Panelists first listed nine primary wetland types and other habitat features (such as, snags, trees for nesting) used by one or more of the listed species (table 4.7). For each species, a list was made of those habitats considered primary for the species. Species then were grouped by similar combinations of habitats. Some groups were composed of only one species, whereas others had several members. Inclusion of species in a particular group did not preclude their use of other wetland types as secondary habitat. Waterbirds and shorebirds that breed or winter in the assessment area comprised 14 groups. Migrant shorebirds formed an additional group (table 4.8). The outcomes of each management alternative were determined for the groups as a whole with comments on individual species recorded as appropriate.

Results—No groups of waterbirds and shorebirds were judged to have been widely distributed (Outcome 1) historically, nor to be widely distributed currently or under any of the alternatives (tables 4.9 and 4.10, fig. 4.16). Most groups had historically patchy distributions as described by Outcomes 3 or 4. Current conditions are somewhat poorer than they were historically, resulting in more groups classified in Outcome 4 and 5, and mean outcomes about 0.5 units lower than historical conditions. Under most alternatives, the mean outcome for all groups combined changed little (< 0.5 units) from the current conditions (fig. 4.17). However, the outcomes under Alternatives 4 and 6 would be better than current conditions for wood duck, mergansers, and harlequin ducks, nearly approaching or exceeding historical conditions (tables 4.9 and 4.10). Outcomes for the EEIS and UCRB planning areas were largely similar, and outcomes under the cumulative effects analysis generally differed little from those for BLM- and FS-administered lands.

Two species were judged as Outcome 5 under one or more alternatives (tables 4.9 and 4.10). Historical habitats and populations of upland sandpiper were broadly distributed approximately as Outcome 2, but loss of grassland habitats and over-hunting have resulted in current and projected isolated habitat patches and populations distributed as Outcome 5 (table 4.9). Habitat on BLM- and FS-administered lands for upland sandpipers would increase slightly under Alternatives 4 and 6, but significant (>0.5 outcomes) improvements in outcome will remain problematic because of currently disjunct and degraded habitat and populations.

Harlequin duck habitat and populations were judged patchy and isolated for Outcome 5 under current conditions and for Alternatives 1 and 5. Significant improvement in harlequin duck outcome (to about mean Outcome 3.5) was predicted under Alternatives 4 and 6 as a result of watershed restoration that improved water quality, reduced streamside disturbance and corvid predation (often associated with human use), and protected and restored riparian vegetation. Harlequin duck was the only waterbird species that showed a significant improvement from current conditions under any alternative (table 4.9). No other individual species or species group was projected to experience significant declines or improvements under any of the alternatives.

Table 4.7. Wetland types and other habitat features used to group breeding and migrant waterbirds and shorebirds for evaluation of ICBEMP management alternatives.

- Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation.
- Permanent, shallow wetlands (such as, springs).
- Seasonal wetlands, flooded winter and spring, dry up in late summer.
- Alkali wetlands.
- Temporary open water (for example, meltwater pools, flooded pasture).
- Tree cavities for nesting.
- Upland grassland, primarily for nesting.
- Tree nesting (non-cavity).
- Rivers and stream riparian, wooded waters.

Discussion—Projected outcomes for the waterbirds and shorebirds as a whole changed very little because alternatives had little planned manipulation of wetland habitat area. Moreover, available projections of wetland and stream riparian habitat areas were poorly modeled for alternatives because of the coarse resolution used to map habitat change under the alternatives and the fine grain (small area relative to the mapping resolution) of the habitats. The panel assumed that wetlands did not change in area on BLM- or FS-administered lands under the alternatives except for natural fluctuations due to the hydrological cycle. Thus, panelists assessed the quality of wetland habitats in assessing viability outcomes. Panel judgments of the effects of alternatives were made largely on the basis of objectives, standards, and guidelines presented in the EIS for management of lentic and lotic riparian vegetation, snags, grazing management, and fire management in riparian areas.

Alternatives with the best outcomes (improved on current conditions) were judged most successful in increasing water quality in streams, maintaining herbaceous and woody riparian vegetation through management of natural and human disturbance, increasing snags in riparian areas and adjacent uplands for cavity nesters, and maintaining flexibility in managing grazing of upland grasslands to reduce negative effects (for example, on upland breeding species such as dabbling ducks) or create positive effects (such as, for cranes, snipe, rails). The best alternatives were not necessarily the most restrictive (for example, Alternative 7), but ones that allowed flexibility in restoration activities.

Panelists described the critical influence of natural fluctuations in wetland area over time on the dynamics and viability of waterbird and shorebird populations. Wetland expansion during wet years results in high production to compensate for drought years. Management needs to recognize the importance of such ephemeral wetlands whether they are on the margin of perennial wetlands or are separate areas that may not be wet every year. For example, mudflats in flooded fields or as part of larger wetlands with fluctuating water levels are considered a key habitat for breeding and migrant sandpipers. Small (<1 acre) wetlands are also vital habitats that are increasingly being converted to other land uses, such as agriculture, or are being degraded by inadequate management of livestock grazing. Such small wetlands are important habitats for grebes and other open water species, herons and egrets, dabbling ducks, cranes, rails, and shorebirds.

Table 4.8. Waterbird and shorebird groups for evaluation of the ICBEMP management alternatives and their associated wetland types, upland habitats, and microhabitats. Groups 1 through 15 are primarily breeding species. Group 15 is only migrant species.

Group 1.	Open water group. Clark's grebe, Red-necked grebe, Western grebe, White pelican, Canvasback, Lesser scaup, Redhead, Ring-necked duck, Ruddy duck, Trumpeter swan, American bittern, Western least bittern, Black tern, California gull, Forster's tern, Ring-billed gull. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer.
Group 2.	Common loon. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation.
Group 3.	Wood duck, Common merganser, Hooded merganser. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Tree cavities for nesting. Rivers and stream riparian, wooded waters.
Group 4.	Common goldeneye, Barrow's goldeneye, Bufflehead. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Tree cavities for nesting.
Group 5.	Snowy plover. Alkali wetlands.
Group 6.	Harlequin duck. Rivers and stream riparian, wooded waters.
Group 7.	Herons and egrets. Black-crowned night heron, Great blue heron, Great egret, Snowy egret, White-faced ibis. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Tree nesting (non-cavity).
Group 8.	Dabbling ducks. Blue-winged teal, Cinnamon teal, Gadwall, Green-winged teal, Mallard, Pintail, Shoveler, American widgeon. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Upland grassland, primarily for nesting.
Group 9.	Spotted sandpiper. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Seasonal wetlands, flooded winter and spring, dry up in late summer. Rivers and stream riparian, wooded waters.
Group 10.	Sandhill crane. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Rivers and stream riparian, wooded waters.
Group 11.	Sora rail, Virginia rail, American avocet, Black-necked stilt, Wilson's phalarope. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer.
Group 12.	Long-billed curlew, Willet. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Upland grassland, primarily for nesting.
Group 13.	Upland sandpiper. Upland grassland, primarily for nesting.
Group 14.	Common snipe. Permanent, shallow wetlands (such as, springs).
Group 15.	Migrant sandpipers: Baird's sandpiper, Black-bellied plover, Dunlin, Greater yellowlegs, Least sandpiper, Lesser yellowlegs, Long-billed dowitcher, Marbled godwit, Pectoral sandpiper, Red-necked phalarope, Sanderling, Semi-palmated plover, Semi-palmated sandpiper, Western sandpiper. Open, deep (> 1 m) permanent, or semi-permanent, wetlands with fish and emergent vegetation. Permanent, shallow wetlands (such as, springs). Seasonal wetlands, flooded winter and spring, dry up in late summer. Alkali wetlands. Temporary open water (for example, meltwater pools, flooded pasture).

Management of herbaceous and woody riparian vegetation, and adjacent upland grassland habitats around small and large wetlands is key to maintaining the proper functioning condition of wetlands for waterbirds. Restoration and management of fire were considered essential to the success of some alternatives in setting back succession to early stages, for example, to increase habitat for rails. Disturbance can have both good and bad effects, depending on the species, and needs to be managed with careful consideration of local habitat conditions and species of interest. Fire may destroy key woody vegetation used for nesting by herons, egrets, and ibis, and snags used for nesting by wood ducks, mergansers, and goldeneyes. Likewise, grazing upland grassland adjacent to wetlands can be detrimental to nesting dabbling ducks. However, short grass associated with grazing can be beneficial to cranes, snipe, curlews, and some species of rails at other times of the year.

Little difference between outcomes for BLM- and FS-administered lands and cumulative effects initially may seem counter-intuitive considering the great extent of wetlands on other Federal and private lands. The positive effects of greater habitat area, in many cases, were offset by negative, non-habitat factors, such as the accumulation of pesticides and other toxic substances in wetlands, degradation of wetlands on private lands in the assessment area, degradation of wintering grounds and population declines south of the United States, and urban and industrial development, pollution, and human activities in marine wintering environments.

Figure 4.16 Waterbirds and Shorebirds

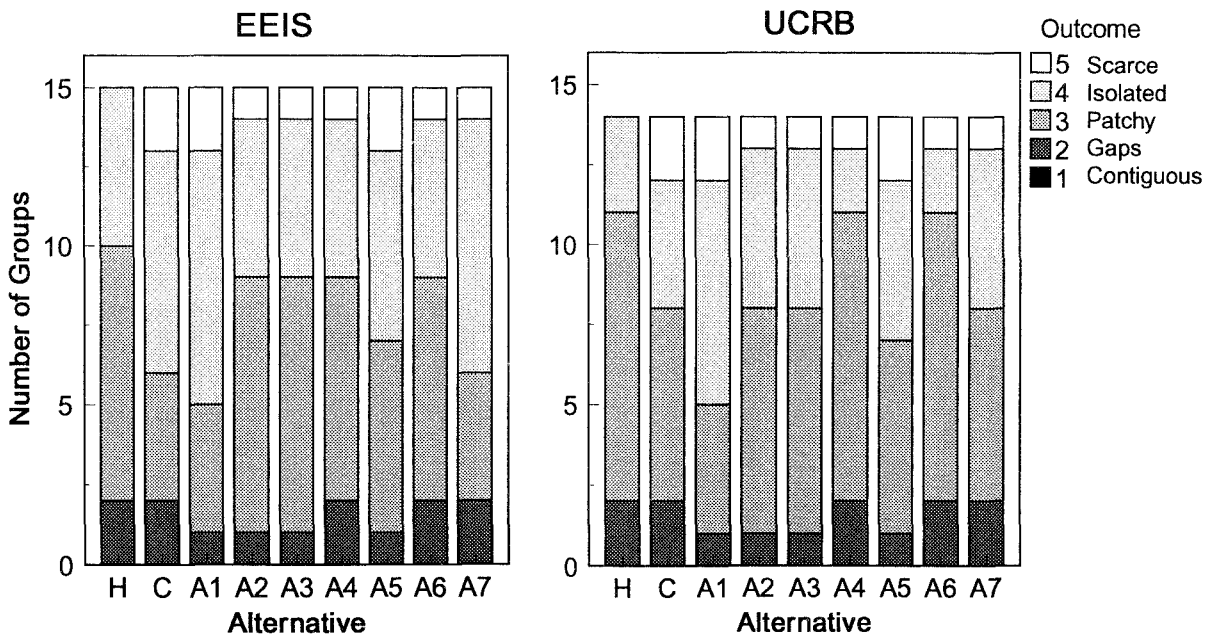


Figure 4.16. Frequency distribution of mean habitat outcome scores for 15 groups of waterbird species on Federal lands in the EEIS planning area and 14 groups in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.17 Waterbirds and Shorebirds

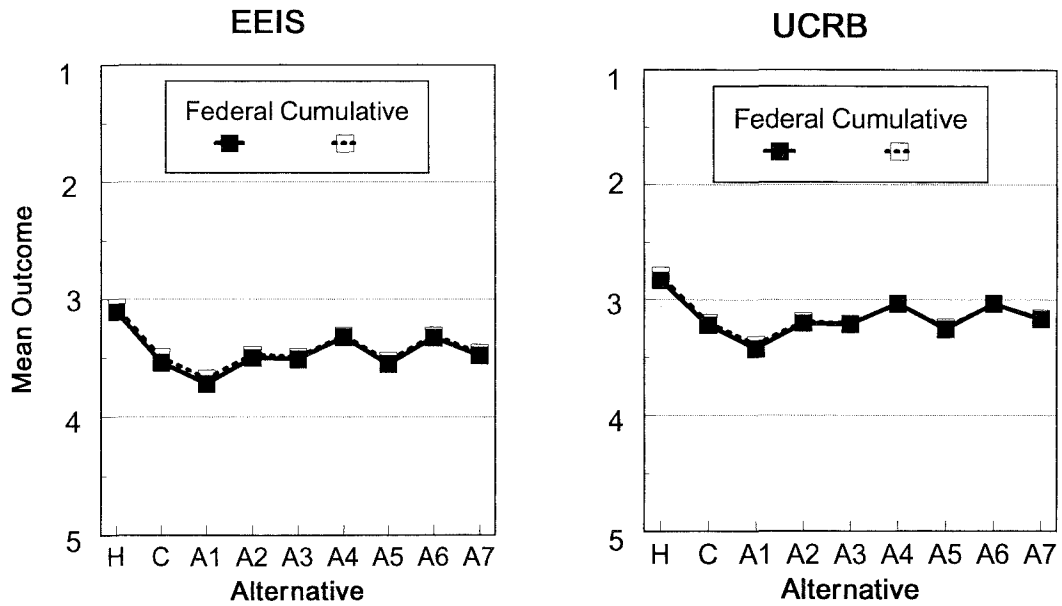


Figure 4.17. Mean outcome scores averaged over 15 groups of waterbird species in the EEIS planning area and 14 groups in the UCRB planning area for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.18 Waterbirds and Shorebirds
Change from Current to Future

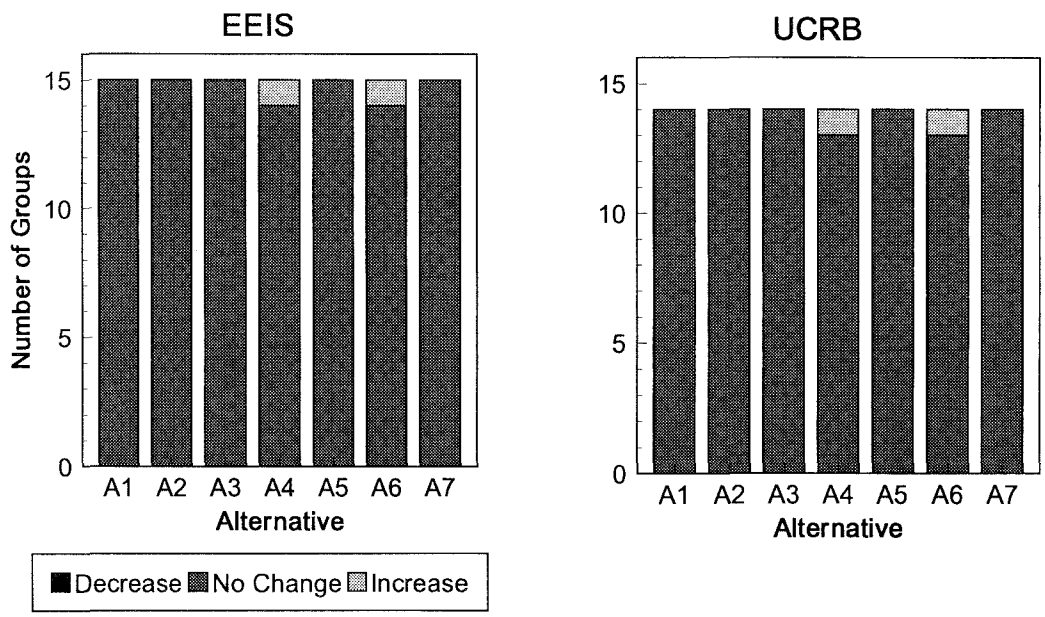


Figure 4.18. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 15 groups of waterbird species in the EEIS planning area and 14 groups in the UCRB planning area. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.9. Mean likelihood scores of viability outcomes for habitat and species groups of waterbirds and shorebirds for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means were calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Habitat & Species Groups	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Group 1: Open water birds	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	7	2	0	3	3	7	0	7	1
		3	91	46	37	51	51	65	51	65	53
		4	2	46	48	42	42	24	44	24	41
		5	0	6	15	4	4	4	5	4	5
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	2	3	0	4	4	9	1	9	2
		3	90	51	43	49	49	59	47	59	53
		4	8	38	44	42	43	28	50	28	40
		5	0	8	13	5	4	4	2	4	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	2	1	0	3	3	6	0	6	2
		3	80	61	36	58	58	67	54	67	65
		4	18	28	48	37	37	22	34	22	31
		5	0	10	16	2	2	5	12	5	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	4	6	2	4	4	12	4	12	4
		3	78	59	38	57	55	60	55	60	61
		4	18	27	46	37	39	24	32	24	33
		5	0	8	14	2	2	4	9	4	2
Group 2: Common loon	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	4	4	4	4	4	4
		3	26	39	28	36	36	40	36	40	36
		4	74	61	60	60	60	56	60	56	60
		5	0	0	12	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	6	16	10	16	16	16	16	16	16
		3	36	40	34	40	41	41	40	43	40
		4	58	44	46	44	43	43	44	41	44
		5	0	0	10	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	4	4	4	4	4	4
		3	18	45	34	42	42	44	42	44	42
		4	82	55	54	54	54	52	54	52	54
		5	0	0	12	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	16	14	16	16	16	16	16	16
		3	37	35	24	33	33	34	34	34	33
		4	63	49	49	51	51	50	50	50	51
		5	0	0	13	0	0	0	0	0	0
Group 3: Wood duck, mergansers	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	2	12	6	14	12	25	11	25	15
		3	40	36	36	38	37	42	38	42	41
		4	58	42	42	42	43	29	40	29	38
		5	0	10	16	6	8	4	11	4	6

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	1	9	5	11	10	22	9	22	13
		3	36	34	33	38	37	41	38	43	41
		4	63	46	39	45	44	33	41	31	40
		5	0	11	23	6	9	4	12	4	6
	UCRB BLM/FS	1	0	5	2	4	4	6	4	6	5
		2	16	23	18	24	21	29	22	29	27
		3	74	45	38	38	39	46	42	46	43
		4	10	19	28	23	26	15	24	15	19
		5	0	8	14	11	10	4	8	4	6
	UCRB CumEff	1	0	6	5	6	6	6	6	6	6
		2	16	18	15	18	18	23	17	24	22
		3	72	44	30	37	37	51	40	50	42
		4	12	24	31	21	22	17	22	17	18
		5	0	8	19	18	17	3	15	3	12
Group 4: Goldeneyes	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	40	24	10	31	26	44	23	44	30
		4	60	70	61	62	63	54	70	54	64
		5	0	6	29	7	11	2	7	2	6
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	41	30	15	31	25	42	22	42	29
		4	59	65	65	59	55	56	67	56	65
		5	0	5	20	10	20	2	11	2	6
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	50	34	12	40	33	53	32	53	38
		4	50	62	65	55	56	43	63	43	60
		5	0	4	23	5	11	4	5	4	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	51	30	15	34	28	46	27	48	36
		4	49	63	64	59	55	50	64	48	62
		5	0	7	21	7	17	4	9	4	2
Group 5: Western snowy plover	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	100	100	88	97	97	97	90	97	100
		5	0	0	12	3	3	3	10	3	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0
		4	100	90	82	90	90	90	83	90	90
		5	0	10	18	10	10	10	17	10	10
Group 6: Harlequin duck	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	60	0	0	0	0	50	0	50	19
		4	40	50	19	60	56	50	50	50	57
		5	0	50	81	40	44	0	50	0	24

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	70	0	0	0	0	45	0	45	14
		4	30	43	15	55	51	55	45	55	57
		5	0	57	85	45	49	0	55	0	29
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	0	0	0	0	0	0	0	0
		3	40	0	0	0	0	60	0	60	19
		4	40	50	21	60	56	32	50	32	57
		5	0	50	79	40	44	8	50	8	24
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	20	0	0	0	0	0	0	0	0
		3	40	0	0	0	0	52	0	51	15
		4	40	41	17	57	49	34	47	34	59
		5	0	59	83	43	51	14	53	15	26
Group 7: Herons, egrets	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	100	64	61	66	64	76	71	76	61
		4	0	30	35	30	32	20	29	20	34
		5	0	6	4	4	4	4	0	4	5
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	4	2	4	2	6	2	6	5
		3	100	69	60	65	64	71	70	71	59
		4	0	19	34	26	30	19	26	19	31
		5	0	8	4	5	4	4	2	4	5
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	80	68	55	71	69	74	68	74	68
		4	20	28	39	27	29	23	28	23	30
		5	0	4	6	2	2	3	4	3	2
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	82	67	53	68	66	68	65	69	64
		4	18	29	41	30	32	28	31	27	34
		5	0	4	6	2	2	4	4	4	2
Group 8: Dabbling ducks	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	30	12	9	12	11	11	10	11	11
		3	70	58	46	67	67	73	52	73	65
		4	0	28	41	19	20	16	38	16	24
		5	0	2	4	2	2	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	44	16	12	15	13	15	13	15	13
		3	56	57	42	62	64	67	55	67	66
		4	0	25	42	22	22	18	32	18	21
		5	0	2	4	1	1	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	18	4	3	5	4	12	4	12	5
		3	80	60	47	66	69	66	56	66	61
		4	2	35	45	28	26	22	40	22	34
		5	0	1	5	1	1	0	0	0	0

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	25	8	7	9	9	9	8	9	8
		3	75	58	43	57	57	63	52	63	56
		4	0	31	44	34	34	28	38	28	36
		5	0	3	6	0	0	0	2	0	0
Group 9: Spotted sandpiper	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	46	54	43	50	50	51	50	51	52
		3	54	46	51	50	50	49	50	49	48
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	50	55	51	54	54	55	54	55	56
		3	50	45	43	46	46	45	46	45	44
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	48	54	43	50	50	51	50	51	52
		3	52	46	51	50	50	49	50	49	48
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	52	54	51	58	58	59	58	59	60
		3	48	46	43	42	42	41	42	41	40
		4	0	0	6	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
Group 10: Greater sandhill crane	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	5	0	0	0	0	3	0	3	0
		3	80	50	34	53	53	69	51	69	50
		4	15	50	65	48	48	29	49	29	50
		5	0	0	1	0	0	0	0	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	8	3	4	3	3	5	3	5	3
		3	79	56	39	56	56	70	55	70	54
		4	14	41	56	41	41	25	43	25	44
		5	0	0	1	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	11	10	3	5	5	10	5	10	5
		3	73	61	46	56	56	68	55	68	53
		4	16	29	51	39	39	23	40	23	43
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	13	5	3	4	4	8	4	8	4
		3	71	63	45	55	55	70	54	70	51
		4	16	33	53	41	41	23	43	23	45
		5	0	0	0	0	0	0	0	0	0
Group 11: Rails, avocets	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	1	0	1	0
		3	69	54	36	57	57	69	54	68	52
		4	31	46	54	41	41	30	44	31	46
		5	0	0	10	2	2	0	2	0	2

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	8	2	2	2	2	3	2	3	2
		3	64	55	36	57	58	70	52	69	52
		4	28	43	53	39	38	27	44	28	44
		5	0	0	9	2	2	0	2	0	2
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	59	45	31	47	47	63	45	62	43
		4	41	55	60	52	52	37	54	38	56
		5	0	0	9	1	1	0	1	0	1
	UCRBCumEff	1	0	0	0	0	0	0	0	0	0
		2	4	2	2	2	2	3	2	3	2
		3	64	50	34	52	52	69	48	68	50
		4	32	48	56	45	45	28	49	29	47
		5	0	0	8	1	1	0	1	0	1
Group 12: Curlew, willet	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	28	10	3	13	13	21	9	21	9
		4	73	90	95	88	88	79	91	79	89
		5	0	0	3	0	0	0	0	0	3
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	33	14	5	16	16	24	13	24	13
		4	68	86	93	84	84	76	88	76	85
		5	0	0	3	0	0	0	0	0	3
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	28	10	3	13	13	18	9	18	9
		4	73	90	95	88	88	83	91	83	89
		5	0	0	3	0	0	0	0	0	3
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	33	14	5	16	16	24	13	24	13
		4	68	86	93	84	84	76	88	76	85
		5	0	0	3	0	0	0	0	0	3
Group 13: Upland sandpiper	EEIS BLM/FS[4]	1	2	0	0	0	0	0	0	0	0
		2	68	0	0	0	0	0	0	0	0
		3	30	0	0	0	0	0	0	0	0
		4	0	0	0	2	10	25	10	25	15
		5	0	100	100	98	90	75	90	75	85
	EEIS CumEff	1	2	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	32	0	0	0	0	0	0	0	0
		4	0	0	0	2	2	12	0	12	2
		5	0	100	100	98	98	88	100	88	98
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	34	0	0	0	0	0	0	0	0
		4	0	0	0	2	10	25	10	25	15
		5	0	100	100	98	90	75	90	75	85

Table 4.9 (continued)

Habitat & Species Groups	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	66	0	0	0	0	0	0	0	0
		3	34	0	0	0	0	0	0	0	0
		4	0	0	0	2	2	12	0	12	2
		5	0	100	100	98	98	88	100	88	98
Group 14: Common snipe	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	12	9	16	16	20	10	20	15
		3	74	68	55	65	65	67	64	66	63
		4	6	20	34	17	17	13	24	14	22
		5	0	0	2	2	2	0	2	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	18	12	10	15	15	18	11	18	14
		3	76	66	53	64	64	68	61	67	62
		4	6	22	35	19	19	14	26	15	24
		5	0	0	2	2	2	0	2	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	20	12	9	16	16	20	10	20	15
		3	74	68	55	64	64	67	63	66	63
		4	6	20	34	20	20	13	27	14	22
		5	0	0	2	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	18	12	10	15	15	18	11	18	14
		3	76	66	53	64	64	68	61	67	62
		4	6	22	35	19	19	14	26	15	24
		5	0	0	2	2	2	0	2	0	0
Group 15: Migrant sandpipers	EEIS BLM/FS	1	32	20	15	24	24	25	16	25	24
		2	52	51	48	48	48	48	49	48	48
		3	16	29	35	28	28	27	35	27	28
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff	1	36	25	17	25	25	26	21	26	25
		2	50	53	53	53	53	53	52	53	53
		3	14	22	28	22	22	21	27	21	22
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	28	12	5	12	12	22	6	22	12
		2	57	59	57	59	59	54	58	54	59
		3	15	29	36	29	29	24	36	24	29
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	35	24	13	25	25	25	14	25	22
		2	51	55	56	55	55	56	56	56	57
		3	14	21	29	20	20	19	30	19	21
		4	0	0	2	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.10. Mean viability outcomes for habitat and species groups of waterbirds and shorebirds for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Habitat & Species Group	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Group 1: Open waterbirds	EEIS BLM/FS	3.0	3.6	3.8	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.1	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	UCRB BLM/FS	3.2	3.5	3.8	3.4	3.4	3.3	3.6	3.3	3.3
	UCRB CumEff	3.1	3.4	3.7	3.4	3.4	3.2	3.5	3.2	3.3
Group 2: Common loon	EEIS BLM/FS	3.7	3.6	3.8	3.6	3.6	3.5	3.6	3.5	3.6
	EEIS CumEff	3.5	3.3	3.6	3.3	3.3	3.3	3.3	3.3	3.3
	UCRB BLM/FS	3.8	3.6	3.8	3.5	3.5	3.5	3.5	3.5	3.5
	UCRB CumEff	3.6	3.3	3.6	3.4	3.4	3.3	3.3	3.3	3.4
Group 3: Wood duck, mergansers	EEIS BLM/FS	3.6	3.5	3.7	3.4	3.5	3.1	3.5	3.1	3.4
	EEIS CumEff	3.6	3.6	3.8	3.5	3.5	3.2	3.6	3.2	3.4
	UCRB BLM/FS	2.9	3.0	3.3	3.1	3.2	2.8	3.1	2.8	2.9
	UCRB CumEff	3.0	3.1	3.4	3.3	3.3	2.9	3.2	2.9	3.1
Group 4: Goldeneyes	EEIS BLM/FS	3.6	3.8	4.2	3.8	3.9	3.6	3.8	3.6	3.8
	EEIS CumEff	3.6	3.8	4.1	3.8	4.0	3.6	3.9	3.6	3.8
	UCRB BLM/FS	3.5	3.7	4.1	3.7	3.8	3.5	3.7	3.5	3.6
	UCRB CumEff	3.5	3.8	4.1	3.7	3.9	3.6	3.8	3.6	3.7
Group 5: Western snowy plover	EEIS BLM/FS	4.0	4.0	4.1	4.0	4.0	4.0	4.1	4.0	4.0
	EEIS CumEff	4.0	4.1	4.2	4.1	4.1	4.1	4.2	4.1	4.1
Group 6: Harlequin duck	EEIS BLM/FS	3.4	4.5	4.8	4.4	4.4	3.5[3]	4.5	3.5[3]	4.1
	EEIS CumEff	3.3	4.6	4.9	4.5	4.5	3.6[3]	4.6	3.6[3]	4.2
	UCRB BLM/FS	3.2	4.5	4.8	4.4	4.4	3.5[3]	4.5	3.5[3]	4.1
	UCRB CumEff	3.2	4.6	4.8	4.4	4.5	3.6[3]	4.5	3.6[3]	4.1
Group 7: Herons, egrets	EEIS BLM/FS	3.0	3.4	3.4	3.4	3.4	3.3	3.3	3.3	3.4
	EEIS CumEff	3.0	3.3	3.4	3.3	3.4	3.2	3.3	3.2	3.4
	UCRB BLM/FS	3.2	3.4	3.5	3.3	3.3	3.3	3.4	3.3	3.3
	UCRB CumEff	3.2	3.4	3.5	3.3	3.4	3.4	3.4	3.4	3.4
Group 8: Dabbling ducks	EEIS BLM/FS	2.7	3.2	3.4	3.1	3.1	3.1	3.3	3.1	3.1
	EEIS CumEff	2.6	3.1	3.4	3.1	3.1	3.0	3.2	3.0	3.1
	UCRB BLM/FS	2.8	3.3	3.5	3.3	3.2	3.1	3.4	3.1	3.3
	UCRB CumEff	2.8	3.3	3.5	3.3	3.3	3.2	3.3	3.2	3.3
Group 9: Spotted sandpiper	EEIS BLM/FS	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5
	EEIS CumEff	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4
	UCRB BLM/FS	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5
	UCRB CumEff	2.5	2.5	2.6	2.4	2.4	2.4	2.4	2.4	2.4
Group 10: Greater sandhill crane	EEIS BLM/FS	3.1	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.1	3.4	3.6	3.4	3.4	3.2	3.4	3.2	3.4
	UCRB BLM/FS	3.1	3.2	3.5	3.3	3.3	3.1	3.4	3.1	3.4
	UCRB CumEff	3.0	3.3	3.5	3.4	3.4	3.2	3.4	3.2	3.4
Group 11: Rails, avocets	EEIS BLM/FS	3.3	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5
	EEIS CumEff	3.2	3.4	3.7	3.4	3.4	3.2	3.5	3.3	3.5
	UCRB BLM/FS	3.4	3.6	3.8	3.5	3.5	3.4	3.6	3.4	3.6
	UCRB CumEff	3.3	3.5	3.7	3.5	3.5	3.3	3.5	3.3	3.5

Table 4.10 (continued)

Habitat & Species Group	Area[1]	Period / Alternative[2] H	C	A1	A2	A3	A4	A5	A6	A7
Group 12: Curlew, willet	EEIS BLM/FS	3.7	3.9	4.0	3.9	3.9	3.8	3.9	3.8	3.9
	EEIS CumEff	3.7	3.9	4.0	3.8	3.8	3.8	3.9	3.8	3.9
	UCRB BLM/FS	3.7	3.9	4.0	3.9	3.9	3.8	3.9	3.8	3.9
	UCRB CumEff	3.7	3.9	4.0	3.8	3.8	3.8	3.9	3.8	3.9
Group 13: Upland sandpiper	EEIS BLM/FS[4]	2.3	5.0	5.0	5.0	4.9	4.8	4.9	4.8	4.9
	EEIS CumEff	2.3	5.0	5.0	5.0	5.0	4.9	5.0	4.9	5.0
	UCRB BLM/FS[4]	2.3	5.0	5.0	5.0	4.9	4.8	4.9	4.8	4.9
	UCRB CumEff	2.3	5.0	5.0	5.0	5.0	4.9	5.0	4.9	5.0
Group 14: Common snipe	EEIS BLM/FS	2.9	3.1	3.3	3.1	3.1	2.9	3.2	2.9	3.1
	EEIS CumEff	2.9	3.1	3.3	3.1	3.1	3.0	3.2	3.0	3.1
	UCRB BLM/FS	2.9	3.1	3.3	3.0	3.0	2.9	3.2	2.9	3.1
	UCRB CumEff	2.9	3.1	3.3	3.1	3.1	3.0	3.2	3.0	3.1
Group 15: Migrant sandpipers	EEIS BLM/FS	1.8	2.1	2.2	2.0	2.0	2.0	2.2	2.0	2.0
	EEIS CumEff	1.8	2.0	2.2	2.0	2.0	2.0	2.1	2.0	2.0
	UCRB BLM/FS	1.9	2.2	2.4	2.2	2.2	2.0	2.3	2.0	2.2
	UCRB CumEff	1.8	2.0	2.2	2.0	2.0	1.9	2.2	1.9	2.0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Upland gamebirds, hawks, falcons, pigeons, and owls

Introduction—Four gamebirds, four hawks, nine owls, band-tailed pigeons, bald eagles, and merlins were selected for detailed analysis. One of these, the bald eagle, is federally threatened and five species (Columbian sharp-tailed grouse, sage grouse, burrowing owl, ferruginous hawk, and northern goshawk) are Federal C2 Candidate species. All of the selected species are associated with habitats that have declined from historic conditions or are expected to decline under one or more alternatives. Eight of the species are primarily forest associates, five are shrubland and grassland associates, three are riparian associates, and four are woodland associates.

Methods—Methods used to assess this group of species followed those outlined in the section "Methods for Assessing Effects on Terrestrial Species."

Results—Scores from the panel assessment were used as the final results with no adjustments. Mean scores for each of the outcomes for each species are shown in table 4.11. Weighted means are in table 4.12. The number of species whose weighted mean fell into each outcome class under each alternative is shown in figure 4.19. The weighted means for each alternative are shown in figure 4.20 and the numbers of species whose weighted mean outcome changed by more than 0.5 of an outcome class between current and the projected future under each alternative are shown in figure 4.21.

Figure 4.19 indicates that historic patterns of habitat were capable of supporting most of these species in conditions described by Outcomes 2 or

3 as broadly distributed to patchy habitat, with populations continuously interacting or acting as metapopulations. Habitat for a few species, Columbian sharp-tailed grouse, burrowing owl, northern pygmy-owl, and northern saw-whet owl, displayed characteristics of Outcome 1. Habitat for two species, boreal owl (EEIS planning area) and band-tailed pigeon (UCRB planning area), was projected to have supported only disjunct, isolated populations. Habitats have declined from historic to current and no species currently have a weighted average Outcome of 1. Two species, Columbian sharp-tailed grouse in both EIS areas and mountain quail in the UCRB, have weighted average Outcomes of 5. Weighted average outcomes are most positive under Alternatives 4 and 6, intermediate under Alternatives 3, 5, and 7, and least favorable under Alternatives 1 and 2 (figs. 4.19 and 4.20). While this group of species has very diverse habitat associations, Alternatives 4 and 6 were judged as having positive effects for many of them because of the emphasis of those alternatives on ecosystem restoration. Restoration was interpreted by the panel to apply to all ecosystems including forested communities, native shrublands, native grasslands, and a variety of riparian communities.

Results for each of the individual species are discussed in more detail below.

Discussion—

Blue grouse. Blue grouse use a mix of forested stages in the ponderosa pine and montane forest vegetation communities (Johnsgard 1983). They tend to use more open forests, including riparian woodland, during the breeding season. Early- and late-seral forest stages are most important as winter habitat. Current management practices, including practices that have altered fire regimes,

Figure 4.19 Raptors and Gamebirds

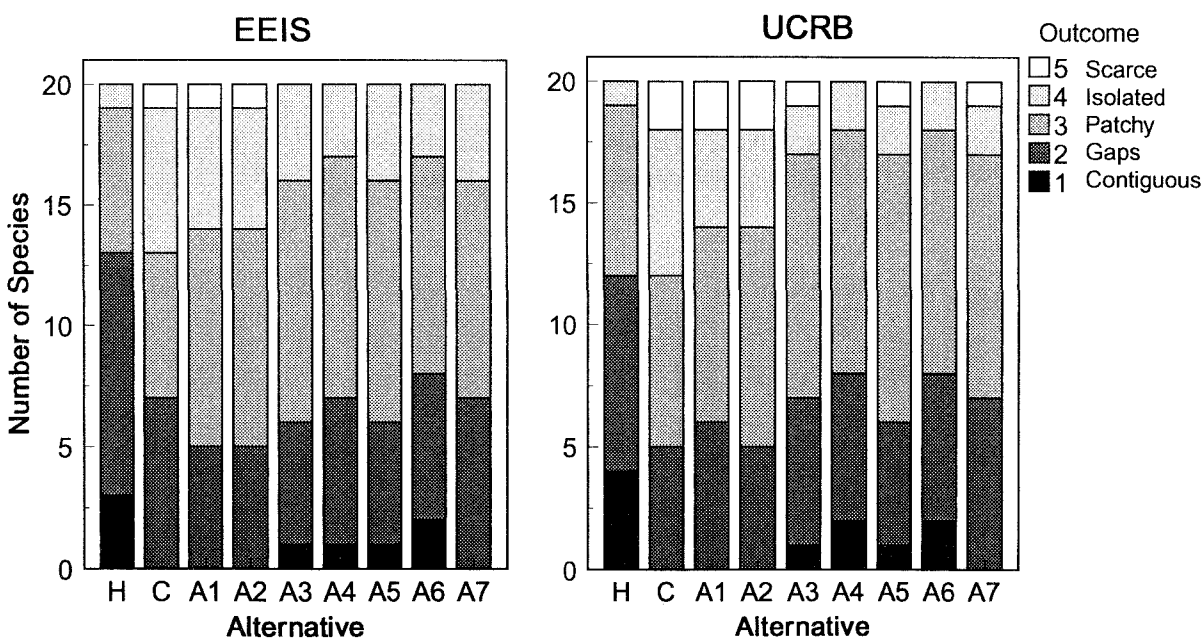


Figure 4.19. Frequency distribution of mean habitat outcome scores for 20 species of raptors and gamebirds on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.20 Raptors and Gamebirds

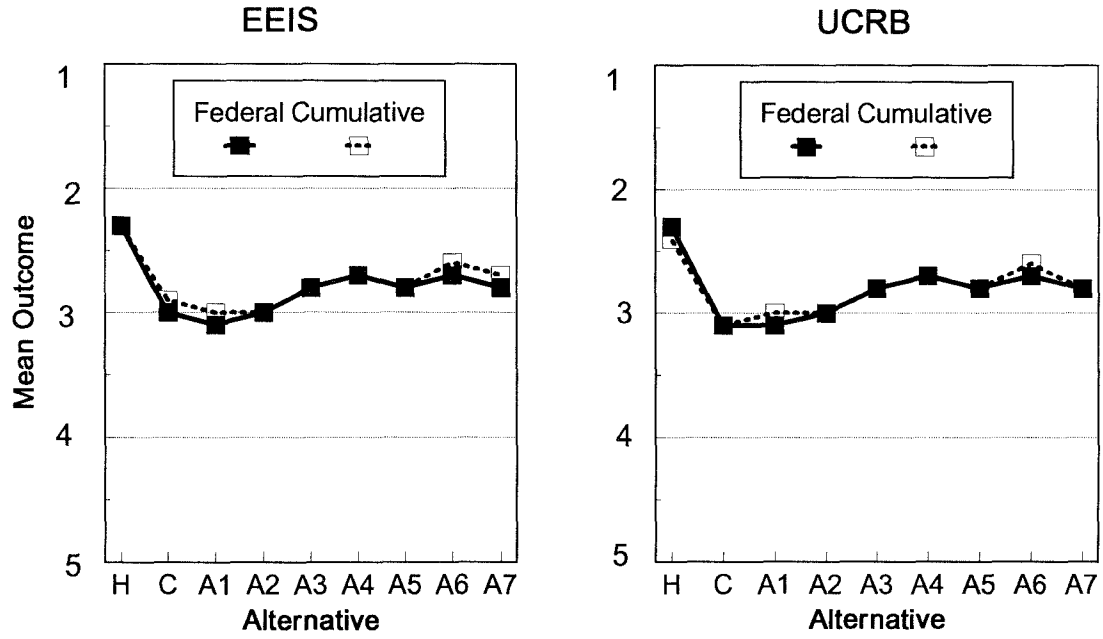


Figure 4.20. Mean outcome scores averaged over 20 species of raptors and gamebirds in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.21 Raptors and Gamebirds

Change from Current to Future

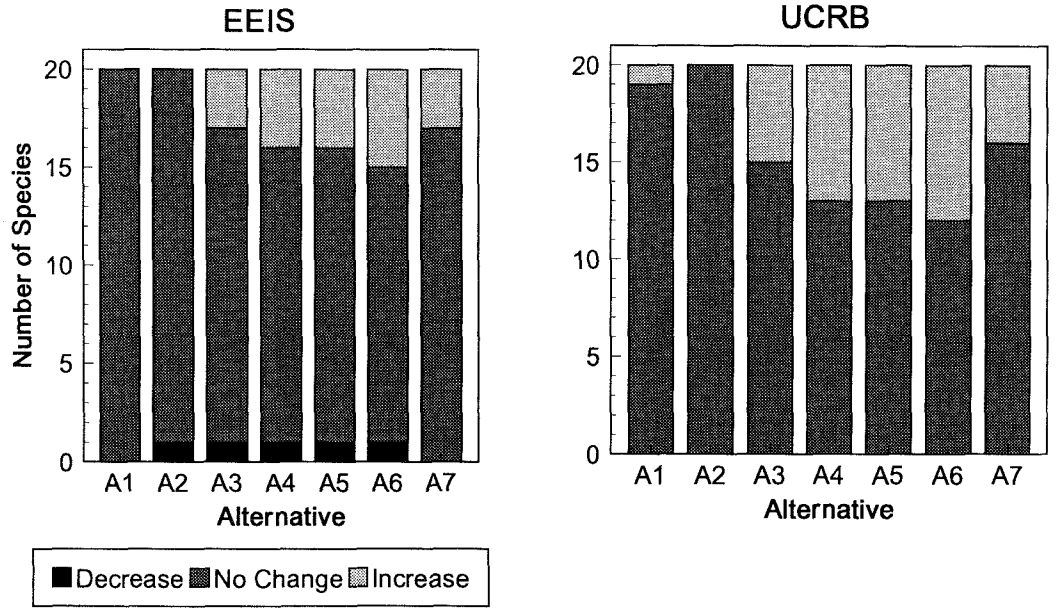


Figure 4.21. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 20 species of raptors and gamebirds in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

have reduced the amount and interspersion of early- and late-seral stages, resulting in a decline in habitat for blue grouse from historical to current periods. Significant improvement in Federal habitat is projected under Alternatives 3 through 7 (table 4.11) because of projected increases in the amount of early- and late-seral stages, and because of a trend toward historic patterns of interspersion of seral stages. However, under any alternative, the habitat available to blue grouse is expected to provide for continued existence of broad to patchy habitat distribution with largely interconnected populations.

Columbian sharp-tailed grouse. Columbian sharp-tailed grouse is a Federal C2 Candidate species. Populations of sharp-tailed grouse have declined sharply in the past due to both hunting and reduction in habitat. They currently occupy only a fraction of their historical range (Johnsgard 1983). They were historically more broadly distributed within the UCRB EIS area than in the EEIS area, but currently exist as only remnant populations in both areas. Upland shrubland and upland herbland are primary habitats (Marks and Marks 1987, Saab and Marks 1992), and both have declined significantly due to conversion to agriculture, grazing, and invasion of non-native plants. Restoration efforts are needed to improve habitat conditions for the species. No improvement is expected under Alternatives 1 and 2 (table 4.11), while Alternatives 3 through 6 are projected to result in the most substantial improvements. Outcomes are expected to be somewhat better under Alternatives 4 and 6 than under Alternatives 3 and 5 because of the more active approach to restoration taken in the former two alternatives. The difference is not a large one however, because of the uncertainty surrounding our ability to actively restore the native shrubland and herbland communities. Under any alternative, however, habitat conditions for sharp-tailed grouse are projected to remain significantly below historic conditions, with habitat capable of supporting only scattered populations and continued probability of local extirpations. The likelihood of extirpations is projected to remain high (> 50%) under Alternatives 1 and 2.

Mountain quail. Primary habitats for mountain quail are riparian zones with tree or shrub cover (Ormiston 1966). Within the Basin, mountain quail historically occupied habitats in western Idaho and along the east slope of the Oregon Cascades Mountains. Habitat has declined on both Federal and non-Federal lands in both EIS areas, most significantly in the UCRB where the species now only occurs in a few scattered pockets (Vogel and Reese 1995). The major factor causing habitat decline has been the reduction in riparian shrub cover and change in riparian shrub species due to grazing. Modification of grazing practices and active restoration of riparian shrub communities would provide the most benefits to mountain quail habitat. Thus, Alternatives 4 and 6 are projected to produce the best habitat outcomes over a 100-year period. Under all alternatives, both habitat and populations in the UCRB are projected to remain patchy and isolated to varying degrees. The likelihood of extirpations is projected to be highest under Alternatives 1 and 2.

Sage grouse. Sage grouse is a Federal C2 Candidate species. Primary habitat is upland shrubland dominated by big sagebrush and perennial bunchgrasses (Call and Maser 1985, Eng and Schladweiler 1972, Wallestad 1971). Habitat has declined historically due to conversions to agriculture and invasions of non-native plants. Populations have declined both in response to loss of habitat and as a result of hunting (Crawford and Lutz 1985). Significant isolation of habitat and populations is projected to have occurred in both EIS areas (table 4.11). Habitat restoration is possible and is projected to result in the greatest changes in habitat under Alternatives 4 and 6. These alternatives, and to a lesser degree Alternatives 3, 5 and 7, would potentially reduce the likelihood of both habitat and population isolation in both EIS areas.

Band-tailed pigeon. Band-tailed pigeons are peripheral to the ICBEMP assessment area as most of their breeding range is on the west side of the Oregon and Washington Cascade Mountains. However, there is some breeding range on the eastern slope of the Cascades, and migrating pigeons

also move through northern Idaho and western Montana (Ryser 1985). Important habitat within the Basin includes late-seral montane forest, late-seral ponderosa pine forest, and woodland upland. Habitat and populations are estimated to have declined historically in the EEIS area, but little change is thought to have occurred historically in the UCRB EIS area (table 4.11). It is projected that Alternatives 3 through 6 would restore habitat for band-tailed pigeons by increasing late-seral ponderosa pine and montane forests, and by restoring historic patterns of interspersion of seral stages. Improvement is projected to be greatest in the EEIS area, with habitat likely to support interacting or continuous populations. Alternatives 1, 2 and 7 are projected to provide little benefit.

Bald eagle. Bald eagles are federally threatened. Habitat and populations were never continuously distributed within the EIS areas, but were always naturally fragmented. Large trees near riparian areas are important for nesting (Anthony and Issacs 1989). Winter communal roosts are described as forest stands with old, open-structured trees close to feeding areas (Keister and Anthony 1983). Both habitat and populations have declined historically, with populations affected by loss of habitat and other factors such as pesticides (Anthony and others 1993) and illegal killing (Bortolotti 1984). A recovery plan has been in effect and has resulted in upward trends in both habitat and population. These trends are expected to continue under any of the alternatives. While none of the alternatives is expected to restore habitat or populations to historic conditions, they all would reduce the likelihood of population isolation and extirpation (table 4.11).

Cooper's hawk. Cooper's hawks historically were broadly and evenly distributed across the Basin. They tend to be habitat generalists, using all seral stages of montane and lower montane community types in addition to upland and riparian woodland. Cooper's hawk habitat and populations are projected to have declined moderately from historic levels (table 4.11), but restoration of those habitats is possible under forest management practices that promote aspen and a mix of forest structures including small openings, clumps of trees of differing densities, and multi-age stands. Alternatives 3 through 7 are projected to result in the greatest improvements in habitat, restoring it to near historic levels on Federal land. Little likelihood of population isolation or local extirpations is projected under any of the alternatives.

Ferruginous hawk. Ferruginous hawk is a Federal C2 Candidate species. Important habitats for ferruginous hawks in the Basin are upland shrubland (sagebrush, saltbush and greasewood), upland herbland, woodland upland, and, to a lesser extent, exotic herbland (Bechard and Schumtz 1995). Habitat for ferruginous hawks is projected to have declined from historic levels due to the conversion of grasslands and shrublands to agriculture and to changes resulting from grazing. Roads and other human disturbances may be a factor in the use of habitat by ferruginous hawks as isolation from human disturbance is considered a significant factor affecting their nest placement (Gilmer and Stewart 1983). Alternatives 1 and 2 were projected to result in little change to the current situation for ferruginous hawk habitat with some likelihood remaining for isolation of local populations (table 4.11). Alternatives 3 through 7 are expected to result in some improvements due to restoration activities in shrublands. Alternatives 4 and 6 would potentially result in the greatest improvements due to restoration activities. Alternative 7 was projected to improve conditions by reducing road densities.

Northern goshawk. Northern goshawk is a Federal C2 Candidate species. It uses old stands of multi-layered conifers for nesting (Reynolds and others 1982, Reynolds and Wight 1978) and a mixture of habitats including young forests and small openings for foraging (Johnsgard 1990). Its habitat is projected to have declined moderately from historic conditions (table 4.11), but the actual status of populations in the EIS areas is not well known. Restoration activities proposed under Alternatives 4 and 6 are projected to have the greatest beneficial effect on goshawk habitat by recreating historic patterns of interspersion of habitat types that are created by frequent, small-scale disturbance.

Table 4.11. Mean likelihood scores of viability outcomes for raptors and gamebirds for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
GMB	Band-tailed pigeon	EEIS BLM/FS	1	34	4	2	2	14	16	12	16	4
			2	31	28	26	30	24	23	24	23	33
			3	32	40	42	39	38	43	38	38	39
			4	3	24	30	29	24	18	26	23	24
			5	0	4	0	0	0	0	0	0	0
		EEIS CumEff	1	36	2	1	1	13	15	11	15	3
			2	28	26	25	28	22	21	22	21	31
			3	33	42	41	42	35	39	38	38	40
			4	3	24	33	29	30	25	29	26	26
			5	0	6	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	4
			2	2	4	4	4	14	16	12	16	12
			3	22	22	36	36	30	29	30	29	30
			4	48	36	44	48	46	46	48	46	44
			5	28	38	16	12	10	9	10	9	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	2	2	2	2	16	16	16	16	16
			3	24	22	36	36	26	27	26	27	28
			4	47	36	44	48	46	46	46	46	44
			5	27	40	18	14	12	11	12	11	12
GMB	Blue grouse	EEIS BLM/FS	1	42	16	14	14	24	27	24	27	22
			2	44	50	44	44	57	56	57	56	60
			3	14	34	36	36	19	17	19	17	18
			4	0	0	6	6	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	44	16	16	16	25	27	25	27	23
			2	42	49	42	43	56	56	56	56	59
			3	14	35	36	35	19	17	19	17	18
			4	0	0	6	6	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	54	14	17	17	27	29	27	29	25
			2	44	50	41	43	55	54	55	54	57
			3	2	36	37	35	18	17	18	17	18
			4	0	0	5	5	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	56	14	17	17	27	29	27	27	25
			2	44	50	43	44	56	55	55	57	59
			3	0	36	40	39	17	16	18	16	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	1	74	0	0	0	0	0	0	0	0
			2	26	0	0	0	2	2	2	2	2
			3	0	2	2	2	14	16	14	16	6
			4	0	20	32	30	47	58	51	57	45
			5	0	78	66	68	37	24	33	25	47

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	76	0	0	0	0	0	0	0	0
			2	24	0	0	0	4	4	4	4	4
			3	0	2	2	2	14	22	14	22	10
			4	0	32	39	37	46	52	50	51	41
			5	0	66	59	61	36	22	32	23	45
		UCRB BLM/FS	1	62	0	0	0	0	0	0	0	0
			2	38	0	0	0	2	2	2	2	2
			3	0	2	2	2	14	16	14	16	6
			4	0	32	37	37	53	59	56	56	45
			5	0	66	61	61	31	23	28	26	47
		UCRB CumEff	1	66	0	0	0	0	0	0	0	0
			2	34	0	0	0	2	2	2	2	2
			3	0	2	2	2	16	24	16	24	12
			4	0	36	42	42	50	53	53	50	41
			5	0	62	56	56	32	21	29	24	45
GMB	Mountain quail	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	62	2	0	0	0	8	0	8	6
			3	22	27	28	29	32	42	37	44	42
			4	16	54	47	48	50	43	49	41	38
			5	0	17	25	23	18	7	14	7	14
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	68	2	0	0	0	0	0	0	0
			3	26	36	33	35	46	55	45	58	47
			4	6	57	59	58	52	45	52	42	51
			5	0	5	8	7	2	0	3	0	2
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	18	0	0	0	0	0	0	0	0
			3	38	0	2	2	8	12	6	13	8
			4	32	18	22	25	27	36	30	39	29
			5	12	82	76	73	65	52	64	48	63
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	24	0	0	0	0	0	0	0	0
			3	37	2	3	3	8	12	7	12	8
			4	35	22	24	29	32	43	32	47	33
			5	4	76	73	68	60	45	61	41	59
GMB	Sage grouse	EEIS BLM/FS	1	42	0	0	0	8	16	7	20	5
			2	54	16	8	12	31	47	38	46	43
			3	4	52	47	52	41	33	41	30	42
			4	0	28	41	32	18	4	12	4	10
			5	0	4	4	4	2	0	2	0	0
		EEIS CumEff	1	48	0	0	0	2	14	1	18	5
			2	49	22	10	12	35	49	42	48	43
			3	3	49	48	55	44	34	44	31	43
			4	0	25	38	29	17	3	11	3	9
			5	0	4	4	4	2	0	2	0	0
		UCRB BLM/FS	1	44	0	0	0	14	20	13	22	5
			2	52	18	10	18	22	42	30	43	41
			3	4	56	49	50	44	34	41	31	42
			4	0	24	39	30	20	4	16	4	12
			5	0	2	2	2	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	50	0	0	0	1	14	1	16	3
			2	47	22	10	18	33	48	40	49	42
			3	3	53	50	51	47	35	44	32	44
			4	0	23	38	29	19	3	15	3	11
			5	0	2	2	2	0	0	0	0	0
RAP	Bald eagle	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	32	6	10	15	15	19	15	19	16
			3	60	42	52	62	68	70	70	70	70
			4	8	42	30	23	17	11	15	11	14
			5	0	10	8	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	0	8	16	16	23	16	24	21
			3	50	45	49	58	64	66	66	65	66
			4	6	43	33	26	20	11	18	11	13
			5	0	12	10	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	32	6	10	15	15	19	15	19	16
			3	60	42	52	62	68	70	70	70	70
			4	8	42	30	23	17	11	15	11	14
			5	0	10	8	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	0	8	16	16	23	16	24	21
			3	50	45	49	58	64	66	66	65	66
			4	6	43	33	26	20	11	18	11	13
			5	0	12	10	0	0	0	0	0	0
RAP	Barred owl	EEIS BLM/FS	1	0	12	6	0	0	0	0	0	8
			2	12	60	49	37	23	21	23	21	56
			3	56	28	33	34	45	42	44	44	32
			4	18	0	12	29	32	35	33	35	4
			5	14	0	0	0	0	2	0	0	0
		EEIS CumEff	1	0	6	8	0	6	6	6	6	0
			2	0	52	42	32	24	24	24	24	52
			3	6	42	38	41	45	41	45	43	36
			4	10	0	12	27	25	29	25	27	12
			5	84	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	2	8	6	6	6	7	6	10
			2	18	32	51	50	51	50	56	48	62
			3	58	38	35	32	32	34	35	36	26
			4	22	28	6	12	11	10	2	10	2
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	2	12	6	10	10	10	10	8
			2	0	24	51	51	47	47	45	47	60
			3	0	34	31	31	31	33	33	34	22
			4	14	32	6	12	12	10	12	9	10
			5	86	8	0	0	0	0	0	0	0
RAP	Boreal owl	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	2
			2	2	0	2	2	2	2	2	2	2
			3	24	18	16	16	27	28	26	28	38
			4	32	40	37	39	36	35	35	35	36
			5	40	42	45	43	35	35	37	35	22

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	2
			2	2	2	2	2	2	2	2	2	2
			3	16	16	17	17	20	20	20	20	29
			4	46	38	35	37	39	38	37	38	40
			5	36	44	46	44	39	40	41	40	27
		UCRB BLM/FS	1	2	0	2	2	2	2	2	2	3
			2	36	7	10	10	23	24	22	23	26
			3	36	42	34	36	37	36	36	39	40
			4	24	24	39	38	32	32	34	32	30
			5	2	27	15	14	6	6	6	4	1
		UCRB CumEff	1	0	0	2	2	2	2	2	2	3
			2	22	7	10	10	10	10	10	10	12
			3	38	40	36	36	44	45	44	47	49
			4	30	26	39	40	40	39	39	39	36
			5	10	27	13	12	4	4	5	2	0
RAP	Burrowing owl	EEIS BLM/FS	1	56	0	0	0	0	0	0	0	0
			2	38	33	31	31	31	37	35	39	34
			3	6	42	44	44	47	44	44	42	45
			4	0	21	21	21	22	19	21	19	21
			5	0	4	4	4	0	0	0	0	0
		EEIS CumEff	1	70	0	0	0	0	0	0	0	0
			2	26	38	33	33	32	37	36	39	35
			3	4	43	48	47	47	46	45	45	43
			4	0	19	17	18	21	17	19	16	22
			5	0	0	2	2	0	0	0	0	0
		UCRB BLM/FS	1	52	0	0	0	0	0	0	0	0
			2	42	36	32	32	34	39	36	41	35
			3	6	40	42	40	47	44	44	42	45
			4	0	20	20	22	19	17	20	17	20
			5	0	4	6	6	0	0	0	0	0
		UCRB CumEff	1	65	0	0	0	0	0	0	0	0
			2	31	40	34	34	34	38	36	40	35
			3	4	41	49	48	49	47	47	46	45
			4	0	19	15	16	17	15	17	14	20
			5	0	0	2	2	0	0	0	0	0
RAP	Cooper's hawk	EEIS BLM/FS	1	34	14	12	12	28	30	28	30	30
			2	50	36	34	38	40	50	40	50	40
			3	14	48	50	46	30	20	30	20	28
			4	2	2	4	4	2	0	2	0	2
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	38	19	18	18	34	36	34	36	35
			2	52	41	39	43	46	54	46	54	45
			3	10	40	41	37	20	10	20	10	20
			4	0	0	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	34	15	15	15	30	31	30	31	31
			2	50	36	34	38	40	50	40	50	40
			3	14	47	47	43	28	19	28	19	27
			4	2	2	4	4	2	0	2	0	2
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	38	16	16	16	31	32	31	32	32
			2	52	43	40	44	48	58	48	58	48
			3	10	41	42	38	21	10	21	10	20
			4	0	0	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Ferruginous hawk	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	66	24	23	28	38	52	39	56	44
			3	32	56	57	54	57	46	56	42	52
			4	0	18	18	14	5	2	5	2	4
			5	0	2	2	4	0	0	0	0	0
		EEIS CumEff	1	6	0	0	0	0	0	0	0	0
			2	70	29	32	33	41	55	40	57	49
			3	24	66	66	65	59	45	60	43	51
			4	0	5	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	64	22	21	26	36	50	37	54	42
			3	34	58	59	56	59	48	58	44	54
			4	0	18	18	14	5	2	5	2	4
			5	0	2	2	4	0	0	0	0	0
		UCRB CumEff	1	6	0	0	0	0	0	0	0	0
			2	70	29	32	33	41	55	40	57	49
			3	24	66	66	65	59	45	60	43	51
			4	0	5	2	2	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Flammulated owl	EEIS BLM/FS	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
		EEIS CumEff	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	5	18	25	17	21	13
			3	21	39	19	32	57	61	56	61	51
			4	2	39	38	47	21	13	23	16	28
			5	0	20	42	16	4	1	4	2	8
		UCRB BLM/FS	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
		UCRB CumEff	1	1	0	0	0	0	0	0	0	0
			2	76	2	1	6	19	26	18	22	14
			3	21	40	20	32	56	60	56	62	51
			4	2	38	39	46	21	13	22	14	27
			5	0	20	40	16	4	1	4	2	8
RAP	Great gray owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	10	4	0	4	2	2	2	2	2
			3	48	44	38	41	46	49	46	49	50
			4	36	32	40	35	46	45	45	45	30
			5	6	20	22	20	6	4	7	4	18

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	13	7	4	4	8	8	8	8	8
			3	51	44	43	43	48	50	48	50	50
			4	30	29	31	33	38	38	37	38	24
			5	6	20	22	20	6	4	7	4	18
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	20	6	14	16	20	22	20	22	23
			3	62	46	44	45	56	56	55	56	43
			4	16	38	34	31	20	22	24	22	32
			5	2	10	8	8	4	0	1	0	2
		UCRB CumEff	1	2	0	0	0	0	0	0	0	0
			2	22	8	18	18	22	24	22	24	27
			3	58	44	39	41	52	52	51	52	38
			4	16	39	35	33	22	24	26	24	33
			5	2	9	8	8	4	0	1	0	2
RAP	Long-eared owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	21	10	8	8	14	19	15	19	11
			3	53	38	33	29	43	46	41	46	41
			4	21	43	46	49	39	30	39	30	40
			5	5	10	14	15	5	5	5	5	8
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	26	14	10	11	19	23	19	23	14
			3	51	46	41	38	48	53	48	53	49
			4	19	35	39	43	31	23	31	23	30
			5	4	5	10	9	3	3	3	3	8
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	21	8	6	5	11	15	11	14	6
			3	53	38	33	31	44	48	44	48	43
			4	21	45	48	49	40	33	40	33	44
			5	5	10	14	15	5	5	5	5	8
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	28	10	6	6	14	18	13	16	6
			3	50	48	43	39	46	50	48	51	48
			4	19	38	41	46	38	30	38	30	39
			5	4	5	10	9	3	3	3	3	8
RAP	Merlin	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	30	20	16	15	22	24	20	24	19
			3	50	49	46	44	51	54	53	54	54
			4	20	29	35	37	25	21	25	21	24
			5	0	2	3	4	2	1	2	1	3
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	25	19	19	25	27	23	28	22
			3	52	47	50	50	49	51	52	51	52
			4	13	28	29	29	25	22	24	21	24
			5	0	0	2	2	1	0	1	0	2
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	30	20	19	17	25	27	22	27	21
			3	51	53	48	46	53	53	55	53	57
			4	19	27	33	37	22	20	23	20	22
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	33	27	22	20	28	30	25	29	24
			3	53	50	53	52	52	51	54	52	56
			4	14	23	25	28	20	19	21	19	20
			5	0	0	0	0	0	0	0	0	0
RAP	Northern goshawk	EEIS BLM/FS	1	16	8	5	5	10	16	9	16	11
			2	54	46	35	37	40	48	41	50	44
			3	30	35	44	45	42	29	42	28	37
			4	0	11	16	13	8	7	8	6	8
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	20	10	6	6	9	20	8	20	12
			2	55	51	39	39	45	50	46	51	47
			3	25	32	46	48	39	24	40	27	37
			4	0	7	9	7	7	6	6	2	4
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	16	9	6	6	7	16	6	16	11
			2	56	38	33	34	41	47	42	49	49
			3	28	36	54	55	48	34	48	33	40
			4	0	17	7	5	4	3	4	2	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	20	10	8	8	10	20	9	20	14
			2	52	44	35	36	44	42	44	44	43
			3	28	32	53	53	44	37	45	35	42
			4	0	14	4	3	2	1	2	1	1
			5	0	0	0	0	0	0	0	0	0
RAP	Northern pygmy-owl	EEIS BLM/FS	1	65	44	35	45	54	59	54	59	51
			2	35	53	60	53	44	40	44	40	46
			3	0	4	5	3	3	1	3	1	3
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	66	45	36	46	55	60	55	60	53
			2	34	53	60	53	44	40	44	40	46
			3	0	3	4	1	1	0	1	0	1
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	68	46	38	48	54	61	54	61	51
			2	33	50	58	50	44	38	44	38	46
			3	0	4	5	3	3	1	3	1	3
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	69	48	39	49	55	63	55	63	53
			2	31	50	58	50	44	38	44	38	46
			3	0	3	4	1	1	0	1	0	1
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
RAP	Northern saw-whet owl	EEIS BLM/FS	1	71	37	32	34	49	56	49	61	49
			2	27	56	58	58	41	38	41	34	44
			3	2	7	10	8	10	6	10	5	7
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	74	38	32	34	49	57	49	62	50
			2	24	56	60	60	43	39	43	36	45
			3	2	6	8	6	8	4	8	2	5
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	73	39	32	36	51	58	51	63	51
			2	27	54	60	56	41	38	41	34	42
			3	0	7	8	8	8	4	8	3	7
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	76	40	32	36	51	59	51	64	52
			2	24	54	62	58	43	39	43	36	43
			3	0	6	6	6	6	2	6	0	5
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RAP	Swainson's hawk	EEIS BLM/FS	1	23	32	32	32	35	35	35	35	31
			2	59	51	53	53	51	52	51	53	55
			3	14	17	15	15	14	13	14	12	14
			4	4	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	23	27	27	27	30	30	30	30	26
			2	59	51	53	53	54	55	54	56	58
			3	14	20	18	18	14	14	14	14	14
			4	4	2	2	2	2	1	2	0	2
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	23	32	32	32	35	35	35	35	31
			2	53	51	53	53	51	52	51	53	55
			3	20	17	15	15	14	13	14	12	14
			4	4	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	23	27	27	27	30	30	30	30	26
			2	53	51	53	53	54	55	54	56	58
			3	20	20	18	18	14	14	14	14	14
			4	4	2	2	2	2	1	2	0	2
			5	0	0	0	0	0	0	0	0	0
RAP	Western screech owl	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	56	33	22	31	36	46	38	47	43
			3	44	58	67	61	58	53	56	53	57
			4	0	9	11	8	6	1	6	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.11 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	61	29	20	32	39	48	42	50	47
			3	39	59	67	61	56	52	54	50	53
			4	0	12	13	7	5	0	4	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	56	33	22	31	36	46	38	47	43
			3	44	58	67	61	58	53	56	53	57
			4	0	9	11	8	6	1	6	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	59	31	22	32	37	47	40	49	45
			3	41	57	65	61	58	53	56	51	55
			4	0	12	13	7	5	0	4	0	0
			5	0	0	0	0	0	0	0	0	0

[1]Group: GMB - gamebird; RAP - raptor.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Under other alternatives, little change from current habitat conditions is anticipated. Habitat is projected to support a population with higher likelihood of remaining broadly-distributed under Alternatives 4 and 6, with greater patchiness projected under other alternatives.

Swainson's hawk. Swainson's hawks use a wide variety of open habitats including riparian shrubland, upland herbland, upland shrubland, nonnative grasses, and agricultural lands. Their habitat and population are projected to have changed little from historic conditions because of their ability to adapt to human-induced changes. Little future change is expected under the alternatives. The most significant concern for Swainson's hawks is the use of pesticides on winter range in south and central America.

Merlin. Important habitats for merlin in the Basin include riparian herb, shrub, and woodland; upland herb, shrub, and woodland; and late-seral, single-story lower montane forest. The distribution of merlins tends to be naturally patchy. Habitat has declined slightly from its historic condition (table 4.11) due to the reduction in single-story lower montane forest and upland woodland. Moderate habitat declines are projected to continue under Alternatives 1 and 2 with little change occurring under the other alternatives. Small likelihoods of local population isolation are projected to continue under all alternatives.

Barred owl. Barred owls, recent invaders in the assessment area, now occupy suitable habitat throughout the Basin. Primary habitats within the Basin are late-seral montane and subalpine multi-layered forest, and riparian woodland. The invasion of barred owls into the area may be due in part to increases in multi-layered forest that have resulted from fire suppression. The habitats that support barred owls are currently believed to be at higher than historic levels (table 4.11). In the EEIS area, late-seral montane multi-layered forest

is projected to decline under all alternatives except Alternative 7, with the greatest declines under Alternatives 4 and 6. Such a decline could be seen as beneficial by potentially slowing the invasion by barred owls. By contrast, this habitat is projected to increase in the UCRB EIS area because of the large area of fire- and harvest-influenced forest that will progress to late-seral condition within 100 years.

Boreal owl. Key habitats for boreal owls within the Basin are late-seral single- and multi-story subalpine forests. Boreal owls are exclusively secondary cavity nesters. Hayward and others (1993) found that boreal owls prefer more complex forests, with higher basal area, more large trees, and less understory development than average sites. They are distributed in relatively large, disjunct patches in the UCRB EIS area and in isolated, small patches within the EEIS area. Their distribution is determined by habitat and elevation. In surveys in Idaho and Montana (Hayward and others, 1987), 75 percent of boreal owl locations were above 5,227 feet elevation. Different patterns of habitat and species outcomes were projected for the two EIS areas (table 4.11). The EEIS area has never supported broadly distributed populations of boreal owls, so the projected historic outcomes were of scattered and isolated habitat and populations. A slight increase in isolation was projected to have occurred from historic to current conditions and would continue under Alternatives 1 and 2. A modest improvement was projected under Alternatives 3 through 7. However, under any conditions, boreal owls and their habitat will remain scattered in isolated areas in the EEIS area. The UCRB EIS area historically supported more habitat and populations that were reasonably well-connected. Habitat has declined historically due to both harvest and natural disturbances. Currently, boreal owl habitat and populations are thought to be more isolated with higher chances of extirpation than they were historically. The status of boreal owls and their habitat is projected to improve under all alternatives, with the greatest improvements on Federal land under Alternatives 3 through 7. Some likelihood of extirpation would remain under these alternatives, but the likelihood would be less than under current conditions or Alternatives 1 and 2.

Burrowing owl. Burrowing owls are distributed throughout the grasslands and shrublands in the Basin, with sagebrush steppe and native grassland providing key habitats (Green and Anthony 1989). They are listed as a Federal C2 Candidate species. Historically, their habitats and populations were likely to have been fairly broad in distribution, but have declined due to conversion of habitat to agriculture and other influences such as pesticides (Haug and others 1993). Their current situation consists of habitat with gaps large enough to result in some likelihood of population isolation (table 4.11). No significant change in habitat was projected under the alternatives, although restoration efforts under Alternatives 4 and 6 would have some beneficial effect compared to other alternatives.

Flammulated owl. Flammulated owls occur throughout the Basin where habitat is available. They are obligate cavity nesters whose primary habitat consists of a mosaic of open forests, dense forests, and open grasslands (Hayward and Verner 1994). The open forest preferred by flammulated owls contains large ponderosa pine and Douglas-fir trees (Goggins 1985). Such open forests have declined due to logging and fire suppression. Both habitat and populations of flammulated owls are projected to have declined from a historic situation of largely connected habitat, to a current situation of scattered and isolated habitat with a significant likelihood of local extirpations (table 4.11). Declines are projected to continue under Alternative 1 with an increasing likelihood of extirpations. Improvement is projected under Alternatives 2 through 7 with the greatest improvement resulting from restoration practices proposed under Alternatives 4 and 6. Restoration practices would return vegetation to historic patterns of interspersion. Alternatives 3 and 5 are projected to have a smaller positive effect because of some emphasis on timber production in potential flammulated habitat. Alternatives 2 and 7 are also projected to have smaller positive effects because of their emphasis on preservation of old forest rather than active restoration.

Table 4.12. Mean viability outcomes for habitat and populations of raptors and gamebirds for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
GMB	Band-tailed pigeon	EEIS BLM/FS	2.0	3.0	3.0	3.0	2.7	2.6	2.8	2.7	2.8
		EEIS CumEff	2.0	3.1	3.1	3.0	2.8	2.7	2.9	2.8	2.9
		UCRB BLM/FS	4.0	4.1	3.7	3.7	3.5[4]	3.5[4]	3.6[4]	3.5[4]	3.4[4]
		UCRB CumEff	4.0	4.1	3.8	3.7	3.5[4]	3.5[4]	3.5[4]	3.5[4]	3.5[4]
GMB	Blue grouse	EEIS BLM/FS	1.7	2.2	2.3	2.3	2.0	1.9	2.0	1.9	2.0
		EEIS CumEff	1.7	2.2	2.3	2.3	1.9	1.9	1.9	1.9	2.0
		UCRB BLM/FS	1.5	2.2	2.3	2.3	1.9	1.9	1.9	1.9	1.9
		UCRB CumEff	1.4	2.2	2.2	2.2	1.9	1.9	1.9	1.9	1.9
GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	1.3	4.8	4.6	4.7	4.2[4]	4.0[4]	4.2[4]	4.1[4]	4.4
		EEIS CumEff	1.2	4.6	4.6	4.6	4.1[4]	3.9[4]	4.1[4]	3.9[4]	4.3
		UCRB BLM/FS	1.4	4.6	4.6	4.6	4.1[4]	4.0[4]	4.1[4]	4.1[4]	4.4
		UCRB CumEff	1.3	4.6	4.5	4.5	4.1	4.1[4]	4.0[4]	4.1[4]	4.3
GMB	Mountain quail	EEIS BLM/FS	2.5	3.9	4.0	3.9	3.9	3.5	3.8	3.5	3.6
		EEIS CumEff	2.4	3.7	3.8	3.7	3.6	3.5	3.6	3.4	3.6
		UCRB BLM/FS	3.4	4.8	4.7	4.7	4.6	4.4	4.6	4.4	4.6
		UCRB CumEff	3.2	4.7	4.7	4.7	4.5	4.3	4.5	4.3	4.5
GMB	Sage grouse	EEIS BLM/FS	1.6	3.2	3.4	3.3	2.8	2.3[4]	2.6[4]	2.2[4]	2.6[4]
		EEIS CumEff	1.6	3.1	3.4	3.3	2.8	2.3[4]	2.7	2.2[4]	2.6[4]
		UCRB BLM/FS	1.6	3.1	3.3	3.2	2.7	2.2[4]	2.6[4]	2.2[4]	2.6
		UCRB CumEff	1.5	3.1	3.3	3.2	2.8	2.3[4]	2.7	2.2[4]	2.6
RAP	Bald eagle	EEIS BLM/FS	2.8	3.6	3.4	3.1	3.0[4]	2.9[4]	3.0[4]	2.9[4]	3.0[4]
		EEIS CumEff	2.6	3.7	3.5	3.1[4]	3.0[4]	2.9[4]	3.0[4]	2.9[4]	2.9[4]
		UCRB BLM/FS	2.8	3.6	3.4	3.1	3.0[4]	2.9[4]	3.0[4]	2.9[4]	3.0[4]
		UCRB CumEff	2.6	3.7	3.5	3.1[4]	3.0[4]	2.9[4]	3.0[4]	2.9[4]	2.9
RAP	Barred owl	EEIS BLM/FS	3.3	2.2	2.5	2.9[4]	3.1[4]	3.2[4]	3.1[4]	3.1[4]	2.3
		EEIS CumEff	4.8	2.4	2.5	3.0[4]	2.9[4]	2.9[4]	2.9[4]	2.9[4]	2.6
		UCRB BLM/FS	3.0	2.9	2.4[4]	2.5	2.5	2.5	2.3[4]	2.5	2.2[4]
		UCRB CumEff	4.9	3.2	2.3[4]	2.5[4]	2.5[4]	2.4[4]	2.5[4]	2.4[4]	2.3[4]
RAP	Boreal owl	EEIS BLM/FS	4.1	4.2	4.3	4.2	4.0	4.0	4.1	4.0	3.7[4]
		EEIS CumEff	4.2	4.2	4.3	4.2	4.2	4.2	4.2	4.2	3.9
		UCRB BLM/FS	2.9	3.7	3.6	3.5	3.2[4]	3.2[4]	3.2[4]	3.1[4]	3.0[4]
		UCRB CumEff	3.3	3.7	3.5	3.5	3.3	3.3	3.4	3.3	3.2[4]
RAP	Burrowing owl	EEIS BLM/FS	1.5	3.0	3.0	3.0	2.9	2.8	2.9	2.8	2.9
		EEIS CumEff	1.3	2.8	2.9	2.9	2.9	2.8	2.8	2.8	2.9
		UCRB BLM/FS	1.5	2.9	3.0	3.0	2.9	2.8	2.8	2.8	2.9
		UCRB CumEff	1.4	2.8	2.9	2.9	2.8	2.8	2.8	2.7	2.9
RAP	Cooper's hawk	EEIS BLM/FS	1.8	2.4	2.5	2.4	2.1	1.9	2.1	1.9	2.0
		EEIS CumEff	1.7	2.2	2.3	2.2	1.9	1.7	1.9	1.7	1.9
		UCRB BLM/FS	1.8	2.4	2.4	2.4	2.0	1.9	2.0	1.9	2.0
		UCRB CumEff	1.7	2.3	2.3	2.3	1.9	1.8	1.9	1.8	1.9
RAP	Ferruginous hawk	EEIS BLM/FS	2.3	3.0	3.0	2.9	2.7	2.5	2.7	2.5[4]	2.6
		EEIS CumEff	2.2	2.8	2.7	2.7	2.6	2.5	2.6	2.4	2.5
		UCRB BLM/FS	2.3	3.0	3.0	3.0	2.7	2.5	2.7	2.5[4]	2.6
		UCRB CumEff	2.2	2.8	2.7	2.7	2.6	2.5	2.6	2.4	2.5

Table 4.12 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3]								
			H	C	A1	A2	A3	A4	A5	A6	A7
RAP	Flammulated owl	EEIS BLM/FS	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		EEIS CumEff	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		UCRB BLM/FS	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
		UCRB CumEff	2.2	3.8	4.2	3.7	3.1[4]	2.9[4]	3.1[4]	3.0[4]	3.3
RAP	Great gray owl	EEIS BLM/FS	3.4	3.7	3.8	3.7	3.6	3.5	3.6	3.5	3.6
		EEIS CumEff	3.3	3.6	3.7	3.7	3.4	3.4	3.4	3.4	3.5
		UCRB BLM/FS	3.0	3.5	3.4	3.3	3.1		3.1		3.1
		UCRB CumEff	2.9	3.5	3.3	3.3	3.1	3.0	3.1	3.0	3.1
RAP	Long-eared owl	EEIS BLM/FS	3.1	3.6	3.7	3.7	3.4	3.2	3.3	3.2	3.5
		EEIS CumEff	3.0	3.3	3.5	3.5	3.2	3.1	3.2	3.1	3.4
		UCRB BLM/FS	3.1	3.6	3.7	3.7	3.4	3.3	3.4	3.3	3.6
		UCRB CumEff	3.0	3.4	3.6	3.6	3.3	3.2	3.4	3.2	3.5
RAP	Merlin	EEIS BLM/FS	2.9	3.1	3.3	3.3	3.1	3.0	3.1	3.0	3.1
		EEIS CumEff	2.8	3.0	3.1	3.1	3.0	3.0	3.0	2.9	3.1
		UCRB BLM/FS	2.9	3.1	3.1	3.2	3.0	2.9	3.0	2.9	3.0
		UCRB CumEff	2.8	3.0	3.0	3.1	2.9	2.9	3.0	2.9	3.0
RAP	Northern goshawk	EEIS BLM/FS	2.1	2.5	2.7	2.7	2.5	2.3	2.5	2.2	2.4
		EEIS CumEff	2.1	2.4	2.6	2.6	2.4	2.2	2.4	2.1	2.3
		UCRB BLM/FS	2.1	2.6	2.6	2.6	2.5	2.2	2.5	2.2	2.3
		UCRB CumEff	2.1	2.5	2.5	2.5	2.4	2.2	2.4	2.2	2.3
RAP	Northern pygmy-owl	EEIS BLM/FS	1.4	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		EEIS CumEff	1.3	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		UCRB BLM/FS	1.3	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.5
		UCRB CumEff	1.3	1.6	1.7	1.5	1.5	1.4	1.5	1.4	1.5
RAP	Northern saw-whet owl	EEIS BLM/FS	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		EEIS CumEff	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		UCRB BLM/FS	1.3	1.7	1.8	1.7	1.6	1.5	1.6	1.4	1.6
		UCRB CumEff	1.2	1.7	1.7	1.7	1.6	1.4	1.6	1.4	1.5
RAP	Swainson's hawk	EEIS BLM/FS	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		EEIS CumEff	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.9
		UCRB BLM/FS	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		UCRB CumEff	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.9
RAP	Western screech owl	EEIS BLM/FS	2.4	2.8	2.9	2.8	2.7	2.6	2.7	2.5	2.6
		EEIS CumEff	2.4	2.8	2.9	2.8	2.7	2.5	2.6	2.5	2.5
		UCRB BLM/FS	2.4	2.8	2.9	2.8	2.7	2.6	2.7	2.5	2.6
		UCRB CumEff	2.4	2.8	2.9	2.8	2.7	2.5	2.6	2.5	2.6

[1]Group: GMB - gamebird; RAP - raptor.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Great gray owl. Great gray owls occur throughout the Basin where habitat exists. They use nest trees in a variety of habitats, but most are located in mature or older stands of mixed-conifer (Bull and Henjum 1990). Natural nest sites are most frequently in large-diameter (> 20 inches dbh) dead trees in cavities or on stick platforms (Bull and Henjum 1990). They forage in open forests which may be partially logged or unlogged. Down woody material appears to be an important component of foraging habitat (Bull and Henjum 1990). Meadows adjoining forests also appear to provide important foraging habitat (Forsman and Bryan 1987). Great gray owls were likely never broadly distributed, but rather, occurred in a patchy distribution with interaction among local populations. Habitat has declined from historic conditions resulting in a pattern of more isolated habitat patches (table 4.11). Declines have been greatest in the UCRB EIS area where old forest is projected to have declined more substantially. Little change in habitat outcomes is projected under Alternatives 1 and 2, with more improvement projected under Alternatives 3 through 6. Management proposed under these alternatives would restore vegetation to natural patterns favorable to great gray owls. The outcome of Alternative 7 is less certain because of the potential for catastrophic fires in reserves. The likelihood of local extirpations would remain (> 10%) under Alternatives 1, 2 and 7 in the EEIS area.

Long-eared owl. Long-eared owls typically nest in willows, cottonwoods, and junipers adjacent to shrubland (Craig and Trost 1979, Marks 1986, Marks and Yensen 1980, Thurow and White 1984), or in ponderosa pine or mixed-conifer forests. Foraging habitat is primarily open forests (Bull and others 1989) and shrub habitats. These habitats have likely declined from historic condition with current habitat occurring in a patchy pattern. This pattern creates the potential for population isolation. Alternatives 3 through 7 propose management practices that focus on restoration of natural vegetative patterns and are projected to reverse the declining trend.

Northern pygmy-owl and northern saw-whet owl. Northern pygmy-owls and northern saw-whet owls have similar habitat associations, using mid- to late-seral mixed conifer and ponderosa pine forests in summer and shrubby and riparian vegetation in winter. Both species of owls are secondary cavity nesters in snags. They are broadly distributed within the Basin, but habitat has likely declined moderately from historic conditions for both species, resulting in a pattern of larger habitat gaps (table 4.11). Little change from current conditions is projected for Alternatives 1 and 2, while Alternatives 3 through 7 are projected to restore more broadly distributed habitat. The restoration emphasis of Alternatives 4 and 6 is projected to be most positive. Local population isolation or extirpation is unlikely under any alternative.

Western screech owl. Western screech owls occupy riparian deciduous habitat throughout the Basin. Declines from historic conditions in this habitat are projected to have resulted in a pattern of increasing patchiness and increasing isolation of screech owl habitat and populations. These trends are projected to continue under Alternative 1. Moderate improvement is projected under other alternatives. There is little likelihood of local population isolation or extirpation under any alternative.

Woodpeckers, nuthatches, and swifts

Introduction—The ICBEMP assessment area database lists 14 species of woodpeckers, 3 species of nuthatches, and 3 species of swifts that occur within the Basin. We selected nine species of woodpeckers, two species of nuthatches, and one species of swift for viability assessments. We recommend that assessment of two species of woodpeckers (yellow-bellied sapsucker and red-breasted sapsucker) be conducted at a fine scale because of their local distributions within the Basin. In all cases, species were selected for assessment because their habitats were projected to decline under at least one of the alternatives. Two of the species originally assessed in this group (western bluebird and chestnut-backed chickadee) were moved to the passerine group for analysis and are not included here.

Methods—We used standard methods, as outlined in overall methods (Methods for Assessing Effects on Terrestrial Species), for the assessment of woodpeckers, nuthatches, and swifts. Because all of these species are cavity nesters, we paid special attention to provisions for the conservation and management of snags and cavity-bearing trees under each preliminary draft EIS alternative. We could not predict actual numbers of snags that might be present under the alternatives. Instead, we relied on the general direction for snag management and assumptions for habitat response, based on degree of emphasis on snag management under each alternative, coupled with projections of amounts of suitable habitat for each species. In addition, several of the species are known to use very large-diameter snags and these snags might not be fully represented under the 100-year timeframe of the projections. Therefore, we extended the time from the normal 100 years to more than 200 years to allow more time for development of large-diameter snags under the alternatives. We modified panel results for four species (Vaux's swift, pileated woodpecker, white-headed woodpecker, and downy woodpecker) based on our interpretation of key features of particular alternatives, our interpretation of the panelist's intent as recorded in the panel notes, and additional clarification about snag management practices proposed under the alternatives that was made available by the landscape analysis team after the panel deliberations.

Results—Results of the viability assessment for the 12 species of woodpeckers, nuthatches, and swifts are listed in tables 4.13 and 4.14. Habitat conditions on federally administered lands were generally judged to be similar between the EEIS and UCRB EIS planning areas. Habitat conditions for the 12 species were not projected to attain Outcome 1 under historic, current, or future periods in either the EEIS or UCRB areas (table 4.14 and fig. 4.22). We judged that habitat conditions of nine species attained Outcome 2 under historic conditions and that habitat for one species (hairy woodpecker) is currently at that level. No species were judged to attain Outcome 2 under Alternatives 1 and 5 (fig. 4.22). Habitat conditions of the Vaux's swift had the lowest outcomes, averaging close to Outcome 4 for all alternatives except Alternative 7, which was projected to support Outcome 3. Habitat outcomes for the white-headed woodpecker were close to Outcome 4 for current conditions and for Alternatives 1 through 3, and averaged closer to Outcome 3 for Alternatives 4 through 7.

Weighted average outcomes, averaged among the 12 species (fig. 4.23), were highest for the historic period, averaging between Outcomes 2 and 3. Current outcomes were lower than historic levels and averaged slightly above Outcome 3; average outcomes were lower than current for Alternatives 2 and 5, were similar to current for Alternatives 2 and 3, and were higher than current for Alternatives 4, 6, and 7 (fig. 4.23).

Compared with current habitat conditions, weighted average outcomes for habitat conditions on Federal lands in the EEIS area were projected to increase by at least 0.5 for four species under Alternatives 4, 6, and 7, and to decrease by that amount for nine species under Alternative 1 and for two species under Alternative 5 (fig. 4.24). Habitat outcomes showed little change from current conditions under Alternatives 2 and 3. In the UCRB EIS area, the pattern was identical to that of the EEIS area for Alternatives 2, 3, 4, 6, and 7. Habitat outcomes for ten species are projected to decrease from current conditions under Alternative 1 and for one species under Alternative 5.

Discussion—The general pattern of habitat response under the scenarios we evaluated primarily reflects the likely distribution and abundance of snags suitable for nesting. According to the assumptions for habitat response that were prepared by the ICBEMP Science Team and EIS teams, Alternatives 1 through 7 are expected to have the following levels of emphasis and projected trends for snags:

Alternative						
1	2	3	4	5	6	7
N (—)	L (-)	M (0)	H (+)	M (0)	H (++)	M (0)

where: N = None, L = Low, M = Moderate, H = High; 0 = stable projected trend, + = upward trend, ++ = strong upward trend, - = downward trend, and — = strong downward trend. A comparison of these estimates with the average outcomes for the 12 species (fig. 4.23) shows a general concordance, except that the outcomes for Alternative 7, for which habitat response was assumed to be moderate with stable trend, were comparable to those of Alternatives 4 and 6. Alternatives 4 and 6 had high emphasis on snag habitat. Outcomes were greater for Alternative 7 because the reserve system and retention of all late-seral forest stands outside of reserves under this alternative would likely lead to greater numbers of large-diameter snags over the long run.

Habitat conditions of three species, white-headed woodpecker, Vaux's swift, and Lewis' woodpecker, were projected to decrease to Outcome 4 under some of the alternatives. The white-headed woodpecker is strongly associated with large-diameter ponderosa pines which it uses for foraging and nesting (Bull 1980; Dixon 1995; Garrett and others, in press; Milne and Hejl 1989). Under current conditions, stands of mature ponderosa pine are small and disjunct resulting in small and isolated subpopulations. Projected habitat conditions are expected to resemble current conditions under Alternatives 1, 2, and 3, but are expected to increase under Alternatives 4 through 7. This would especially be true under Alternatives 4 and 6 which place greater emphasis on restoration of late-seral lower montane forest (table 4.14).

Figure 4.22 Woodpeckers, Nuthatches, Swifts

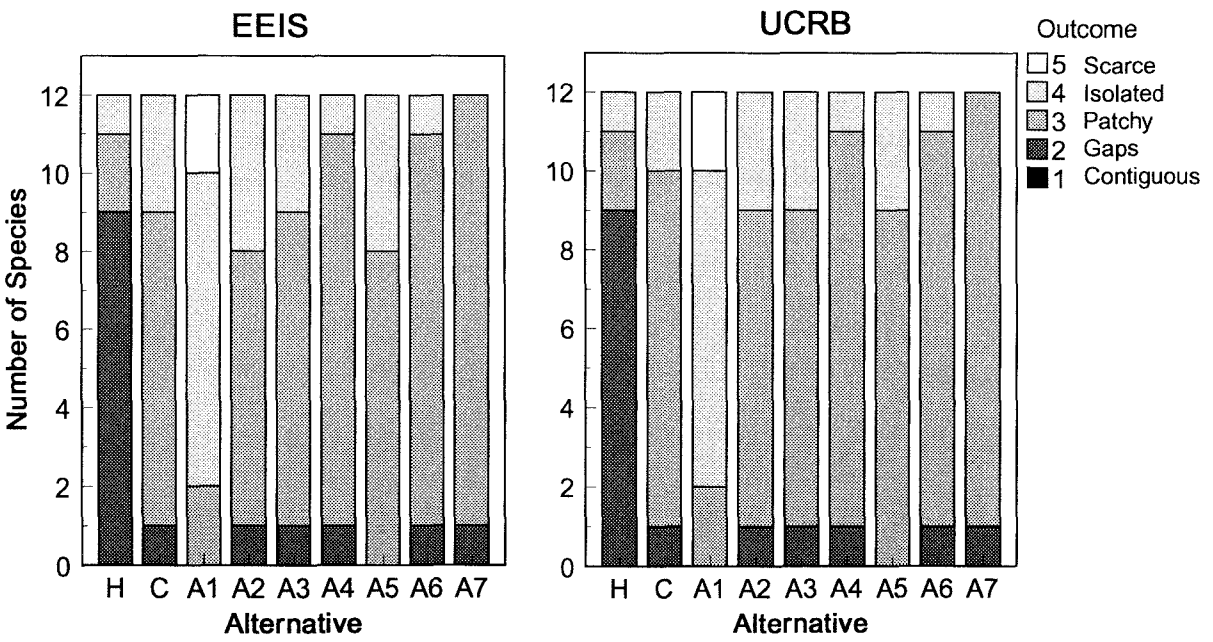


Figure 4.22. Frequency distribution of mean habitat outcome scores for 12 species of woodpeckers, nuthatches, and swifts on Federal lands in the EEIS and UCRB planning areas for historic, current and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.23 Woodpeckers, Nuthatches, Swifts

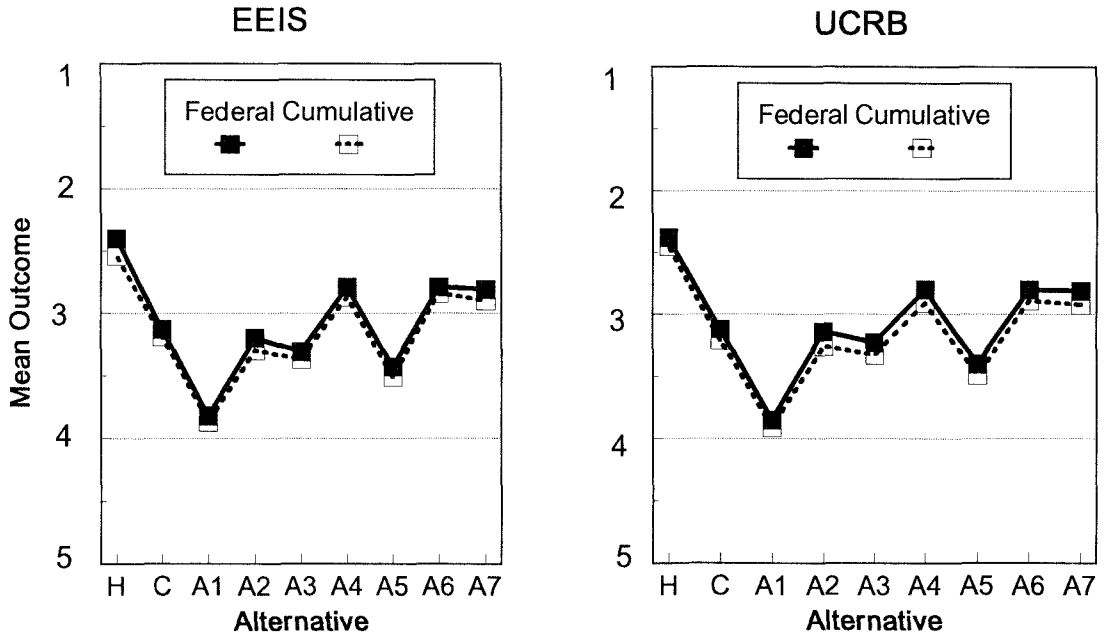


Figure 4.23. Mean outcome scores averaged over 12 species of woodpeckers, nuthatches, and swifts in the EEIS and UCRB planning areas for historic, current, and future conditions under seven alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.24 Woodpeckers, Nuthatches, Swifts
Change from Current to Future

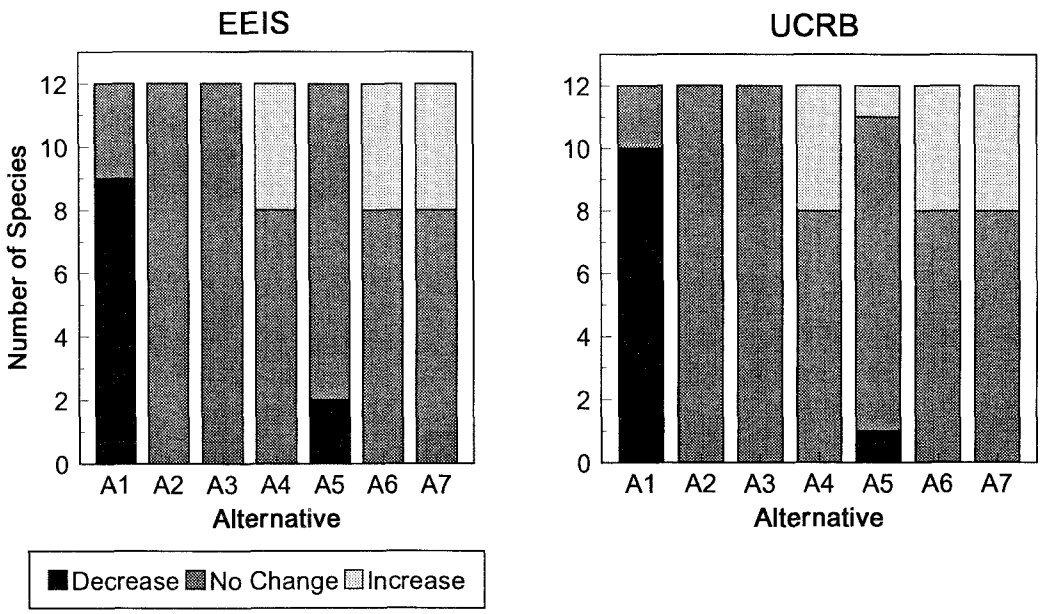


Figure 4.24. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 12 species of woodpeckers, nuthatches, and swifts in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.13. Mean likelihood scores of viability outcomes for woodpeckers, nuthatches, and swifts for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

			Period / Alternative[3]								
Species Name	Area[1]	Outcome[2]	H	C	A1	A2	A3	A4	A5	A6	A7
Black-backed woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	3	0	8	8	15	0	15	15
		3	20	83	19	68	58	73	51	73	80
		4	0	15	58	25	35	13	46	13	5
		5	0	0	24	0	0	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	5	5	13	0	13	13
		3	20	80	16	65	55	70	46	70	73
		4	0	20	55	30	40	18	49	18	15
		5	0	0	29	0	0	0	5	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	80	5	4	15	10	23	5	25	23
		3	20	80	16	70	64	68	44	65	73
		4	0	15	59	15	26	10	49	10	5
		5	0	0	21	0	0	0	3	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	80	0	0	8	5	13	0	15	15
		3	20	80	15	70	63	68	41	65	70
		4	0	20	59	23	33	20	54	20	15
		5	0	0	26	0	0	0	5	0	0
Downy woodpecker	EEIS BLM/FS[4]	1	25	0	0	0	0	0	0	0	0
		2	75	30	10	23	18	25	13	28	18
		3	0	70	70	73	78	73	65	70	78
		4	0	0	20	5	5	3	23	3	5
		5	0	0	0	0	0	0	0	0	0
	EEIS CumEff[4]	1	25	0	0	0	0	0	0	0	0
		2	75	25	15	18	18	25	15	28	23
		3	0	75	75	80	80	73	70	73	75
		4	0	0	10	3	3	3	15	0	3
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS[4]	1	25	0	0	0	0	0	0	0	0
		2	75	33	3	28	25	25	20	28	13
		3	0	68	75	68	70	73	58	70	80
		4	0	0	23	5	5	3	23	3	8
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff[4]	1	25	0	0	0	0	0	0	0	0
		2	75	30	3	28	25	25	20	28	13
		3	0	70	80	68	70	73	63	73	80
		4	0	0	18	5	5	3	18	0	8
		5	0	0	0	0	0	0	0	0	0
Hairy woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	80	45	65	58	58	43	60	80
		3	13	20	55	35	43	43	58	40	20
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	85	89	43	53	58	60	43	60	70
		3	15	11	58	48	43	40	58	40	30
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	85	50	66	55	60	45	65	83
		3	13	15	50	34	45	40	55	35	18
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	85	45	55	60	63	45	65	75
		3	13	15	55	45	40	38	55	35	25
		4	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0
Lewis' woodpecker	EEIS BLM/FS	1	10	0	0	0	0	0	0	0	0
		2	47	10	0	0	0	53	0	47	43
		3	43	27	0	47	55	40	23	47	53
		4	0	63	50	53	45	7	60	7	3
		5	0	0	50	0	0	0	17	0	0
	EEIS CumEff	1	10	0	0	0	0	0	0	0	0
		2	27	10	0	0	0	17	0	17	17
		3	47	17	0	17	35	70	0	67	67
		4	17	47	23	70	58	13	40	17	17
		5	0	27	77	13	7	0	60	0	0
	UCRB BLM/FS	1	15	0	0	0	0	0	0	0	0
		2	45	15	0	0	0	45	0	40	35
		3	40	30	0	60	80	45	25	50	60
		4	0	55	50	40	20	10	50	10	5
		5	0	0	50	0	0	0	25	0	0
	UCRB CumEff	1	15	0	0	0	0	0	0	0	0
		2	15	15	0	0	0	0	0	0	0
		3	45	15	0	20	35	80	0	75	75
		4	25	30	25	60	55	20	45	25	25
		5	0	40	75	20	10	0	55	0	0
Pileated woodpecker	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	25	10	0	0	0	50	0	50	47
		3	43	40	3	47	47	50	80	50	53
		4	32	50	97	53	53	0	13	0	0
		5	0	0	0	0	0	0	7	0	0
	EEIS CumEf[4]	1	0	0	0	0	0	0	0	0	0
		2	25	10	0	0	0	50	0	50	47
		3	43	40	3	47	47	50	80	50	53
		4	32	50	97	53	53	0	13	0	0
		5	0	0	0	0	0	0	7	0	0
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	25	15	0	0	0	50	0	50	45
		3	50	35	3	45	45	50	85	50	55
		4	25	50	97	55	55	0	10	0	0
		5	0	0	0	0	0	0	5	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	25	15	0	0	0	50	0	50	45
		3	50	35	3	45	45	50	85	50	55
		4	25	50	97	55	55	0	10	0	0
		5	0	0	0	0	0	0	5	0	0
Pygmy nuthatch	EEIS BLM/FS	1	0	0	0	0	0	3	0	3	0
		2	88	13	0	18	15	40	15	40	20
		3	13	88	43	60	58	58	43	58	78
		4	0	0	55	23	25	0	40	0	3
		5	0	0	3	0	3	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	3	0	3	0
		2	88	13	0	18	15	40	15	40	20
		3	13	88	43	60	58	58	43	58	78
		4	0	0	55	23	25	0	40	0	3
		5	0	0	3	0	3	0	3	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	3	0	18	15	40	15	40	20
		3	13	98	43	60	55	60	43	60	78
		4	0	0	55	23	30	0	43	0	3
		5	0	0	3	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	3	0	18	15	40	15	40	20
		3	13	98	43	60	55	60	43	60	78
		4	0	0	55	23	30	0	43	0	3
		5	0	0	3	0	0	0	0	0	0
Red-naped sapsucker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	15	23	30	5	31	19
		3	0	75	45	73	65	70	58	69	56
		4	0	25	30	13	13	0	25	0	25
		5	0	0	25	0	0	0	13	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	10	18	25	3	26	14
		3	0	75	43	78	70	75	58	74	61
		4	0	25	33	13	13	0	28	0	25
		5	0	0	25	0	0	0	13	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	15	23	30	5	31	19
		3	0	75	45	73	65	70	58	69	56
		4	0	25	30	13	13	0	25	0	25
		5	0	0	25	0	0	0	13	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	100	0	0	10	18	25	3	26	14
		3	0	75	43	78	70	75	58	74	61
		4	0	25	33	13	13	0	28	0	25
		5	0	0	25	0	0	0	13	0	0
Three-toed woodpecker	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	89	20	70	58	88	63	80	79
		4	0	1	60	23	33	8	38	8	6
		5	0	0	20	0	0	0	0	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	88	20	70	58	88	63	80	79
		4	0	3	60	23	33	8	38	8	6
		5	0	0	20	0	0	0	0	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	89	20	75	63	88	63	80	81
		4	0	1	59	18	28	8	38	8	4
		5	0	0	21	0	0	0	0	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	45	10	0	8	10	5	0	13	15
		3	55	88	20	75	63	88	63	80	81
		4	0	3	59	18	28	8	38	8	4
		5	0	0	21	0	0	0	0	0	0
Vaux's swift	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	3	0	0	0	0	3	0	0	10
		3	23	27	0	50	20	27	0	7	87
		4	40	73	50	47	43	67	75	87	3
		5	33	0	50	3	37	3	25	7	0
	EEIS CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	3	0	0	20	0	10	0	3	63
		4	57	93	25	65	47	70	50	90	33
		5	40	7	75	15	53	20	50	7	3
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	10	0	0	0	0	3	0	0	10
		3	23	20	0	50	20	27	0	7	87
		4	33	80	50	47	47	70	75	87	3
		5	33	0	50	3	33	0	25	7	0
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0
		3	10	0	0	20	0	10	0	3	63
		4	57	87	25	65	47	70	50	90	33
		5	33	13	75	15	53	20	50	7	3
White-breasted nuthatch	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	8	0	8	8	20	3	30	18
		3	13	88	43	80	63	80	53	70	75
		4	0	5	55	13	28	0	43	0	8
		5	0	0	3	0	3	0	3	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	8	0	8	8	23	3	33	18
		3	13	93	43	80	63	78	53	68	75
		4	0	0	55	13	28	0	43	0	8
		5	0	0	3	0	3	0	3	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	83	10	0	7	10	27	0	40	23
		3	17	90	37	90	73	73	62	60	60
		4	0	0	63	3	17	0	38	0	17
		5	0	0	0	0	0	0	0	0	0

Table 4.13 (continued)

Species Name	Area[1]	Outcome[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	83	10	0	7	10	27	0	40	23
		3	17	90	37	90	73	73	62	60	60
		4	0	0	63	3	17	0	38	0	17
		5	0	0	0	0	0	0	0	0	0
White-headed woodpecker	EEIS BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	33	18	35	23
		3	38	35	2	28	30	68	30	65	48
		4	0	53	78	58	45	0	52	0	30
		5	0	13	20	15	25	0	0	0	0
	EEIS CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	25	15	30	20
		3	38	35	2	15	18	75	33	70	50
		4	0	53	65	70	58	0	52	0	30
		5	0	13	33	15	25	0	0	0	0
	UCRB BLM/FS[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	30	20	38	28
		3	38	33	2	30	33	70	30	63	43
		4	0	55	78	58	45	0	50	0	30
		5	0	13	20	13	23	0	0	0	0
	UCRB CumEff[4]	1	0	0	0	0	0	0	0	0	0
		2	63	0	0	0	0	25	18	15	25
		3	38	33	2	18	20	75	32	80	45
		4	0	55	70	70	58	0	50	5	30
		5	0	13	28	13	23	0	0	0	0
Williamson's sapsucker	EEIS BLM/FS	1	0	0	0	0	0	0	0	3	0
		2	88	10	0	8	10	28	5	28	25
		3	13	70	25	53	46	63	35	61	65
		4	0	20	55	40	41	10	53	9	10
		5	0	0	20	0	3	0	8	0	0
	EEIS CumEff	1	0	0	0	0	0	0	0	3	0
		2	88	10	0	8	10	25	5	25	25
		3	13	70	25	55	46	65	35	64	63
		4	0	20	53	38	39	10	50	9	13
		5	0	0	23	0	5	0	10	0	0
	UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
		2	88	5	0	8	10	23	5	20	25
		3	13	75	28	73	53	55	38	59	65
		4	0	20	58	20	36	23	54	21	10
		5	0	0	15	0	1	0	4	0	0
	UCRB CumEff	1	0	0	0	0	0	0	0	0	0
		2	88	5	0	8	10	23	5	20	25
		3	13	75	28	70	53	53	38	56	63
		4	0	20	55	23	34	25	54	24	13
		5	0	0	18	0	4	0	4	0	0

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.14. Mean viability outcomes for habitat and populations of cavity nesting woodpeckers, nuthatches and swifts for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

		Period / Alternative[2]								
Species Name	Area[1]	H	C	A1	A2	A3	A4	A5	A6	A7
Black-backed woodpecker	EEIS BLM/FS	2.2	3.2	4.1[3]	3.2	3.3	3.0	3.5	3.0	2.9
	EEIS CumEff	2.2	3.2	4.1[3]	3.3	3.4	3.1	3.6	3.1	3.1
	UCRB BLM/FS	2.2	3.1	4.0[3]	3.0	3.2	2.9	3.5	2.9	2.9
	UCRB CumEff	2.2	3.2	4.1[3]	3.2	3.3	3.1	3.6	3.1	3.0
Downy woodpecker	EEIS BLM/FS[4]	1.8	2.7	3.1	2.9	2.9	2.8	3.1	2.8	2.9
	EEIS CumEff[4]	1.8	2.8	3.0	2.9	2.9	2.8	3.0	2.8	2.8
	UCRB BLM/FS[4]	1.8	2.7	3.2[3]	2.8	2.8	2.8	3.1	2.8	3.0
	UCRB CumEff[4]	1.8	2.7	3.2	2.8	2.8	2.8	3.0	2.8	3.0
Hairy woodpecker	EEIS BLM/FS	2.2	2.2	2.6	2.4	2.5	2.5	2.6	2.4	2.2
	EEIS CumEff	2.2	2.1	2.6	2.5	2.5	2.4	2.6	2.4	2.3
	UCRB BLM/FS	2.2	2.2	2.5	2.3	2.5	2.4	2.6	2.4	2.2
	UCRB CumEff	2.2	2.2	2.6	2.5	2.4	2.4	2.6	2.4	2.3
Lewis' woodpecker	EEIS BLM/FS	2.3	3.5	4.5[3]	3.5	3.5	2.5[3]	3.9	2.6[3]	2.6[3]
	EEIS CumEff	2.7	3.9	4.8[3]	4.0	3.7	3.0[3]	4.6[3]	3.0[3]	3.0[3]
	UCRB BLM/FS	2.3	3.4	4.5[3]	3.4	3.2	2.7[3]	4.0[3]	2.7[3]	2.7[3]
	UCRB CumEff	2.8	4.0	4.8[3]	4.0	3.8	3.2[3]	4.6[3]	3.3[3]	3.3[3]
Pileated woodpecker	EEIS BLM/FS[4]	3.1	3.4	4.0[3]	3.5	3.5	2.5[3]	3.3	2.5[3]	2.5[3]
	EEIS CumEff[4]	3.1	3.4	4.0[3]	3.5	3.5	2.5[3]	3.3	2.5[3]	2.5[3]
	UCRB BLM/FS[4]	3.0	3.4	4.0[3]	3.6	3.6	2.5[3]	3.2	2.5[3]	2.6[3]
	UCRB CumEff[4]	3.0	3.4	4.0[3]	3.6	3.6	2.5[3]	3.2	2.5[3]	2.6[3]
Pygmy nuthatch	EEIS BLM/FS	2.2	2.9	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	EEIS CumEff	2.2	2.9	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	UCRB BLM/FS	2.2	3.0	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
	UCRB CumEff	2.2	3.0	3.6[3]	3.1	3.2	2.6	3.3	2.6	2.9
Red-naped sapsucker	EEIS BLM/FS	2.0	3.3	3.8[3]	3.0	2.9	2.7[3]	3.5	2.7[3]	3.1
	EEIS CumEff	2.0	3.3	3.9[3]	3.1	3.0	2.8[3]	3.6	2.7[3]	3.1
	UCRB BLM/FS	2.0	3.3	3.8[3]	3.0	2.9	2.7[3]	3.5	2.7[3]	3.1
	UCRB CumEff	2.0	3.3	3.9[3]	3.1	3.0	2.8[3]	3.6	2.7[3]	3.1
Three-toed woodpecker	EEIS BLM/FS	2.6	2.9	4.0[3]	3.2	3.3	3.1	3.4[3]	3.0	2.9
	EEIS CumEff	2.6	3.0	4.0[3]	3.2	3.3	3.1	3.4[3]	3.0	2.9
	UCRB BLM/FS	2.6	2.9	4.0[3]	3.1	3.2	3.1	3.4[3]	3.0	2.9
	UCRB CumEff	2.6	3.0	4.0[3]	3.1	3.2	3.1	3.4[3]	3.0	2.9
Vaux's swift	EEIS BLM/FS[4]	4.0	3.7	4.5[3]	3.5	4.2	3.7	4.3[3]	4.0	2.9[3]
	EEIS CumEff[4]	4.4	4.1	4.8	4.0	4.5	4.1	4.5	4.0	3.4
	UCRB BLM/FS[4]	3.9	3.8	4.5	3.5	4.1	3.7	4.3	4.0	2.9
	UCRB CumEff[4]	4.2	4.1	4.8	4.0	4.5	4.1	4.5	4.0	3.4
White-breasted nuthatch	EEIS BLM/FS	2.2	3.0	3.6[3]	3.1	3.3	2.8	3.5[3]	2.7	2.9
	EEIS CumEff	2.2	3.0	3.6[3]	3.1	3.3	2.8	3.5[3]	2.7	2.9
	UCRB BLM/FS	2.2	2.9	3.6[3]	3.0	3.1	2.7	3.4	2.6	2.9
	UCRB CumEff	2.2	2.9	3.6[3]	3.0	3.1	2.7	3.4	2.6	2.9
White-headed woodpecker	EEIS BLM/FS[4]	2.4	3.8	4.2	3.9	4.0	2.7[3]	3.3	2.7[3]	3.1[3]
	EEIS CumEff[4]	2.4	3.8	4.3	4.0	4.1	2.8[3]	3.4	2.7[3]	3.1[3]
	UCRB BLM/FS[4]	2.4	3.8	4.2	3.9	3.9	2.7[3]	3.3[3]	2.7[3]	3.1[3]
	UCRB CumEff[4]	2.4	3.8	4.3	4.0	4.1	2.8[3]	3.3[3]	2.9[3]	3.1[3]

Table 4.14 (continued)

Species Name	Area[1]	Period / Alternative[2] H	C	A1	A2	A3	A4	A5	A6	A7
Williamson's sapsucker	EEIS BLM/FS	2.2	3.1	4.0[3]	3.4	3.4	2.9	3.7[3]	2.8	2.9
	EEIS CumEff	2.2	3.1	4.0[3]	3.3	3.4	2.9	3.7[3]	2.8	2.9
	UCRB BLM/FS	2.2	3.2	3.9[3]	3.2	3.3	3.0	3.6	3.0	2.9
	UCRB CumEff	2.2	3.2	3.9[3]	3.2	3.4	3.1	3.6	3.0	2.9

[1]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[2]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[3]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Vaux's swifts nest in large-diameter snags and hollow trees, especially grand fir (Bull and Collins 1993, Bull and Hohmann 1993). Suitable nesting habitat is distributed in disjunct patches and is projected to remain so under nearly all alternatives (table 4.14). Alternative 7, with its system of reserves and retention of late-seral patches of forest, is expected to result in improved distribution of nesting habitat with larger patches containing large-diameter trees for nesting. The Vaux's swift had lower outcomes under the cumulative effects analysis (table 4.14). Unlike most other cavity-nesting species that are permanent residents, Vaux's swift is a migrant and is influenced by loss of habitat on the wintering grounds.

Lewis' woodpeckers nest in large-diameter cottonwoods along permanently-flowing streams and in mature, decayed trees in upland sites (Bock 1970, Galen 1989, Marshall 1992, Raphael and White 1984). Therefore, Alternatives 1 and 5, which have limited riparian buffers, were projected to provide more isolated and smaller patches of nesting habitat than current. Alternatives 4, 6, and 7 were projected to improve distribution of habitat to near historic levels. The cumulative effects analysis showed greater risk due to the likely increased loss of suitable nesting habitat along streams on non-Federal lands.

Cuckoos, hummingbirds, and passerines

Introduction—The ICBEMP assessment database lists 174 species of cuckoos, hummingbirds, and passerines that occur within the Basin. Using the methods outlined above (Methods for Assessing Effects on Terrestrial Species), we selected 36 species for viability assessments. We recommend that assessment of five species (black-chinned sparrow, clay-colored sparrow, hermit warbler, least flycatcher, and tricolored blackbird) be conducted at a fine scale because of their local distributions within the Basin. Species were selected for assessment because of known population declines or because their habitats were projected to decline under at least one of the alternatives. We included two species (western bluebird and chestnut-backed chickadee) in this group that were actually assessed by the woodpeckers, nuthatches, and swifts panel.

Methods—We used standard methods, as outlined in the methods section of this chapter, for the assessment of cuckoos, hummingbirds and passerines. Because of the large number of species involved, we grouped species into their general habitat associations. We grouped 13 species associated with coniferous forest habitat, 4 species as woodland habitat associates, 7 species as riparian

habitat associates, and 12 species as grass/shrub habitat associates (table 4.15). One of the forest species, broad-tailed hummingbird, occurs only in the UCRB area and was not analyzed for the EEIS area. We did not adjust original outcome scores for any of the species.

Results—Results of the viability assessment for the 36 species are listed in tables 4.15 and 4.16. For the combined set of birds in this group, mean outcomes were generally similar between the EEIS and UCRB EIS planning areas (fig. 4.25). In addition, the difference in mean outcome between assessments on Federal lands and the cumulative effects assessment averaged about 0.25 outcome units for each alternative (fig. 4.25). Mean outcomes under all of the alternatives were judged to be lower than under historic conditions and were similar to current conditions. Alternatives 1 and 5 had lower mean outcomes than any of the other alternatives, but mean differences were small (fig. 4.25).

Forest birds. Among forest birds, one species (western tanager) was judged to have broadly distributed habitat (Outcome 1) under all of the alternatives. Another (rufous-sided towhee) was judged to have habitat conditions typical of Outcome 2 under historic conditions and under all alternatives except Alternatives 4, 6, and 7 (table 4.16). We judged that no species had outcomes lower than Outcome 3 historically, and that Alternatives 4, 6, and 7 would not result in species with outcomes lower than 3. Alternatives 1 and 5 would have 5 species at Outcome 4 in the EEIS planning (fig. 4.26). The UCRB planning area had similar patterns.

Figure 4.25 Cuckoos, Hummingbirds, Passerines

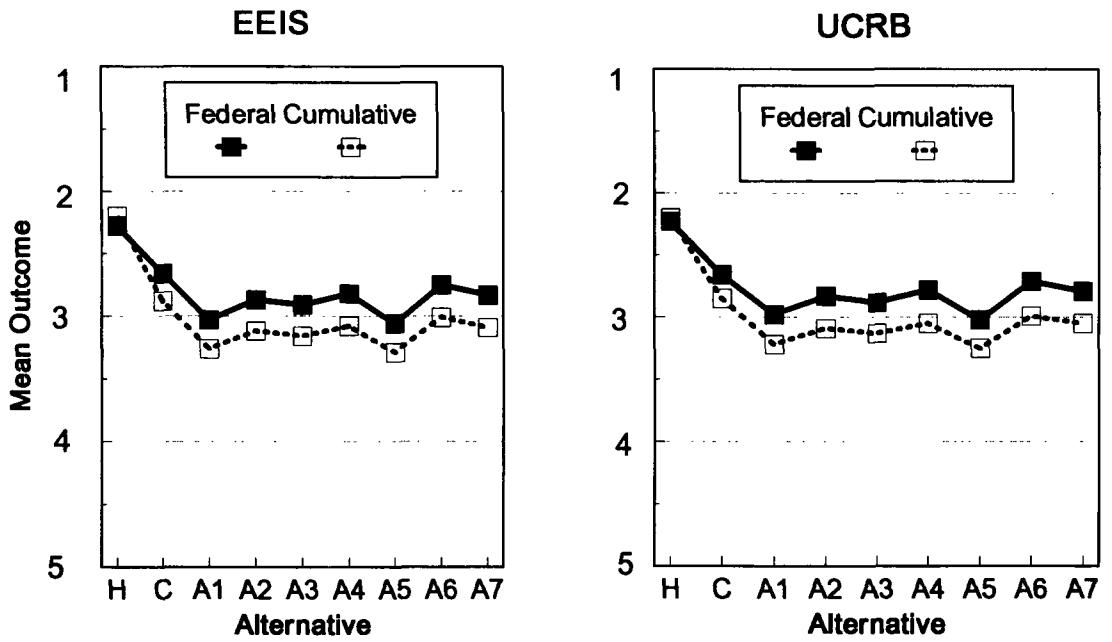


Figure 4.25. Mean outcome scores averaged over 36 species of cuckoos, hummingbirds, and passerines in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Mean outcomes were judged to be about 2.5 (between Outcomes 2 and 3) historically and were lowest under Alternatives 1 and 5 in both planning areas (fig. 4.27). Compared with current habitat conditions, habitat decreased in the EEIS area by at least 0.5 outcome units for three species under Alternative 1 and for two species under Alternative 5. In the UCRB EIS area, habitat conditions decreased for two species under Alternative 1, and for one species under Alternative 5 (fig. 4.28). In both planning areas, habitat conditions were judged to have increased for one or more species under Alternatives 4, 6, and 7.

Woodland birds. Woodland birds were generally judged to have future habitat conditions under each of the alternatives similar to those of historic and current periods (tables 4.15 and 4.16). Except for Alternatives 4 and 6, all alternatives would provide habitat conditions of Outcome 3 or better (fig. 4.29). In Alternatives 4 and 6, habitat of one species (bushtit) that is associated with juniper woodlands declined to Outcome 4 in both planning areas (table 4.16). Habitat of the chipping sparrow was distributed in Outcome 1 historically, currently, and under all alternatives. Outcomes under the cumulative effects analysis were slightly lower than those of the Federal habitat analysis (fig. 4.30).

Riparian birds. Current and future habitat condition for riparian birds was judged to have declined from historic conditions. Historically, habitat was distributed in Outcomes 2 and 3 for all seven species. Current and future habitat condition under the alternatives is mostly in Outcomes 3, 4, and 5 (fig. 4.31). Compared to current habitat, distribution of habitat under the alternatives was not projected to increase or decline by more than 0.5 outcome units. Overall, mean outcomes were between Outcomes 3 and 4 for this group of birds. Projected mean outcomes were lowest under Alternatives 1 and 5 and highest under Alternatives 4 and 6 (fig. 4.32). Outcomes for the cumulative effects analysis were lower than outcomes for the Federal habitat assessment under current conditions and under each of the alternatives.

Grassland/shrubland birds. Of the 12 species of grassland/shrubland birds, nine were judged to have habitat conditions of Outcome 3 or better under each of the alternatives. We estimated that seven species had historic habitat conditions in Outcome 1 in both planning areas (fig. 4.33). We estimated that eight species had current habitat conditions in Outcome 1 in the EEIS area and that five species had Outcome 1 in the UCRB EIS area. In the EEIS area, three species had habitat conditions in Outcomes 4 or 5 under all of the alternatives. In the UCRB EIS area, all three species were projected to have habitat conditions in Outcome 4 under all alternatives (fig. 4.33). Mean habitat outcomes among all the species were projected as Outcome 2 historically, were estimated as slightly lower currently, and were projected to be greater than 0.5 units lower under each of the alternatives (fig. 4.34). Compared with current habitat, habitat was projected to decrease by more than 0.5 units for four to six species under the alternatives in each planning area. Habitat was not expected to increase for any species from current conditions (fig. 4.35).

Discussion—

Comparisons among habitats. Several general patterns are apparent within the group of cuckoos, hummingbirds, and passerines. First, species associated with riparian habitats had lower mean outcome scores than were typical of other species groups, reflecting the more patchy and disjunct distribution of riparian habitat compared with other upland habitats. Alternatives that would provide wider riparian buffers (Alternatives 2, 3, 4, 6, and 7) had higher average scores than alternatives that would provide smaller buffers (Alternatives 1 and 5). In addition, provisions for modifying grazing practices that might interfere with aquatic conservation objectives led to increased outcome scores for species associated with shrub habitats within the riparian zones. One species in this group, the yellow-billed cuckoo, occurs as extremely disjunct and small populations and its habitat (both current and projected under the alternatives) is distributed in Outcome 5. This

species occurs in scattered locations within the planning areas, and is associated with large cottonwood trees with dense shrubby understories (Laymon 1987; Marshall 1992; Saab and Rich, in press). The species is at risk due to pesticide spraying (Laymon 1987) and has undergone a long-term population decline (Marshall 1992; Saab and Rich, in press).

Second, birds associated with woodland habitat had generally higher scores than those of birds associated with other habitats in this group. Birds associated with woodland habitat tend to have generalized habitat associations. The amount of upland woodland habitat is not projected to vary significantly among alternatives. For both reasons, historic, current, and projected future outcomes under alternatives for this group of species were consistently projected into Outcomes 1, 2, or 3. We did note, however, that retention of juniper woodland is a key requirement of ash-throated flycatcher (Ehrlich and others 1988, Zeiner and others 1990), sage thrasher (Saab and Rich, in press), and bushtit (Butler 1981, Ehrlich and others 1988, Zeiner and others 1990). We assumed that restoration activity in Alternatives 4 and 6 would include juniper woodland in the desired mix of future vegetation types.

Third, we noted that three species associated with grassland/shrubland habitat (bobolink, grasshopper sparrow, and black rosy finch) had current and projected future weighted mean habitat outcomes lower than 4.0. The bobolink is associated with moist grassland habitats (Bollinger and Gavin 1992, Martin and Gavin 1995, Wittenberger 1978). Populations have undergone marked declines, possibly resulting from loss of habitat on their wintering grounds (Saab and Rich, in press). Habitat was judged to be disjunct and patchy, both currently and in the future under the alternatives. Restoration of native grasslands and herbs under Alternatives 4 and 6 would likely result in a broader and more contiguous distribution of favorable habitat for this species, depending on the levels of grazing that are prescribed. The grasshopper sparrow is associated with Palouse and other native bunchgrasses (Cannings 1991, Janes 1983, Marshall 1992). The distribution of this habitat is much reduced from historic levels and was judged to remain disjunct and patchy in the future under all alternatives. Restoration, if successful and if prescribed fire can be effectively used, may result in increased representation of native bunchgrasses under Alternatives 4 and 6. The black rosy finch is associated with alpine and barren, high elevation habitats (Ryser 1985, Twining 1940, Zeiner and others 1990). These habitats have a naturally patchy and disjunct distribution and as a result, the species was judged to occur in Outcome 4 under all time periods and alternatives. The major risk to alpine habitat is potential overgrazing by sheep.

Although coniferous forest habitats were generally projected to remain relatively well distributed, several species associated with coniferous forest (Hammond's flycatcher, winter wren, olive-sided flycatcher, and Wilson's warbler) had lower than average habitat outcomes. Hammond's flycatcher (Sakai 1988, Sedgwick 1994) and winter wren (Zeiner and others 1990) are associated with late-seral forest, especially that dominated by ponderosa pine. Alternatives 4 and 6 were projected to lead to increased amounts of late-seral montane forest, and thus, outcomes under these alternatives were higher than under other alternatives. Olive-sided flycatchers are associated with mature forest in juxtaposition with openings, such as those created by fire or logging (Dobkin 1993; Saab and Rich, in press). Restoration of late-seral forest conditions under Alternatives 4 and 6, and retention of late-seral forest under Alternative 7, were projected to create greater amounts and a more contiguous distribution of habitat than under other alternatives. However, differences were not great considering the uncertainty associated with mean outcome scores (table 4.15, appendix 4-D). Wilson's warblers occur in mid-seral montane forest as well as riparian shrub habitats (Dobkin 1993, Johnsgard 1986, Stewart 1973). Their habitats were judged to have been patchy and disjunct historically, currently, and under each of the alter-

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natives. Livestock grazing in riparian areas creates the most likely risk to maintenance of well-distributed habitat for this species.

Cumulative effects. As shown in figure 4.25, average weighted mean outcomes for cuckoos, hummingbirds, and passerines were lower under the cumulative effects analysis than under the Federal habitat analysis. Several factors contributed to this difference in results. First, many of these species migrate to the neotropics where habitat is at risk to agriculture and other development (Saab and Rich, in press). Second, many of the species are insectivores whose prey densities may be reduced by pesticide spraying, especially on non-Federal lands (Saab and Rich, in press). In addition, some species may be directly affected by the toxic effects of herbicides and insecticides (Dobkin 1993). Expansion of cheatgrass, especially on non-Federal lands, will continue to reduce suitable habitat for species associated with native herbs and grasses. For species associated with sagebrush habitat, fire suppression has resulted in increased habitat because sagebrush is favored by suppression of fire. However, widespread conversion of sagebrush to agriculture on non-Federal lands has reduced the amount of suitable sagebrush habitat.

Figure 4.26 Forest Birds

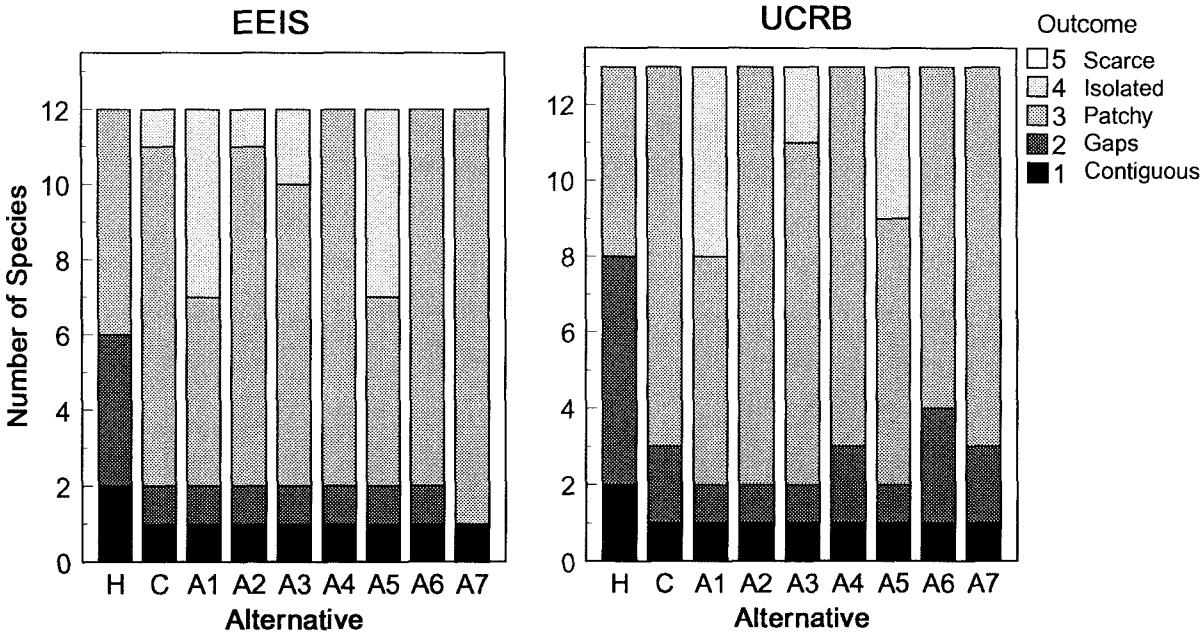


Figure 4.26. Frequency distribution of mean habitat outcome scores for 12 species of birds associated with forest habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.27 Forest Birds

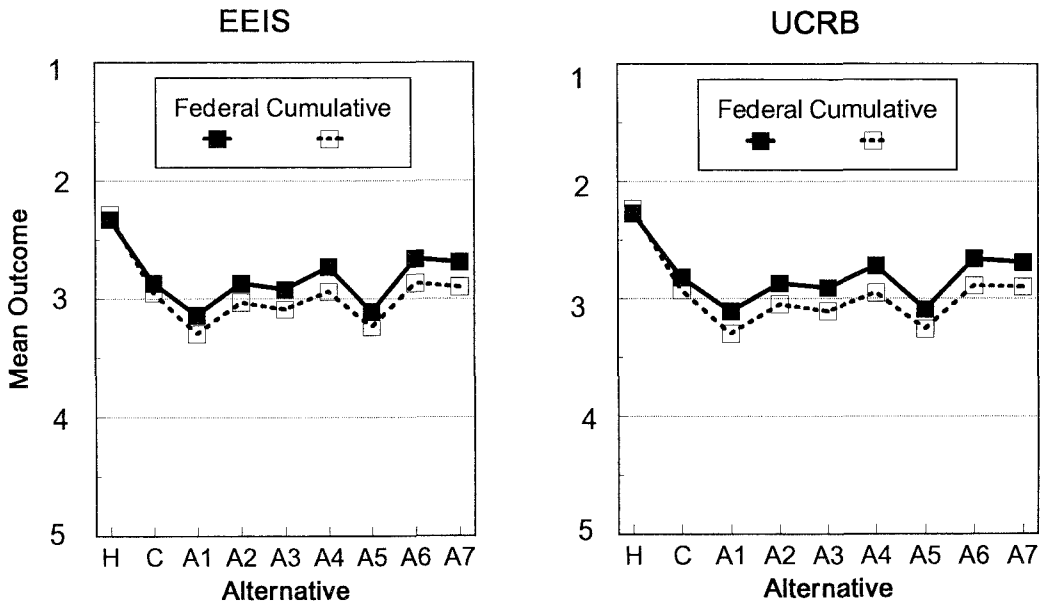


Figure 4.27. Mean outcome scores averaged over 12 species of birds associated with forest habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.28 Forest Birds
Change from Current to Future

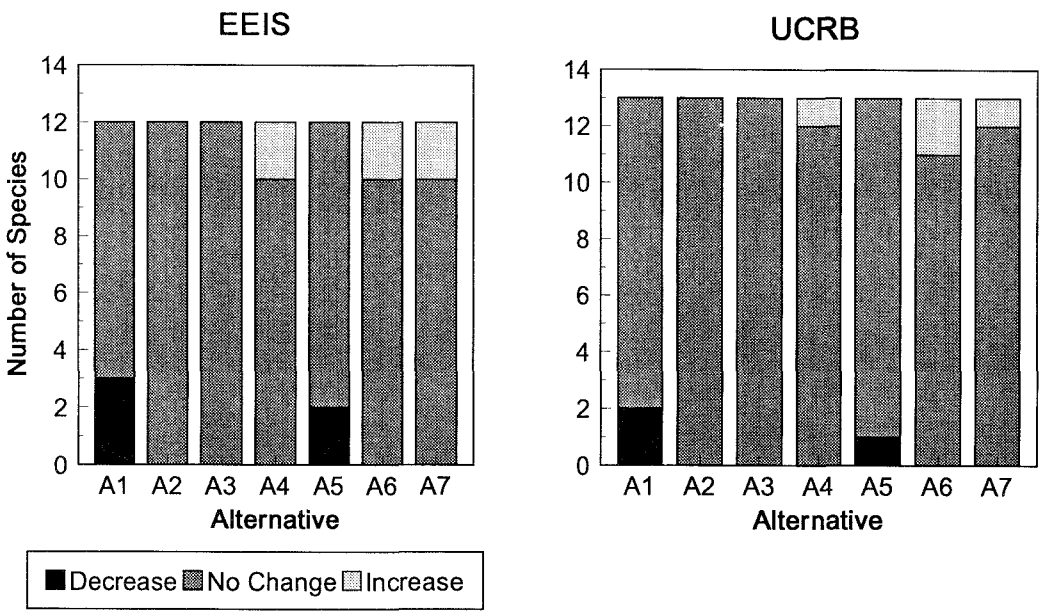


Figure 4.28. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 12 species of birds associated with forest habitat in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Figure 4.29 Woodland Birds

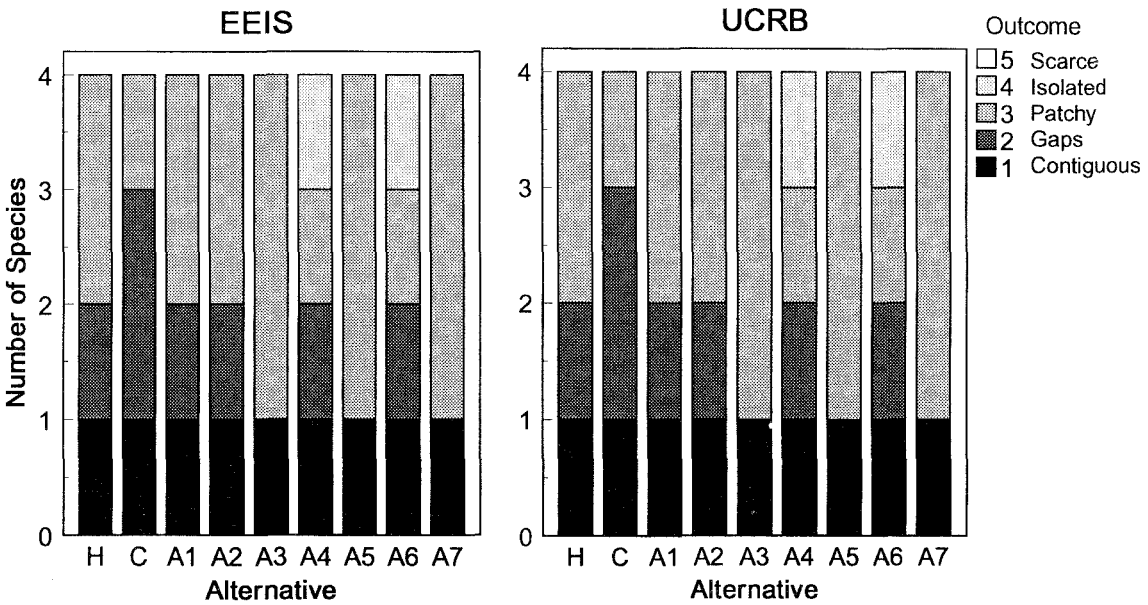


Figure 4.29. Frequency distribution of mean habitat outcome scores for four species of birds associated with woodland habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.30 Woodland Birds

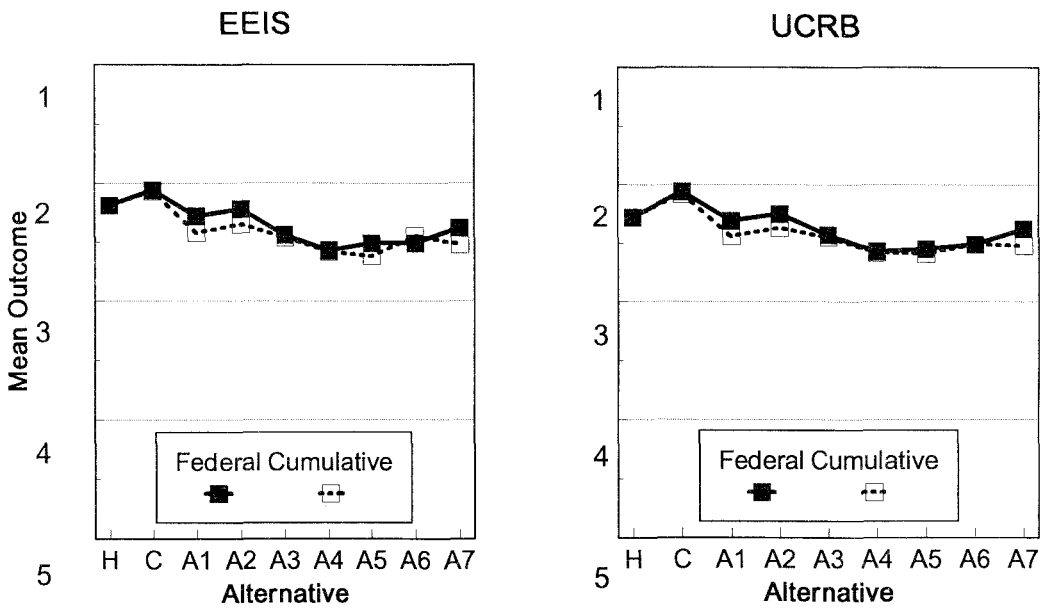


Figure 4.30. Mean outcome scores averaged over four species of birds associated with woodland habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.31 Riparian Birds

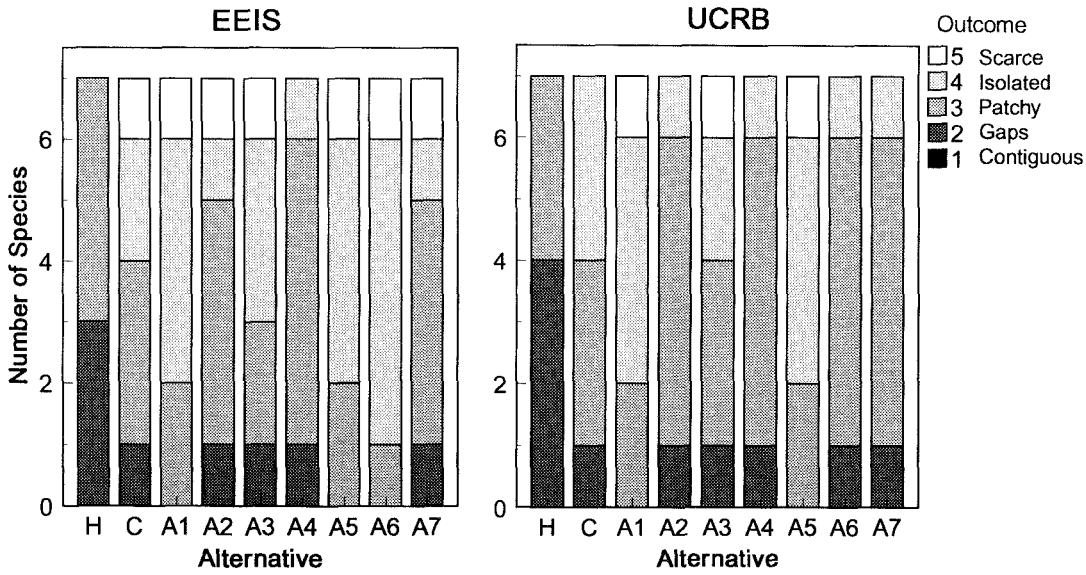


Figure 4.31. Frequency distribution of mean habitat outcome scores for seven species of birds associated with riparian habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.32 Riparian Birds

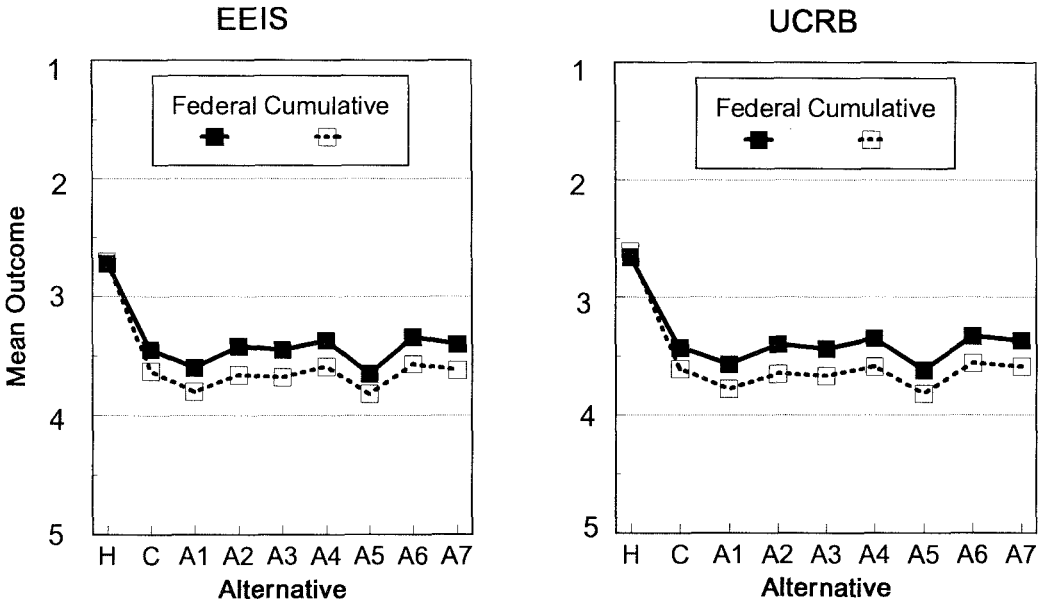


Figure 4.32. Mean outcome scores averaged over seven species of birds associated with riparian habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.33 Grass/Shrub Birds

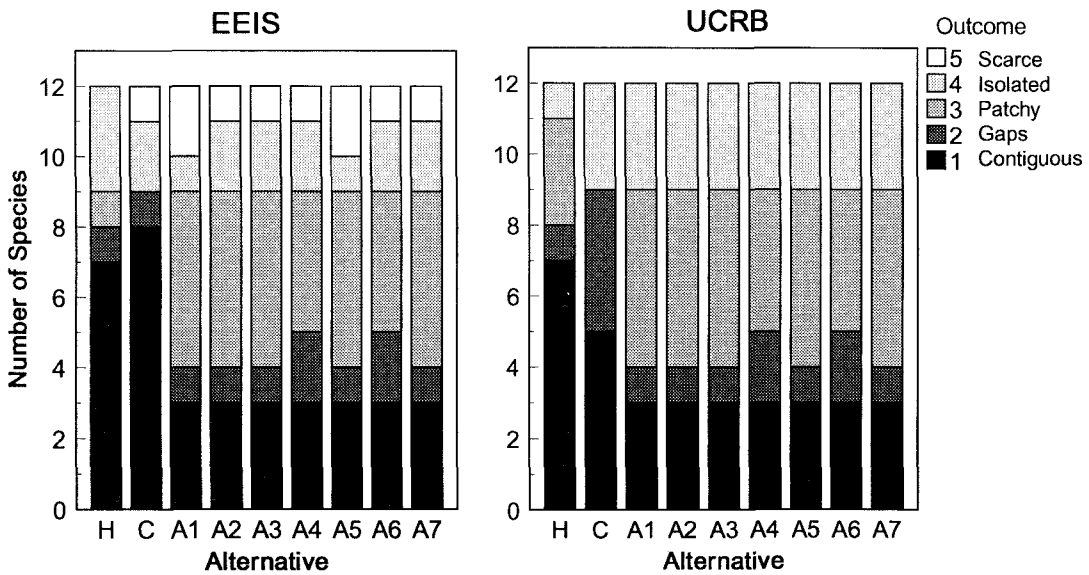


Figure 4.33. Frequency distribution of mean habitat outcome scores for 12 species of birds associated with grass/shrub habitat on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.34 Grass/Shrub Birds

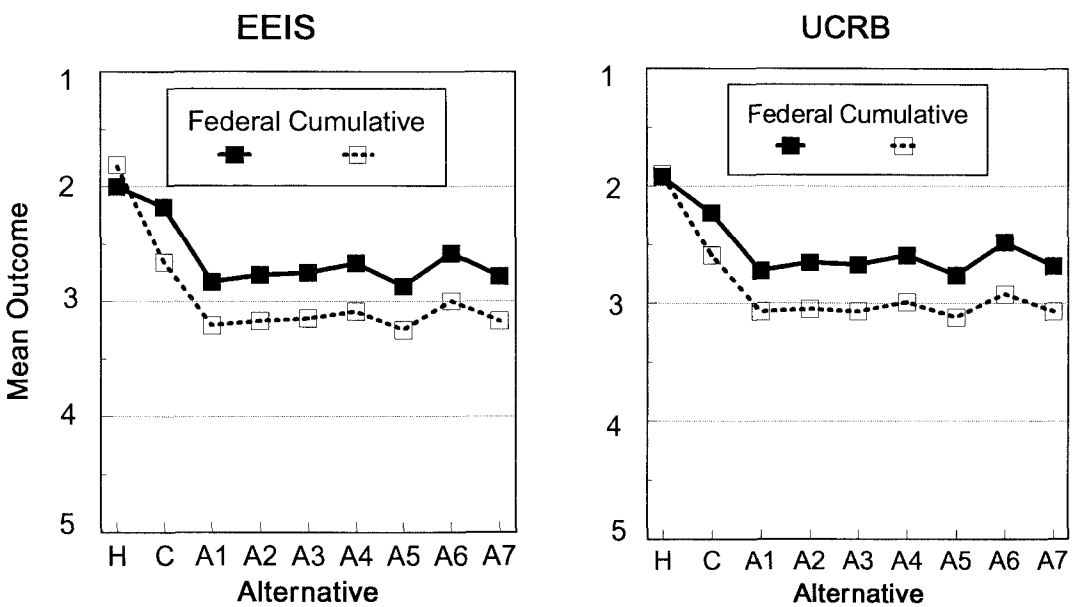


Figure 4.34. Mean outcome scores averaged over 12 species of birds associated with grass/shrub habitat in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.35 Grass/Shrub Birds
Change from Current to Future

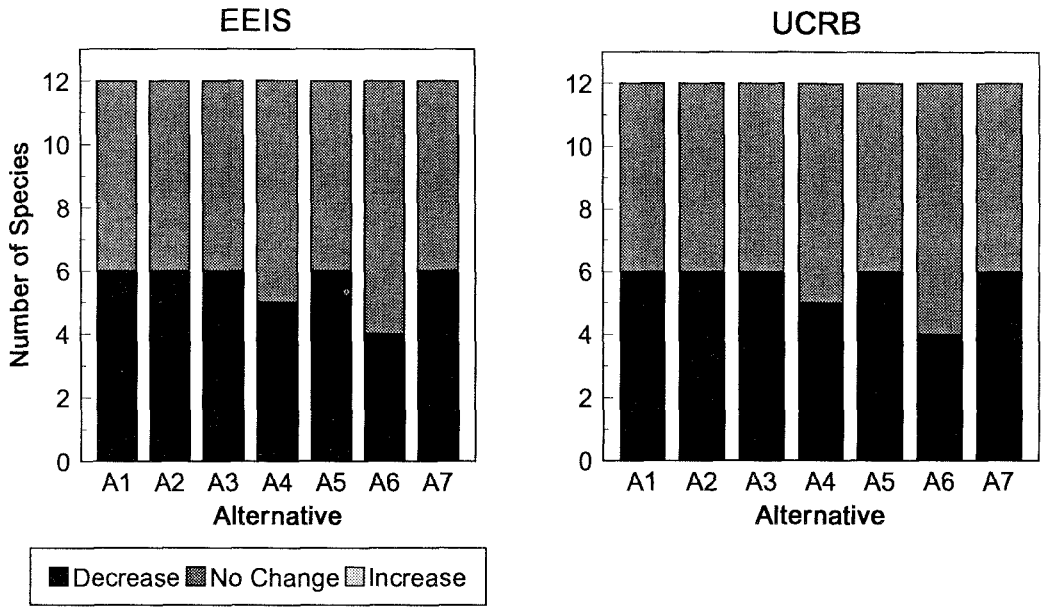


Figure 4.35. Departure of habitat outcomes on Federal lands from current conditions to each alternative for 12 species of birds associated with grass/shrub habitat in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.15. Mean likelihood scores of viability outcomes for cuckoos, hummingbirds, and passerines for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
FOR	Black-chinned hummingbird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	13	0	15	13
			3	78	90	70	74	70	70	63	78	70
			4	0	10	30	26	30	18	35	8	18
			5	0	0	0	0	0	0	3	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	8	0	10	6
			3	78	85	53	60	53	63	48	68	65
			4	0	15	43	39	43	28	48	21	28
			5	0	0	5	1	5	3	5	1	1

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	13	0	15	13
			3	78	90	70	74	70	70	63	78	70
			4	0	10	30	26	30	18	35	8	18
			5	0	0	0	0	0	0	3	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	23	0	0	0	0	5	0	10	6
			3	78	85	53	60	53	63	48	68	65
			4	0	15	43	39	43	30	48	21	28
			5	0	0	5	1	5	3	5	1	1
FOR	Broad-tailed hummingbird	UCRB BLM/FS	1	3	0	0	0	0	0	0	0	0
			2	58	3	0	3	0	13	0	14	8
			3	40	70	53	54	53	68	48	69	69
			4	0	28	43	44	48	20	48	18	24
			5	0	0	5	0	0	0	5	0	0
		UCRB CumEff	1	3	0	0	0	0	0	0	0	0
			2	58	0	0	3	0	5	0	6	5
			3	40	58	45	44	43	63	40	64	61
			4	0	40	51	51	55	33	53	30	34
			5	0	3	4	3	3	0	8	0	0
FOR	Chestnut-backed chickadee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	20	20	20	0	20	37
			3	83	75	20	80	80	57	40	63	63
			4	17	25	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	20	20	20	0	20	37
			3	83	75	20	80	80	57	40	63	63
			4	17	25	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	20	20	20	0	20	37
			3	83	83	20	80	80	57	40	63	63
			4	0	17	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	17	0	0	20	20	20	0	20	37
			3	83	83	20	80	80	57	40	63	63
			4	0	17	80	0	0	23	60	17	0
			5	0	0	0	0	0	0	0	0	0
FOR	Hammond's flycatcher	EEIS BLM/FS	1	35	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	20	0	25	23
			3	0	58	35	58	35	70	30	70	70
			4	0	43	60	43	60	10	60	5	8
			5	0	0	5	0	5	0	10	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	75	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	10	0	15	13
			3	0	50	30	48	30	60	25	65	68
			4	0	50	60	48	60	30	55	20	20
			5	0	0	10	5	10	0	20	0	0
		UCRB BLM/FS	1	35	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	20	0	25	23
			3	0	68	40	68	40	70	35	70	70
			4	0	33	55	33	55	10	55	5	8
			5	0	0	5	0	5	0	10	0	0
		UCRB CumEff	1	75	0	0	0	0	0	0	0	0
			2	25	0	0	0	0	10	0	15	13
			3	0	60	30	58	30	60	25	65	68
			4	0	40	60	38	60	30	55	20	20
			5	0	0	10	5	10	0	20	0	0
FOR	Lazuli bunting	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	38	24	18	25	23	37	16	36	39
			3	62	76	70	75	77	63	70	64	61
			4	0	0	12	0	0	0	14	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	38	20	14	17	15	23	12	23	23
			3	62	67	70	68	70	68	71	70	67
			4	0	13	16	15	15	9	17	7	10
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	64	44	36	40	40	52	27	52	51
			3	36	56	61	60	60	48	66	48	49
			4	0	0	3	0	0	0	7	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	64	26	16	21	17	28	14	28	28
			3	36	68	74	71	75	68	74	70	64
			4	0	6	10	8	8	4	12	2	8
			5	0	0	0	0	0	0	0	0	0
FOR	Olive-sided flycatcher	EEIS BLM/FS	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	2	0	4	0	7	2
			3	0	64	51	62	55	77	42	78	77
			4	0	36	49	36	45	19	58	15	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	0	0	0	0
			3	0	57	35	46	38	54	33	54	53
			4	0	43	63	54	61	46	61	46	47
			5	0	0	2	0	1	0	6	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	10	0	11	6
			3	0	84	61	65	67	79	56	80	82
			4	0	16	39	35	33	11	44	9	12
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	80	0	0	0	0	0	0	0	0
			2	20	0	0	0	0	0	0	0	0
			3	0	67	42	42	44	63	38	67	64
			4	0	33	58	58	56	37	60	33	36
			5	0	0	0	0	0	0	2	0	0
FOR	Rufous hummingbird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	61	41	33	41	33	48	28	50	49
			3	39	59	50	54	49	53	49	50	51
			4	0	0	18	5	19	0	24	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	61	34	10	16	10	16	9	18	18
			3	39	59	50	55	50	65	45	64	64
			4	0	8	40	29	40	19	46	19	19
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	66	51	33	41	33	50	28	53	51
			3	34	49	48	49	54	50	49	48	49
			4	0	0	20	10	14	0	24	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	66	34	10	16	10	16	9	18	18
			3	34	59	50	55	50	65	45	64	64
			4	0	8	40	29	40	19	46	19	19
			5	0	0	0	0	0	0	0	0	0
FOR	Rufous-sided towhee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	65	63	64	58	48	56	48	48
			3	56	35	37	36	42	52	44	52	52
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	44	59	60	59	56	47	58	46	46
			3	56	41	40	41	44	53	42	54	54
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	48	70	68	69	60	50	60	50	50
			3	52	30	32	31	40	50	40	50	50
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	48	63	64	63	60	49	58	48	48
			3	52	37	36	37	40	51	42	52	52
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
FOR	Western bluebird	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	88	3	10	23	35	63	35	75	45
			3	13	98	40	78	65	38	65	25	55
			4	0	0	40	0	0	0	0	0	0
			5	0	0	10	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	88	0	0	19	26	49	29	49	29
			3	13	98	40	74	71	36	69	44	51
			4	0	3	40	8	3	15	3	5	20
			5	0	0	20	0	0	0	0	3	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	88	3	10	25	38	63	38	73	43
			3	13	98	40	75	63	38	63	28	58
			4	0	0	40	0	0	0	0	0	0
			5	0	0	10	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	88	0	0	21	29	49	31	46	26
			3	13	98	40	71	69	36	66	46	54
			4	0	3	40	8	3	15	3	5	20
			5	0	0	20	0	0	0	0	3	0
FOR	Western tanager	EEIS BLM/FS	1	90	90	70	88	90	90	70	90	90
			2	10	10	30	12	10	10	30	10	10
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	88	88	46	56	58	58	44	58	58
			2	12	12	40	36	34	34	40	34	34
			3	0	0	14	8	8	8	16	8	8
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	90	90	72	88	90	90	72	90	90
			2	10	10	28	12	10	10	28	10	10
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	88	88	46	56	58	58	44	58	58
			2	12	12	40	36	34	34	40	34	34
			3	0	0	14	8	8	8	16	8	8
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
FOR	White-winged crossbill	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	15
			3	100	100	65	100	95	85	65	100	85
			4	0	0	35	0	5	15	35	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	10	10	0	10	0	15	0	18	35
			3	90	90	75	90	95	70	70	83	65
			4	0	0	25	0	5	15	30	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	15
			3	100	100	65	100	95	85	65	100	85
			4	0	0	35	0	5	15	35	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	10	10	0	10	0	15	0	18	35
			3	90	90	75	90	95	70	70	83	65
			4	0	0	25	0	5	15	30	0	0
			5	0	0	0	0	0	0	0	0	0
FOR	Wilson's warbler	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	76	48	43	47	44	58	30	63	71
			4	24	52	57	53	56	42	70	37	29
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	76	48	43	47	44	58	30	63	71
			4	24	52	57	53	56	42	70	37	29
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	80	61	45	52	49	59	33	64	74
			4	20	39	55	48	51	41	67	36	26
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	80	61	45	52	49	59	33	64	74
			4	20	39	55	48	51	41	67	36	26
			5	0	0	0	0	0	0	0	0	0
FOR	Winter wren	EEIS BLM/FS	1	5	0	0	0	0	0	0	0	0
			2	75	16	3	3	5	25	5	35	18
			3	20	68	43	48	48	55	38	53	48
			4	0	16	55	50	48	20	55	13	35
			5	0	0	0	0	0	0	3	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	5	0	0	0	0	0	0	0	0
			2	75	3	0	0	0	5	0	14	0
			3	20	53	33	34	35	53	31	56	43
			4	0	45	61	61	60	43	60	30	58
			5	0	0	6	5	5	0	9	0	0
		UCRB BLM/FS	1	10	0	0	0	0	0	0	0	0
			2	83	25	10	13	13	33	13	38	25
			3	8	68	55	58	58	55	41	51	49
			4	0	8	35	30	30	13	44	11	26
			5	0	0	0	0	0	0	3	0	0
		UCRB CumEff	1	10	0	0	0	0	0	0	0	0
			2	83	5	0	0	0	10	0	13	5
			3	8	63	30	35	38	50	31	51	43
			4	0	33	64	60	58	40	60	36	53
			5	0	0	6	5	5	0	9	0	0
GS	Black rosy finch	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	67	67	96	100	67	100	100
			5	0	0	33	33	4	0	33	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	67	67	96	100	67	100	100
			5	0	0	33	33	4	0	33	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	100	100	100	100	100	100	100
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	100	100	100	100	100	100	100	100	100
			5	0	0	0	0	0	0	0	0	0
GS	Bobolink	BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	30	0	0	4	4	6	0	6	4
			4	70	62	44	62	62	74	42	76	64
			5	0	38	56	34	34	20	58	18	32
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	62	0	0	16	16	10	0	10	4
			4	38	42	28	46	44	45	26	46	44
			5	0	58	72	38	40	45	74	44	52
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	6	2	16	16	18	2	18	16
			4	34	62	50	56	56	64	48	66	56
			5	0	32	48	28	28	18	50	16	28

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	0	0	18	18	12	0	12	12
			4	34	64	46	53	53	58	44	59	53
			5	0	36	54	29	29	30	56	29	35
GS	Brewer's blackbird	EEIS BLM/FS	1	92	90	65	88	82	89	63	89	86
			2	8	10	29	12	18	11	31	11	14
			3	0	0	6	0	0	0	6	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	92	57	20	25	23	26	20	28	23
			2	8	33	54	53	53	52	54	50	53
			3	0	10	26	22	24	22	26	22	24
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	92	90	65	88	82	89	63	89	86
			2	8	10	29	12	18	11	31	11	14
			3	0	0	6	0	0	0	6	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	92	57	30	25	23	26	20	28	23
			2	8	33	54	53	53	52	54	50	53
			3	0	10	16	22	24	22	26	22	24
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Brewer's sparrow	EEIS BLM/FS	1	71	60	2	4	4	4	0	8	0
			2	29	40	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	75	12	0	0	0	0	0	0	0
			2	25	53	11	10	10	12	7	17	10
			3	0	32	57	52	52	50	54	59	48
			4	0	3	32	38	38	38	39	24	40
			5	0	0	0	0	0	0	0	0	2
		UCRB BLM/FS	1	64	22	2	4	4	4	0	10	0
			2	36	60	26	26	26	30	26	34	27
			3	0	14	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	0	0	0	0	0	0	0	0
			2	32	47	8	9	8	12	7	17	10
			3	0	45	53	53	54	50	54	59	48
			4	0	8	39	38	38	38	39	24	40
			5	0	0	0	0	0	0	0	0	2
GS	Grasshopper sparrow	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	42	0	0	0	0	0	0	0	0
			4	58	6	6	6	4	21	4	33	8
			5	0	94	94	94	96	79	96	67	92

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	18	0	0	0	0	0	0	0	0
			2	74	0	0	0	0	0	0	0	0
			3	8	0	0	0	0	0	0	0	0
			4	0	6	6	6	4	19	4	31	8
			5	0	94	94	94	96	81	96	69	92
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	26	0	0	0	0	0	0	0	0
			3	66	6	6	6	4	16	6	28	15
			4	8	86	80	80	68	73	77	64	74
			5	0	8	14	14	28	11	17	8	11
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	2	0	2	0
			3	56	16	14	14	12	22	12	32	20
			4	4	82	84	84	72	74	86	66	80
			5	0	2	2	2	16	2	2	0	0
GS	Horned lark	EEIS BLM/FS	1	2	54	57	57	62	74	55	74	71
			2	42	46	43	43	38	26	45	26	29
			3	56	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	2	51	10	10	10	11	6	12	11
			2	42	49	48	48	48	49	50	48	49
			3	56	0	42	42	42	40	44	40	40
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	54	57	57	62	74	55	74	74
			2	42	46	43	43	38	26	45	26	26
			3	56	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	2	51	10	10	10	11	6	12	11
			2	42	49	48	48	48	49	50	48	49
			3	56	0	42	42	42	40	44	40	40
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Lark sparrow	EEIS BLM/FS	1	67	58	2	4	4	4	0	8	0
			2	33	42	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	71	2	0	0	0	0	0	0	0
			2	29	49	9	10	10	12	7	17	10
			3	0	42	59	58	58	56	60	57	56
			4	0	7	32	32	32	32	33	26	34
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	60	20	2	4	4	4	0	10	0
			2	40	62	26	26	26	30	26	34	27
			3	0	14	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	64	0	0	0	0	0	0	0	0
			2	36	47	8	9	8	12	7	17	10
			3	0	45	53	53	54	50	54	57	54
			4	0	8	39	38	38	38	39	26	34
			5	0	0	0	0	0	0	0	0	2
GS	Loggerhead shrike	EEIS BLM/FS	1	34	11	1	3	3	4	1	4	2
			2	66	48	26	26	26	25	24	32	25
			3	0	41	45	43	43	44	47	46	42
			4	0	0	28	28	28	27	28	18	31
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	34	8	0	0	0	0	0	0	0
			2	66	28	10	10	10	14	12	16	8
			3	0	40	40	38	36	53	30	34	28
			4	0	22	46	48	50	33	52	50	61
			5	0	2	4	4	4	0	6	0	3
		UCRB BLM/FS	1	34	11	1	3	3	3	1	4	2
			2	66	48	31	31	31	31	29	37	30
			3	0	41	43	41	41	41	45	43	38
			4	0	0	25	25	25	25	25	16	30
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	34	8	0	0	0	0	0	0	0
			2	66	28	10	10	10	14	12	16	10
			3	0	40	42	40	40	55	34	34	29
			4	0	22	46	48	48	31	50	50	58
			5	0	2	2	2	2	0	4	0	3
GS	Sage sparrow	EEIS BLM/FS	1	77	66	7	8	8	10	4	13	2
			2	23	34	41	40	40	44	39	47	42
			3	0	0	46	46	46	40	51	36	48
			4	0	0	6	6	6	6	6	4	8
			5	0	0	0	0	0	0	0	0	0
		EEIS Cum/Eff	1	81	4	0	0	0	0	0	0	0
			2	19	56	19	20	20	22	17	29	20
			3	0	34	53	52	52	50	54	59	50
			4	0	6	28	28	28	28	29	12	30
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	77	66	7	8	8	10	4	13	2
			2	23	34	41	40	40	44	39	47	42
			3	0	0	46	46	46	40	51	36	48
			4	0	0	6	6	6	6	6	4	8
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	81	2	0	0	0	0	0	0	0
			2	19	58	19	19	18	22	17	29	20
			3	0	34	53	53	54	50	54	59	50
			4	0	6	28	28	28	28	29	12	30
			5	0	0	0	0	0	0	0	0	0
GS	Sage thrasher	EEIS BLM/FS	1	71	60	2	4	4	4	0	8	0
			2	29	40	26	26	26	28	25	32	25
			3	0	0	58	56	56	54	61	54	54
			4	0	0	14	14	14	14	14	6	21
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	75	2	0	0	0	0	0	4	0
			2	25	51	12	13	12	15	10	25	14
			3	0	41	55	55	55	54	56	56	53
			4	0	6	33	32	33	31	34	15	33
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	64	40	2	4	4	4	0	10	0
			2	36	44	26	26	26	30	26	34	27
			3	0	12	56	54	54	50	58	48	52
			4	0	4	16	16	16	16	16	8	21
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	0	0	0	0	0	0	0	0
			2	32	51	10	13	12	15	10	19	12
			3	0	43	56	55	55	54	56	58	51
			4	0	6	34	32	33	31	34	23	35
			5	0	0	0	0	0	0	0	0	2
GS	Vesper sparrow	EEIS BLM/FS	1	80	64	30	30	30	35	28	40	30
			2	20	36	54	54	54	51	52	52	54
			3	0	0	16	16	16	14	20	8	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	86	40	4	4	4	6	4	10	4
			2	14	49	54	54	54	57	51	62	54
			3	0	11	42	42	42	37	45	28	42
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	80	66	30	30	30	35	28	40	30
			2	20	34	54	54	54	51	52	52	54
			3	0	0	16	16	16	14	20	8	16
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	86	40	4	4	4	6	4	10	4
			2	14	48	53	53	53	55	50	58	53
			3	0	12	43	43	43	39	46	32	43
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
GS	Western meadowlark	EEIS BLM/FS	1	92	90	60	60	60	70	56	75	60
			2	8	10	40	40	40	30	44	25	40
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	92	90	41	41	41	49	37	55	43
			2	8	10	59	59	59	51	63	45	57
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	92	90	60	60	60	70	56	75	60
			2	8	10	40	40	40	30	44	25	40
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	92	90	41	41	41	49	37	55	43
			2	8	10	59	59	59	51	63	45	57
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
RIP	Red-eyed vireo	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	65	38	34	49	49	51	25	54	48
			4	35	63	66	51	51	49	75	46	53
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	73	30	19	29	29	36	19	41	38
			4	28	70	81	71	71	64	81	59	63
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	65	45	38	54	54	56	29	59	53
			4	35	55	63	46	46	44	71	41	48
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	75	38	26	35	35	39	19	44	44
			4	25	63	74	65	65	61	81	56	56
			5	0	0	0	0	0	0	0	0	0
RIP	Red-winged blackbird	EEIS BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	84	56	34	70	70	71	34	73	73
			3	14	44	66	30	30	29	66	27	27
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	2	0	0	0	0	0	0	0	0
			2	84	50	12	26	26	27	12	25	25
			3	14	50	67	62	62	62	67	64	64
			4	0	0	21	12	12	11	21	11	11
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	2	0	0	0	0	0	0	0	0
			2	84	56	34	70	70	71	40	67	73
			3	14	44	66	30	30	29	60	33	27
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	2	0	0	0	0	0	0	0	0
			2	84	50	12	26	26	27	12	29	29
			3	14	50	67	62	62	62	67	60	60
			4	0	0	21	12	12	11	21	11	11
			5	0	0	0	0	0	0	0	0	0
RIP	Veery	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	28	4	4	7	5	8	5	8	8
			3	72	58	49	55	51	64	45	68	58
			4	0	38	47	38	44	28	50	24	34
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	28	2	2	2	2	4	2	4	2
			3	72	40	28	44	42	55	30	53	50
			4	0	58	70	54	56	41	68	43	48
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	62	6	5	9	7	10	7	10	10
			3	38	61	53	61	56	66	50	69	64
			4	0	33	42	30	37	24	43	21	26
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	4	2	3	3	6	2	6	4
			3	38	41	32	42	43	47	33	53	46
			4	0	55	66	55	54	47	65	41	50
			5	0	0	0	0	0	0	0	0	0
RIP	Willow flycatcher	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	2	0	2	0	2	0	2	2
			3	56	56	40	51	45	54	40	58	55
			4	0	42	60	47	55	44	60	40	43
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	46	0	0	0	0	0	0	0	0
			3	54	42	27	40	34	42	29	43	38
			4	0	58	73	60	66	58	71	57	62
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	44	2	0	2	0	2	0	2	2
			3	56	56	42	51	45	54	40	58	55
			4	0	42	58	47	55	44	60	40	43
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	58	0	0	0	0	0	0	0	0
			3	42	42	27	40	32	42	29	41	42
			4	0	58	73	60	68	58	71	59	58
			5	0	0	0	0	0	0	0	0	0
RIP	Yellow warbler	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	64	50	59	62	70	48	73	67
			4	0	36	50	41	38	30	52	27	33
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	49	33	42	43	53	26	57	49
			4	0	51	67	58	57	47	74	43	51
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	64	50	59	62	70	48	72	67
			4	0	36	50	41	38	30	52	28	33
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	49	33	42	43	53	26	57	49
			4	0	51	67	58	57	47	74	43	51
			5	0	0	0	0	0	0	0	0	0
RIP	Yellow-billed cuckoo	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	55	0	0	0	0	0	0	0	0
			4	45	50	28	48	48	53	5	54	45
			5	0	50	73	53	53	48	95	46	55
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	56	0	0	0	0	0	0	0	0
			4	44	10	10	25	25	28	0	30	26
			5	0	90	90	75	75	73	100	70	74
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	66	0	0	0	0	0	0	0	0
			4	34	54	28	48	48	53	5	54	45
			5	0	46	73	53	53	48	95	46	55
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	69	0	0	0	0	0	0	0	0
			4	31	13	11	26	26	29	0	31	28
			5	0	88	89	74	74	71	100	69	73
RIP	Yellow-breasted chat	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	45	49	41	54	48	61	39	65	54
			4	0	51	59	46	53	39	61	35	46
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	36	30	41	34	50	28	53	50
			4	0	64	70	59	66	50	73	48	50
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	55	0	0	0	0	0	0	0	0
			3	45	49	44	56	46	63	40	66	61
			4	0	51	56	44	54	38	60	34	39
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	0	0	0	0
			3	40	36	30	41	34	50	28	53	50
			4	0	64	70	59	66	50	73	48	50
			5	0	0	0	0	0	0	0	0	0
WD	Ash-throated flycatcher	EEIS BLM/FS	1	15	24	10	0	0	0	0	0	5
			2	63	65	58	58	13	13	10	29	48
			3	23	11	30	30	51	51	46	40	35
			4	0	0	3	3	31	31	39	31	13
			5	0	0	0	0	5	5	5	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	15	24	5	5	0	0	0	5	0
			2	63	65	53	53	20	23	13	46	39
			3	23	11	35	35	54	54	50	41	43
			4	0	0	8	8	26	24	38	8	19
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	15	24	10	10	0	0	0	0	5
			2	61	64	56	56	13	13	10	29	46
			3	24	13	31	31	50	50	45	39	36
			4	0	0	3	3	33	33	40	33	13
			5	0	0	0	0	5	5	5	0	0
		UCRB CumEff	1	15	24	5	5	0	0	0	3	0
			2	61	64	53	53	20	23	13	41	39
			3	24	13	35	35	54	54	50	39	43
			4	0	0	8	8	26	24	38	13	19
			5	0	0	0	0	0	0	0	5	0
WD	Bushtit	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	25	20	20	25	0	30	0	0
			3	100	65	55	55	60	50	60	50	60
			4	0	10	25	25	15	50	10	50	40
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	25	20	20	25	0	30	0	0
			3	100	65	55	55	60	50	60	50	60
			4	0	10	25	25	15	50	10	50	40
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	25	15	15	25	0	25	0	0
			3	65	65	55	55	65	50	55	50	60
			4	35	10	30	30	10	50	20	50	40
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	25	15	15	25	0	25	0	0
			3	65	65	55	55	65	50	55	50	60
			4	35	10	30	30	10	50	20	50	40
			5	0	0	0	0	0	0	0	0	0
WD	Chipping sparrow	EEIS BLM/FS	1	95	93	93	93	93	95	93	95	95
			2	5	8	8	8	8	5	8	5	5
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	95	86	60	61	61	64	60	66	64
			2	5	14	40	39	39	36	40	34	36
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	95	93	93	93	93	95	93	95	95
			2	5	8	8	8	8	5	8	5	5
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.15 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff	1	95	86	60	61	61	64	60	66	64
			2	5	14	40	39	39	36	40	34	36
			3	0	0	0	0	0	0	0	0	0
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
WD	Green-tailed towhee	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	58	26	50	50	56	26	55	49
			3	65	43	71	50	50	44	71	45	51
			4	0	0	3	0	0	0	3	0	0
			5	0	0	0	0	0	0	0	0	0

[1]Group: FOR - forest birds; GS - grassland/shrub birds; RIP - riparian birds; WD - woodland birds.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

Table 4.16. Mean viability outcomes for habitat and populations of cuckoos, hummingbirds, and passerines for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

Group[1]	Species Name	Area[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
FOR	Black-chinned hummingbird	EEIS BLM/FS	2.8	3.1	3.3	3.3	3.3	3.1	3.4	3.0	3.1
		EEIS CumEff	2.8	3.2	3.6	3.4	3.6	3.3	3.6	3.1	3.2
		UCRB BLM/FS	2.8	3.1	3.3	3.3	3.3	3.1	3.4	3.0	3.1
		UCRB CumEff	2.8	3.2	3.6	3.4	3.6	3.3	3.6	3.1	3.2

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
FOR	Broad-tailed hummingbird	UCRB BLM/FS	2.4	3.3	3.6	3.4	3.5	3.1	3.6	3.1	3.2
		UCRB CumEff	2.4	3.5	3.6	3.6	3.6	3.3	3.7	3.2	3.3
FOR	Chestnut-backed chickadee	EEIS BLM/FS	3.2	3.3	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		EEIS CumEff	3.2	3.3	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		UCRB BLM/FS	2.8	3.2	3.8	2.8	2.8	3.0	3.6	3.0	2.6
		UCRB CumEff	2.8	3.2	3.8	2.8	2.8	3.0	3.6	3.0	2.6
FOR	Hammond's flycatcher	EEIS BLM/FS	1.7	3.5	3.7	3.5	3.7	2.9[4]	3.8	2.8[4]	2.9[4]
		EEIS CumEff	1.3	3.5	3.8	3.6	3.8	3.2	4.0	3.1	3.1
		UCRB BLM/FS	1.7	3.4	3.7	3.4	3.7	2.9	3.8	2.8[4]	2.9
		UCRB CumEff	1.3	3.4	3.8	3.5	3.8	3.2	4.0[4]	3.1	3.1
FOR	Lazuli bunting	EEIS BLM/FS	2.6	2.8	2.9	2.8	2.8	2.6	3.0	2.6	2.6
		EEIS CumEff	2.6	2.9	3.0	3.0	3.0	2.9	3.1	2.8	2.9
		UCRB BLM/FS	2.4	2.6	2.7	2.6	2.6	2.5	2.8	2.5	2.5
		UCRB CumEff	2.4	2.8	2.9	2.9	2.9	2.8	3.0	2.7	2.8
FOR	Olive-sided flycatcher	EEIS BLM/FS	1.2	3.4	3.5	3.3	3.5	3.2	3.6	3.1	3.2
		EEIS CumEff	1.2	3.4	3.7	3.5	3.6	3.5	3.7	3.5	3.5
		UCRB BLM/FS	1.2	3.2	3.4	3.4	3.3	3.0	3.4	3.0	3.1
		UCRB CumEff	1.2	3.3	3.6	3.6	3.6	3.4	3.6	3.3	3.4
FOR	Rufous hummingbird	EEIS BLM/FS	2.4	2.6	2.9	2.6	2.9	2.6	3.0	2.5	2.5
		EEIS CumEff	2.4	2.8	3.3[4]	3.1	3.3[4]	3.0	3.4[4]	3.0	3.0
		UCRB BLM/FS	2.3	2.5	2.9	2.7	2.8	2.5	3.0[4]	2.5	2.5
		UCRB CumEff	2.3	2.8	3.3[4]	3.1	3.3[4]	3.0	3.4[4]	3.0	3.0
FOR	Rufous-sided towhee	EEIS BLM/FS	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
		EEIS CumEff	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
		UCRB BLM/FS	2.5	2.3	2.3	2.3	2.4	2.5	2.4	2.5	2.5
		UCRB CumEff	2.5	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5
FOR	Western bluebird	EEIS BLM/FS	2.2	3.0	3.5[4]	2.8	2.7	2.4[4]	2.7	2.3[4]	2.6
		EEIS CumEff	2.2	3.1	3.8[4]	2.9	2.8	2.7	2.8	2.7	2.9
		UCRB BLM/FS	2.2	3.0	3.5[4]	2.8	2.7	2.4[4]	2.7	2.3[4]	2.6
		UCRB CumEff	2.2	3.1	3.8[4]	2.9	2.8	2.7	2.7	2.7	2.9
FOR	Western tanager	EEIS BLM/FS	1.1	1.1	1.3	1.1	1.1	1.1	1.3	1.1	1.1
		EEIS CumEff	1.1	1.1	1.7[4]	1.5	1.5	1.5	1.7[4]	1.5	1.5
		UCRB BLM/FS	1.1	1.1	1.3	1.1	1.1	1.1	1.3	1.1	1.1
		UCRB CumEff	1.1	1.1	1.7[4]	1.5	1.5	1.5	1.7[4]	1.5	1.5
FOR	White-winged crossbill	EEIS BLM/FS	3.0	3.0	3.4	3.0	3.1	3.2	3.4	3.0	2.9
		EEIS CumEff	2.9	2.9	3.3	2.9	3.1	3.0	3.3	2.9	2.7
		UCRB BLM/FS	3.0	3.0	3.4	3.0	3.1	3.2	3.4	3.0	2.9
		UCRB CumEff	2.9	2.9	3.3	2.9	3.1	3.0	3.3	2.9	2.7
FOR	Wilson's warbler	EEIS BLM/FS	3.2	3.5	3.6	3.5	3.6	3.4	3.7	3.4	3.3
		EEIS CumEff	3.2	3.5	3.6	3.5	3.6	3.4	3.7	3.4	3.3
		UCRB BLM/FS	3.2	3.4	3.6	3.5	3.5	3.4	3.7	3.4	3.3
		UCRB CumEff	3.2	3.4	3.6	3.5	3.5	3.4	3.7	3.4	3.3
FOR	Winter wren	EEIS BLM/FS	2.2	3.0	3.6[4]	3.5[4]	3.5	3.0	3.6[4]	2.8	3.2
		EEIS CumEff	2.2	3.5	3.7	3.7	3.7	3.4	3.8	3.2	3.6
		UCRB BLM/FS	2.0	2.9	3.3	3.2	3.2	2.8	3.4[4]	2.7	3.0
		UCRB CumEff	2.0	3.3	3.8	3.7	3.7	3.3	3.8	3.2	3.5

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
GS	Black rosy finch	EEIS BLM/FS	4.0	4.0	4.3	4.3	4.0	4.0	4.3	4.0	4.0
		EEIS CumEff	4.0	4.0	4.3	4.3	4.0	4.0	4.3	4.0	4.0
		UCRB BLM/FS	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		UCRB CumEff	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
GS	Bobolink	EEIS BLM/FS	3.7	4.4	4.6	4.3	4.3	4.1	4.6	4.1	4.3
		EEIS CumEff	3.4	4.6	4.7	4.2	4.2	4.4	4.7	4.3	4.5
		UCRB BLM/FS	3.3	4.3	4.5	4.1	4.1	4.0	4.5	4.0	4.1
		UCRB CumEff	3.3	4.4	4.5	4.1	4.1	4.2	4.6	4.2	4.2
GS	Brewer's blackbird	EEIS BLM/FS	1.1	1.1	1.4	1.1	1.2	1.1	1.4	1.1	1.1
		EEIS CumEff	1.1	1.5	2.1[4]	2.0	2.0	2.0	2.1[4]	1.9	2.0
		UCRB BLM/FS	1.1	1.1	1.4	1.1	1.2	1.1	1.4	1.1	1.1
		UCRB CumEff	1.1	1.5	1.9	2.0	2.0	2.0	2.1[4]	1.9	2.0
GS	Brewer's sparrow	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.3	3.2[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1[4]	3.3[4]
		UCRB BLM/FS	1.4	2.0	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.3	2.6	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1	3.3[4]
GS	Grasshopper sparrow	EEIS BLM/FS	3.6	4.9	4.9	4.9	5.0	4.8	5.0	4.7	4.9
		EEIS CumEff	1.9	4.9	4.9	4.9	5.0	4.8	5.0	4.7	4.9
		UCRB BLM/FS	2.8	4.0	4.1	4.1	4.2	4.0	4.1	3.8	4.0
		UCRB CumEff	2.6	3.9	3.9	3.9	4.0	3.8	3.9	3.6	3.8
GS	Horned lark	EEIS BLM/FS	2.5	1.5	1.4	1.4	1.4	1.3	1.5	1.3	1.3
		EEIS CumEff	2.5	1.5	2.3[4]	2.3[4]	2.3[4]	2.3[4]	2.4[4]	2.3[4]	2.3[4]
		UCRB BLM/FS	2.5	1.5	1.4	1.4	1.4	1.3	1.5	1.3	1.3
		UCRB CumEff	2.5	1.5	2.3[4]	2.3[4]	2.3[4]	2.3[4]	2.4[4]	2.3[4]	2.3[4]
GS	Lark sparrow	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.5	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.3[4]	3.1[4]	3.2[4]
		UCRB BLM/FS	1.4	2.0	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.4	2.6	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.3[4]	3.1	3.3[4]
GS	Loggerhead shrike	EEIS BLM/FS	1.7	2.3	3.0[4]	3.0[4]	3.0[4]	2.9[4]	3.0[4]	2.8	3.0[4]
		EEIS CumEff	1.7	2.8	3.4[4]	3.5[4]	3.5[4]	3.2	3.5[4]	3.3[4]	3.6[4]
		UCRB BLM/FS	1.7	2.3	2.9[4]	2.9[4]	2.9[4]	2.9[4]	2.7	2.9[4]	3.0[4]
		UCRB CumEff	1.7	2.8	3.4[4]	3.4[4]	3.4[4]	3.2	3.5[4]	3.3[4]	3.5[4]
GS	Sage sparrow	EEIS BLM/FS	1.2	1.3	2.5[4]	2.5[4]	2.5[4]	2.4[4]	2.6[4]	2.3[4]	2.6[4]
		EEIS Cum/Eff	1.2	2.4	3.1[4]	3.1[4]	3.1[4]	3.1[4]	3.1[4]	2.8	3.1[4]
		UCRB BLM/FS	1.2	1.3	2.5[4]	2.5[4]	2.5[4]	2.4[4]	2.6[4]	2.3[4]	2.6[4]
		UCRB CumEff	1.2	2.4	3.1[4]	3.1[4]	3.1[4]	3.1[4]	3.1[4]	2.8	3.1[4]
GS	Sage thrasher	EEIS BLM/FS	1.3	1.4	2.8[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.6[4]	3.0[4]
		EEIS CumEff	1.3	2.5	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.2[4]	2.8	3.2[4]
		UCRB BLM/FS	1.4	1.8	2.9[4]	2.8[4]	2.8[4]	2.8[4]	2.9[4]	2.5[4]	2.9[4]
		UCRB CumEff	1.3	2.6	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.2[4]	3.0	3.3[4]
GS	Vesper sparrow	EEIS BLM/FS	1.2	1.4	1.9[4]	1.9[4]	1.9[4]	1.8	1.9[4]	1.7	1.9[4]
		EEIS CumEff	1.1	1.7	2.4[4]	2.4[4]	2.4[4]	2.3[4]	2.4[4]	2.2	2.4[4]
		UCRB BLM/FS	1.2	1.3	1.9[4]	1.9[4]	1.9[4]	1.8	1.9[4]	1.7	1.9[4]
		UCRB CumEff	1.1	1.7	2.4[4]	2.4[4]	2.4[4]	2.3[4]	2.4[4]	2.4[4]	2.4[4]
GS	Western meadowlark	EEIS BLM/FS	1.1	1.1	1.4	1.4	1.4	1.3	1.4	1.3	1.4
		EEIS CumEff	1.1	1.1	1.6	1.6	1.6	1.5	1.6[4]	1.5	1.6
		UCRB BLM/FS	1.1	1.1	1.4	1.4	1.4	1.3	1.4	1.3	1.4
		UCRB CumEff	1.1	1.1	1.6	1.6	1.6	1.5	1.6[4]	1.5	1.6

Table 4.16 (continued)

Group[1]	Species Name	Area[2]	Period / Alternative[3] H	C	A1	A2	A3	A4	A5	A6	A7
RIP	Red-eyed vireo	EEIS BLM/FS	3.4	3.7	3.7	3.5	3.5	3.5	3.8	3.5	3.6
		EEIS CumEff	3.3	3.7	3.8	3.7	3.7	3.6	3.8	3.6	3.7
		UCRB BLM/FS	3.4	3.6	3.7	3.5	3.5	3.4	3.7	3.4	3.5
		UCRB CumEff	3.3	3.7	3.7	3.7	3.7	3.6	3.8	3.6	3.6
RIP	Red-winged blackbird	EEIS BLM/FS	2.1	2.4	2.7	2.3	2.3	2.3	2.7	2.3	2.3
		EEIS CumEff	2.1	2.5	3.1[4]	2.9	2.9	2.8	3.1[4]	2.9	2.9
		UCRB BLM/FS	2.1	2.4	2.7	2.3	2.3	2.3	2.6	2.3	2.3
		UCRB CumEff	2.1	2.5	3.1[4]	2.9	2.9	2.8	3.1[4]	2.8	2.8
RIP	Veery	EEIS BLM/FS	2.7	3.3	3.4	3.3	3.4	3.2	3.5	3.2	3.3
		EEIS CumEff	2.7	3.6	3.7	3.5	3.5	3.4	3.7	3.4	3.5
		UCRB BLM/FS	2.4	3.3	3.4	3.2	3.3	3.1	3.4	3.1	3.2
		UCRB CumEff	2.4	3.5	3.6	3.5	3.5	3.4	3.6	3.4	3.5
RIP	Willow flycatcher	EEIS BLM/FS	2.6	3.4	3.6	3.5	3.6	3.4	3.6	3.4	3.4
		EEIS CumEff	2.5	3.6	3.7	3.6	3.7	3.6	3.7	3.6	3.6
		UCRB BLM/FS	2.6	3.4	3.6	3.5	3.6	3.4	3.6	3.4	3.4
		UCRB CumEff	2.4	3.6	3.7	3.6	3.7	3.6	3.7	3.6	3.6
RIP	Yellow warbler	EEIS BLM/FS	2.4	3.4	3.5	3.4	3.4	3.3	3.5	3.3	3.3
		EEIS CumEff	2.4	3.5	3.7	3.6	3.6	3.5	3.7	3.4	3.5
		UCRB BLM/FS	2.4	3.4	3.5	3.4	3.4	3.3	3.5	3.3	3.3
		UCRB CumEff	2.4	3.5	3.7	3.6	3.6	3.5	3.7	3.4	3.5
RIP	Yellow-billed cuckoo	EEIS BLM/FS	3.5	4.5	4.8	4.6	4.6	4.5	5.0	4.5	4.6
		EEIS CumEff	3.4	4.9	4.9	4.8	4.8	4.8	5.0	4.7	4.7
		UCRB BLM/FS	3.3	4.5	4.8	4.6	4.6	4.5	5.0	4.5	4.6
		UCRB CumEff	3.3	4.9	4.9	4.7	4.7	4.7	5.0	4.7	4.8
RIP	Yellow-breasted chat	EEIS BLM/FS	2.5	3.5	3.6	3.5	3.6	3.4	3.6	3.4	3.5
		EEIS CumEff	2.4	3.6	3.7	3.6	3.7	3.5	3.8	3.5	3.5
		UCRB BLM/FS	2.5	3.5	3.6	3.4	3.5	3.4	3.6	3.3	3.4
		UCRB CumEff	2.4	3.6	3.7	3.6	3.7	3.5	3.8	3.5	3.5
WD	Ash-throated flycatcher	EEIS BLM/FS	2.1	1.9	2.3	2.3	3.3[4]	3.3[4]	3.4[4]	3.0[4]	2.6[4]
		EEIS CumEff	2.1	1.9	2.5[4]	2.5[4]	3.1[4]	3.0[4]	3.3[4]	2.5[4]	2.8[4]
		UCRB BLM/FS	2.1	1.9	2.3	2.3	3.3[4]	3.3[4]	3.4[4]	3.0[4]	2.6[4]
		UCRB CumEff	2.1	1.9	2.5[4]	2.5[4]	3.1[4]	3.0[4]	3.3[4]	2.8[4]	2.8[4]
WD	Bushtit	EEIS BLM/FS	3.0	2.9	3.1	3.1	2.9	3.5[4]	2.8	3.5[4]	3.4[4]
		EEIS CumEff	3.0	2.9	3.1	3.1	2.9	3.5[4]	2.8	3.5[4]	3.4[4]
		UCRB BLM/FS	3.4	2.9	3.2	3.2	2.9	3.5[4]	3.0	3.5[4]	3.4[4]
		UCRB CumEff	3.4	2.9	3.2	3.2	2.9	3.5[4]	3.0	3.5[4]	3.4[4]
WD	Chipping sparrow	EEIS BLM/FS	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		EEIS CumEff	1.1	1.1	1.4	1.4	1.4	1.4	1.4	1.3	1.4
		UCRB BLM/FS	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		UCRB CumEff	1.1	1.1	1.4	1.4	1.4	1.4	1.4	1.3	1.4
WD	Green-tailed towhee	EEIS BLM/FS	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		EEIS CumEff	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		UCRB BLM/FS	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5
		UCRB CumEff	2.7	2.5	2.8	2.5	2.5	2.4	2.8	2.5	2.5

[1]Group: FOR - forest birds; GS - grassland/shrub birds; RIP - riparian birds; WD - woodland birds.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Mammals

Bats

Introduction—The panel considered the fringed myotis, hoary bat, long-eared myotis, long-legged myotis, pale western big-eared bat, silver-haired bat, spotted bat, western pipistrelle, western small-footed myotis and the Yuma myotis when evaluating the effects of the preliminary draft EIS alternatives. The process used to select species for evaluation under the alternatives is outlined in the section "Methods for Assessing Effect on Terrestrial Species." All of the bats except hoary, silver-haired, and western pipistrelle were initially included because they were Federal C2 Candidate species for federal listing as endangered or threatened. The other three species were evaluated because of past population declines, and/or because their habitat has declined from historic levels or would potentially decline under one or more of the alternatives.

Methods—During the panel discussions, the western pipistrelle was dropped from further consideration because we judged that alternatives would not strongly influence its habitat. The Yuma myotis was not rated by panelists because analysis at a finer scale was determined to be more appropriate for this species.

The bat panel developed a summary of characteristics of the alternatives key to evaluating the effects on bats. The most important parameters for evaluating bat habitat under the alternatives were: acres of late-seral lower montane and montane forest habitat maintained through time; snag and down wood standards; riparian management standards; projected road density; and cliff, mine, and cave management standards.

Results—After reviewing results of the expert panel, the Science Team adjusted the bat species outcomes for the BLM and Forest Service habitat evaluation. These adjustments reflected additional information on Alternatives 2 and 7 that had been obtained after panel deliberations were completed; the information included corrections of late-seral habitat projections, and clarification of riparian standards. An underestimation of large snag retention under the alternatives at year 100 and the tendency of panelists to reflect population, rather than habitat effects in the BLM and Forest Service habitat evaluation, were also addressed. Results are shown in table 4.17, which displays mean outcomes, and table 4.18, which displays the weighted mean outcomes. The weighted means for each alternative are shown in figure 4.36. The number of species whose weighted mean fell into each outcome class under each alternative is shown in figure 4.37. The numbers of species whose weighted mean outcome changed by more than one-half of an outcome class between current and the projected future under each alternative are shown in figure 4.38.

Discussion—Habitat outside of BLM- and FS-administered lands has been significantly altered by conversion to agricultural and urban uses. Habitat on BLM- and Forest Service-administered lands, although reduced in acreage from historic conditions, has been impacted less than the habitat on non-Federal lands and plays an important role in providing habitat for these bats. Restoration of historic habitat conditions across the Federal landscape would make a significant contribution to re-establishment or retention of bat populations throughout the Basin.

Projected outcomes for habitat on BLM- and Forest Service-administered lands were similar for all the bat species and indicate that current habitat on these lands has declined from historic conditions (fig. 4.36). Habitat conditions for most bat species have declined significantly on BLM- and FS-administered lands from historic to current conditions (table 4.18). The exception is the spotted bat whose habitat was patchy and isolated even under historic conditions and is not projected to have declined significantly on Federal lands from historic to current conditions (table 4.18). The historic declines for most species result from increased human disturbance of roosts, reduced large snag densities, decreased acreage and distribution of late-seral lower montane and montane forest, and reduced acreage and quality of riparian areas.

Habitat for three species (fringed myotis, hoary bat, and western small-footed myotis) was projected to continue declining significantly under Alternative 5, and habitat for these three species plus the silver-haired bat is projected to decline under Alternative 1 (table 4.18). Under Alternatives 2, 3, and 7, habitat outcomes for BLM- and Forest Service-administered lands were projected to remain similar to current habitat conditions for most species (fig. 4.38). Habitat quality, quantity, and distribution were projected to increase from current conditions for one species under Alternatives 4 and 6 (fig. 4.38). Alternatives 4 and 6 generally increase late-seral forest and snags, improve riparian conditions, and reduce the likelihood of human disturbance.

Projections of cumulative effects for bat populations followed a pattern similar to the outcomes for Federal lands, but outcomes were generally poorer when cumulative effects were considered. Historic bat populations throughout the entire Basin landscape were projected as Outcome 2 or 3 for most of these bats (the spotted bat is described as being in Outcome 4 historically). Change in habitat across all ownerships and other cumulative effects have led to increased patchiness and isolation of populations. In addition to the factors associated with the Federal habitat declines on Federal lands, overall population declines have been attributed to effects of pesticides, unregulated killing, changes in habitat on non-Federal lands, water quality issues not related to habitat management on Federal lands, air quality issues, and effects from outside the Basin.

Fringed myotis. The range of fringed myotis encompasses most of the EEIS area, except parts of northeastern Washington and southeastern Oregon, and part of the Upper Clark Fork region in Montana. Members of the genus *Myotis* are most often detected in mature stands but may also be observed in younger, managed stands (Erickson and West, in press). In New Mexico, colonial roosts containing 30 to more than 200 fringed myotis bats were found in individual ponderosa pine snags, or in live ponderosa pine with long, vertical cracks. These snag and live tree roosts were located in stringers of ponderosa pine within pure pinyon/juniper habitats or at the interface of these two habitats (Chung-MacCoubrey, in press). Fringed myotis have also been found in mines (Perkins and others 1990). Fringed myotis are considered to be between-, within-, and below-canopy foragers (Black 1974).

Fringed myotis are considered to be very sensitive to human disturbance. Therefore, road density was an important factor in evaluating alternatives. Cave and mine protection was not specified in the alternatives and initial panelist judgments reflected this through lower outcomes. Later adjustments to outcomes were based, in part, on further specifying standards for cliff, cave, and mine management to ensure protection of these species. Current habitat outcomes on BLM- and Forest Service-administered lands for fringed myotis are projected to have declined one outcome from historic conditions. Outcome under Alternative 1 would continue to decline 0.5 outcome units over a 100-year period (to slightly less than Outcome 4). Alternatives 3 and 5 produce outcomes similar to Alternative 1. Alternatives 2, 4, 6, and 7 result in outcomes at or above current conditions because of increased large snags, increased late-seral habitat, reduced timber harvest levels, reduced human disturbance, improved riparian conditions, and reduced areas of high road density.

Hoary bat. The range of the hoary bat encompasses the entire Basin. This bat is a wide-ranging and long-lived species (20-year longevity). An Oregon study suggests that male hoary bats prefer Douglas-fir/western hemlock forests that are older than 200 years. Older trees most likely provide shelter, open space to gain flight when leaving the roost, and immediate accessibility to the roost site upon return (Perkins and Cross 1988).

Panel members considered late-seral habitat, snags, and riparian habitat of greatest significance in evaluating alternatives. As a result, habitat on

BLM- and Forest Service-administered lands was judged to have been reduced from Outcome 2 under historic conditions, to approximately Outcome 3 currently. Alternatives 1, 2, 3, and 5 were projected to result in continued habitat reduction on Federal lands, whereas Alternatives 4, 6, and 7 were projected to result in slight improvements in habitat conditions.

Long-eared bat. The range of the long-eared bat encompasses the entire Basin. Like other members of the genus *Myotis,* long-eared bats are detected in all stands with a variety of structures, but are most often detected in mature stands (Erickson and West, in press). In New Mexico, maternity roosts of long-eared myotis were located in live and dead junipers. Hibernacula of long-eared myotis in northwest California were located in limestone caves that were 5 to 150 meters from permanent streams (Marcot 1984). In a search of 650 caves and mines and 70 buildings in the Pacific Northwest during the winters of 1982 to 1989, long-eared bats were found in caves and one garage (Perkins and others 1990). Panelists indicated that roosting within the assessment area may be occurring in rocks because preferred habitat is not available. Important factors in evaluating alternatives for this species were maintenance of mine openings/cliffs/caves/talus, riparian condition (structural and vegetative diversity), protection of intermittent streams (these bats glean in foliage of riparian zones), and old forest physiology and structures including snags. As a result, the effects of the alternatives are similar to those described for the hoary bat.

Figure 4.36 Bats

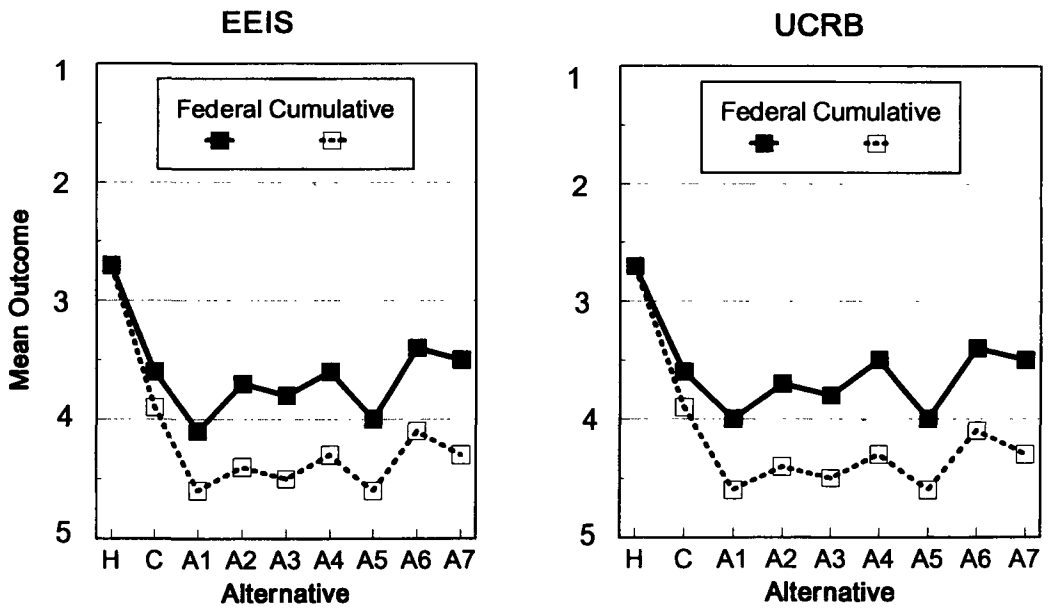


Figure 4.36. Mean outcome scores averaged over eight species of bats in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.37 Bats

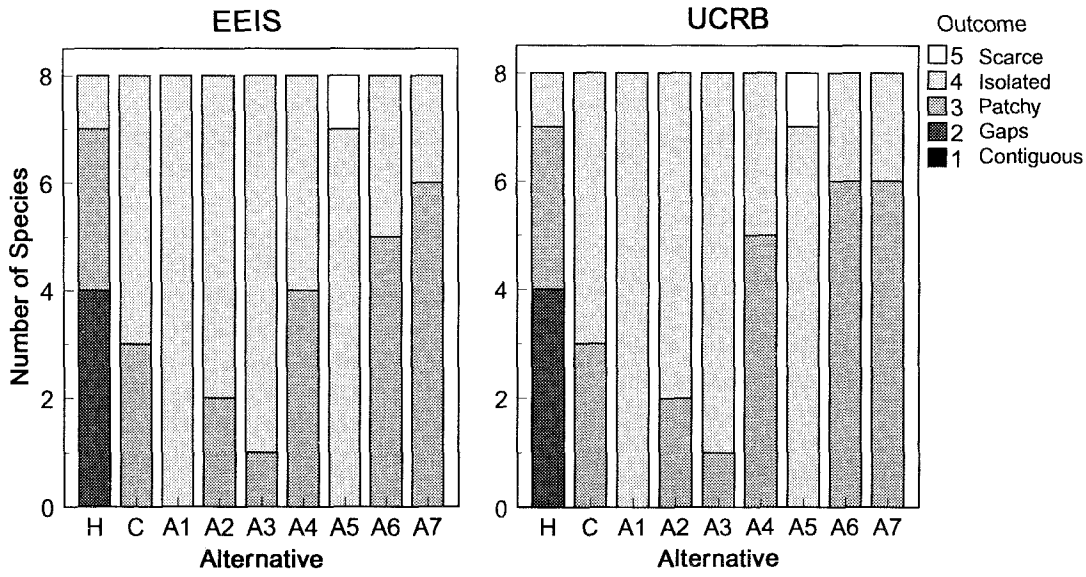


Figure 4.37. Frequency distribution of mean habitat outcome scores for eight species of bats on Federal lands in the EEIS and UCRB planning areas for historic, current, and projected future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.38 Bats
Change from Current to Future

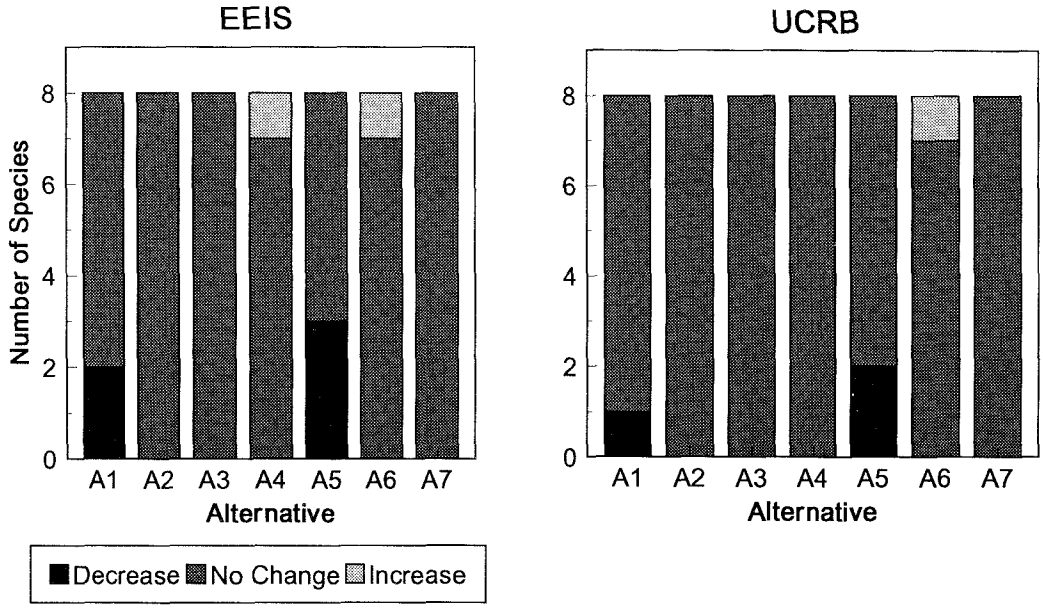


Figure 4.38. Departure of habitat outcomes on Federal lands from current conditions to each alternative for eight species of bats in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Table 4.17. Mean likelihood scores of viability outcomes for bats and small mammals for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
BAT	Fringed myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	1	0	2	0	5	7
			3	63	33	17	43	22	43	10	47	45
			4	2	60	47	49	55	43	50	41	42
			5	0	7	36	7	23	12	40	7	6
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	0	0	0	0	0	0
			3	63	22	0	0	0	3	0	15	10
			4	2	65	20	37	38	47	30	48	40
			5	0	13	80	63	62	50	70	37	50
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	28	0	0	1	0	5	0	8	7
			3	70	33	17	43	32	48	30	54	45
			4	2	60	48	50	57	45	46	36	42
			5	0	7	35	6	11	2	24	2	6
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	35	0	0	0	0	0	0	0	0
			3	63	22	0	0	0	3	0	15	10
			4	2	65	22	43	40	47	35	53	43
			5	0	13	78	57	60	50	65	32	47
BAT	Hoary bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	78	6	0	10	0	14	0	24	22
			3	22	70	43	40	44	50	40	47	34
			4	0	22	47	36	48	31	40	26	28
			5	0	2	10	14	8	5	20	3	16
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	78	0	0	0	0	0	0	0	0
			3	22	56	13	10	14	20	8	37	18
			4	0	30	37	48	38	51	30	42	52
			5	0	14	50	42	48	29	62	21	30
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	78	4	0	6	0	14	0	24	20
			3	22	70	45	40	48	49	40	44	30
			4	0	24	48	42	33	33	46	26	36
			5	0	2	7	12	19	4	14	6	14
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	78	0	0	0	0	0	0	0	0
			3	22	56	5	8	8	20	8	36	17
			4	0	30	40	50	40	54	31	43	53
			5	0	14	55	42	52	26	61	21	30
BAT	Long-eared myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	5	0	10	0	15	10
			3	38	50	36	47	45	50	39	50	50
			4	0	44	56	37	46	35	56	30	30
			5	0	6	8	11	9	5	5	5	10

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	28	8	16	10	19	6	29	21
			4	0	56	38	42	44	48	40	43	51
			5	0	16	54	42	46	33	54	28	28
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	5	0	5	0	15	10
			3	38	50	37	47	46	55	40	50	50
			4	0	44	57	37	47	35	48	30	30
			5	0	6	6	11	7	5	12	5	10
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	62	0	0	0	0	0	0	0	0
			3	38	28	8	10	10	19	10	29	21
			4	0	56	39	43	45	48	36	42	49
			5	0	16	53	47	45	33	54	29	30
BAT	Long-legged myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	5	0	14	0	20	13
			3	35	44	24	44	52	56	34	62	45
			4	0	46	54	42	36	30	54	18	42
			5	0	10	22	9	12	0	12	0	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	0	0	0	0
			3	35	23	0	10	5	5	0	19	15
			4	0	58	30	44	43	61	30	46	50
			5	0	20	70	46	53	34	70	35	35
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	5	0	11	0	16	13
			3	35	44	35	44	54	60	45	64	50
			4	0	46	46	45	36	25	50	18	30
			5	0	10	19	6	10	4	5	2	7
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	65	0	0	0	0	0	0	0	0
			3	35	23	0	5	5	5	0	19	15
			4	0	58	31	41	44	59	30	50	53
			5	0	20	69	54	51	36	70	31	33
BAT	Pale western big-eared bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	2	12	10	13	8	25	20
			4	14	72	52	78	64	78	58	67	69
			5	2	16	46	10	26	9	34	8	11
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	0	0	0	2	0	5	3
			4	14	68	24	38	44	46	20	58	40
			5	2	20	76	62	56	52	80	37	57

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	2	12	12	13	8	35	30
			4	14	72	54	78	64	79	58	61	59
			5	2	16	44	10	24	8	34	4	11
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	6	0	0	0	0	0	0	0	0
			3	78	12	0	0	0	2	0	5	3
			4	14	70	25	39	45	44	20	59	41
			5	2	18	75	61	55	54	80	36	56
BAT	Silver-haired bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	52	2	0	5	5	15	0	18	10
			3	46	54	30	62	65	63	49	65	63
			4	2	44	48	22	26	18	38	16	22
			5	0	0	22	11	4	4	13	1	5
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	2	0	7	0
			3	40	40	7	22	16	26	8	41	18
			4	0	46	42	47	37	32	33	37	43
			5	0	14	51	31	47	40	59	15	39
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	52	2	0	5	8	18	8	22	10
			3	46	54	34	60	62	61	41	65	62
			4	2	44	44	29	26	17	31	10	25
			5	0	0	22	6	4	4	20	3	3
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	60	0	0	0	0	2	0	7	0
			3	40	40	7	19	16	26	8	40	18
			4	0	46	43	45	37	33	36	37	43
			5	0	14	50	36	47	39	56	16	39
BAT	Spotted bat	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	5	3	3	0	3	0	3	5
			4	90	75	55	63	53	65	45	73	75
			5	5	20	43	35	48	33	55	25	20
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	0	0	0	0	0	0	0	0
			4	90	60	43	48	35	53	30	63	55
			5	5	40	58	53	65	48	70	38	45
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	5	3	3	0	3	0	3	5
			4	90	75	58	65	53	68	45	75	75
			5	5	20	40	33	48	30	55	23	20
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	5	0	0	0	0	0	0	0	0
			4	90	60	45	50	35	55	33	65	55
			5	5	40	55	50	65	45	68	35	45

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
BAT	Western small-footed myotis	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	80	0	0	10	0	0	0	10	10
			3	20	70	0	60	50	50	0	60	60
			4	0	30	70	20	30	30	70	20	30
			5	0	0	30	10	20	20	30	10	0
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	80	0	0	10	0	0	0	10	10
			3	20	70	0	60	50	50	0	60	60
			4	0	30	70	20	30	30	70	20	30
			5	0	0	30	10	20	20	30	10	0
SMM	Northern flying squirrel	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	90	15	0	18	15	24	4	30	25
			3	10	40	29	51	55	51	49	54	54
			4	0	33	51	21	20	20	38	10	21
			5	0	13	20	10	10	5	9	6	0
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	83	10	0	0	0	0	0	0	0
			3	18	43	5	18	10	18	10	25	20
			4	0	33	43	49	48	44	39	48	49
			5	0	15	53	34	43	39	51	28	31
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	90	15	0	21	16	25	5	28	26
			3	10	40	40	45	45	53	50	55	55
			4	0	33	32	30	30	20	25	15	10
			5	0	13	28	4	9	2	20	2	9
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	83	10	0	0	0	0	0	0	0
			3	18	45	5	13	10	20	10	25	20
			4	0	33	46	53	51	45	43	49	49
			5	0	13	49	35	39	35	48	26	31
SMM	Pygmy rabbit	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	0	0	0	0	0	0	0	0
			4	50	50	50	50	50	50	50	50	50
			5	10	50	50	50	50	50	50	50	50
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	40	0	0	0	0	0	0	0	0
			4	50	50	50	50	50	50	50	50	50
			5	10	50	50	50	50	50	50	50	50
SMM	White-tailed jackrabbit	EEIS BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	80	20	20	20	20	20	20	20	20
			3	0	80	80	80	80	80	80	80	80
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.17 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	20	0	0	0	0	0	0	0	0
			2	80	10	10	10	10	10	10	10	10
			3	0	20	20	20	20	20	20	20	20
			4	0	60	60	60	60	60	60	60	60
			5	0	10	10	10	10	10	10	10	10
		UCRB BLM/FS	1	20	0	0	0	0	0	0	0	0
			2	80	20	20	20	20	20	20	20	20
			3	0	80	80	80	80	80	80	80	80
			4	0	0	0	0	0	0	0	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	20	0	0	0	0	0	0	0	0
			2	80	10	10	10	10	10	10	10	10
			3	0	20	20	20	20	20	20	20	20
			4	0	60	60	60	60	60	60	60	60
			5	0	10	10	10	10	10	10	10	10

[1]Group: BAT - bat; SMM - small mammal.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Long-legged bat. The range of the long-legged bat encompasses the entire Basin. A search of 650 caves and mines and 70 buildings in the Pacific Northwest found long-legged myotis to be the only species hibernating in a cluster (Perkins and others 1990). A radio-telemetry study of female long-legged bats in the central Cascades of Oregon suggested a non-random pattern of day roost selection by individual bats. Bats radio-marked at the same night roost were generally found at separate day roosts. The study recommended maximizing day roost opportunities by managing for both solitary and multiple clusters of day roost structures throughout forested drainages of the central Oregon Cascades (Ormsbee, in press). A second study in the central Cascades indicated that long-legged myotis differentially select larger bridges (which maintain higher nighttime temperatures than do smaller bridges) and that males show a strong tendency to roost alone while clusters were almost exclusively composed of females (Perlmeter, in press). In a southern Alberta, Canada study, long-legged myotis fed high above ground and along cliff edges and the diet was primarily Lepidopteran moths (Saunders and Barclay 1992). The types of broad habitats and the pattern of panelists judgments were similar to those described for the hoary bat.

Pale western big-eared bat. The range of the pale western big-eared bat encompasses the entire Basin. The distribution is highly dependent on caves and mines and, to a lesser extent, forest management practices that affect foraging areas. The two major actions that have historically affected the pale western big-eared bat have been disturbance and destruction of roost sites. In a stand-level survey of bat activity within managed forests in the Pacific Northwest (1993-1994) the

highest detection rates were in clearcut stands. No detections were made in young, unthinned stands (Erickson and West, in press). Hibernacula of the species were studied on the Shasta-Trinity National Forest in four limestone caves (Marcot 1984). Pale western big-eared bats in these hibernacula were found singly or in groups of 3 to 50 individuals.

Important features of the alternatives that panelists considered for this species were large-diameter snag densities, maintaining mine openings/cliffs/caves/talus, riparian condition (structural and vegetative diversity), protection of intermittent streams (these bats glean in foliage of riparian zone), and projected road densities. Historic habitat approximated Outcome 3. Current habitat has declined to Outcome 4. Alternatives 1, 3, and 5 would continue to reduce roost site availability and increase levels of disturbance resulting in reductions in habitat on BLM- and FS-administered land. Alternatives 2 and 4 would maintain current habitat levels by improving snag and riparian conditions and reducing the density of open roads. It was assumed that cave and mine protection would increase as part of the alternatives. Alternatives 6 and 7 were judged to slightly improve habitat conditions on Federal lands for pale western bit-eared bat by implementing additional broad-scale ecosystem restoration or retention and increasing protection of cave/mine/cliff habitat.

Silver-haired bat. The range of the silver-haired bat encompasses the entire Basin. In the Pacific Northwest, a stand-level survey of bat activity within managed forests (1993-1994) detected silver-haired bats most frequently in clearcuts and did not record them in mature stands (Erickson and West, in press). However, in an Oregon study, Perkins and Cross (1988) found a significant difference in captures of silver-haired bats in Douglas-fir stands, 100 years old or greater, when compared with ponderosa pine stands of the same age and younger stands of Douglas-fir and ponderosa pine. The bark of older Douglas-fir trees tends to pull away from the bole providing crevices for shelter. The oldest Douglas-fir stands provide the greatest number of snags with exfoliating bark, cracks, and excavations of cavity-nesting birds. Older ponderosa pine does not provide as many roost sites because bark ridges are not as deep as are those of Douglas-fir, and bark exfoliation occurs in thin plates and does not create deep crevices. In the southern-Washington Cascades and the Oregon Coast Range, bat activity was greater in old-growth Douglas-fir forests than in mature or young tree stands. The high level of activity in these stands is probably due to the increased diversity and/or abundance of day roosts as compared with young and mature stands. Day roosts of five silver-haired bats in northeastern Oregon were located by radiotelemetry from 1994 to 1995. All roost sites were in trees ranging from 15 to 22 inches dbh, and from 18 to 82 feet in height. Eight of the 12 roost trees used by silver-haired bats were snags and all were on forested slopes (Betts, in press). Roost site preferences of silver-haired bats were studied just north of the United States border in southern British Columbia where approximately 15 roost trees were found. With two exceptions, all roosts were in abandoned woodpecker cavities and were commonly found in both aspen and Douglas-fir (Vonhof, in press).

Panelists determined that features of the alternatives that increased large trees, snags, and riparian conditions would be most beneficial to this species. Habitat was judged to have declined from between Outcomes 2 and 3, to between Outcomes 3 and 4, from historic to current. Alternatives 1 and 5 were judged to result in further declines by year 100, largely because fewer snags would be provided, and riparian conditions were not expected to improve from current conditions. All other alternatives were expected to improve conditions for the species because of increased riparian quality and diversity, increased large snag densities, and increased late-seral forests.

Table 4.18. Mean viability outcomes for habitat and populations of bats and small mammals for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
BAT	Fringed myotis	EEIS BLM/FS[4]	2.7	3.7	4.2	3.6	4.0	3.7	4.3[5]	3.5	3.5
		EEIS CumEff	2.7	3.9	4.8[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.2	4.4
		UCRB BLM/FS[4]	2.7	3.7	4.2	3.6	3.8	3.4	3.9	3.3	3.5
		UCRB CumEff	2.7	3.9	4.8[5]	4.6[5]	4.6[5]	4.5[5]	4.7[5]	4.2	4.4
BAT	Hoary bat	EEIS BLM/FS[4]	2.2	3.2	3.7	3.5	3.6	3.3	3.8[5]	3.1	3.4
		EEIS CumEff	2.2	3.6	4.4[5]	4.3[5]	4.3[5]	4.1[5]	4.5[5]	3.8	4.1[5]
		UCRB BLM/FS[4]	2.2	3.2	3.6	3.6	3.7	3.3	3.7[5]	3.1	3.4
		UCRB CumEff	2.2	3.6	4.5[5]	4.3[5]	4.4[5]	4.1	4.5[5]	3.9	4.1[5]
BAT	Long-eared myotis	EEIS BLM/FS[4]	2.4	3.6	3.7	3.5	3.6	3.4	3.7	3.3	3.4
		EEIS CumEff	2.4	3.9	4.5[5]	4.3	4.4	4.1	4.5[5]	4.0	4.1
		UCRB BLM/FS[4]	2.4	3.6	3.7	3.5	3.6	3.4	3.7	3.3	3.4
		UCRB CumEff	2.4	3.9	4.5[5]	4.4	4.4	4.1	4.4[5]	4.0	4.1
BAT	Long-legged myotis	EEIS BLM/FS[4]	2.4	3.7	4.0	3.6	3.6	3.2[5]	3.8	3.0[5]	3.3
		EEIS CumEff	2.4	4.0	4.7[5]	4.4	4.5[5]	4.3	4.7[5]	4.2	4.2
		UCRB BLM/FS[4]	2.4	3.7	3.8	3.5	3.6	3.2	3.6	3.1[5]	3.3
		UCRB CumEff	2.4	4.0	4.7[5]	4.5	4.5	4.3	4.7[5]	4.1	4.2
BAT	Pale western big-eared bat	EEIS BLM/FS[4]	3.1	4.0	4.4	4.0	4.2	4.0	4.3	3.8	3.9
		EEIS CumEff	3.1	4.1	4.8[5]	4.6[5]	4.6	4.5	4.8[5]	4.3	4.5
		UCRB BLM/FS[4]	3.1	4.0	4.4	4.0	4.1	4.0	4.3	3.7	3.8
		UCRB CumEff	3.1	4.1	4.8[5]	4.6[5]	4.6	4.5	4.8[5]	4.3	4.5
BAT	Silver-haired bat	EEIS BLM/FS[4]	2.5	3.4	3.9[5]	3.4	3.3	3.1	3.6	3.0	3.2
		EEIS CumEff	2.4	3.7	4.4[5]	4.1	4.3[5]	4.1	4.5[5]	3.6	4.2
		UCRB BLM/FS[4]	2.5	3.4	3.9	3.4	3.3	3.1	3.6	2.9	3.2
		UCRB CumEff	2.4	3.7	4.4[5]	4.2	4.3[5]	4.1	4.5[5]	3.6	4.2
BAT	Spotted bat	EEIS BLM/FS[4]	4.0	4.2	4.4	4.4	4.5	4.3	4.6	4.3	4.2
		EEIS CumEff	4.0	4.4	4.6	4.6	4.7	4.5	4.7	4.4	4.5
		UCRB BLM/FS[4]	4.0	4.2	4.4	4.3	4.5	4.3	4.6	4.2	4.2
		UCRB CumEff	4.0	4.4	4.6	4.5	4.7	4.5	4.7	4.4	4.5
BAT	Western small-footed myotis	EEIS BLM/FS[4]	2.2	2.3	4.3[5]	3.3	3.7	3.7	4.3[5]	3.3	3.2
		UCRB BLM/FS[4]	2.2	3.3	4.3[5]	3.3	3.7	3.7	4.3[5]	3.3	3.2
SMM	Northern flying squirrel	EEIS BLM/FS[4]	2.1	3.5	3.9	3.2	3.3	3.1	3.5	2.9[5]	3.0[5]
		EEIS CumEff	2.2	3.6	4.5[5]	4.2[5]	4.4[5]	4.3[5]	4.4[5]	4.1[5]	4.1[5]
		UCRB BLM/FS[4]	2.1	3.5	3.9	3.2	3.3	3.0	3.6	2.9[5]	3.0
		UCRB CumEff	2.2	3.5	4.4[5]	4.3[5]	4.3[5]	4.2[5]	4.4[5]	4.0	4.1[5]
SMM	Pygmy rabbit	EEIS BLM/FS	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		UCRB BLM/FS	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
SMM	White-tailed jackrabbit	EEIS BLM/FS	1.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
		EEIS CumEff	1.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
		UCRB BLM/FS	1.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
		UCRB CumEff	1.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7

[1]Group: BAT - bat; SMM - small mammal.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table may be misleading.

Spotted bat. The range of the spotted bat encompasses the entire EEIS area and western and southern Idaho. In British Columbia, spotted bats were found to roost in cliff faces and forage alone in a variety of habitats, most actively over marshes and open ponderosa pine woodlands (Wai-Ping and Fenton 1989). Surveys in Northwestern Colorado at Dinosaur National Monument found spotted bats using a wide range of habitats, from pinyon-juniper to riparian zones, from dusk to early morning hours (Navo and others 1992). Spotted bats in British Columbia fed mainly on moths (Wai-Ping and Fenton 1989).

The most important feature of the alternatives for the spotted bat was protection of high cliff/forest interfaces at the tops of canyons. The spotted bat is patchily distributed where this high cliff/forest interface is found. Because the species is very sensitive to disturbance, a vigorous survey of this habitat is recommended in order to identify specific areas for protection. Panelists judged historic distribution to approximate Outcome 4 because of extremely patchy distribution throughout the Basin. Habitat condition is judged to have declined due to recreational use, timber harvest, and other disturbance factors near cliffs. No alternatives were judged to improve current habitat conditions. Alternatives 6 and 7 were considered to maintain current habitat.

Western small-footed bat. The range of the western small-footed myotis encompasses the entire Basin. During a search of 650 caves and mines and 70 buildings in the Pacific Northwest (Perkins and others 1990), western small-footed bats were found using caves and mines as hibernacula. Comparatively, in Pennsylvania, 52 percent of occupied hibernacula were small caves of less than 150 meters in length (Dunn and Hall 1989). Gates and others (1984) recommended conducting cave surveys, implementing stronger efforts to diminish or alleviate disturbance, acquiring or protecting caves with 30 or more individuals, and monitoring populations in minor and major hibernacula.

The outcomes for western small-footed bat assumed that specific cave/mine/cliff/talus standards would be developed for the alternatives that are consistent with the broad alternative themes. Current habitat is judged to have declined from historic conditions (from Outcome 2 to Outcome 3). Further declines were judged to be likely under Alternatives 1, 3, 4, and 5. Alternatives 2, 6, and 7 were judged likely to result in higher outcomes than current conditions through reduction of human disturbance and by protection of cave/mine sites.

Other Small Mammals

Introduction—The species initially considered by the small mammal panel were selected through the process described in "Methods for Assessing Effects on Terrestrial Species." Species included in the analysis were Preble's shrew, pygmy rabbit, Wyoming ground squirrel, white-tailed jackrabbit, northern flying squirrel, and Uinta ground squirrel. Preble's shrew, pygmy rabbit, and Wyoming ground squirrel were initially included because they were Candidate species (Category 2 or 3) for listing by the U.S. Fish and Wildlife Service. The white-tailed jackrabbit, northern flying squirrel, and Uinta ground squirrel were included because previous analyses suggested that habitat may have declined from historic to current conditions or was projected to decline under one or more alternatives.

Methods—During the panel discussions, Preble's shrew was dropped from further evaluation because fine-scale analysis (at the 4th field HUC watershed or smaller scale) would be necessary to address this species because of its local distribution within the Basin. Wyoming ground squirrel was dropped from analysis because the panelists agreed that major changes in habitat are not expected and agriculture probably benefits the species. Uinta ground squirrel was dropped from the analysis because panelists did not have the background or habitat information to evaluate the effects of the alternatives on the species. We recommend that this species be analyzed at a finer scale.

Results—After reviewing results of the expert panel, the SIT adjusted some of the outcomes for the evaluation of habitat on BLM- and Forest Service-administered lands for the northern flying squirrel. These adjustments reflected additional information on Alternatives 2 and 7 that was obtained after the panel deliberations had concluded. The information included corrections of late-seral habitat projections, and clarification of riparian standards. An underestimation of large snag retention under the alternatives at year 100 and the tendency of panelists to emphasize populations rather than habitat conditions in the analysis of habitat on BLM- and FS-administered lands were also addressed. Detailed results are shown in tables 4.17 and 4.18.

Discussion—

Pygmy rabbit. The pygmy rabbit is found primarily in the upland shrub habitats of southeastern Oregon, southwestern Idaho, and northern Nevada. The species is patchily distributed. There are also remnant populations persisting in central eastern Washington (approximately 250 animals). The pygmy rabbit is strongly dependant on sagebrush, which comprises 99 percent of its winter diet. Dense sagebrush and relatively deep, loose soil are important characteristics of pygmy rabbit habitat (Washington Department of Wildlife 1993).

Agricultural development, sagebrush conversion, and sagebrush removal were the primary factors considered in evaluating conditions for pygmy rabbits. Panelists were only able to assess conditions for pygmy rabbit on Federal land (see table 4.17). The large historic decline in pygmy rabbit habitat reflects a loss of big sagebrush. The alternatives were not considered likely to significantly reduce habitat from current conditions. Site-specific analysis may be necessary to fully address this species including the assessment of cumulative effects.

White-tailed jackrabbit. White-tailed jackrabbits use upland herblands throughout the Basin. Past agricultural conversion, intensive grazing, and fire suppression were the primary factors considered in the evaluation of alternatives. The results for Federal lands indicate that habitat has declined significantly from historic to current conditions (table 4.17). Changes due to cumulative effects have been even greater. No distinct changes are predicted under the alternatives. Cumulative effects on populations reflect the historic agricultural conversion from rangeland to row crops and no further significant changes are predicted.

Northern flying squirrel. The range of the northern flying squirrel encompasses forest lands throughout both EIS areas. Panelists identified multi-storied forest stands as suitable habitat for northern flying squirrels, and highlighted the importance of riparian zones for the species. Large live trees and snags are breeding habitat for the northern flying squirrels. Key considerations for snags include such features as placement, decay state, diameter, height, proximity to other snags, presence of bark, and so on. Fungi are an important food item during much of the year and are more abundant in moist environments and near down wood. This food source can be reduced as a result of high-temperature burning and compaction.

The northern flying squirrel is sensitive to riparian habitat reduction, snag loss, and forest fragmentation. Habitat on Federal lands is estimated to have declined from 90 percent likelihood of Outcome 2 under historic conditions to a current level of 73 percent likelihood of Outcomes 3 and 4 (table 4.17). Alternatives 1 and 5 are expected to result in a continuing trend toward habitat isolation, while Alternatives 2, 3, 4, 6, and 7 are expected to maintain or improve conditions (table 4.18).

Cumulative effects were judged to result in continued population decline under all alternatives as a result of fragmentation of habitat on non-Federal land (see weighted mean outcomes in table 4.18).

Carnivores

Introduction—Twenty-two species of carnivores were identified as being present within the assessment area. Of these, six were selected for detailed analysis because they are listed under the Endangered Species Act (ESA), are candidates for listing, are listed as sensitive under FS or BLM policy, or have been the subject of lawsuits. Additionally, three of these species, fisher, American marten, and lynx, are associated with late-seral forests for at least part of their habitat requirements. All six species are known to or are suspected to have declined in abundance within the assessment area since European settlement.

Methods—Outcomes projected by the expert panel were adjusted by the Science Team for marten, fisher, lynx, and wolverine. The adjustments were based on additional information on species habitat requirements from recently published reports, consultation with additional species experts, and additional information regarding the alternatives obtained following the panel deliberations.

Results—The viability outcomes for carnivores significantly declined (1.0 to 0.5 units) from the historical period (tables 4.19 and 4.20, and figs. 4.39 and 4.40). Historical distributions on average were described by Outcome 2 or 3, whereas current distributions are characterized by Outcome 4 or 5. In general, the mean outcome for all carnivores under the alternatives would not be significantly different (+ > 0.5 units) from current conditions (fig. 4.39). However, Alternatives 4, 6, and 7 would result in increased viability for one to two species on BLM- and FS-administered lands (fig. 4.41). Generally, projected outcomes were higher in the UCRB EIS area, but the relative effects of the alternatives were the same in both the UCRB EIS and EEIS areas. Lynx was an exception since both areas had very similar outcome scores.

Discussion—

Fisher. Declines in fisher populations in the assessment area have been previously described (Aubry and Houston 1992, Weckwerth and Wright 1968). The decline appears to be a result of heavy trapping and habitat deterioration (Powell and Zielinski 1994). Reintroductions of fisher in the assessment area began in the late 1950s and continued through the early 1990s. Regulating trapping seasons in Idaho and Montana to prevent overharvest may result in slow expansion of populations in these areas (Powell and Zielinski 1994).

Fishers are found in a diversity of forest types but are most commonly associated with riparian habitats in landscapes dominated by mature conifer forests and late-seral forests (Aubry and Houston 1992, Buskirk and Powell 1994, Jones and Garton 1994, Powell and Zielinski). Studies in northern California (Buck and others 1994) investigated fisher use of harvested forests. They found different use of habitats by fisher within lightly harvested and heavily harvested areas. They also reported that management practices that reduce mature forest structure and increase the proportion of hardwoods result in sub-optimal fisher habitat. Jones and Garton (1994) suggested that the inclusion of early- and mid-seral forests may be important components of fisher habitat, providing prey diversity. Jones (1991) reported of young forest use by fisher in winter, but noted that fisher selected locations within the young forests having higher availability of large-diameter trees, snags, and down woody material.

Riparian standards associated with Alternatives 2, 3, 4, 6 and 7 would result in the greatest improvement in riparian habitat conditions. Alternatives 3, 4, and 6 would promote restoration of the historic distribution of late-seral habitats and protect riparian habitat, thus, these alternatives are predicted to improve fisher habitat the most. Alternative 7 would establish reserves of late-seral conifer forests, but the locations are not in primary fisher habitat. This alternative would also restrict activity in unroaded areas greater than 1,000 acres and would retain existing late-seral vegetation. Alternative 1 would provide for only limited protection of riparian habitats and would result in continued fragmentation and loss of late-

seral forests. Alternative 5 would emphasize commodity production in the primary fisher range and would provide little protection to riparian habitats.

Alternatives 4 and 6 in the EEIS area are predicted to improve fisher habitat above current conditions and result in isolated patches of habitat with limited possibility for interactions between local populations. Alternatives 1 and 5 would reduce habitat quality to small isolated patches with no potential for interactions and a high likelihood of extirpation in 100 years. In the UCRB EIS area Alternatives 2, 3, 4, and 6 would improve habitat above current levels, but habitat would still remain as isolated islands with limited potential for interactions between populations. Alternatives 1, 5, and 7 would reduce habitat to small isolated islands with little potential for interactions between local populations and little opportunity for recolonization of habitats.

American marten. American marten are closely associated with late-seral conifer forests with complex physical structure near the ground (Buskirk and Powell 1994). Baker (1992) reported use by marten of second-growth vegetation that had small patches of old forest, large stumps, and logs remaining in the treated area. Mesic habitats, especially riparian habitat, are selected over xeric conditions for foraging and resting (Buskirk and others 1989, Buskirk and Powell 1994, Spencer and others 1983), probably because of the greater abundance of habitat structures that are associated with riparian areas. Open areas without overhead cover are infrequently used by martens, probably due to increased risk of predation.

Figure 4.39 Carnivores

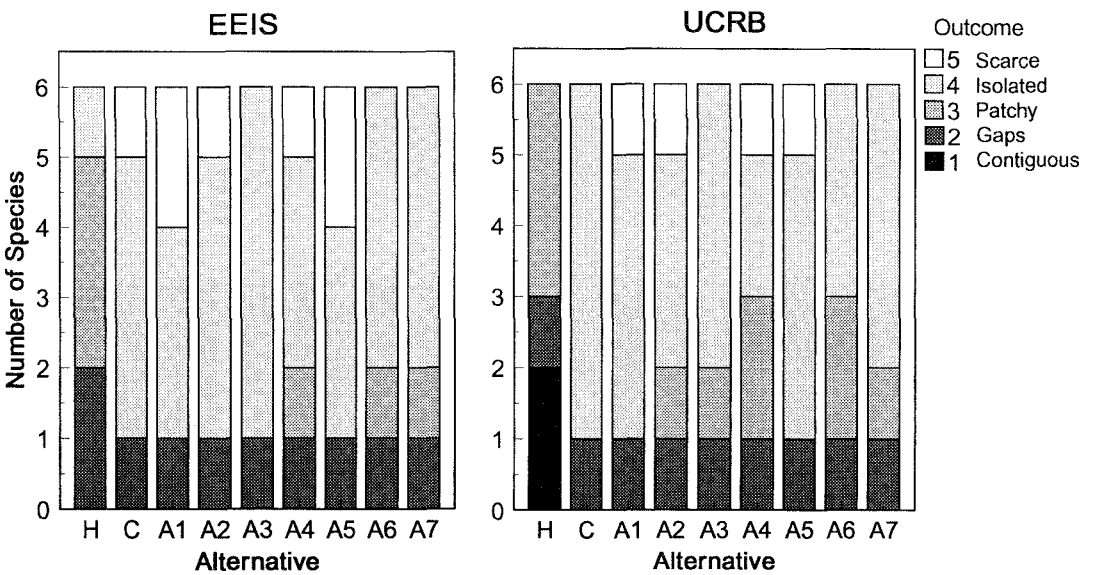


Figure 4.39. Frequency distribution of mean habitat outcome scores for six species of carnivores on Federal lands in the EEIS and UCRB planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.40 Carnivores

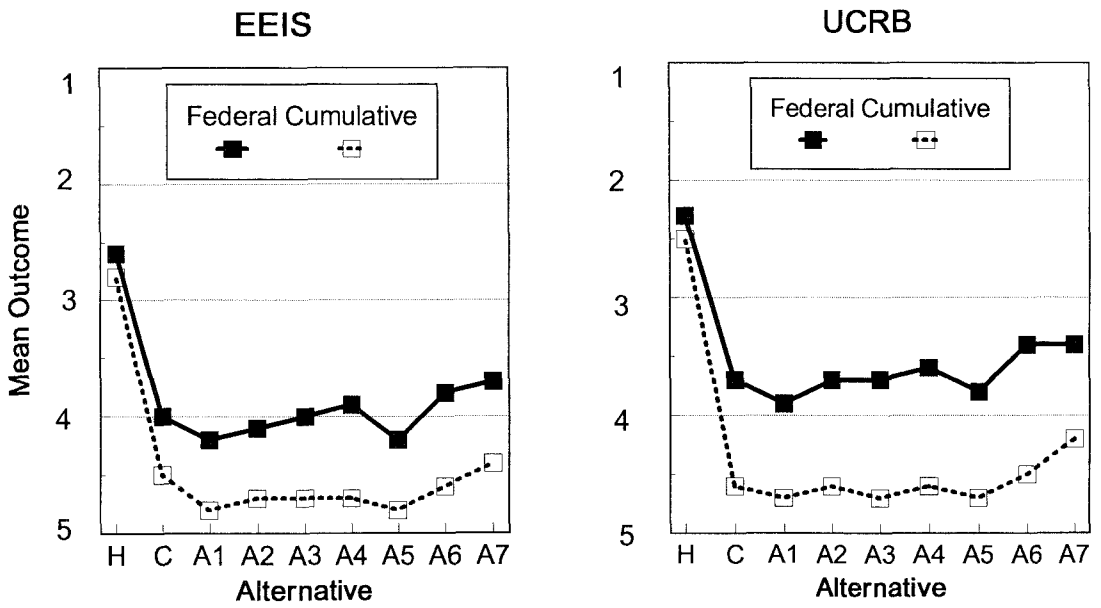


Figure 4.40. Mean outcome scores averaged over six species of carnivores in the EEIS and UCRB planning areas for historic, current, and future conditions under seven alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.41 Carnivores
Change from Current to Future

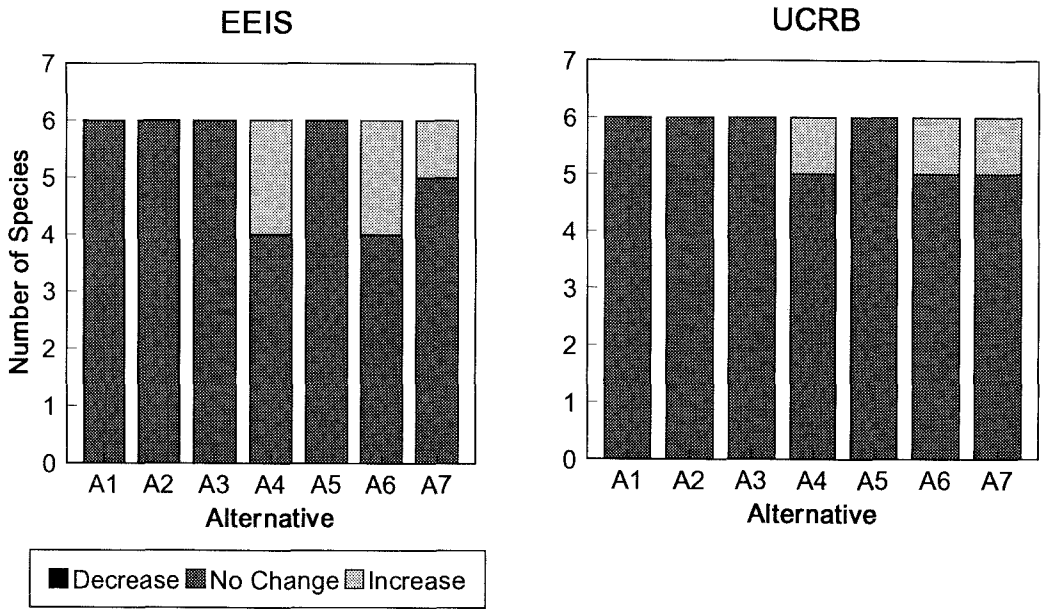


Figure 4.41. Departure of habitat outcomes on Federal lands from current conditions to each alternative for six species of carnivores in the EEIS and UCRB planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

Alternative 7 is predicted to provide the best marten habitat because of designation of reserves, retention of large, unroaded areas and late-seral forests, and riparian protection. Alternatives 4 and 6 contain standards to protect riparian habitat and actively manage conifer forests for late-seral conditions. Both of these alternatives would result in a less-fragmented landscape and would retain large snags and down wood. Therefore, Alternatives 4 and 6 would improve habitat conditions from current. Alternatives 2 and 3 are predicted to maintain or slightly improve habitat from current by retaining late-seral conifer forests in the range of historical conditions and by providing strong riparian protection. These alternatives also provide for the beneficial retention of large snags and moderate amounts of down wood across the landscape. Alternatives 1 and 5 would result in continued fragmentation of late-seral forests and would not provide strong riparian protection.

Alternative 7, would restore marten habitat to near historic conditions by providing strict reserves. Alternatives 4 and 6 would restore habitat to provide more continuous distribution with greater opportunities for individuals to interact between populations than under current conditions. Alternatives 1, 2, 3, and 5 are projected to result in a decrease in marten habitat from current conditions and result in conditions that provide isolated habitats with limited opportunity for interactions between populations or the possibility of recolonization.

Lynx. Lynx are highly specialized predators and are closely associated with snowshoe hare populations (Koehler 1990, Koehler and Aubry 1994, Koehler and Brittell 1990). Exploitation for fur and deterioration of habitat conditions due to logging have been suggested as reasons for population declines and consequent population viability (Koehler 1987). Early-seral forests resulting from fire, timber harvest, disease and wind-throw provide habitat to support high densities of snowshoe hare and the best foraging conditions for lynx (Koehler 1990, Koehler 1991, Koehler and Brittell 1990).

Because of development on non-Federal lands, lynx habitat would largely remain under all alternatives as isolated islands with little opportunity for dispersal of individuals between local populations. Alternative 6 provides the greatest opportunity to improve lynx habitat from current conditions because the restoration strategy would be tested and refined under an adaptive management approach that would validate response of prey populations and lynx to various management techniques. Alternative 4, with similar outcomes after 100 years, may be too aggressive in the early decades and result in extensive and rapid modification of lynx and snowshoe hare habitat in population strongholds and little opportunity to validate management practices. Alternative 7 designates reserves in portions of important lynx range with a strategy for allowing natural fire that would result in improved habitat conditions for snowshoe hare and lynx. Alternative 3 is predicted to provide better conditions than alternatives other than 6 and 7, but only slight improvements over current conditions. Alternatives 1, 2, and 5 would result in further declines in lynx habitat resulting from continued fire suppression under Alternatives 1 and 2 and aggressive commodity production under Alternative 5.

Lynx habitat would remain as isolated patches under Alternative 7, but habitat within the patches should improve, resulting in larger within-patch sub-populations and increased dispersal to other habitats. Alternative 6 would restore habitat above current levels through management that would create more snowshoe hare habitat, and allow monitoring to assure objectives are attained. Alternatives 1, 2, 4, and 5 would result in a reduction of habitat from current conditions in the initial decades of implementation, which may create a bottleneck for lynx populations from which they may not be able to recover. In the short term (30 years), isolation of existing habitat patches would increase under management and result in limited opportunity for interactions between sub-populations. Opportunity for recolonization, once habitats are restored, would be limited.

Table 4.19. Mean likelihood scores of viability outcomes for carnivores and ungulates for evaluation of ICBEMP management alternatives. Likelihood scores for each period or alternative sum to 100 points. High scores indicate high likelihood of an outcome. Means are calculated from the individual likelihood scores of panelists.

				Period / Alternative[4]								
Group[1]	Species Name	Area[2]	Outcome[3]	H	C	A1	A2	A3	A4	A5	A6	A7
CAR	American marten	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	50	4	2	4	4	4	2	4	20
			3	50	22	10	16	14	50	6	50	60
			4	0	42	36	40	38	46	36	46	20
			5	0	32	52	40	44	0	56	0	0
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	50	4	0	2	2	2	0	2	4
			3	50	22	8	8	8	12	8	13	21
			4	0	42	29	39	34	33	27	34	34
			5	0	32	63	51	56	53	65	51	41
		UCRB BLM/FS[5]	1	24	0	0	0	0	0	0	0	0
			2	42	12	2	6	6	20	12	20	40
			3	34	34	17	28	28	60	35	60	50
			4	0	26	41	40	40	20	27	20	10
			5	0	28	40	26	26	0	26	0	0
		UCRB CumEff[5]	1	24	0	0	0	0	0	0	0	0
			2	42	4	0	2	2	2	2	4	6
			3	34	16	16	18	18	21	13	25	44
			4	0	30	27	31	31	39	31	37	37
			5	0	50	57	49	49	38	54	34	13
CAR	Fisher	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	12	0	0	0	0	0	0	0	1
			3	22	2	1	4	5	28	1	28	12
			4	34	14	13	47	47	24	9	24	25
			5	32	84	86	49	48	48	90	48	62
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	12	0	0	0	0	0	0	0	0
			3	22	2	0	2	0	2	0	2	12
			4	34	10	8	10	6	10	6	10	20
			5	32	88	92	88	94	88	94	88	68
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	0	0	0	0
			3	40	40	20	70	70	70	40	70	20
			4	20	40	50	20	20	20	40	20	50
			5	0	20	30	10	10	10	20	10	30
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	40	0	0	0	0	0	0	0	0
			3	40	2	3	0	0	1	0	5	16
			4	20	14	22	34	23	31	23	34	43
			5	0	84	75	66	77	68	77	61	41
CAR	Gray wolf	EEIS BLM/FS	1	40	12	8	12	10	12	8	14	20
			2	50	42	42	46	42	47	42	46	48
			3	10	46	46	42	46	41	46	40	32
			4	0	0	4	0	2	0	4	0	0
			5	0	0	0	0	0	0	0	0	0

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		EEIS CumEff	1	36	0	0	0	0	0	0	0	0
			2	48	4	2	4	2	6	2	8	10
			3	16	8	8	8	8	6	8	6	14
			4	0	42	43	42	43	44	43	41	44
			5	0	46	47	46	47	44	47	45	32
		UCRB BLM/FS	1	68	22	18	22	18	22	16	24	36
			2	30	43	44	43	44	43	44	42	39
			3	2	35	34	35	34	35	36	34	25
			4	0	0	4	0	4	0	4	0	0
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff	1	68	4	0	0	0	0	0	0	0
			2	30	4	0	1	0	1	0	2	3
			3	2	4	8	9	10	9	8	9	16
			4	0	42	46	46	44	46	46	46	50
			5	0	46	46	44	46	44	46	43	31
CAR	Grizzly bear	EEIS BLM/FS	1	44	0	0	0	0	0	0	0	0
			2	44	0	0	0	0	0	0	0	4
			3	10	12	4	5	5	4	4	4	11
			4	2	40	47	47	47	50	47	50	49
			5	0	48	49	48	48	46	49	46	36
		EEIS CumEff	1	46	0	0	0	0	0	0	0	0
			2	46	0	0	0	0	0	0	0	2
			3	8	2	0	0	0	0	0	0	4
			4	0	8	6	8	8	8	8	9	19
			5	0	90	94	92	92	92	92	91	75
		UCRB BLM/FS	1	62	8	4	4	4	5	4	8	10
			2	32	4	6	8	6	6	6	6	4
			3	6	10	6	6	6	6	6	4	16
			4	0	38	44	42	44	43	44	42	40
			5	0	40	40	40	40	40	40	40	30
		UCRB CumEff	1	58	0	0	0	0	0	0	0	2
			2	32	0	0	0	0	0	0	4	4
			3	10	4	2	3	3	4	2	6	6
			4	0	8	10	9	9	8	10	4	8
			5	0	88	88	88	88	88	88	86	80
CAR	Lynx	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	4	0	0	2	2
			3	80	12	0	0	8	0	3	18	17
			4	10	40	42	42	42	42	22	44	41
			5	0	48	58	58	46	58	75	36	40
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	0	4	4	3	4	0	0	0
			4	10	42	15	15	22	15	10	42	42
			5	0	58	81	81	75	81	90	58	58
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	4	0	0	4	2
			3	80	12	0	0	8	0	3	25	20
			4	10	40	50	50	42	42	22	40	44
			5	0	48	50	50	46	58	75	31	34

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	0	4	4	3	4	0	0	0
			4	10	40	15	15	22	15	10	42	42
			5	0	60	81	81	75	81	90	58	58
CAR	Wolverine	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	12	4	5	5	4	4	4	11
			4	10	40	47	47	47	50	47	50	54
			5	0	48	49	48	48	46	49	46	35
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	36	0	0	0	0	0	0	0	19
			4	30	38	0	5	0	6	0	6	21
			5	34	62	100	95	100	94	100	94	60
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	4	7	8	8	9	8	9	9
			3	80	20	13	10	11	12	10	16	21
			4	10	44	41	42	44	43	42	44	50
			5	0	32	39	40	37	36	40	31	20
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	36	0	0	0	0	0	0	0	26
			4	30	4	2	10	2	8	2	10	23
			5	34	96	98	90	98	92	98	90	51
UNG	California bighorn sheep	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	40	40	50	40	40	50	40	10
			5	0	60	60	50	60	60	50	60	90
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	30	30	40	30	30	40	30	10
			5	0	70	70	60	70	70	60	70	90
		UCRB BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	40	40	50	40	40	50	40	10
			5	0	60	60	50	60	60	50	60	90
		UCRB CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	50	0	0	0	0	0	0	0	0
			4	50	30	30	40	30	30	40	30	10
			5	0	70	70	60	70	70	60	70	90

Table 4.19 (continued)

Group[1]	Species Name	Area[2]	Outcome[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
UNG	Pronghorn	EEIS BLM/FS[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	50	25	25	60	70	25	70	25
			4	10	50	60	60	40	30	60	30	60
			5	0	0	15	15	0	0	15	0	15
		EEIS CumEff[5]	1	0	0	0	0	0	0	0	0	0
			2	10	0	0	0	0	0	0	0	0
			3	80	20	10	10	10	10	10	10	10
			4	10	50	50	50	50	50	50	50	50
			5	0	30	40	40	40	40	40	40	40
		UCRB BLM/FS[5]	1	10	0	0	0	0	0	0	0	0
			2	80	60	20	20	65	70	20	70	20
			3	10	30	60	60	35	30	60	30	60
			4	0	10	20	20	0	0	20	0	20
			5	0	0	0	0	0	0	0	0	0
		UCRB CumEff[5]	1	10	0	0	0	0	0	0	0	0
			2	80	0	0	0	0	0	0	0	0
			3	10	60	10	10	10	10	10	10	10
			4	0	40	50	50	50	50	50	50	50
			5	0	0	40	40	40	40	40	40	40
UNG	Woodland caribou	EEIS BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	46
			5	50	100	100	100	100	100	100	100	54
		EEIS CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	42
			5	50	100	100	100	100	100	100	100	58
		UCRB BLM/FS	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	46
			5	50	100	100	100	100	100	100	100	54
		UCRB CumEff	1	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0
			4	50	0	0	0	0	0	0	0	42
			5	50	100	100	100	100	100	100	100	58

[1]Group: CAR - carnivore; UNG - ungulate.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Outcome: 1 - contiguous; 2 - gaps; 3 - patchy; 4 - isolated; 5 - scarce. See text for complete explanation.

[4]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[5]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

Table 4.20. Mean viability outcomes for habitat and populations of mammalian carnivores and ungulates for evaluation of ICBEMP management alternatives. Mean outcomes were calculated as the weighted mean of average likelihood scores in each outcome.

			Period / Alternative[3]								
Group[1]	Species Name	Area[2]	H	C	A1	A2	A3	A4	A5	A6	A7
CAR	American marten	EEIS BLM/FS[4]	2.5	4.0	4.4	4.2	4.2	3.4[5]	4.5	3.4[5]	3.0[5]
		EEIS CumEff[4]	2.5	4.0	4.6[5]	4.4	4.4	4.4	4.6[5]	4.3	4.1
		UCRB BLM/FS[4]	2.1	3.7	4.2	3.9	3.9	3.0[5]	3.7	3.0[5]	2.7[5]
		UCRB CumEff[4]	2.1	4.3	4.4	4.3	4.3	4.1	4.4	4.0	3.6[5]
CAR	Fisher	EEIS BLM/FS[4]	3.9	4.8	4.9	4.5	4.4	4.2[5]	4.9	4.2[5]	4.5
		EEIS CumEff[4]	3.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.6
		UCRB BLM/FS[4]	2.8	3.8	4.1	3.4	3.4	3.4	3.8	3.4	4.1
		UCRB CumEff[4]	2.8	4.8	4.7	4.7	4.8	4.7	4.8	4.6	4.3[5]
CAR	Gray wolf	EEIS BLM/FS	1.7	2.3	2.5	2.3	2.4	2.3	2.5	2.3	2.1
		EEIS CumEff	1.8	4.3	4.4	4.3	4.4	4.3	4.4	4.2	4.0
		UCRB BLM/FS	1.3	2.1	2.2	2.1	2.2	2.1	2.3	2.1	1.9
		UCRB CumEff	1.3	4.2	4.4	4.3	4.4	4.3	4.4	4.3	4.1
CAR	Grizzly bear	EEIS BLM/FS	1.7	4.4	4.5	4.4	4.4	4.4	4.5	4.4	4.2
		EEIS CumEff	1.6	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.7
		UCRB BLM/FS	1.4	4.0	4.1	4.1	4.1	4.1	4.1	4.0	3.8
		UCRB CumEff	1.5	4.8	4.9	4.9	4.9	4.8	4.9	4.7	4.6
CAR	Lynx	EEIS BLM/FS[4]	3.0	4.4	4.6	4.6	4.3	4.6	4.7	4.1	4.2
		EEIS CumEff[4]	3.0	4.6	4.8	4.8	4.7	4.8	4.9	4.6	4.6
		UCRB BLM/FS[4]	3.0	4.4	4.5	4.5	4.3	4.6	4.7	4.0	4.1
		UCRB CumEff[4]	3.0	4.6	4.8	4.8	4.7	4.8	4.9	4.6	4.6
CAR	Wolverine	EEIS BLM/FS[4]	3.0	4.4	4.5	4.4	4.4	4.4	4.5	4.4	4.2
		EEIS CumEff[4]	4.0	4.6	5.0	5.0	5.0	4.9	5.0	4.9	4.4
		UCRB BLM/FS[4]	3.0	4.0	4.1	4.1	4.1	4.1	4.1	4.0	3.8
		UCRB CumEff[4]	4.0	5.0	5.0	4.9	5.0	4.9	5.0	4.9	4.3[5]
UNG	California bighorn sheep	EEIS BLM/FS[4]									
		EEIS CumEff[4]	3.5	4.7	4.7	4.6	4.7	4.7	4.6	4.7	4.9
		UCRB BLM/FS[4]	3.5	4.6	4.6	4.5	4.6	4.6	4.5	4.6	4.9
		UCRB CumEff[4]	3.5	4.7	4.7	4.6	4.7	4.7	4.6	4.7	4.9
UNG	Pronghorn	EEIS BLM/FS[4]	3.0	3.5	3.9	3.9	3.4	3.3	3.9	3.3	3.9
		EEIS CumEff[4]	3.0	4.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3
		UCRB BLM/FS[4]	2.0	2.5	3.0[5]	3.0[5]	2.4	2.3	3.0[5]	2.3	3.0[5]
		UCRB CumEff[4]	2.0	3.4							
UNG	Woodland caribou	EEIS BLM/FS	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5
		EEIS CumEff	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.6
		UCRB BLM/FS	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5
		UCRB CumEff	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.6

[1]Group: CAR - carnivore; UNG - ungulate.

[2]Area: EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[3]Period / Alternative: H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

[4]Species for which panelists' scores were adjusted by Science Team. Scores were adjusted when considered to reflect a misinterpretation or incomplete understanding of the management alternatives or their outcomes, or the species ecology.

[5]Mean outcome for alternative departs from current outcome by greater than or equal to 0.5 units. Outcomes reported in table were rounded to 0.1 units; but, differences were calculated to 0.01 units. Hence, departure calculated from the table many be misleading.

Wolverine. Wolverines were historically widespread, but present in low densities in the assessment area. They were classified as predators and considered "vermin" or pests throughout much of their range until the 1960s (Banci 1994, Hornocker and Hash 1981). Copeland and Harris (1994) describe wolverines as nomadic in nature using a variety of habitats. Their preliminary data identify subalpine cirque habitats as important during reproduction. Wolverines are scavengers and depend on other large predators and natural mortality (winter kill, disease) for carrion. Refugia or large reserves that are capable of providing source populations combined with additional habitat suitable to support dispersing animals, may provide the best strategy for wolverine conservation (Banci 1994, Hornocker and Hash 1981).

Alternative 7 is predicted to provide the best wolverine habitat by establishing reserves with limited roads and human activity and requiring all existing unroaded areas greater than 1,000 acres to remain unroaded. These reserves have the potential to provide source populations from which individuals can disperse to other areas as habitat becomes available. The remaining alternatives would all provide outcomes similar to current conditions; habitat would remain isolated with little opportunity for female dispersal. Road management would be similar among Alternatives 2, 3, 4, 5, and 6, with overall open road densities predicted to remain stable or to decline, but with some currently unroaded areas proposed for roading. Alternative 1 would provide for continued increases in open road densities and loss of some current unroaded areas.

Gray wolf. Gray wolves use a wide variety of habitats (Fritts 1992, Fritts and others 1994, Gunson 1991, Martin and others 1995, Mech 1993, USDI 1987). Availability of prey (primarily large ungulates) and protection from direct mortality are considered important for wolf conservation and recovery (Fritts and others 1994, USDI 1987). Gray wolves were listed as endangered under the ESA in 1973. A recovery plan for the Northern Rocky Mountains (northwest Montana, central Idaho, and the greater Yellowstone area) was approved in 1987 (USDI 1987).

Habitat conditions for gray wolves were predicted to be similar for all alternatives. Wolf habitat under Alternatives 1, 3, and 5 is projected to decline slightly. Alternatives 2, 4, and 6 are projected to result in little change in habitat from current conditions. A slight increase in habitat was predicted under Alternative 7 as a result of retention of large unroaded areas and establishment of reserves. Because gray wolves are habitat generalists, all alternatives would provide adequate vegetation conditions, including habitat for prey populations. Cumulative effects from actions on other lands were predicted to be significant as a result of very high road densities, including high-volume interstate highways, and residential development in large river valleys which may be barriers to wolf movements.

Grizzly bear. Grizzly bears were listed as threatened under the ESA in 1975 and a recovery plan was approved in 1982 and revised in 1993 (USDI 1993). Six recovery zones were established for grizzly bears (USDI 1993). Three of the recovery zones, the Bitterroots, Selkirks, and Cabinet-Yaak, are completely within the assessment area and the remaining three, the Northern Continental Divide, Yellowstone, and North Cascades are partially within the area. Threats to grizzly bear persistence are more related to human activities in grizzly bear habitat than changes in vegetation composition and structure.

Alternative 7 is the only alternative predicted to improve conditions for grizzly bears on Federal lands. Establishment of reserves, retention of large unroaded areas, and management of natural disturbances within the reserves would provide the security habitat needed by bears and maintain desired foods, such as *Vaccinium* sp. Alternatives 1 through 6 would maintain or slightly improve on current conditions based on the existing recovery plan. Increased protection for riparian habitat in Alternatives 2, 3, 4, and 6 would benefit spring habitat conditions for bears. Except for Alternative 7, cumulative effects on lands other than federally administered are predicted to negatively influence grizzly bear populations. Human developments are predicted to expand in major river valleys, resulting in barriers to movement between bear populations.

Ungulates

Introduction—Twelve species of ungulates (including the feral horse) were identified and considered in the assessment. Three of these, woodland caribou, California bighorn sheep, and pronghorn, were selected for detailed analysis. Two species, woodland caribou and California bighorn sheep, are listed under the ESA or are listed as sensitive, and have suspected declines in population. Pronghorn were selected because of habitat declines from historic conditions and because habitat is predicted to continue to decline under one or more of the alternatives.

Methods—Outcomes projected by the expert panel were adjusted for pronghorn by the Science Team for similar reasons as with carnivores. Consultation with an additional species expert provided additional insight into historic, current, and projected outcomes for pronghorn. Outcomes for California bighorn sheep were adjusted to reflect disease as a part of cumulative effects rather than direct habitat effects (Hunt 1980, Jessup 1980, Jessup 1982).

Results—The alternatives would have very mixed effects on the ungulate species that were evaluated. Woodland caribou habitat on federally administered lands in the planning area would decline similarly under Alternatives 1 through 6 (tables 4.19 and 4.20). Habitat conditions would remain nearly unchanged, or improve very slightly, from current conditions under Alternative 7. Conversely, habitat for California bighorn sheep would be poorer under Alternative 7. Habitat for California bighorn sheep under Alternatives 1 through 6 would change little from current conditions. Habitat for pronghorn within the planning area would improve slightly from current conditions under Alternatives 3, 4, and 6. Pronghorn habitat would decline similarly under Alternative 1, 2, 5, and 7.

Outcomes for California bighorn sheep and woodland caribou were the same for both the EEIS and UCRB EIS areas. Outcomes for pronghorn were higher in the UCRB EIS area, but the alternatives were projected to have similar effects relative to the current condition.

Discussion—

Woodland caribou. Historically, the range of woodland caribou in the assessment area was limited to northwestern Montana and Idaho south to the Salmon River (USDI 1994). Current range in the assessment area is limited to approximately 2,200 square miles in the Selkirk Mountains in northeastern Washington and northern Idaho. Woodland caribou were listed as endangered under the ESA in 1983. A recovery plan was approved in 1985 and revised in 1994 (USDI 1994). Woodland caribou habitat varies seasonally, but appears to be associated with mature and late-seral conifer forests during early winter, spring (including calving), and fall. During late winter, high elevation, open-canopied vegetation containing high lichen densities is important (USDI 1994). Vegetation management, including timber harvest, has resulted in improved habitat for deer and elk. The increases in these ungulate populations has also resulted in predator (especially cougar) population increases in the range of woodland caribou. Predation has been identified as a potential problem in woodland caribou recovery (USDI 1994). Because existing late-seral habitat is limited, large fires have the potential to reduce the existing range of woodland caribou as do insects, disease, and timber harvesting activities (USDI 1994).

The woodland caribou recovery area is within a reserve that would be established under Alternative 7. Although a reserve area, this alternative would allow for restoration activities to protect short-term habitats necessary for threatened or endangered species such as caribou. Also control of large fires that could reduce habitat or restrict movement of woodland caribou may be necessary. Restoration of late-seral forests in Alternatives 3, 4, and 6 would improve woodland caribou habitat, but because the range and population are so small and isolated, extirpation is predicted without continued augmentation of the herd.

California bighorn sheep. Historically, California bighorn sheep were restricted to arid

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canyons within the assessment area. Although patchily distributed (Outcomes 3 and 4), these populations were connected by movement of sheep across open habitats between canyons. Currently, encroachment of juniper and increased densities of sagebrush have reduced the amount of open areas, restricted sheep movement, and reduced the amount of habitat within canyons, thereby, resulting in isolated and smaller populations. Many of the existing populations have been reintroduced. Diseases transmitted by domestic livestock, primarily sheep, contribute to cumulative effects to California bighorn sheep that reduce population size and distribution.

Reintroductions and augmentation would be required to maintain populations under all alternatives. Restoration of native ranges using prescribed burning would improve habitat conditions by reducing the amount of juniper and the density of sagebrush, but the difference between alternatives is slight. It is also estimated that the spread of exotic vegetation would continue in all alternatives, but at a slower rate in Alternatives 4 and 6. Because of disease problems associated with domestic livestock, especially domestic sheep, cumulative effects on California bighorn sheep populations will remain high under all alternatives.

Pronghorn. Pronghorn populations in the assessment area have declined from historic levels during early human settlement. Construction of fences (impassable by pronghorn), roads, railroads, and the conversion of native ranges to agricultural crops have created barriers to pronghorn movement between ranges and have resulted in restricted use of available habitats. However, conditions were improved beginning in the 1950s when fences were modified on Federal lands to promote movement of pronghorn. Encroachment of woody vegetation, increases in the density of sagebrush and associated decline in native herbaceous vegetation, and increases in livestock grazing have contributed to declines in habitat on Federal lands.

Alternatives 1, 2, 5, and 7 would result in continued decline in pronghorn habitat as a result of continuation of current livestock grazing levels. Reserves would not be located in pronghorn range. Alternatives 3, 4, and 6 would promote active restoration of rangelands by prescribing higher levels of burning to reduce sagebrush and juniper densities and to promote increased forb growth. This would improve the quality and distribution of pronghorn habitat to near historic levels. Cumulative effects of highways, railroads, agricultural lands, and fences on non-Federal lands will continue to fragment landscapes and restrict movements of pronghorn.

Summary Effects by Alternative

Species Outcomes

Weighted mean outcomes for all plant and vertebrate species assessed in this study are displayed by alternative and planning area in figure 4.42. These summarized results are a reflection of the pattern of outcomes seen within most of the individual species groups reported above. Habitat for nearly all species was more favorable under historic conditions than currently. Further declines in habitat are projected under Alternatives 1 and 5, but overall mean outcomes would change little from current projections under the other alternatives. Alternatives 4 and 6 appear to be most favorable in overall mean outcome, but distinctions among Alternatives 2, 3, 4, 6, and 7 are difficult to detect in the overall means shown here.

Differences among the alternatives are more obvious in figure 4.43, which displays the number of species that fell into each outcome class by time period (historic, current, and future under each of the seven alternatives) and by planning area. One view of these differences would be to look at species that fall into Outcomes 1, 2, and 3 as contrasted to those that fall into Outcomes 4 and 5. The break between Outcomes 3 and 4 is important as Outcome 4 indicates conditions under which populations are largely isolated. On that basis, Alternative 1 is projected to clearly support the fewest species at the level of Outcomes 1, 2,

and 3, and Alternatives 4, 6, and 7 is projected to support the most species. Alternatives 2, 3, and 5 are intermediate. A comparison of the alternatives to current conditions reflects a conservative view of our ability to restore ecosystems that have been heavily modified from historic conditions. Even Alternatives 4, 6, and 7 which would have the most positive results, are projected to result in only moderate improvements over current conditions, especially in the UCRB planning area. Alternatives 1 and 5 are projected to result in declines from current. Compared on the basis of number of species that fall in Outcomes 1 and 2, none of the alternatives would allow habitat and populations to return to historic conditions.

Distinctions between the alternatives are further clarified in figure 4.44 which shows the number of species under each alternative and planning area that were projected to change > 0.5 in weighted mean outcome. There are few species for which habitat is projected to improve under Alternatives 1 and 2. A large number of species are projected to experience habitat decreases under Alternative 1. Under Alternative 5, habitat decreases are projected for more species than are habitat increases. Alternatives 3 and 7 display approximately equal numbers of increases and decreases, while only Alternatives 4 and 6 clearly show more species for which habitat is expected to increase than species for which decreases are expected.

Figure 4.42 Plants and Vertebrates

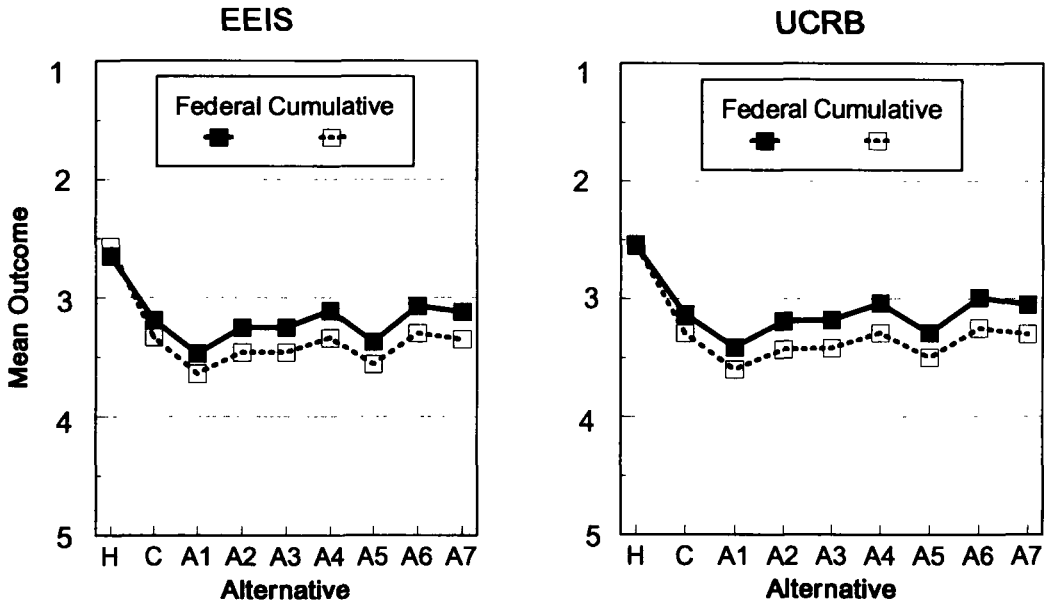


Figure 4.42. Mean outcome scores averaged over 141 (EEIS) and 132 (UCRB) species of plants and vertebrates in the planning areas for historic, current, and future scenarios under seven preliminary draft EIS alternatives. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.43 Plants and Vertebrates

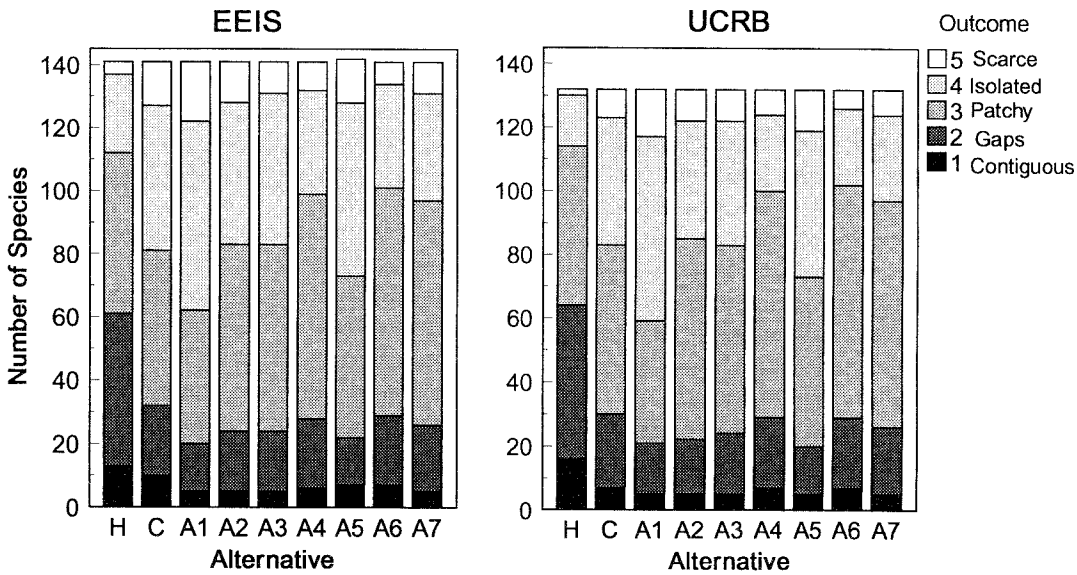


Figure 4.43. Frequency distribution of mean habitat outcome scores for 141 (EEIS) and 132 (UCRB) species of plants and vertebrates on Federal lands in the planning areas for historic, current, and future conditions under seven preliminary draft EIS alternatives. See "Methods for Assessing Species and Habitat Outcomes" for full definition of each outcome score and for ranges of weighted mean outcome values used to define each outcome score.

Figure 4.44 Plants and Vertebrates
Change from Current to Future

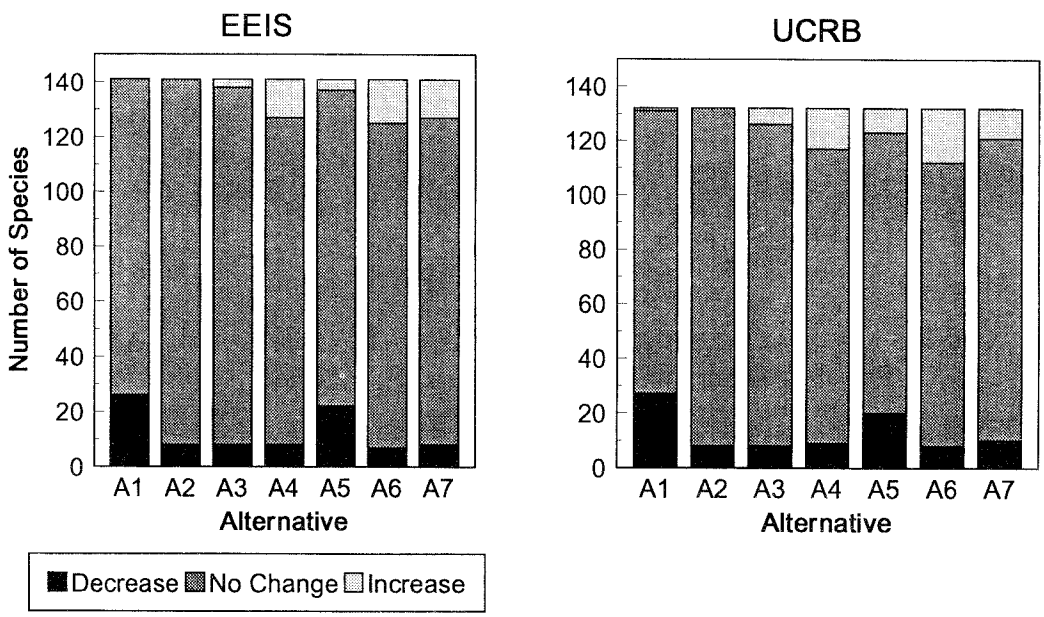


Figure 4.44. Departure of habitat outcomes on Federal lands from current conditions under each alternative for 141 (EEIS) and 132 (UCRB) species of plants and vertebrates on Federal lands in the planning areas. Departure is estimated as a change of weighted mean outcome of 0.5 units or greater.

One important distinction among the alternatives is the number of species for which some likelihood of extirpation (Outcome 5) is projected. Figure 4.45 shows the number of species, by alternative and planning area, for which there were mean likelihoods of 10 points, 20 points, and 50 points attributed to Outcome 5 in the Federal habitat analysis. Three different levels of likelihood were used for this analysis because there is no single, critical threshold of concern, particularly when all taxa are combined in a single analysis. At all three levels of likelihood a similar pattern among alternatives emerges. The overall likelihood of extirpations has increased from historic to current conditions and is projected to continue increasing under Alternatives 1 and 5. Alternatives 4 and 6 are projected to result in small decreases in the likelihood of extirpation. Alternatives 2, 3 and 7 show intermediate results, although the effects of Alternative 7 are closer to those of Alternatives 4 and 6 than are those of Alternatives 2 and 3. None of the alternatives is projected to result in a return to the relatively low likelihoods of extirpation that were predicted for historic conditions.

Similarity of Alternatives

We used the weighted mean habitat outcomes for all plant and vertebrate species that were assessed to calculate average similarity among the time periods and alternatives (current conditions, historic conditions, projected future conditions under each of the seven alternatives). For this analysis, we computed matrices of Pearson correlation coefficients for habitat on Federal land on the two planning areas (table 4.21) and then used these matrices to compute a hierarchical cluster

Figure 4.45 Outcome 5

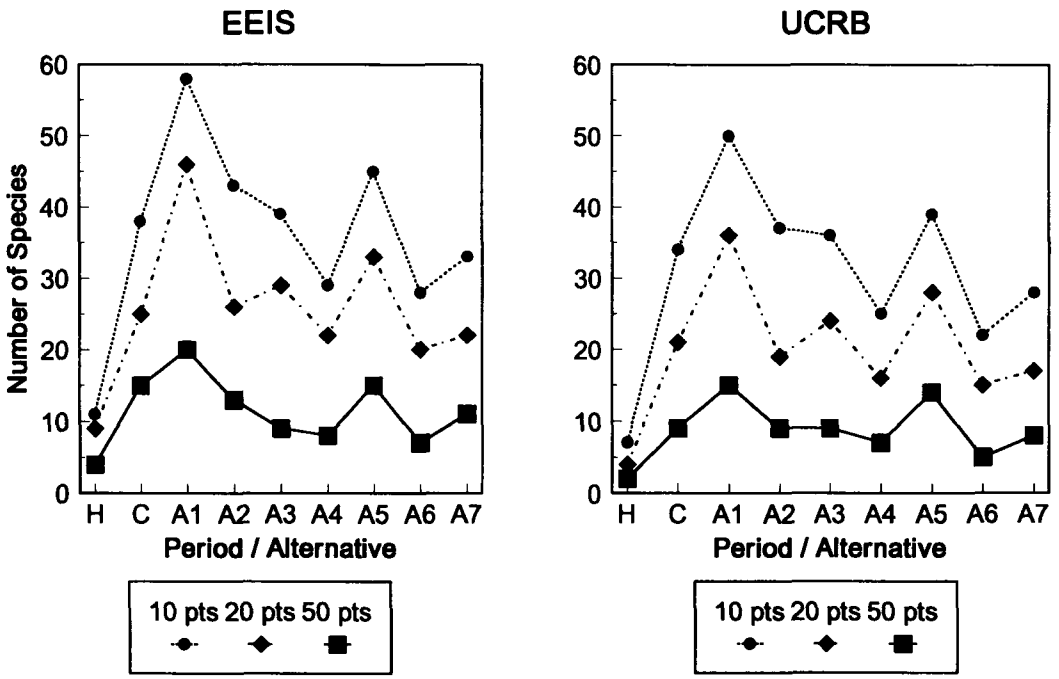


Figure 4.45. Numbers of species with likelihoods of 10, 20, and 50 points in Outcome 5 (habitat scarce, patchy and isolated with high risk of local population extirpation) under historic and current periods and under each preliminary draft EIS alternative in the EEIS and UCRB planning areas.

Table 4.21. Similarity matrix (Pearson correlation) based upon weighted mean outcomes for all species (plants and vertebrates) in the EEIS and UCRB planning areas.

Alternative	H	C	A1	A2	A3	A4	A5	A6
EEIS								
C	.7425							
A1	.5867	.8515						
A2	.6399	.8710	.9551					
A3	.6523	.8518	.9514	.9775				
A4	.6883	.8270	.9008	.9518	.9670			
A5	.6138	.8286	.9670	.9476	.9737	.9485		
A6	.7132	.8381	.8995	.9513	.9639	.9956	.9413	
A7	.6651	.8329	.9006	.9613	.9512	.9695	.9195	.9692
UCRB								
C	.6885							
A1	.5292	.8392						
A2	.5573	.8593	.9532					
A3	.5664	.8343	.9517	.9711				
A4	.6029	.8112	.9067	.9463	.9668			
A5	.5390	.8098	.9636	.9440	.9753	.9579		
A6	.6283	.8217	.9077	.9463	.9631	.9944	.9507	
A7	.5758	.8122	.9082	.9560	.9490	.9678	.9327	.9674

analysis using unweighted pair-group agglomeration. We then constructed dendrograms to display relationships among the scenarios (fig. 4.46).

This analysis shows similar clustering of alternatives in both planning areas. Alternatives 4, 6, and 7 formed one cluster, indicating that species were judged to respond more similarly to these three alternatives than to other alternatives (fig. 4.46). Alternatives 2 and 3 were closely correlated and clustered together, and Alternatives 1 and 5 were clustered. Further clustering of the alternative outcomes in the UCRB EIS first grouped Alternatives 1, 2, 3, and 5, then that cluster with Alternatives 4, 6, and 7. Current and historic outcomes were then linked at successively lower similarity levels. The pattern was slightly different in the EEIS area where Alternatives 2, 3, 4, 6, and 7 clustered next, then that cluster was joined with the cluster of Alternatives 1 and 5. The current and historic outcomes were then linked to the combination of all alternatives. It is further apparent from table 4.21 that historic outcomes are clearly dissimilar to current outcomes and from the alternatives.

Figure 4.46 Dendrograms

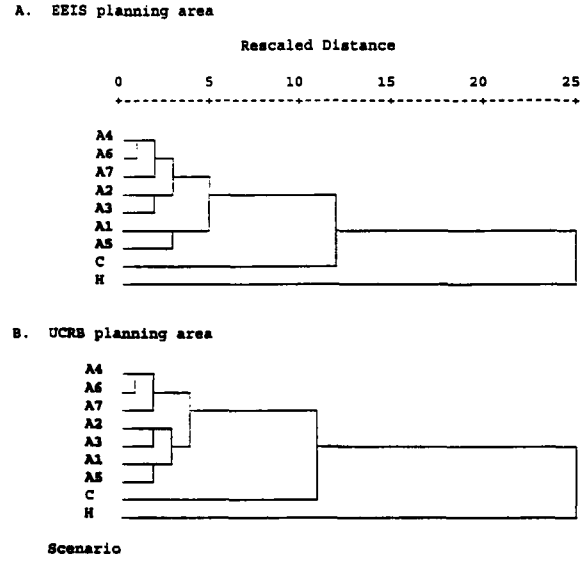


Figure 4.46. Dendrograms of similarity among time periods and alternatives, based upon mean outcomes for 141 (EEIS) and 132 (UCRB) species of vascular plants and vertebrates in the planning areas. Similarity was calculated from a matrix of Pearson correlation coefficients among all scenarios (see table 4.21). In these figures, vertical lines connect sets of more closely similar scenarios.

The linkage of Alternatives 4, 6, and 7 in both planning areas reflects the patterns of species response described in the results of this assessment. In most cases, species had higher average outcome scores in these alternatives than in others, reflecting likely improvement in distribution and abundance of habitat that is projected to occur under these alternatives. Similarly, the linkage of Alternatives 1 and 5 reflects correlated responses of species to reduced riparian buffer provisions of these alternatives and to effects of increased commodity production on species' habitat.

Uncertainty

The measure of uncertainty used throughout this report is the standard deviation of the frequency distribution of likelihoods among the outcome classes for each species. This measure incorporates variation among individual panelists as well as the spread of likelihood points among outcomes by each panelist. We calculated the standard deviation for each species and scenario and then averaged these values among species for each scenario. Uncertainty, assessed by this measure, ranged from about 0.48 outcome units in the historic scenario in both planning areas to about 0.58 in most alternatives in the UCRB EIS area (fig. 4.47). Uncertainty was lowest in the historic and current scenarios in both areas. Uncertainty varied among classes of organisms in our assessment and was highest for amphibians, lowest for plants, and intermediate for birds, mammals, and reptiles in the two planning areas (figs. 4.48 and 4.49).

Figure 4.47 Plants and Vertebrates

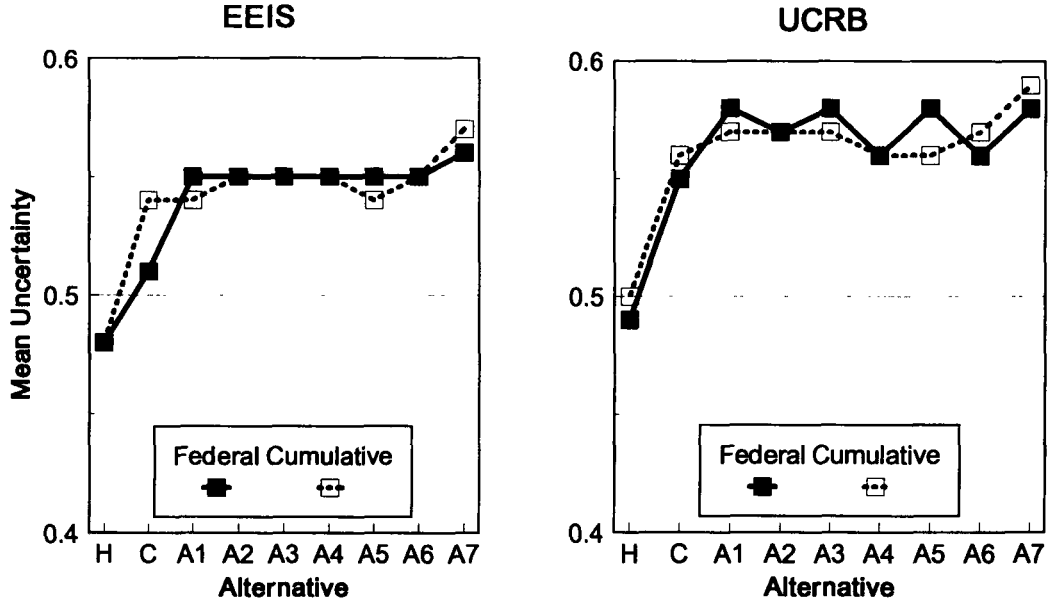


Figure 4.47. Mean indices of uncertainty associated with weighted mean outcomes for 141 (EEIS) and 132 (UCRB) species of vascular plants and vertebrates in the planning areas for historic, current, and future conditions under each alternative. Solid lines indicate scores for habitat conditions on Federal lands only; dashed lines indicate projected populations from cumulative effects analysis. These lines are for illustrative purposes only; they do not imply trends between alternatives.

Figure 4.48 EEIS Federal Lands

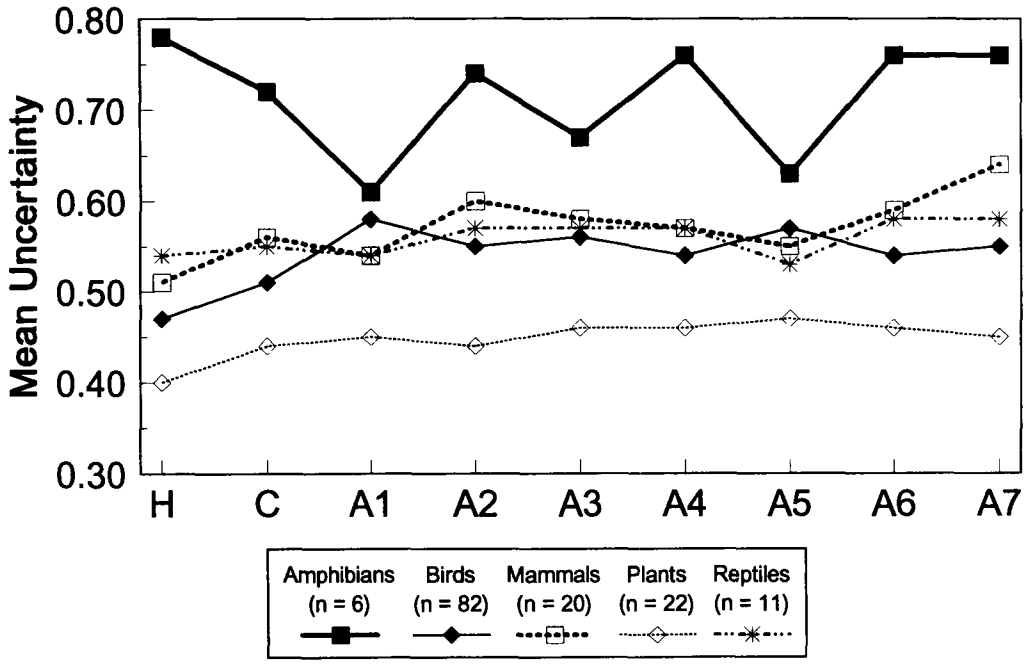


Figure 4.48. Variation in mean uncertainty in weighted mean outcomes for amphibians, reptiles, birds, mammals, and vascular plants in the EEIS planning area.

Figure 4.49 UCRB Federal Lands

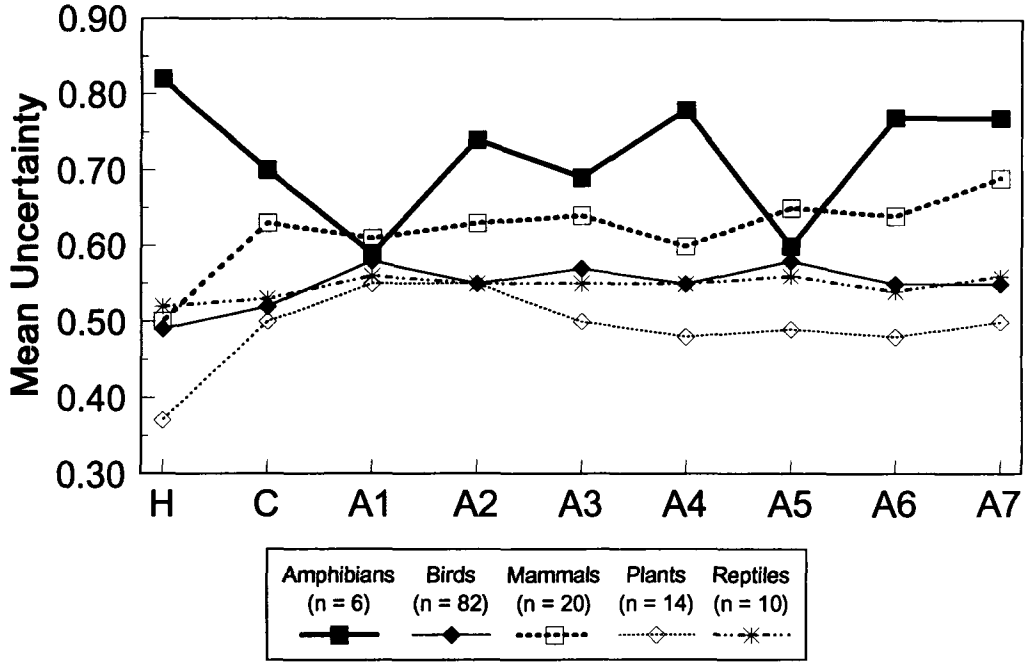


Figure 4.49. Variation in mean uncertainty in weighted mean habitat outcome scores for amphibians, reptiles, birds, mammals, and vascular plants in the UCRB planning area.

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Appendix 4-A

List of panel participants

Vascular Plants Panel

Lisa Croft, panel leader
Stephen Shelly, USDA Forest Service
Wayne Owen, USDA Forest Service

Amphibians and Reptiles Panel

Randy Hickenbottom, panel leader
Cay Ogden, scribe, USDI Fish and Wildlife Service
Charlotte Corkran, Portland, Oregon
Kenneth Kardong, Washington State University
Charles Peterson, Idaho State University

Waterbirds and Shorebirds Panel

John Lehmkuhl, panel leader
Cay Ogden, scribe, USDI Fish and Wildlife Service
Gary Ivey, USDI Fish and Wildlife Service
Matt Monda, Washington Department of Fish and Game
John Ratti, University of Idaho
Daniel Svingen, Nez Perce National Forest
Nils Warnock, University of Nevada, Reno

Raptors and Gamebirds Panel

Richard Holthausen, panel leader
Brad Thurber, scribe
Edward Garton, University of Idaho
John Marzluff, Sustainable Ecosystems Institute
Kerry Reese, University of Idaho
Richard Reynolds, USDA Forest Service
John Squires, USDA Forest Service

Cavity Nesting Birds Panel

Martin Raphael, panel leader
Paul Brewster, scribe, USDA Forest Service
Evelyn Bull, USDA Forest Service
James Sedgwick, National Biological Survey
Rita Dixon, University of Idaho
David Marshall, Portland, Oregon

Passerines and Other Birds Panel

Martin Raphael, panel leader
Katrina Martin, scribe, USDI Fish and Wildlife Service
Victoria Saab, USDA Forest Service
Christine Paige, Missoula, Montana
David Dobkin, High Desert Museum
Helen Ulmschneider, USDI Bureau of Land Management
Diane Evans, USDA Forest Service

Bats and Other Small Mammals Panel

Randy Hickenbottom, panel leader
Brad Thurber, scribe
James Hallett, Washington State University
Donna Howell, U.S. Department of the Army
Chris Maser, Corvallis, Oregon
Mark Perkins, Salt Lake City, Utah
Elizabeth Pierson, Berkeley, California

Carnivores and Ungulates Panel

Robert Naney, panel leader
Chris Loggers, scribe, USDA Forest Service
John Cook, National Council for Air and Stream Improvement
Thomas Hobbes, Colorado Division of Wildlife
Fred Lindsey, University of Wyoming
Paul Paquet, University of Alberta
Leonard Ruggiero, USDA Forest Service

Appendix 4-B

Vascular plant species considered for evaluation of management alternatives in the Interior Columbia River Basin assessment area.

Distribution & Scientific Name	Evaluation[1]
Locally Endemic:	
Abronia ammophila	Fine
Agrostis rossiae	Fine
Allium aaseae	Fine
Allium dictuon	Fine
Amsinckia carinata	Fine
Arabis suffrutescens var. *horizontalis*	Fine
Artemisia ludoviciana ssp. *estesii*	Fine
Astragalus applegatei	No
Astragalus atratus var. *inseptus*	Fine
Astragalus collinus var. *laurentii*	Fine
Astragalus columbianus	Fine
Astragalus diaphanus var. *diurnis*	Fine
Astragalus howellii	Fine
Astragalus sinuatus	Fine
Astragalus tyghensis	Fine
Astragalus vexilliflexus var. *nubilus*	Fine
Balsamorhiza rosea	Fine
Botrychium pumicola	Fine
Calochortus longebarbatus var. *peckii*	Yes
Calochortus macrocarpus var. *maculosus*	Fine
Camissonia pygmaea	Fine
Castilleja christii	Fine
Castilleja cryptantha	Fine
Castilleja pilosa var. *steenensis*	Fine
Castilleja rubida	Fine
Chrysothamnus parryi ssp. *montanus*	Fine
Claytonia umbellata	Fine
Cymopterus davisii	Fine
Delphinium viridescens	Fine
Draba trichocarpa	Fine
Erigeron basalticus	Fine
Erigeron lackschewitzii	Fine
Eriogonum chrysops	Fine
Eriogonum crosbyae	Fine
Eriogonum meledonum	Fine
Erythronium grandiflorum var. *nudipetalum*	Fine
Hackelia venusta	Fine
Haplopappus insecticruris	Fine
Ivesia rhypara var. *shellyi*	Fine
Lathyrus grimesii	Fine
Leptodactylon glabrum	Fine
Leptodactylon pungens ssp. *hazeliae*	Fine
Lesquerella carinata var. *languida*	Fine
Lesquerella humilis	Fine
Lomatium erythrocarpum	Fine
Lomatium greenmanii	Fine

Distribution & Scientific Name	Evaluation[1]
Lomatium sp. *nov. ("ochocoensis")*	Fine
Lomatium tuberosum	Fine
Luina serpentina	Fine
Lupinus cusickii	Fine
Mimulus hymenophyllus	Fine
Mimulus patulus	Fine
Mirabilis macfarlanei	Yes
Oenothera psammophila	Fine
Oxytropis campestris var. *wanapum*	Fine
Parnassia kotzebuei var. *pumila*	Fine
Penstemon idahoensis	Fine
Penstemon peckii	Fine
Perideridia erythrorhiza	Fine
Petrophytum cinerascens	Fine
Phacelia lenta	Fine
Phlox idahonis	Fine
Physaria didymocarpa var. *lyrata*	Fine
Primula alcalina	Fine
Ranunculus reconditus	Fine
Rubus bartonianus	Fine
Rubus nigerrimus	Fine
Saxifraga bryophora var. *tobiasiae*	Fine
Senecio ertterae	Fine
Sidalcea oregana var. *calva*	Fine
Silene seelyi	Fine
Sisyrinchium sarmentosum	Fine
Stephanomeria malheurensis	Yes
Tauschia hooveri	Fine
Thelypodium howellii ssp. *spectabilis*	Fine
Thelypodium repandum	Fine
Tofieldia glutinosa ssp. *absona*	Fine
Trifolium leibergii	Fine
Trifolium thompsonii	Yes
Regionally Endemic:	
Arabis falcifructa	Fine
Arabis fecunda	Fine
Artemisia campestris var. *wormskioldii*	Fine
Aster jessicae	No
Aster mollis	Fine
Astragalus anserinus	Fine
Astragalus cusickii var. sterilis	Fine
Astragalus diaphanus var. *diaphanus*	Fine
Astragalus mulfordiae	Yes
Astragalus oniciformis	Yes
Astragalus paysonii	Yes
Astragalus peckii	Fine
Astragalus scaphoides	Fine
Astragalus solitarius	Yes
Astragalus tegetarioides	Fine
Astragalus yoder-williamsii	Yes
Calochortus longebarbatus var. *longebarbatus*	Yes
Calochortus nitidus	Yes

Distribution & Scientific Name	Evaluation[1]
Carex parryana ssp. *idahoa*	Fine
Castilleja chlorotica	Yes
Chaenactis cusickii	Fine
Collomia mazama	Yes
Cymopterus douglassii	Fine
Descurainia torulosa	Fine
Douglasia idahoensis	Fine
Erigeron latus	Fine
Erigeron salmonensis	Fine
Eriogonum cusickii	Fine
Eriogonum lewisii	Fine
Eriogonum prociduum	Fine
Grindelia howellii	Yes
Hackelia cronquistii	Yes
Haplopappus liatriformis	Yes
Haplopappus radiatus	Fine
Iliamna longisepala	Fine
Ivesia rhypara var. *rhypara*	Fine
Lepidium davisii	Fine
Lepidium papilliferum	Fine
Lesquerella carinata var. *carinata*	No
Lesquerella paysonii	Fine
Lesquerella pulchella	No
Limnanthes floccosa var. *bellingeriana*	Fine
Lomatium suksdorfii	Yes
Lupinus biddlei	No
Mentzelia mollis	Fine
Mentzelia packardiae	Fine
Mimulus clivicola	Fine
Mimulus evanescens	Fine
Mimulus jungermannioides	Fine
Mimulus pygmaeus	Yes
Mimulus washingtonensis	Yes
Oryzopsis hendersonii	Fine
Oryzopsis wallensis	Fine
Oxytropis campestris var. *columbiana*	Fine
Papaver pygmaeum	Fine
Penstemon barrettiae	Fine
Penstemon compactus	Fine
Penstemon glaucinus	Yes
Penstemon lemhiensis	Yes
Physaria integrifolia var. *monticola*	Fine
Pleuropogon oregonus	Fine
Polemonium pectinatum	Yes
Potentilla cottamii	Fine
Silene spaldingii	Yes
Thelypodium eucosmum	Fine
Trifolium douglasii	Fine
Trifolium owyheense	Fine

Distribution & Scientific Name	Evaluation[1]
Scattered Distribution:	
Antennaria arcuata	Fine
Botrychium ascendens	Yes
Botrychium crenulatum	Yes
Botrychium paradoxum	Yes
Botrychium pedunculosum	Fine
Collomia renacta	Fine
Cymopterus nivalis	Fine
Cypripedium fasciculatum	Yes
Howellia aquatilis	Yes
Meconella oregana	Fine
Oryzopsis contracta	No
Phacelia inconspicua	Fine
Phacelia minutissima	Fine
Rorippa columbiae	Fine
Disjunct Distribution:	
Astragalus pulsiferae var. *suksdorfii*	Fine
Musineon lineare	Fine
Sullivantia hapemanii var. *hapemanii*	Fine
Peripheral to Columbia Basin:	
Carex lenticularis var. *dolia*	Fine

[1]Evaluation: "Yes" - alternative outcomes evaluated; "Fine" - recommended for fine-scale analysis by Forests or BLM units; "No" - no panel analysis done, and not recommended for fine-scale analysis.

Appendix 4-C

Vertebrate species occurring in the Interior Columbia River Basin assessment area, with designation for evaluation of management alternatives.

Common name	Scientific name	Evaluation[1]
Amphibians:		
Cascade torrent salamander	*Rhyacotriton cascadae*	no
Cope's giant salamander	*Dicamptodon copei*	no
Idaho giant salamander	*Dicamptodon aterrimus*	Fine
Long-toed salamander	*Ambystoma macrodactylum*	no
Northwestern salamander	*Ambystoma gracile*	no
Tiger salamander	*Ambystoma tigrinum*	no
Coeur d'Alene salamander	*Plethodon idahoensis*	HER
Dunn's salamander	*Plethodon dunni*	no
Ensatina	*Ensatina eschscholtzii*	no
Larch mountain salamander	*Plethodon larselli*	Fine
Oregon slender salamander	*Batrachoseps wrighti*	no
Rough-skin newt	*Taricha granulosa*	no
Western toad	*Bufo boreas*	HER
Woodhouse's toad	*Bufo woodhousii*	HER
Pacific chorus frog	*Pseudacris regilla*	no
Western chorus frog	*Pseudacris triseriata*	no
Tailed frog	*Ascaphus truei*	HER
Great basin spadefoot	*Spea intermontana*	no
Bullfrog	*Rana catesbeiana*	no
Cascades frog	*Rana cascadae*	no
Foothill yellow-legged frog	*Rana boylei*	no
Green frog	*Rana clamitans*	no
Northern leopard frog	*Rana pipiens*	HER
Red-legged frog	*Rana aurora*	no
Spotted frog species B	*Rana pretiosa* sp. B	HER
Spotted frog species A	*Rana pretiosa* sp. A	HER
Wood frog	*Rana sylvatica*	Fine
Birds:		
Common loon	*Gavia immer*	WAT
Pacific loon	*Gavia pacifica*	no
Red-throated loon	*Gavia stellata*	no
Yellow-billed loon	*Gavia adamsii*	no
Clark's grebe	*Aechmophorus clarkii*	WAT
Eared grebe	*Podiceps nigricollis*	no
Horned grebe	*Podiceps auritus*	no
Pied-billed grebe	*Podilymbus podiceps*	no
Red-necked grebe	*Podiceps grisegena*	WAT
Western grebe	*Aechmophorus occidentalis*	WAT
American white pelican	*Pelecanus erythrorhynchos*	WAT
Double-crested cormorant	*Phalacrocorax auritus*	no
American bittern	*Botaurus lentiginosus*	WAT
Black-crowned night heron	*Nycticorax nycticorax*	WAT
Cattle egret	*Bubulcus ibis*	no
Great blue heron	*Ardea herodias*	WAT
Great egret	*Casmerodius albus*	WAT

Common name	Scientific name	Evaluation[1]
Green heron	*Butorides virescens*	no
Snowy egret	*Egretta thula*	WAT
Western least bittern	*Ixobrychus exilis hesperis*	WAT
White-faced ibis	*Plegadis chihi*	WAT
American black duck	*Anas rubripes*	no
American wigeon	*Anas americana*	WAT
Barrow's goldeneye	*Bucephala islandica*	WAT
Black scoter	*Melanitta nigra*	no
Blue-winged teal	*Anas discors*	WAT
Brant	*Branta bernicla*	no
Bufflehead	*Bucephala albeola*	WAT
Canada goose	*Branta canadensis*	no
Canvasback	*Aythya valisineria*	WAT
Cinnamon teal	*Anas cyanoptera*	WAT
Common goldeneye	*Bucephala clangula*	WAT
Common merganser	*Mergus merganser*	WAT
Eurasian wigeon	*Anas penelope*	no
Gadwall	*Anas strepera*	WAT
Greater scaup	*Aythya marila*	no
Greater white-fronted goose	*Anser albifrons*	no
Green-winged teal	*Anas crecca*	WAT
Harlequin duck	*Histrionicus histrionicus*	WAT
Hooded merganser	*Lophodytes cucullatus*	WAT
Lesser scaup	*Aythya affinis*	WAT
Mallard	*Anas platyrhynchos*	WAT
Mute swan	*Cygnus olor*	no
Northern pintail	*Anas acuta*	WAT
Northern shoveler	*Anas clypeata*	WAT
Oldsquaw	*Clangula hyemalis*	no
Red-breasted merganser	*Mergus serrator*	no
Redhead	*Aythya americana*	WAT
Ring-necked duck	*Aythya collaris*	WAT
Ross' goose	*Chen rossii*	no
Ruddy duck	*Oxyura jamaicensis*	WAT
Snow goose	*Chen caerulescens*	no
Surf scoter	*Melanitta perspicillata*	no
Trumpeter swan	*Cygnus buccinator*	WAT
Tundra swan	*Cygnus columbianus*	no
White-winged scoter	*Melanitta fusca*	no
Wood duck	*Aix sponsa*	WAT
Turkey vulture	*Cathartes aura*	no
Bald eagle	*Haliaeetus leucocephalus*	RGB
Black-shouldered kite	*Elanus caeruleus*	no
Cooper's hawk	*Accipiter cooperii*	RGB
Ferruginous hawk	*Buteo regalis*	RGB
Golden eagle	*Aquila chrysaetos*	no
Northern goshawk	*Accipiter gentilis*	RGB
Northern harrier	*Circus cyaneus*	no
Osprey	*Pandion haliaetus*	no
Red-shouldered hawk	*Buteo lineatus*	no
Red-tailed hawk	*Buteo jamaicensis*	no
Rough-legged hawk	*Buteo lagopus*	no
Sharp-shinned hawk	*Accipiter striatus*	no
Swainson's hawk	*Buteo swainsoni*	RGB

Common name	Scientific name	Evaluation[1]
American kestrel	*Falco sparverius*	no
Gyrfalcon	*Falco rusticolus*	no
Merlin	*Falco columbarius*	RGB
Peregrine falcon	*Falco peregrinus*	no
Prairie falcon	*Falco mexicanus*	no
Blue grouse	*Dendragapus obscurus*	RGB
California quail	*Callipepla californica*	no
Chukar	*Alectoris chukar*	no
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	RGB
Gambel's quail	*Callipepla gambelii*	no
Gray partridge	*Perdix perdix*	no
Mountain quail	*Oreortyx pictus*	RGB
Northern bobwhite	*Colinus virginianus*	no
Ring-necked pheasant	*Phasianus colchicus*	no
Ruffed grouse	*Bonasa umbellus*	no
Sage grouse	*Centrocercus urophasianus*	RGB
Scaled quail	*Callipepla squamata*	no
Spruce grouse	*Dendragapus canadensis*	no
White-tailed ptarmigan	*Lagopus leucurus*	no
Wild turkey	*Meleagris gallopavo*	no
American coot	*Fulica americana*	no
Sora	*Porzana carolina*	WAT
Virginia rail	*Rallus limicola*	WAT
Yellow rail	*Coturnicops noveboracensis*	Fine
Greater sandhill crane	*Grus canadensis tabida*	WAT
Whooping crane	*Grus americana*	no
American golden-plover	*Pluvialis dominica*	no
Black-bellied plover	*Pluvialis squatarola*	WAT
Killdeer	*Charadrius vociferus*	no
Mountain plover	*Charadrius montanus*	no
Semipalmated plover	*Charadrius semipalmatus*	WAT
Western snowy plover	*Charadrius alexandrinus nivosus*	WAT
American avocet	*Recurvirostra americana*	WAT
Black-necked stilt	*Himantopus mexicanus*	WAT
Baird's sandpiper	*Calidris bairdii*	WAT
Common snipe	*Gallinago gallinago*	WAT
Dunlin	*Calidris alpina*	WAT
Greater yellowlegs	*Tringa melanoleuca*	WAT
Hudsonian godwit	*Limosa haemastica*	no
Least sandpiper	*Calidris minutilla*	WAT
Lesser yellowlegs	*Tringa flavipes*	WAT
Long-billed curlew	*Numenius americanus*	WAT
Long-billed dowitcher	*Limnodromus scolopaceus*	WAT
Marbled godwit	*Limosa fedoa*	WAT
Pectoral sandpiper	*Calidris melanotos*	WAT
Red knot	*Calidris canutus*	no
Red phalarope	*Phalaropus fulicaria*	no
Red-necked phalarope	*Phalaropus lobatus*	WAT
Sanderling	*Calidris alba*	WAT
Semipalmated sandpiper	*Calidris pusilla*	WAT
Short-billed dowitcher	*Limnodromus griseus*	no
Solitary sandpiper	*Tringa solitaria*	no
Spotted sandpiper	*Actitis macularia*	WAT
Stilt sandpiper	*Calidris himantopus*	no

Common name	Scientific name	Evaluation[1]
Upland sandpiper	*Bartramia longicauda*	WAT
Western sandpiper	*Calidris mauri*	WAT
Whimbrel	*Numenius phaeopus*	no
White-rumped sandpiper	*Calidris fuscicollis*	no
Willet	*Catoptrophorus semipalmatus*	WAT
Wilson's phalarope	*Phalaropus tricolor*	WAT
Black tern	*Chlidonias niger*	WAT
Bonaparte's gull	*Larus philadelphia*	no
California gull	*Larus californicus*	WAT
Caspian tern	*Sterna caspia*	Fine
Common tern	*Sterna hirundo*	no
Forster's tern	*Sterna forsteri*	WAT
Franklin's gull	*Larus pipixcan*	no
Glaucous gull	*Larus hyperboreus*	no
Glaucous-winged gull	*Larus glaucescens*	no
Herring gull	*Larus argentatus*	no
Long-tailed jaeger	*Stercorarius longicaudus*	no
Mew gull	*Larus canus*	no
Parasitic jeager	*Stercorarius parasiticus*	no
Ring-billed gull	*Larus delawarensis*	WAT
Sabine's gull	*Xema sabini*	no
Thayer's gull	*Larus thayeri*	no
Ancient murrelet	*Synthliboramphus antiquus*	no
Marbled murrelet	*Brachyramphus marmoratus*	no
Band-tailed pigeon	*Columba fasciata*	RGB
Mourning dove	*Zenaida macroura*	no
Rock dove	*Columba livia*	no
Black-billed cuckoo	*Coccyzus erythropthalmus*	no
Yellow-billed cuckoo	*Coccyzus americanus*	PAS
Common barn owl	*Tyto alba*	no
Barred owl	*Strix varia*	RGB
Boreal owl	*Aegolius funereus*	RGB
Burrowing owl	*Athene cunicularia*	RGB
Flammulated owl	*Otus flammeolus*	RGB
Great gray owl	*Strix nebulosa*	RGB
Great horned owl	*Bubo virginianus*	no
Long-eared owl	*Asio otus*	RGB
Northern hawk owl	*Surnia ulula*	no
Northern pygmy-owl	*Glaucidium gnoma*	RGB
Northern saw-whet owl	*Aegolius acadicus*	RGB
Northern spotted owl	*Strix occidentalis caurina*	RGB
Short-eared owl	*Asio flammeus*	no
Snowy owl	*Nyctea scandiaca*	no
Western screech owl	*Otus kennicottii*	RGB
Common nighthawk	*Chordeiles minor*	PAS
Common poorwill	*Phalaenoptilus nuttallii*	no
Whip-poor-will	*Caprimulgus vociferus*	no
Black swift	*Cypseloides niger*	no
Vaux's swift	*Chaetura vauxi*	CAV
White-throated swift	*Aeronautes saxatalis*	no
Anna's hummingbird	*Calypte anna*	no
Black-chinned hummingbird	*Archilochus alexandri*	PAS
Broad-tailed hummingbird	*Selasphorus platycercus*	PAS
Calliope hummingbird	*Stellula calliope*	no

Common name	Scientific name	Evaluation[1]
Costa's hummingbird	*Calypte costae*	no
Rufous hummingbird	*Selasphorus rufus*	PAS
Belted kingfisher	*Ceryle alcyon*	no
Black-backed woodpecker	*Picoides arcticus*	CAV
Downy woodpecker	*Picoides pubescens*	CAV
Hairy woodpecker	*Picoides villosus*	CAV
Lewis' woodpecker	*Melanerpes lewis*	CAV
Northern flicker	*Colaptes auratus*	no
Pileated woodpecker	*Dryocopus pileatus*	CAV
Red-breasted sapsucker	*Sphyrapicus ruber*	Fine
Red-headed woodpecker	*Melanerpes erythrocephalus*	no
Red-naped sapsucker	*Sphyrapicus nuchalis*	CAV
Three-toed woodpecker	*Picoides tridactylus*	CAV
White-headed woodpecker	*Picoides albolarvatus*	CAV
Williamson's sapsucker	*Sphyrapicus thyroideus*	CAV
Yellow-bellied sapsucker	*Sphyrapicus varius*	Fine
Acorn woodpecker	*Melanerpes formicivorus*	no
Alder flycatcher	*Empidonax alnorum*	no
Ash-throated flycatcher	*Myiarchus cinerascens*	PAS
Cordilleran flycatcher	*Empidonax occidentalis*	no
Dusky flycatcher	*Empidonax oberholseri*	no
Eastern kingbird	*Tyrannus tyrannus*	no
Gray flycatcher	*Empidonax wrightii*	no
Hammond's flycatcher	*Empidonax hammondii*	PAS
Least flycatcher	*Empidonax minimus*	Fine
Olive-sided flycatcher	*Contopus borealis*	PAS
Say's phoebe	*Sayornis saya*	no
Scissor-tailed flycatcher	*Tyrannus forficatus*	no
Western kingbird	*Tyrannus verticalis*	no
Western wood-pewee	*Contopus sordidulus*	no
Willow flycatcher	*Empidonax traillii*	PAS
Horned lark	*Eremophila alpestris*	PAS
Bank swallow	*Riparia riparia*	no
Barn swallow	*Hirundo rustica*	no
Cliff swallow	*Hirundo pyrrhonota*	no
Northern rough-winged swallow	*Stelgidopteryx serripennis*	no
Purple martin	*Progne subis*	no
Tree swallow	*Tachycineta bicolor*	no
Violet-green swallow	*Tachycineta thalassina*	no
American crow	*Corvus brachyrhynchos*	no
Black-billed magpie	*Pica pica*	no
Blue jay	*Cyanocitta cristata*	no
Clark's nutcracker	*Nucifraga columbiana*	no
Common raven	*Corvus corax*	no
Gray jay	*Perisoreus canadensis*	no
Pinyon jay	*Gymnorhinus cyanocephalus*	no
Scrub jay	*Aphelocoma coerulescens*	no
Steller's jay	*Cyanocitta stelleri*	no
Black-capped chickadee	*Parus atricapillus*	no
Boreal chickadee	*Parus hudsonicus*	no
Chestnut-backed chickadee	*Parus rufescens*	CAV
Mountain chickadee	*Parus gambeli*	no
Plain titmouse	*Parus inornatus*	no
Bushtit	*Psaltriparus minimus*	PAS

Common name	Scientific name	Evaluation[1]
Pygmy nuthatch	*Sitta pygmaea*	CAV
Red-breasted nuthatch	*Sitta canadensis*	no
White-breasted nuthatch	*Sitta carolinensis*	CAV
Brown creeper	*Certhia americana*	no
Bewick's wren	*Thryomanes bewickii*	no
Canyon wren	*Catherpes mexicanus*	no
House wren	*Troglodytes aedon*	no
Marsh wren	*Cistothorus palustris*	no
Rock wren	*Salpinctes obsoletus*	no
Winter wren	*Troglodytes troglodytes*	PAS
American dipper	*Cinclus mexicanus*	no
American robin	*Turdus migratorius*	no
Blue-gray gnatcatcher	*Polioptila caerulea*	no
Golden-crowned kinglet	*Regulus satrapa*	no
Hermit thrush	*Catharus guttatus*	no
Mountain bluebird	*Sialia currucoides*	no
Ruby-crowned kinglet	*Regulus calendula*	no
Swainson's thrush	*Catharus ustulatus*	no
Townsend's solitaire	*Myadestes townsendi*	no
Varied thrush	*Ixoreus naevius*	no
Veery	*Catharus fuscescens*	PAS
Western bluebird	*Sialia mexicana*	PAS
Wrentit	*Chamaea fasciata*	no
Brown thrasher	*Toxostoma rufum*	no
Gray catbird	*Dumetella carolinensis*	no
Northern mockingbird	*Mimus polyglottos*	no
Sage thrasher	*Oreoscoptes montanus*	PAS
American pipit	*Anthus rubescens*	no
Sprague's pipit	*Anthus spragueii*	no
Bohemian waxwing	*Bombycilla garrulus*	no
Cedar waxwing	*Bombycilla cedrorum*	no
Phainopepla	*Phainopepla nitens*	no
Loggerhead shrike	*Lanius ludovicianus*	PAS
Northern shrike	*Lanius excubitor*	no
European starling	*Sturnus vulgaris*	no
Red-eyed vireo	*Vireo olivaceus*	PAS
Solitary vireo	*Vireo solitarius*	no
Warbling vireo	*Vireo gilvus*	no
American redstart	*Setophaga ruticilla*	no
American tree sparrow	*Spizella arborea*	no
Baird's sparrow	*Ammodramus bairdii*	no
Bay-breasted warbler	*Dendroica castanea*	no
Black-and-white warbler	*Mniotilta varia*	no
Black-headed grosbeak	*Pheucticus melanocephalus*	no
Black-throated blue warbler	*Dendroica caerulescens*	no
Black-throated gray warbler	*Dendroica nigrescens*	no
Black-throated sparrow	*Amphispiza bilineata*	Fine
Blackburnian warbler	*Dendroica fusca*	no
Blackpoll warbler	*Dendroica striata*	no
Blue grosbeak	*Guiraca caerulea*	no
Bobolink	*Dolichonyx oryzivorus*	PAS
Brewer's blackbird	*Euphagus cyanocephalus*	PAS
Brewer's sparrow	*Spizella breweri*	PAS
Brown-headed cowbird	*Molothrus ater*	no

Common name	Scientific name	Evaluation[1]
California towhee	*Pipilo crissalis*	no
Chestnut-collared longspur	*Calcarius ornatus*	no
Chestnut-sided warbler	*Dendroica pensylvanica*	no
Chipping sparrow	*Spizella passerina*	PAS
Clay-colored sparrow	*Spizella pallida*	Fine
Common grackle	*Quiscalus quiscula*	no
Common yellowthroat	*Geothlypis trichas*	no
Dark-eyed junco	*Junco hyemalis*	no
Dickcissel	*Spiza americana*	no
Fox sparrow	*Passerella iliaca*	no
Golden-crowned sparrow	*Zonotrichia atricapilla*	no
Grasshopper sparrow	*Ammodramus savannarum*	PAS
Great-tailed grackle	*Quiscalus mexicanus*	no
Green-tailed towhee	*Pipilo chlorurus*	PAS
Harris' sparrow	*Zonotrichia querula*	no
Hermit warbler	*Dendroica occidentalis*	Fine
House sparrow	*Passer domesticus*	no
Indigo bunting	*Passerina cyanea*	no
Lapland longspur	*Calcarius lapponicus*	no
Lark bunting	*Calamospiza melanocorys*	no
Lark sparrow	*Chondestes grammacus*	PAS
Lazuli bunting	*Passerina amoena*	PAS
Le conte's sparrow	*Ammodramus leconteii*	no
Lincoln's sparrow	*Melospiza lincolnii*	no
Macgillivray's warbler	*Oporornis tolmiei*	no
Magnolia warbler	*Dendroica magnolia*	no
Mccown's longspur	*Calcarius mccownii*	no
Nashville warbler	*Vermivora ruficapilla*	no
Northern oriole	*Icterus galbula*	no
Northern parula	*Parula americana*	no
Northern waterthrush	*Seiurus noveboracensis*	no
Orange-crowned warbler	*Vermivora celata*	no
Ovenbird	*Seiurus aurocapillus*	no
Painted redstart	*Myioborus pictus*	no
Palm warbler	*Dendroica palmarum*	no
Red-winged blackbird	*Agelaius phoeniceus*	PAS
Rose-breasted grosbeak	*Pheucticus ludovicianus*	no
Rufous-sided towhee	*Pipilo erythrophthalmus*	PAS
Rusty blackbird	*Euphagus carolinus*	no
Sage sparrow	*Amphispiza belli*	PAS
Scarlet tanager	*Piranga olivacea*	no
Scott's oriole	*Icterus parisorum*	no
Snow bunting	*Plectrophenax nivalis*	no
Song sparrow	*Melospiza melodia*	no
Summer tanager	*Piranga rubra*	no
Swamp sparrow	*Melospiza georgiana*	no
Tennessee warbler	*Vermivora peregrina*	no
Townsend's warbler	*Dendroica townsendi*	no
Tricolored blackbird	*Agelaius tricolor*	Fine
Vesper sparrow	*Pooecetes gramineus*	PAS
Virginia's warbler	*Vermivora virginiae*	no
Western meadowlark	*Sturnella neglecta*	PAS
Western tanager	*Piranga ludoviciana*	PAS
White-crowned sparrow	*Zonotrichia leucophrys*	no

Common name	Scientific name	Evaluation[1]
White-throated sparrow	*Zonotrichia albicollis*	no
Wilson's warbler	*Wilsonia pusilla*	PAS
Yellow warbler	*Dendroica petechia*	PAS
Yellow-breasted chat	*Icteria virens*	PAS
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	no
Yellow-rumped warbler	*Dendroica coronata*	no
American goldfinch	*Carduelis tristis*	no
Black rosy finch	*Leucosticte atrata*	PAS
Cassin's finch	*Carpodacus cassinii*	no
Common redpoll	*Carduelis flammea*	no
Evening grosbeak	*Coccothraustes vespertinus*	no
Gray-crowned rosy finch	*Leucosticte tephrocotis*	no
Hoary redpoll	*Carduelis hornemanni*	no
House finch	*Carpodacus mexicanus*	no
Lesser goldfinch	*Carduelis psaltria*	no
Pine grosbeak	*Pinicola enucleator*	no
Pine siskin	*Carduelis pinus*	no
Purple finch	*Carpodacus purpureus*	no
Red crossbill	*Loxia curvirostra*	no
White-winged crossbill	*Loxia leucoptera*	PAS
Savannah sparrow	*Passerculus sandwichensis*	no
Mammals:		
Virginia opossum	*Didelphis virginiana*	no
Masked shrew	*Sorex cinereus*	no
Merriam's shrew	*Sorex merriami*	no
Montane shrew	*Sorex monticolus*	no
Preble's shrew	*Sorex preblei*	Fine
Pygmy shrew	*Sorex hoyi*	Fine
Trowbridge's shrew	*Sorex trowbridgii*	no
Vagrant shrew	*Sorex vagrans*	no
Water shrew	*Sorex palustris*	Fine
Broad-footed mole	*Scapanus latimanus*	Fine
Coast mole	*Scapanus orarius*	no
Shrew-mole	*Neurotrichus gibbsii*	Fine
Big brown bat	*Eptesicus fuscus*	no
California myotis	*Myotis californicus*	no
Fringed myotis	*Myotis thysanodes*	BSM
Hoary bat	*Lasiurus cinereus*	BSM
Little brown myotis	*Myotis lucifugus*	no
Long-eared myotis	*Myotis evotis*	BSM
Long-legged myotis	*Myotis volans*	BSM
Pale western big-eared bat	*Plecotus townsendii pallescens*	BSM
Pallid bat	*Antrozous pallidus*	no
Silver-haired bat	*Lasionycteris noctivagans*	BSM
Spotted bat	*Euderma maculatum*	BSM
Western pipistrelle	*Pipistrellus hesperus*	no
Western small-footed myotis	*Myotis ciliolabrum*	BSM
Yuma myotis	*Myotis yumanensis*	Fine
Brazilian free-tailed bat	*Tadarida brasiliensis*	Fine
American pika	*Ochotona princeps*	no
Black-tailed jackrabbit	*Lepus californicus*	no
Eastern cottontail	*Sylvilagus floridanus*	no
Mountain cottontail	*Sylvilagus nuttallii*	no

Common name	Scientific name	Evaluation[1]
Pygmy rabbit	*Brachylagus idahoensis*	BSM
Snowshoe hare	*Lepus americanus*	no
White-tailed jackrabbit	*Lepus townsendii*	BSM
Mountain beaver	*Aplodontia rufa*	Fine
Belding's ground squirrel	*Spermophilus beldingi*	no
California ground squirrel	*Spermophilus beecheyi*	no
Cascade golden-mantled ground squirrel	*Spermophilus saturatus*	no
Cliff chipmunk	*Tamias dorsalis*	Fine
Columbian ground squirrel	*Spermophilus columbianus*	no
Douglas' squirrel	*Tamiasciurus douglasii*	no
Eastern fox squirrel	*Sciurus niger*	no
Golden-mantled ground squirrel	*Spermophilus lateralis*	no
Hoary marmot	*Marmota caligata*	no
Idaho ground squirrel	*Spermophilus brunneus*	Fine
Least chipmunk	*Tamias minimus*	no
Northern flying squirrel	*Glaucomys sabrinus*	BSM
Red squirrel	*Tamiasciurus hudsonicus*	no
Red-tailed chipmunk	*Tamias ruficaudus*	no
Townsend's ground squirrel	*Spermophilus townsendii*	no
Uinta chipmunk	*Tamias umbrinus*	Fine
Uinta ground squirrel	*Spermophilus armatus*	Fine
Washington ground squirrel	*Spermophilus washingtoni*	Fine
Western gray squirrel	*Sciurus griseus*	Fine
White-tailed antelope squirrel	*Ammospermophilus leucurus*	Fine
Wyoming ground squirrel	*Spermophilus elegans nevadensis*	no
Yellow-bellied marmot	*Marmota flaviventris*	no
Yellow-pine chipmunk	*Tamias amoenus*	no
Botta's pocket gopher	*Thomomys bottae*	Fine
Brushprairie pocket gopher	*Thomomys talpoides douglasi*	Fine
Northern pocket gopher	*Thomomys talpoides*	no
Townsend's pocket gopher	*Thomomys townsendii*	no
Western pocket gopher	*Thomomys mazama*	no
White salmon pocket gopher	*Thomomys talpoides limosus*	Fine
California kangaroo rat	*Dipodomys californicus*	no
Chisel-toothed kangaroo rat	*Dipodomys microps*	no
Dark kangaroo mouse	*Microdipodops megacephalus*	no
Great basin pocket mouse	*Perognathus parvus*	no
Little pocket mouse	*Perognathus longimembris*	no
Ord's kangaroo rat	*Dipodomys ordii*	no
Beaver	*Castor canadensis*	no
Black rat	*Rattus rattus*	no
Bushy-tailed woodrat	*Neotoma cinerea*	no
Canyon mouse	*Peromyscus crinitus*	no
Columbian mouse	*Peromyscus keenii*	no
Common muskrat	*Ondatra zibethicus*	no
Creeping vole	*Microtus oregoni*	no
Deer mouse	*Peromyscus maniculatus*	no
Desert woodrat	*Neotoma lepida*	no
Dusky-footed woodrat	*Neotoma fuscipes*	Fine
Heather vole	*Phenacomys intermedius*	no
House mouse	*Mus musculus*	no
Long-tailed vole	*Microtus longicaudus*	no
Meadow vole	*Microtus pennsylvanicus*	no
Montane vole	*Microtus montanus*	no

Common name	Scientific name	Evaluation[1]
Northern bog lemming	*Synaptomys borealis*	Fine
Northern grasshopper mouse	*Onychomys leucogaster*	no
Norway rat	*Rattus norvegicus*	no
Pinyon mouse	*Peromyscus truei*	Fine
Potholes meadow vole	*Microtus pennsylvanicus kincaidi*	Fine
Sagebrush vole	*Lemmiscus curtatus*	no
Southern red-backed vole	*Clethrionomys gapperi*	no
Water vole	*Microtus richardsoni*	no
Western harvest mouse	*Reithrodontomys megalotis*	no
Western red-backed vole	*Clethrionomys californicus*	no
Pacific jumping mouse	*Zapus trinotatus*	Fine
Western jumping mouse	*Zapus princeps*	no
Common porcupine	*Erethizon dorsatum*	no
Nutria	*Myocastor coypus*	no
Common gray fox	*Urocyon cinereoargenteus*	Fine
Coyote	*Canis latrans*	no
Gray wolf	*Canis lupus*	C&U
Kit fox	*Vulpes velox*	Fine
Red fox	*Vulpes vulpes*	no
Black bear	*Ursus americanus*	no
Grizzly bear	*Ursus arctos*	C&U
Common raccoon	*Procyon lotor*	no
American badger	*Taxidea taxus*	no
American marten	*Martes americana*	C&U
Ermine	*Mustela erminea*	no
Fisher	*Martes pennanti*	C&U
Long-tailed weasel	*Mustela frenata*	no
Mink	*Mustela vison*	no
Northern river otter	*Lutra canadensis*	no
Striped skunk	*Mephitis mephitis*	no
Western spotted skunk	*Spilogale gracilis*	no
Wolverine	*Gulo gulo*	C&U
Bobcat	*Lynx rufus*	no
Lynx	*Lynx lynx*	C&U
Mountain lion	*Felis concolor*	no
Feral horse	*Equus caballus*	no
Black-tailed deer	*Odocoileus hemionus columbianus*	no
Moose	*Alces alces*	no
Mule deer	*Odocoileus hemionus*	no
Rocky mountain elk	*Cervus elaphus nelsonii*	no
White-tailed deer	*Odocoileus virginianus*	no
Woodland caribou	*Rangifer tarandus caribou*	C&U
Pronghorn	*Antilocapra americana*	C&U
American bison	*Bos bison*	no
California bighorn sheep	Ovis *canadensis californiana*	C&U
Mountain goat	*Oreamnos americanus*	no
Rocky mountain bighorn sheep	*Ovis canadensis canadensis*	no
Reptiles:		
Painted turtle	*Chrysemys picta*	HER
Western pond turtle	*Clemmys marmorata*	HER
Northern alligator lizard	*Elgaria coerulea*	no
Southern alligator lizard	*Elgaria multicarinata*	no
Desert horned lizard	*Phrynosoma platyrhinos*	HER

Common name	Scientific name	Evaluation[1]
Longnose leopard lizard	*Gambelia wislizenii*	HER
Mojave black-collared lizard	*Crotaphytus bicinctores*	HER
Sagebrush lizard	*Sceloporus graciosus graciosus*	HER
Short-horned lizard	*Phrynosoma douglassii*	HER
Side-blotched lizard	*Uta stansburiana*	no
Western fence lizard	*Sceloporus occidentalis*	no
Western skink	*Eumeces skiltonianus*	no
Plateau striped whiptail	*Cnemidophorus velox*	no
Western whiptail	*Cnemidophorus tigris*	no
Rubber boa	*Charina bottae*	HER
California mountain kingsnake	*Lampropeltis zonata*	Fine
Common garter snake	*Thamnophis sirtalis*	HER
Gopher snake	*Pituophis catenifer*	no
Ground snake	*Sonora semiannulata*	Fine
Longnose snake	*Rhinocheilus lecontei*	Fine
Night snake	*Hypsiglena torquata*	HER
Racer	*Coluber constrictor*	no
Ringneck snake	*Diadophis punctatus*	HER
Sharptail snake	*Contia tenuis*	HER
Striped whipsnake	*Masticophis taeniatus*	HER
Western terrestrial garter snake	*Thamnophis elegans*	no
Western rattlesnake	*Crotalus viridis*	no

[1]Evaluation: BSM - bat and small mammal panel; CAV - cavity nesting woodpeckers, swifts, and nuthatches; C&U - mammalian carnivore and ungulate panel; HER - amphibian and reptile panel; PAS - passerine and other birds; RGB - raptor and game bird panel; WAT - waterbird and shorebird panel; "Fine" - recommended for fine-scale analysis by Forests or BLM units; "no" - no panel analysis done, and not recommended for fine-scale analysis.

Appendix 4-D

Standard deviation of mean outcome of management alternatives for selected vascular plant and vertebrate species in the Interior Columbia River Basin assessment area. Mean outcomes were calculated as the mean of outcomes weighted by likelihood scores averaged across all panelists.

				Period / Alternative[4]								
Panel[1]	Group[2]	Species Name	Area[3]	H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Astragalus mulfordiae*	EEIS BLM/FS	0.40	0.49	0.60	0.67	0.67	0.67	0.67	0.67	0.67
			EEIS CumEff	0.40	0.67	0.60	0.67	0.67	0.67	0.75	0.67	0.67
			UCRB BLM/FS	0.40	0.46	0.60	0.67	0.67	0.67	0.67	0.67	0.67
			UCRB CumEff	0.40	0.49	0.64	0.75	0.75	0.74	0.75	0.74	0.75
PLT	PLT	*Astragalus oniciformis*	UCRB BLM/FS	0.30	0.49	0.75	0.75	0.59	0.67	0.59	0.67	0.67
			UCRB CumEff	0.30	0.49	0.59	0.59	0.67	0.67	0.67	0.67	0.67
PLT	PLT	*Astragalus paysonii*	UCRB BLM/FS	0.40	0.46	0.46	0.49	0.36	0.30	0.36	0.30	0.36
			UCRB CumEff	0.40	0.46	0.46	0.49	0.36	0.30	0.36	0.30	0.36
PLT	PLT	*Astragalus solitarius*	EEIS BLM/FS	0.40	0.46	0.46	0.46	0.46	0.40	0.46	0.40	0.46
			EEIS CumEff	0.40	0.46	0.46	0.46	0.46	0.40	0.46	0.40	0.46
PLT	PLT	*Astragalus yoder-williamsii*	UCRB BLM/FS	0.30	0.67	0.64	0.67	0.67	0.48	0.64	0.48	0.64
			UCRB CumEff	0.30	0.67	0.64	0.67	0.67	0.48	0.64	0.48	0.64
PLT	PLT	*Botrychium ascendens*	EEIS BLM/FS	0.50	0.50	0.40	0.40	0.46	0.46	0.46	0.46	0.40
			UCRB BLM/FS	0.50	0.50	0.49	0.49	0.46	0.49	0.46	0.49	0.46
			UCRB CumEff	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Botrychium crenulatum*	EEIS BLM/FS	0.50	0.50	0.83	0.67	0.67	0.75	0.75	0.75	0.67
			EEIS CumEff	0.50	0.50	0.83	0.67	0.67	0.75	0.75	0.75	0.67
			UCRB BLM/FS	0.49	0.49	0.67	0.75	0.75	0.75	0.67	0.75	0.75
			UCRB CumEff	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Botrychium paradoxum*	EEIS BLM/FS	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
			UCRB BLM/FS	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Calochortus longebartatus* var. *longebarbatus*	EEIS BLM/FS	0.40	0.46	0.50	0.48	0.48	0.49	0.50	0.49	0.48
			EEIS CumEff	0.40	0.48	0.50	0.49	0.49	0.50	0.50	0.50	0.49
PLT	PLT	*Calochortus longebarbatus* var. *peckii*	EEIS BLM/FS	0.00	0.40	0.40	0.30	0.30	0.40	0.46	0.40	0.30
			EEIS CumEff	0.00	0.44	0.40	0.30	0.30	0.40	0.46	0.40	0.30
PLT	PLT	*Calochortus nitidus*	EEIS BLM/FS	0.49	0.46	0.46	0.46	0.50	0.50	0.50	0.50	0.40
			EEIS CumEff	0.49	0.44	0.44	0.44	0.50	0.50	0.50	0.50	0.40
			UCRB BLM/FS	0.30	0.30	0.40	0.30	0.44	0.44	0.44	0.44	0.40
			UCRB CumEff	0.46	0.67	0.56	0.56	0.56	0.56	0.56	0.56	0.30
PLT	PLT	*Castilleja chlorotica*	EEIS BLM/FS	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.46
			EEIS CumEff	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.48

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Collomia mazama*	EEIS BLM/FS	0.30	0.30	0.30	0.30	0.40	0.30	0.40	0.30	0.30
			EEIS CumEff	0.30	0.30	0.30	0.30	0.40	0.30	0.40	0.30	0.30
PLT	PLT	*Cypripedium fasciculatum*	EEIS BLM/FS	0.46	0.60	0.60	0.60	0.45	0.45	0.45	0.45	0.46
			EEIS CumEff	0.46	0.70	0.70	0.70	0.66	0.66	0.66	0.66	0.66
			UCRB BLM/FS	0.46	0.64	0.67	0.67	0.36	0.30	0.36	0.30	0.40
			UCRB CumEff	0.49	0.67	0.67	0.64	0.67	0.48	0.67	0.48	0.36
PLT	PLT	*Grindelia howellii*	UCRB BLM/FS	0.00	0.50	0.49	0.44	0.40	0.46	0.40	0.46	0.46
			UCRB CumEff	0.49	0.49	0.36	0.36	0.36	0.36	0.36	0.36	0.36
PLT	PLT	*Hackelia cronquistii*	EEIS BLM/FS	0.50	0.49	0.60	0.56	0.54	0.59	0.56	0.66	0.66
			EEIS CumEff	0.50	0.46	0.46	0.46	0.46	0.49	0.46	0.48	0.49
PLT	PLT	*Haplopappus liatriformis*	UCRB BLM/FS	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
			UCRB CumEff	0.40	0.36	0.30	0.30	0.30	0.30	0.30	0.30	0.30
PLT	PLT	*Howellia aquatilis*	EEIS BLM/FS	0.40	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
			EEIS CumEff	0.49	0.80	0.80	0.80	0.78	0.78	0.78	0.78	0.78
			UCRB BLM/FS	0.30	0.48	0.51	0.51	0.51	0.51	0.51	0.51	0.48
			UCRB CumEff	0.30	0.48	0.64	0.64	0.64	0.64	0.64	0.64	0.48
PLT	PLT	*Lomatium suksdorfii*	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.49	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49
PLT	PLT	*Mimulus pygmaeus*	EEIS BLM/FS	0.30	0.40	0.40	0.36	0.40	0.36	0.40	0.36	0.40
			EEIS CumEff	0.30	0.40	0.40	0.36	0.40	0.36	0.40	0.36	0.40
PLT	PLT	*Mimulus washingtonensis* var. *washingtonensis*	EEIS BLM/FS	0.46	0.40	0.40	0.46	0.46	0.46	0.46	0.46	0.40
			EEIS CumEff	0.46	0.40	0.40	0.46	0.46	0.46	0.46	0.46	0.40
PLT	PLT	*Mirabilis macfarlanei*	EEIS BLM/FS	0.30	0.32	0.32	0.45	0.45	0.45	0.45	0.45	0.54
			EEIS CumEff	0.30	0.50	0.64	0.60	0.60	0.60	0.60	0.60	0.54
			UCRB BLM/FS	0.30	0.51	0.51	0.54	0.54	0.54	0.54	0.54	0.46
			UCRB CumEff	0.30	0.45	0.45	0.54	0.54	0.54	0.54	0.54	0.54
PLT	PLT	*Penstemon glaucinus*	EEIS BLM/FS	0.49	0.46	0.40	0.40	0.40	0.40	0.40	0.40	0.44
			EEIS CumEff	0.49	0.46	0.40	0.40	0.40	0.40	0.40	0.40	0.44
PLT	PLT	*Penstemon lemhiensis*	UCRB BLM/FS	0.46	0.64	0.64	0.64	0.40	0.30	0.40	0.30	0.49
			UCRB CumEff	0.46	0.60	0.60	0.60	0.46	0.40	0.46	0.40	0.49
PLT	PLT	*Polemonium pectinatum*	EEIS BLM/FS	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.40	0.30	0.22	0.22	0.22	0.22	0.22	0.22	0.22
PLT	PLT	*Silene spaldingii*	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.64	0.64	0.64	0.64	0.50
			EEIS CumEff	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
PLT	PLT	*Stephanomeria malheurensis*	EEIS BLM/FS	0.00	0.0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PLT	PLT	*Trifolium thompsonii*	EEIS BLM/FS	0.50	0.50	0.49	0.49	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HER	AMP	Coeur d'Alene salamander	UCRB BLM/FS	0.64	0.68	0.50	0.54	0.46	0.51	0.50	0.51	0.50
			UCRB CumEff	0.64	0.54	0.36	0.42	0.42	0.45	0.36	0.47	0.56
HER	AMP	Northern leopard frog	EEIS BLM/FS	0.69	0.77	0.45	0.67	0.49	0.74	0.48	0.74	0.78
			EEIS CumEff	0.69	0.77	0.17	0.22	0.22	0.27	0.17	0.27	0.36
			UCRB BLM/FS	0.91	0.46	0.26	0.67	0.49	0.78	0.46	0.80	0.89
			UCRB CumEff	0.91	0.42	0.17	0.22	0.22	0.22	0.17	0.22	0.36
HER	AMP	Spotted frog species A	EEIS BLM/FS	0.67	0.67	0.70	0.74	0.67	0.73	0.71	0.77	0.77
			EEIS CumEff	0.67	0.67	0.70	0.72	0.72	0.72	0.71	0.72	0.67
HER	AMP	Spotted frog species B	EEIS BLM/FS	1.08	0.67	0.70	0.67	0.67	0.67	0.58	0.67	0.53
			EEIS CumEff	1.08	0.67	0.67	0.62	0.61	0.62	0.55	0.62	0.67
			UCRB BLM/FS	0.89	0.70	0.67	0.60	0.63	0.67	0.54	0.67	0.59
			UCRB CumEff	0.89	0.70	0.58	0.63	0.65	0.63	0.49	0.63	0.67
HER	AMP	Tailed frog	EEIS BLM/FS	0.93	0.91	0.43	0.91	0.86	0.94	0.64	0.94	0.94
			EEIS CumEff	0.93	0.91	0.44	0.62	0.65	0.65	0.67	0.65	0.62
			UCRB BLM/FS	0.88	0.94	0.72	0.88	0.88	0.88	0.73	0.90	0.88
			UCRB CumEff	0.88	0.94	0.88	0.68	0.72	0.78	0.86	0.78	0.72
HER	AMP	Western toad	EEIS BLM/FS	0.70	0.73	0.80	0.61	0.58	0.64	0.80	0.64	0.71
			EEIS CumEff	0.70	0.89	0.91	0.74	0.74	0.80	0.90	0.80	0.84
			UCRB BLM/FS	0.88	0.88	0.83	0.91	0.94	0.98	0.81	0.93	0.95
			UCRB CumEff	0.88	0.92	0.98	0.84	0.86	0.84	0.81	0.82	0.95
HER	AMP	Woodhouse's toad	EEIS BLM/FS	0.59	0.58	0.59	0.81	0.74	0.85	0.59	0.81	0.80
			EEIS CumEff	0.59	0.58	0.46	0.50	0.50	0.50	0.48	0.50	0.50
			UCRB BLM/FS	0.71	0.54	0.58	0.81	0.74	0.85	0.58	0.81	0.80
			UCRB CumEff	0.71	0.54	0.46	0.48	0.48	0.19	0.46	0.19	0.50
HER	REP	Common garter snake	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.67	0.70	0.67	0.67	0.67	0.70	0.67	0.54
			UCRB CumEff	0.50	0.77	1.00	0.69	0.69	0.69	1.00	0.69	0.77
HER	REP	Desert horned lizard	EEIS BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			EEIS CumEff	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
HER	REP	Longnose leopard lizard	EEIS BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			EEIS CumEff	0.50	0.63	0.67	0.63	0.63	0.63	0.67	0.63	0.60
			UCRB BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			UCRB CumEff	0.50	0.63	0.67	0.63	0.63	0.63	0.67	0.63	0.60
HER	REP	Mojave black-collared lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.60	0.64	0.60	0.60	0.60	0.64	0.60	0.63
			UCRB CumEff	0.88	0.75	0.75	0.63	0.63	0.63	0.75	0.63	0.60

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
HER	REP	Night snake	UCRB BLM/FS	0.50	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.49	0.48	0.49	0.49	0.49	0.48	0.49	0.50
HER	REP	Painted turtle	EEIS BLM/FS	0.59	0.58	0.68	0.77	0.77	0.59	0.68	0.59	0.59
			EEIS CumEff	0.59	0.77	0.95	1.03	1.03	0.75	0.91	0.75	0.73
			UCRB BLM/FS	0.50	0.48	0.58	0.66	0.70	0.49	0.58	0.43	0.50
			UCRB CumEff	0.50	0.73	0.91	0.97	0.87	0.62	0.91	0.72	0.65
HER	REP	Rubber boa	EEIS BLM/FS	0.50	0.50	0.30	0.50	0.50	0.64	0.30	0.64	0.70
			EEIS CumEff	0.50	0.50	0.30	0.50	0.50	0.64	0.30	0.64	0.70
			UCRB BLM/FS	0.71	0.36	0.44	0.36	0.36	0.48	0.44	0.48	0.68
			UCRB CumEff	0.71	0.50	0.72	0.67	0.67	0.67	0.72	0.67	0.51
HER	REP	Sagebrush lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.49	0.48	0.49	0.49	0.49	0.48	0.49	0.50
			UCRB CumEff	0.50	0.78	0.77	0.77	0.77	0.77	0.75	0.77	0.78
HER	REP	Sharptail snake	EEIS BLM/FS	0.50	0.50	0.46	0.59	0.59	0.66	0.49	0.75	0.70
			EEIS CumEff	0.50	0.50	0.00	0.30	0.30	0.30	0.00	0.30	0.50
HER	REP	Short-horned lizard	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.49	0.46	0.49	0.49	0.49	0.46	0.49	0.50
			UCRB CumEff	0.50	0.48	0.46	0.48	0.48	0.48	0.46	0.48	0.50
HER	REP	Striped whipsnake	EEIS BLM/FS	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.63	0.66	0.63	0.63	0.63	0.66	0.63	0.64
			UCRB CumEff	0.50	0.63	0.66	0.60	0.60	0.60	0.66	0.60	0.63
HER	REP	Western pond turtle	EEIS BLM/FS	0.83	0.80	0.90	0.75	0.75	0.75	0.70	0.75	0.75
			EEIS CumEff	0.83	0.67	0.30	0.67	0.67	0.67	0.30	0.67	0.67
WAT	WAT	Group 1: Open water birds	EEIS BLM/FS	0.30	0.64	0.69	0.63	0.63	0.64	0.59	0.64	0.61
			EEIS CumEff	0.31	0.69	0.69	0.66	0.64	0.68	0.56	0.68	0.63
			UCRB BLM/FS	0.42	0.69	0.70	0.58	0.58	0.65	0.70	0.65	0.55
			UCRB CumEff	0.45	0.72	0.73	0.60	0.60	0.70	0.72	0.70	0.59
WAT	WAT	Group 2: Common loon	EEIS BLM/FS	0.44	0.49	0.61	0.57	0.57	0.58	0.57	0.58	0.57
			EEIS CumEff	0.61	0.73	0.81	0.73	0.72	0.72	0.73	0.72	0.73
			UCRB BLM/FS	0.39	0.50	0.64	0.58	0.58	0.58	0.58	0.58	0.58
			UCRB CumEff	0.49	0.74	0.89	0.74	0.74	0.74	0.74	0.74	0.74
WAT	WAT	Group 3: Wood duck, mergansers	EEIS BLM/FS	0.54	0.83	0.82	0.80	0.81	0.83	0.83	0.83	0.81
			EEIS CumEff	0.51	0.81	0.85	0.77	0.80	0.83	0.82	0.82	0.79
			UCRB BLM/FS	0.51	0.97	1.00	1.03	1.01	0.90	0.97	0.90	0.95
			UCRB CumEff	0.53	0.99	1.11	1.14	1.12	0.87	1.09	0.87	1.06
WAT	WAT	Group 4: Goldeneyes	EEIS BLM/FS	0.49	0.52	0.60	0.57	0.59	0.54	0.53	0.54	0.55
			EEIS CumEff	0.49	0.54	0.59	0.61	0.67	0.53	0.57	0.53	0.55
			UCRB BLM/FS	0.50	0.54	0.58	0.58	0.63	0.58	0.55	0.58	0.52
			UCRB CumEff	0.50	0.57	0.60	0.58	0.67	0.57	0.58	0.57	0.52

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
WAT	WAT	Group 5: Western snowy plover	EEIS BLM/FS	0.00	0	0.33	0.17	0.17	0.17	0.30	0.17	0.00
			EEIS CumEff	0.00	0.30	0.39	0.30	0.30	0.30	0.38	0.30	0.30
WAT	WAT	Group 6: Harlequin duck	EEIS BLM/FS	0.49	0.50	0.39	0.49	0.50	0.50	0.50	0.50	0.66
			EEIS CumEff	0.46	0.50	0.36	0.50	0.50	0.50	0.50	0.50	0.64
			UCRB BLM/FS	0.75	0.50	0.41	0.49	0.50	0.64	0.50	0.64	0.66
			UCRB CumEff	0.75	0.49	0.38	0.50	0.50	0.72	0.50	0.73	0.63
WAT	WAT	Group 7: Herons, egrets	EEIS BLM/FS	0.00	0.61	0.57	0.56	0.57	0.53	0.46	0.53	0.59
			EEIS CumEff	0.00	0.68	0.60	0.63	0.59	0.61	0.53	0.61	0.66
			UCRB BLM/FS	0.40	0.56	0.61	0.51	0.51	0.52	0.56	0.52	0.52
			UCRB CumEff	0.39	0.56	0.61	0.52	0.52	0.56	0.57	0.56	0.53
WAT	WAT	Group 8: Dabbling ducks	EEIS BLM/FS	0.46	0.67	0.71	0.62	0.61	0.52	0.64	0.52	0.58
			EEIS CumEff	0.50	0.69	0.75	0.64	0.62	0.58	0.65	0.58	0.58
			UCRB BLM/FS	0.42	0.57	0.64	0.56	0.53	0.58	0.56	0.58	0.56
			UCRB CumEff	0.44	0.66	0.72	0.61	0.61	0.58	0.65	0.58	0.60
WAT	WAT	Group 9: Spotted sandpiper	EEIS BLM/FS	0.50	0.50	0.60	0.50	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.50	0.61	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.50	0.60	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB CumEff	0.50	0.50	0.61	0.50	0.50	0.49	0.50	0.49	0.49
WAT	WAT	Group 10: Greater sandhill crane	EEIS BLM/FS	0.44	0.50	0.49	0.36	0.36	0.38	0.50	0.38	0.50
			EEIS CumEff	0.35	0.55	0.59	0.55	0.55	0.51	0.43	0.51	0.43
			UCRB BLM/FS	0.52	0.60	0.56	0.57	0.57	0.47	0.58	0.47	0.47
			UCRB CumEff	0.54	0.44	0.44	0.56	0.56	0.44	0.45	0.44	0.57
WAT	WAT	Group 11: Rails, avocets	EEIS BLM/FS	0.46	0.50	0.63	0.54	0.54	0.48	0.54	0.48	0.54
			EEIS CumEff	0.57	0.53	0.66	0.57	0.57	0.49	0.58	0.50	0.58
			UCRB BLM/FS	0.49	0.50	0.60	0.52	0.52	0.49	0.52	0.49	0.52
			UCRB CumEff	0.53	0.54	0.64	0.56	0.56	0.50	0.56	0.50	0.56
WAT	WAT	Group 12: Curlew, willet	EEIS BLM/FS	0.25	0.30	0.25	0.34	0.34	0.41	0.29	0.41	0.34
			EEIS CumEff	0.29	0.35	0.28	0.37	0.37	0.43	0.34	0.43	0.39
			UCRB BLM/FS	0.25	0.30	0.25	0.34	0.34	0.02	0.29	0.02	0.34
			UCRB CumEff	0.29	0.35	0.28	0.37	0.37	0.43	0.34	0.43	0.39
WAT	WAT	Group 13: Upland sandpiper	EEIS BLM/FS	0.49	0.00	0.00	0.14	0.30	0.44	0.30	0.44	0.36
			EEIS CumEff	0.50	0.00	0.00	0.14	0.14	0.33	0.00	0.33	0.14
			UCRB BLM/FS	0.48	0.00	0.00	0.14	0.30	0.44	0.30	0.44	0.36
			UCRB CumEff	0.48	0.00	0.00	0.14	0.14	0.33	0.00	0.33	0.14
WAT	WAT	Group 14: Common snipe	EEIS BLM/FS	0.49	0.56	0.66	0.64	0.64	0.57	0.63	0.58	0.61
			EEIS CumEff	0.48	0.58	0.67	0.65	0.65	0.57	0.65	0.58	0.61
			UCRB BLM/FS	0.49	0.56	0.66	0.60	0.60	0.57	0.59	0.58	0.61
			UCRB CumEff	0.48	0.58	0.67	0.65	0.65	0.57	0.65	0.58	0.61

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
WAT	WAT	Group 15: Migrant sandpipers	EEIS BLM/FS	0.68	0.70	0.73	0.72	0.72	0.72	0.69	0.72	0.72
			EEIS CumEff	0.68	0.69	0.72	0.69	0.69	0.69	0.69	0.69	0.69
			UCRB BLM/FS	0.65	0.62	0.61	0.62	0.62	0.68	0.58	0.68	0.62
			UCRB CumEff	0.67	0.67	0.68	0.67	0.67	0.66	0.65	0.66	0.66
RGB	GMB	Band-tailed pigeon	EEIS BLM/FS	0.89	0.92	0.80	0.82	0.99	0.96	0.97	1.00	0.84
			EEIS CumEff	0.90	0.91	0.79	0.78	1.01	1.00	0.97	1.01	0.83
			UCRB BLM/FS	0.77	0.87	0.78	0.74	0.86	0.87	0.83	0.87	0.97
			UCRB CumEff	0.77	0.83	0.76	0.72	0.90	0.89	0.90	0.89	0.90
RGB	GMB	Blue grouse	EEIS BLM/FS	0.70	0.69	0.79	0.79	0.66	0.66	0.66	0.66	0.63
			EEIS CumEff	0.70	0.69	0.82	0.81	0.66	0.66	0.66	0.66	0.64
			UCRB BLM/FS	0.54	0.68	0.81	0.81	0.67	0.67	0.67	0.67	0.66
			UCRB CumEff	0.50	0.68	0.72	0.72	0.66	0.66	0.67	0.65	0.64
RGB	GMB	Columbian sharp-tailed grouse	EEIS BLM/FS	0.44	0.47	0.52	0.52	0.75	0.70	0.73	0.70	0.69
			EEIS CumEff	0.43	0.52	0.54	0.53	0.80	0.77	0.78	0.78	0.80
			UCRB BLM/FS	0.49	0.52	0.53	0.53	0.72	0.69	0.70	0.71	0.69
			UCRB CumEff	0.48	0.53	0.54	0.54	0.74	0.73	0.73	0.75	0.76
RGB	GMB	Mountain quail	EEIS BLM/FS	0.76	0.71	0.73	0.72	0.70	0.75	0.68	0.74	0.80
			EEIS CumEff	0.60	0.61	0.59	0.59	0.54	0.50	0.55	0.50	0.54
			UCRB BLM/FS	0.92	0.39	0.48	0.50	0.64	0.70	0.61	0.70	0.64
			UCRB CumEff	0.85	0.48	0.52	0.54	0.64	0.68	0.63	0.67	0.64
RGB	GMB	Sage grouse	EEIS BLM/FS	0.56	0.75	0.70	0.73	0.91	0.77	0.86	0.80	0.74
			EEIS CumEff	0.56	0.79	0.72	0.72	0.81	0.73	0.76	0.76	0.73
			UCRB BLM/FS	0.57	0.70	0.68	0.73	0.95	0.81	0.91	0.82	0.76
			UCRB CumEff	0.56	0.73	0.68	0.73	0.73	0.74	0.72	0.75	0.72
RGB	RAP	Bald eagle	EEIS BLM/FS	0.59	0.76	0.77	0.61	0.57	0.54	0.55	0.54	0.55
			EEIS CumEff	0.60	0.68	0.78	0.64	0.60	0.57	0.59	0.58	0.58
			UCRB BLM/FS	0.59	0.76	0.77	0.61	0.57	0.54	0.55	0.54	0.55
			UCRB CumEff	0.60	0.68	0.78	0.64	0.60	0.57	0.59	0.58	0.58
RGB	RAP	Barred owl	EEIS BLM/FS	0.87	0.61	0.78	0.81	0.74	0.78	0.75	0.74	0.68
			EEIS CumEff	0.54	0.59	0.81	0.77	0.85	0.88	0.85	0.87	0.70
			UCRB BLM/FS	0.70	0.82	0.72	0.78	0.77	0.76	0.63	0.76	0.64
			UCRB CumEff	0.35	0.96	0.76	0.78	0.83	0.81	0.83	0.79	0.77
RGB	RAP	Boreal owl	EEIS BLM/FS	0.95	0.74	0.80	0.79	0.84	0.85	0.84	0.85	0.89
			EEIS CumEff	0.76	0.79	0.81	0.80	0.81	0.81	0.82	0.81	0.90
			UCRB BLM/FS	0.87	0.95	0.94	0.93	0.92	0.93	0.92	0.88	0.85
			UCRB CumEff	0.92	0.94	0.92	0.90	0.79	0.79	0.81	0.76	0.76
RGB	RAP	Burrowing owl	EEIS BLM/FS	0.61	0.84	0.83	0.83	0.73	0.73	0.74	0.74	0.73
			EEIS CumEff	0.55	0.73	0.76	0.76	0.72	0.71	0.73	0.71	0.75
			UCRB BLM/FS	0.61	0.85	0.88	0.89	0.72	0.72	0.73	0.73	0.73
			UCRB CumEff	0.57	0.74	0.74	0.75	0.70	0.69	0.71	0.69	0.73
RGB	RAP	Cooper's hawk	EEIS BLM/FS	0.73	0.75	0.76	0.75	0.81	0.70	0.81	0.70	0.82
			EEIS CumEff	0.64	0.74	0.78	0.76	0.73	0.63	0.73	0.63	0.73
			UCRB BLM/FS	0.73	0.76	0.79	0.79	0.82	0.70	0.82	0.70	0.82
			UCRB CumEff	0.64	0.72	0.76	0.75	0.72	0.61	0.72	0.61	0.71

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
RGB	RAP	Ferruginous hawk	EEIS BLM/FS	0.50	0.71	0.70	0.76	0.57	0.54	0.57	0.54	0.57
			EEIS CumEff	0.52	0.53	0.50	0.51	0.49	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.51	0.70	0.69	0.75	0.56	0.54	0.57	0.54	0.56
			UCRB CumEff	0.52	0.53	0.50	0.51	0.49	0.50	0.49	0.50	0.50
RGB	RAP	Flammulated owl	EEIS BLM/FS	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
			EEIS CumEff	0.49	0.79	0.78	0.79	0.74	0.64	0.74	0.67	0.80
			UCRB BLM/FS	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
			UCRB CumEff	0.49	0.79	0.78	0.81	0.75	0.65	0.74	0.67	0.81
RGB	RAP	Great gray owl	EEIS BLM/FS	0.75	0.84	0.76	0.83	0.64	0.61	0.66	0.61	0.80
			EEIS CumEff	0.77	0.89	0.86	0.84	0.73	0.69	0.74	0.69	0.88
			UCRB BLM/FS	0.67	0.76	0.82	0.84	0.75	0.67	0.69	0.67	0.79
			UCRB CumEff	0.74	0.77	0.87	0.86	0.77	0.70	0.72	0.70	0.82
RGB	RAP	Long-eared owl	EEIS BLM/FS	0.78	0.73	0.73	0.73	0.71	0.81	0.79	0.81	0.80
			EEIS CumEff	0.78	0.77	0.81	0.73	0.70	0.62	0.70	0.62	0.74
			UCRB BLM/FS	0.78	0.70	0.69	0.77	0.75	0.71	0.75	0.77	0.64
			UCRB CumEff	0.74	0.65	0.76	0.74	0.67	0.69	0.56	0.74	0.64
RGB	RAP	Merlin	EEIS BLM/FS	0.70	0.75	0.76	0.77	0.74	0.70	0.73	0.70	0.74
			EEIS CumEff	0.66	0.73	0.74	0.74	0.74	0.70	0.72	0.70	0.74
			UCRB BLM/FS	0.69	0.69	0.71	0.71	0.69	0.69	0.67	0.69	0.66
			UCRB CumEff	0.66	0.71	0.69	0.69	0.69	0.69	0.68	0.69	0.67
RGB	RAP	Northern goshawk	EEIS BLM/FS	0.67	0.80	0.80	0.77	0.78	0.81	0.77	0.79	0.79
			EEIS CumEff	0.67	0.76	0.74	0.72	0.76	0.81	0.73	0.74	0.74
			UCRB BLM/FS	0.66	0.87	0.71	0.68	0.69	0.75	0.67	0.73	0.66
			UCRB CumEff	0.69	0.86	0.70	0.69	0.69	0.76	0.68	0.75	0.72
RGB	RAP	Northern pygmy-owl	EEIS BLM/FS	0.48	0.55	0.56	0.53	0.54	0.52	0.54	0.52	0.56
			EEIS CumEff	0.48	0.53	0.55	0.52	0.52	0.49	0.52	0.49	0.52
			UCRB BLM/FS	0.45	0.57	0.54	0.54	0.54	0.51	0.54	0.51	0.56
			UCRB CumEff	0.46	0.54	0.53	0.52	0.52	0.47	0.52	0.47	0.52
RGB	RAP	Northern saw-whet owl	EEIS BLM/FS	0.51	0.59	0.61	0.60	0.67	0.61	0.67	0.59	0.62
			EEIS CumEff	0.49	0.58	0.59	0.57	0.64	0.58	0.64	0.53	0.59
			UCRB BLM/FS	0.45	0.60	0.59	0.60	0.64	0.58	0.64	0.55	0.62
			UCRB CumEff	0.43	0.59	0.56	0.58	0.61	0.54	0.61	0.48	0.59
RGB	RAP	Swainson's hawk	EEIS BLM/FS	0.73	0.69	0.67	0.67	0.67	0.66	0.67	0.65	0.65
			EEIS CumEff	0.73	0.74	0.73	0.73	0.71	0.68	0.71	0.65	0.69
			UCRB BLM/FS	0.77	0.69	0.67	0.67	0.67	0.66	0.67	0.65	0.65
			UCRB CumEff	0.77	0.74	0.73	0.73	0.71	0.68	0.71	0.65	0.69
RGB	RAP	Western screech owl	EEIS BLM/FS	0.50	0.61	0.57	0.58	0.58	0.52	0.58	0.50	0.50
			EEIS CumEff	0.49	0.62	0.57	0.58	0.57	0.50	0.56	0.50	0.50
			UCRB BLM/FS	0.50	0.61	0.57	0.58	0.58	0.52	0.58	0.50	0.50
			UCRB CumEff	0.49	0.63	0.59	0.58	0.57	0.50	0.56	0.50	0.50
CAV	CAV	Black-backed woodpecker	EEIS BLM/FS	0.40	0.26	0.51	0.45	0.50	0.44	0.56	0.44	0.44
			EEIS CumEff	0.40	0.40	0.66	0.54	0.58	0.46	0.59	0.46	0.44
			UCRB BLM/FS	0.40	0.44	0.73	0.55	0.58	0.48	0.54	0.58	0.41
			UCRB CumEff	0.40	0.40	0.63	0.44	0.44	0.48	0.58	0.59	0.55

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
CAV	CAV	Downy woodpecker	EEIS BLM/FS	0.44	0.46	0.54	0.41	0.36	0.39	0.51	0.42	0.36
			EEIS CumEff	0.44	0.44	0.50	0.33	0.33	0.39	0.55	0.36	0.38
			UCRB BLM/FS	0.44	0.39	0.34	0.45	0.51	0.39	0.58	0.42	0.35
			UCRB CumEff	0.44	0.46	0.30	0.45	0.51	0.39	0.54	0.36	0.35
CAV	CAV	Hairy woodpecker	EEIS BLM/FS	0.26	0.40	0.50	0.48	0.44	0.44	0.43	0.49	0.40
			EEIS CumEff	0.36	0.31	0.43	0.44	0.44	0.49	0.43	0.49	0.46
			UCRB BLM/FS	0.26	0.36	0.50	0.48	0.50	0.49	0.50	0.48	0.32
			UCRB CumEff	0.26	0.36	0.50	0.50	0.49	0.43	0.50	0.48	0.44
CAV	CAV	Lewis' woodpecker	EEIS BLM/FS	0.65	0.67	0.50	0.50	0.50	0.63	0.63	0.56	0.61
			EEIS CumEff	0.83	0.83	0.42	0.55	0.59	0.55	0.49	0.50	0.50
			UCRB BLM/FS	0.70	0.74	0.50	0.49	0.40	0.66	0.71	0.64	0.56
			UCRB CumEff	0.98	1.08	0.44	0.64	0.63	0.40	0.50	0.44	0.44
CAV	CAV	Pileated woodpecker	EEIS BLM/FS	0.76	0.67	0.17	0.50	0.50	0.50	0.58	0.50	0.50
			EEIS CumEff	0.76	0.67	0.17	0.50	0.50	0.50	0.58	0.50	0.50
			UCRB BLM/FS	0.71	0.73	0.17	0.50	0.50	0.50	0.51	0.50	0.50
			UCRB CumEff	0.71	0.73	0.17	0.50	0.50	0.50	0.51	0.50	0.50
CAV	CAV	Pygmy nuthatch	EEIS BLM/FS	0.26	0.17	0.41	0.56	0.63	0.50	0.68	0.50	0.35
			EEIS CumEff	0.26	0.17	0.41	0.56	0.63	0.50	0.68	0.50	0.35
			UCRB BLM/FS	0.26	0.17	0.41	0.56	0.66	0.49	0.63	0.49	0.35
			UCRB CumEff	0.26	0.17	0.41	0.56	0.66	0.49	0.63	0.49	0.35
CAV	CAV	Red-naped sapsucker	EEIS BLM/FS	0.00	0.44	0.82	0.44	0.52	0.46	0.70	0.46	0.66
			EEIS CumEff	0.00	0.44	0.71	0.37	0.47	0.44	0.57	0.44	0.62
			UCRB BLM/FS	0.00	0.44	0.82	0.44	0.52	0.46	0.70	0.46	0.66
			UCRB CumEff	0.00	0.44	0.71	0.37	0.47	0.44	0.57	0.44	0.62
CAV	CAV	Three-toed woodpecker	EEIS BLM/FS	0.50	0.32	0.64	0.44	0.52	0.19	0.35	0.35	0.45
			EEIS CumEff	0.50	0.20	0.64	0.44	0.52	0.19	0.35	0.35	0.45
			UCRB BLM/FS	0.50	0.32	0.64	0.39	0.50	0.19	0.35	0.35	0.42
			UCRB CumEff	0.50	0.20	0.64	0.39	0.50	0.19	0.35	0.35	0.42
CAV	CAV	Vaux's swift	EEIS BLM/FS	0.92	0.45	0.50	0.56	0.74	0.58	0.44	0.38	0.36
			EEIS CumEff	0.54	0.26	0.44	0.59	0.50	0.54	0.50	0.32	0.64
			UCRB BLM/FS	1.05	0.40	0.50	0.56	0.72	0.53	0.44	0.38	0.36
			UCRB CumEff	0.62	0.34	0.44	0.59	0.50	0.54	0.50	0.32	0.64
CAV	CAV	White-breasted nuthatch	EEIS BLM/FS	0.26	0.20	0.41	0.34	0.45	0.40	0.36	0.46	0.41
			EEIS CumEff	0.26	0.27	0.41	0.34	0.45	0.32	0.36	0.39	0.41
			UCRB BLM/FS	0.38	0.30	0.49	0.32	0.52	0.45	0.49	0.49	0.63
			UCRB CumEff	0.38	0.30	0.49	0.32	0.52	0.45	0.49	0.49	0.63
CAV	CAV	White-headed woodpecker	EEIS BLM/FS	0.43	0.54	0.44	0.51	0.74	0.39	0.77	0.48	0.66
			EEIS CumEff	0.43	0.54	0.51	0.55	0.51	0.44	0.73	0.46	0.70
			UCRB BLM/FS	0.43	0.53	0.44	0.51	0.63	0.46	0.78	0.41	0.70
			UCRB CumEff	0.43	0.53	0.48	0.39	0.52	0.44	0.76	0.44	0.74

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
CAV	CAV	Williamson's sapsucker	EEIS BLM/FS	0.26	0.54	0.67	0.52	0.71	0.52	0.60	0.60	0.58
			EEIS CumEff	0.26	0.54	0.57	0.51	0.74	0.58	0.73	0.58	0.53
			UCRB BLM/FS	0.26	0.48	0.51	0.41	0.65	0.61	0.55	0.64	0.58
			UCRB CumEff	0.26	0.48	0.55	0.44	0.63	0.63	0.55	0.67	0.53
PAS	FOR	Black-chinned hummingbird	EEIS BLM/FS	0.32	0.30	0.46	0.44	0.46	0.46	0.43	0.37	0.46
			EEIS CumEff	0.32	0.36	0.48	0.51	0.48	0.45	0.47	0.58	0.57
			UCRB BLM/FS	0.32	0.30	0.46	0.44	0.46	0.46	0.43	0.37	0.46
			UCRB CumEff	0.32	0.36	0.48	0.51	0.48	0.52	0.47	0.58	0.57
PAS	FOR	Broad-tailed hummingbird	UCRB BLM/FS	0.49	0.38	0.48	0.43	0.36	0.48	0.47	0.48	0.44
			UCRB CumEff	0.49	0.44	0.57	0.50	0.41	0.44	0.49	0.55	0.56
PAS	FOR	Chestnut-backed chickadee	EEIS BLM/FS	0.38	0.44	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			EEIS CumEff	0.38	0.44	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			UCRB BLM/FS	0.38	0.38	0.40	0.40	0.40	0.66	0.49	0.61	0.49
			UCRB CumEff	0.38	0.38	0.40	0.40	0.40	0.66	0.49	0.61	0.49
PAS	FOR	Hammond's flycatcher	EEIS BLM/FS	0.48	0.36	0.56	0.36	0.56	0.54	0.60	0.51	0.46
			EEIS CumEff	0.44	0.50	0.60	0.47	0.60	0.60	0.67	0.59	0.48
			UCRB BLM/FS	0.48	0.33	0.58	0.33	0.58	0.54	0.63	0.51	0.46
			UCRB CumEff	0.44	0.49	0.60	0.48	0.60	0.60	0.67	0.59	0.48
PAS	FOR	Lazuli bunting	EEIS BLM/FS	0.49	0.43	0.55	0.44	0.42	0.49	0.55	0.48	0.49
			EEIS CumEff	0.49	0.57	0.55	0.57	0.55	0.55	0.54	0.53	0.56
			UCRB BLM/FS	0.48	0.50	0.53	0.49	0.49	0.50	0.55	0.50	0.50
			UCRB CumEff	0.48	0.53	0.51	0.53	0.49	0.51	0.51	0.48	0.57
PAS	FOR	Olive-sided flycatcher	EEIS BLM/FS	0.40	0.48	0.50	0.52	0.50	0.46	0.50	0.46	0.44
			EEIS CumEff	0.40	0.50	0.51	0.50	0.51	0.50	0.57	0.50	0.50
			UCRB BLM/FS	0.40	0.37	0.49	0.48	0.47	0.46	0.50	0.45	0.42
			UCRB CumEff	0.40	0.47	0.50	0.50	0.50	0.49	0.52	0.47	0.48
PAS	FOR	Rufous hummingbird	EEIS BLM/FS	0.49	0.49	0.64	0.58	0.65	0.44	0.66	0.50	0.50
			EEIS CumEff	0.49	0.53	0.64	0.66	0.64	0.59	0.65	0.53	0.53
			UCRB BLM/FS	0.48	0.50	0.66	0.65	0.60	0.50	0.66	0.44	0.50
			UCRB CumEff	0.48	0.53	0.64	0.66	0.64	0.59	0.65	0.53	0.53
PAS	FOR	Rufous-sided towhee	EEIS BLM/FS	0.50	0.48	0.49	0.48	0.50	0.50	0.50	0.50	0.50
			EEIS CumEff	0.50	0.49	0.49	0.49	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.50	0.46	0.47	0.46	0.49	0.50	0.49	0.50	0.50
			UCRB CumEff	0.50	0.49	0.48	0.49	0.49	0.50	0.50	0.50	0.50
PAS	FOR	Western bluebird	EEIS BLM/FS	0.26	0.17	0.81	0.32	0.48	0.43	0.48	0.44	0.50
			EEIS CumEff	0.26	0.17	0.75	0.42	0.49	0.73	0.42	0.67	0.70
			UCRB BLM/FS	0.26	0.17	0.81	0.44	0.41	0.43	0.41	0.39	0.43
			UCRB CumEff	0.26	0.17	0.75	0.53	0.42	0.73	0.51	0.72	0.68
PAS	FOR	Western tanager	EEIS BLM/FS	0.30	0.30	0.46	0.33	0.30	0.30	0.46	0.30	0.30
			EEIS CumEff	0.33	0.33	0.71	0.64	0.64	0.64	0.73	0.64	0.64
			UCRB BLM/FS	0.30	0.30	0.45	0.33	0.30	0.30	0.45	0.30	0.30
			UCRB CumEff	0.33	0.33	0.71	0.64	0.64	0.64	0.73	0.64	0.64

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	FOR	White-winged crossbill	EEIS BLM/FS	0.00	0.00	0.48	0.00	0.22	0.36	0.48	0.00	0.36
			EEIS CumEff	0.30	0.30	0.44	0.30	0.22	0.55	0.46	0.26	0.48
			UCRB BLM/FS	0.00	0..00	0.48	0.00	0.22	0.36	0.48	0.00	0.36
			UCRB CumEff	0.30	0.30	0.44	0.30	0.22	0.55	0.46	0.26	0.48
PAS	FOR	Wilson's warbler	EEIS BLM/FS	0.43	0.50	0.50	0.50	0.50	0.50	0.46	0.49	0.46
			EEIS CumEff	0.43	0.50	0.50	0.50	0.50	0.50	0.46	0.49	0.46
			UCRB BLM/FS	0.40	0.49	0.50	0.50	0.50	0.49	0.47	0.48	0.44
			UCRB CumEff	0.40	0.49	0.50	0.50	0.50	0.49	0.47	0.48	0.44
PAS	FOR	Winter wren	EEIS BLM/FS	0.48	0.57	0.44	0.44	0.48	0.67	0.53	0.60	0.64
			EEIS CumEff	0.48	0.44	0.57	0.56	0.56	0.47	0.60	0.65	0.35
			UCRB BLM/FS	0.38	0.47	0.63	0.55	0.55	0.59	0.67	0.65	0.72
			UCRB CumEff	0.38	0.44	0.55	0.56	0.43	0.64	0.60	0.66	0.48
PAS	WD	Ash-throated flycatcher	EEIS BLM/FS	0.58	0.58	0.64	0.64	0.75	0.75	0.74	0.78	0.74
			EEIS CumEff	0.58	0.58	0.67	0.67	0.68	0.62	0.59	0.72	0.68
			UCRB BLM/FS	0.62	0.57	0.68	0.68	0.68	0.68	0.74	0.73	0.78
			UCRB CumEff	0.62	0.57	0.67	0.67	0.68	0.62	0.59	0.86	0.68
PAS	WD	Bushtit	EEIS BLM/FS	0.00	0.58	0.67	0.67	0.63	0.50	0.60	0.50	0.49
			EEIS CumEff	0.00	0.58	0.67	0.67	0.63	0.50	0.60	0.50	0.49
			UCRB BLM/FS	0.48	0.58	0.66	0.66	0.58	0.50	0.67	0.50	0.49
			UCRB CumEff	0.48	0.58	0.66	0.66	0.58	0.50	0.67	0.50	0.49
PAS	WD	Chipping sparrow	EEIS BLM/FS	0.22	0.25	0.25	0.25	0.25	0.22	0.25	0.22	0.22
			EEIS CumEff	0.22	0.35	0.49	0.49	0.49	0.48	0.49	0.48	0.48
			UCRB BLM/FS	0.22	0.25	0.25	0.25	0.25	0.22	0.25	0.22	0.22
			UCRB CumEff	0.22	0.35	0.49	0.49	0.49	0.48	0.49	0.48	0.48
PAS	WD	Green-tailed towhee	EEIS BLM/FS	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			EEIS CumEff	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
			UCRB CumEff	0.48	0.44	0.49	0.50	0.50	0.50	0.49	0.50	0.50
PAS	RIP	Red-eyed vireo	EEIS BLM/FS	0.48	0.32	0.48	0.50	0.50	0.50	0.44	0.50	0.36
			EEIS CumEff	0.31	0.46	0.39	0.46	0.46	0.48	0.39	0.49	0.32
			UCRB BLM/FS	0.48	0.50	0.32	0.50	0.50	0.50	0.46	0.49	0.36
			UCRB CumEff	0.44	0.32	0.44	0.48	0.48	0.49	0.39	0.50	0.50
PAS	RIP	Red-winged blackbird	EEIS BLM/FS	0.38	0.50	0.48	0.46	0.46	0.46	0.48	0.45	0.45
			EEIS CumEff	0.38	0.50	0.57	0.60	0.60	0.60	0.57	0.59	0.59
			UCRB BLM/FS	0.38	0.50	0.48	0.46	0.46	0.46	0.49	0.47	0.45
			UCRB CumEff	0.38	0.50	0.57	0.60	0.60	0.60	0.57	0.61	0.61
PAS	RIP	Veery	EEIS BLM/FS	0.45	0.55	0.57	0.60	0.58	0.57	0.59	0.55	0.60
			EEIS CumEff	0.45	0.54	0.51	0.54	0.54	0.56	0.52	0.57	0.54
			UCRB BLM/FS	0.49	0.57	0.58	0.59	0.59	0.57	0.61	0.55	0.58
			UCRB CumEff	0.49	0.58	0.52	0.56	0.56	0.60	0.53	0.59	0.58
PAS	RIP	Willow flycatcher	EEIS BLM/FS	0.50	0.53	0.49	0.54	0.50	0.54	0.49	0.53	0.53
			EEIS CumEff	0.50	0.50	0.45	0.49	0.48	0.50	0.46	0.50	0.49
			UCRB BLM/FS	0.50	0.53	0.50	0.54	0.50	0.54	0.49	0.53	0.53
			UCRB CumEff	0.50	0.50	0.45	0.49	0.47	0.50	0.46	0.49	0.50

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	RIP	Yellow warbler	EEIS BLM/FS	0.49	0.48	0.50	0.49	0.49	0.46	0.50	0.45	0.47
			EEIS CumEff	0.49	0.50	0.47	0.50	0.50	0.50	0.44	0.50	0.50
			UCRB BLM/FS	0.49	0.48	0.50	0.49	0.49	0.46	0.50	0.45	0.47
			UCRB CumEff	0.49	0.50	0.47	0.50	0.50	0.50	0.44	0.50	0.50
PAS	RIP	Yellow-billed cuckoo	EEIS BLM/FS	0.50	0.50	0.45	0.21	0.21	0.22	0.22	0.50	0.50
			EEIS CumEff	0.50	0.30	0.30	0.44	0.44	0.45	0.00	0.46	0.44
			UCRB BLM/FS	0.48	0.50	0.45	0.21	0.21	0.22	0.22	0.50	0.50
			UCRB CumEff	0.46	0.34	0.31	0.44	0.44	0.46	0.00	0.46	0.45
PAS	RIP	Yellow-breasted chat	EEIS BLM/FS	0.50	0.50	0.49	0.50	0.36	0.49	0.49	0.48	0.50
			EEIS CumEff	0.49	0.48	0.46	0.49	0.48	0.50	0.25	0.36	0.50
			UCRB BLM/FS	0.50	0.50	0.50	0.50	0.50	0.35	0.49	0.48	0.49
			UCRB CumEff	0.49	0.48	0.46	0.49	0.48	0.50	0.25	0.36	0.50
PAS	GS	Black rosy finch	EEIS BLM/FS	0.00	0.00	0.47	0.47	0.20	0.00	0.47	0.00	0.00
			EEIS CumEff	0.00	0.00	0.47	0.47	0.20	0.00	0.47	0.00	0.00
			UCRB BLM/FS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			UCRB CumEff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAS	GS	Bobolink	EEIS BLM/FS	0.46	0.49	0.50	0.54	0.54	0.49	0.50	0.48	0.53
			EEIS CumEff	0.49	0.50	0.45	0.70	0.71	0.66	0.44	0.65	0.58
			UCRB BLM/FS	0.48	0.56	0.54	0.66	0.66	0.60	0.54	0.59	0.66
			UCRB CumEff	0.48	0.48	0.50	0.68	0.68	0.63	0.50	0.62	0.65
PAS	GS	Brewer's blackbird	EEIS BLM/FS	0.27	0.30	0.60	0.33	0.39	0.31	0.61	0.31	0.35
			EEIS CumEff	0.27	0.67	0.68	0.69	0.69	0.70	0.68	0.71	0.69
			UCRB BLM/FS	0.27	0.30	0.60	0.33	0.39	0.31	0.61	0.31	0.35
			UCRB CumEff	0.27	0.67	0.67	0.69	0.69	0.70	0.68	0.71	0.69
PAS	GS	Brewer's sparrow	EEIS BLM/FS	0.46	0.49	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.44	0.71	0.62	0.64	0.64	0.66	0.60	0.64	0.68
			UCRB BLM/FS	0.48	0.72	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.47	0.63	0.61	0.62	0.61	0.66	0.60	0.64	0.68
PAS	GS	Grasshopper sparrow	EEIS BLM/FS	0.50	0.24	0.24	0.24	0.20	0.41	0.20	0.47	0.27
			EEIS CumEff	0.50	0.24	0.24	0.24	0.20	0.39	0.20	0.46	0.27
			UCRB BLM/FS	0.56	0.38	0.44	0.44	0.51	0.52	0.47	0.57	0.51
			UCRB CumEff	0.56	0.40	0.38	0.38	0.53	0.51	0.36	0.52	0.40
PAS	GS	Horned lark	EEIS BLM/FS	0.54	0.50	0.50	0.50	0.49	0.44	0.50	0.44	0.46
			EEIS CumEff	0.54	0.50	0.65	0.65	0.65	0.66	0.60	0.67	0.66
			UCRB BLM/FS	0.54	0.50	0.50	0.50	0.49	0.44	0.50	0.44	0.44
			UCRB CumEff	0.54	0.50	0.65	0.65	0.65	0.66	0.60	0.67	0.66
PAS	GS	Lark sparrow	EEIS BLM/FS	0.47	0.50	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.46	0.66	0.60	0.61	0.61	0.64	0.58	0.65	0.62
			UCRB BLM/FS	0.49	0.71	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.48	0.63	0.61	0.62	0.61	0.66	0.60	0.65	0.67
PAS	GS	Loggerhead shrike	EEIS BLM/FS	0.48	0.66	0.77	0.82	0.82	0.83	0.75	0.79	0.80
			EEIS CumEff	0.48	0.94	0.73	0.73	0.73	0.66	0.78	0.74	0.68
			UCRB BLM/FS	0.48	0.66	0.77	0.82	0.82	0.82	0.76	0.78	0.83
			UCRB CumEff	0.48	0.94	0.70	0.70	0.70	0.65	0.76	0.74	0.72

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
PAS	GS	Sage sparrow	EEIS BLM/FS	0.42	0.48	0.72	0.73	0.73	0.75	0.67	0.75	0.66
			EEIS Cum/Eff	0.39	0.67	0.68	0.69	0.69	0.71	0.67	0.62	0.70
			UCRB BLM/FS	0.42	0.48	0.72	0.73	0.73	0.75	0.67	0.75	0.66
			UCRB CumEff	0.39	0.64	0.68	0.68	0.67	0.71	0.67	0.62	0.70
PAS	GS	Sage thrasher	EEIS BLM/FS	0.46	0.49	0.68	0.72	0.72	0.73	0.62	0.73	0.68
			EEIS CumEff	0.44	0.64	0.64	0.65	0.64	0.66	0.62	0.73	0.66
			UCRB BLM/FS	0.48	0.80	0.70	0.74	0.74	0.76	0.64	0.78	0.69
			UCRB CumEff	0.47	0.61	0.62	0.65	0.64	0.66	0.62	0.65	0.69
PAS	GS	Vesper sparrow	EEIS BLM/FS	0.40	0.48	0.67	0.67	0.67	0.67	0.69	0.62	0.67
			EEIS CumEff	0.35	0.66	0.56	0.56	0.56	0.58	0.57	0.59	0.56
			UCRB BLM/FS	0.40	0.48	0.67	0.67	0.67	0.67	0.69	0.62	0.67
			UCRB CumEff	0.35	0.67	0.57	0.57	0.57	0.59	0.57	0.61	0.57
PAS	GS	Western meadowlark	EEIS BLM/FS	0.27	0.30	0.49	0.49	0.49	0.46	0.50	0.44	0.49
			EEIS CumEff	0.27	0.30	0.49	0.49	0.49	0.50	0.49	0.50	0.50
			UCRB BLM/FS	0.27	0.30	0.49	0.49	0.49	0.46	0.50	0.44	0.49
			UCRB CumEff	0.27	0.30	0.49	0.49	0.49	0.50	0.49	0.50	0.50
BSM	BAT	Fringed myotis	EEIS BLM/FS	0.51	0.58	0.71	0.63	0.67	0.72	0.64	0.70	0.72
			EEIS CumEff	0.51	0.59	0.40	0.49	0.49	0.56	0.46	0.69	0.67
			UCRB BLM/FS	0.48	0.58	0.70	0.62	0.62	0.62	0.74	0.65	0.72
			UCRB CumEff	0.51	0.59	0.42	0.50	0.49	0.56	0.48	0.67	0.66
BSM	BAT	Hoary bat	EEIS BLM/FS	0.42	0.57	0.65	0.86	0.63	0.76	0.75	0.79	1.00
			EEIS CumEff	0.42	0.73	0.71	0.65	0.71	0.70	0.64	0.75	0.69
			UCRB BLM/FS	0.42	0.55	0.62	0.78	0.77	0.75	0.69	0.85	0.97
			UCRB CumEff	0.42	0.73	0.59	0.62	0.64	0.68	0.64	0.74	0.68
BSM	BAT	Long-eared myotis	EEIS BLM/FS	0.49	0.61	0.60	0.76	0.64	0.73	0.57	0.77	0.80
			EEIS CumEff	0.49	0.66	0.64	0.72	0.66	0.71	0.61	0.76	0.70
			UCRB BLM/FS	0.49	0.61	0.58	0.76	0.62	0.67	0.67	0.77	0.80
			UCRB CumEff	0.49	0.66	0.64	0.66	0.66	0.71	0.67	0.77	0.71
BSM	BAT	Long-legged myotis	EEIS BLM/FS	0.48	0.65	0.68	0.73	0.70	0.65	0.64	0.62	0.69
			EEIS CumEff	0.48	0.52	0.46	0.66	0.39	0.56	0.46	0.72	0.68
			UCRB BLM/FS	0.48	0.65	0.72	0.69	0.67	0.69	0.59	0.65	0.79
			UCRB CumEff	0.48	0.52	0.46	0.59	0.59	0.56	0.46	0.70	0.52
BSM	BAT	Pale western big-eared bat	EEIS BLM/FS	0.52	0.53	0.54	0.47	0.58	0.47	0.60	0.55	0.55
			EEIS CumEff	0.52	0.56	0.43	0.49	0.50	0.54	0.40	0.57	0.56
			UCRB BLM/FS	0.52	0.53	0.54	0.47	0.59	0.46	0.60	0.54	0.61
			UCRB CumEff	0.52	0.55	0.44	0.49	0.50	0.54	0.40	0.56	0.56
BSM	BAT	Silver-haired bat	EEIS BLM/FS	0.54	0.54	0.72	0.75	0.62	0.69	0.70	0.62	0.69
			EEIS CumEff	0.49	0.69	0.62	0.73	0.73	0.86	0.64	0.83	0.73
			UCRB BLM/FS	0.54	0.54	0.74	0.67	0.66	0.71	0.90	0.66	0.66
			UCRB CumEff	0.49	0.69	0.62	0.73	0.73	0.85	0.64	0.84	0.73

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4]								
				H	C	A1	A2	A3	A4	A5	A6	A7
BSM	BAT	Spotted bat	EEIS BLM/FS	0.32	0.48	0.33	0.30	0.22	0.29	0.50	0.23	0.48
			EEIS CumEff	0.32	0.49	0.19	0.21	0.48	0.22	0.46	0.21	0.50
			UCRB BLM/FS	0.32	0.48	0.32	0.29	0.22	0.27	0.50	0.21	0.48
			UCRB CumEff	0.32	0.49	0.50	0.50	0.48	0.50	0.04	0.48	0.50
BSM	BAT	Western small-footed myotis	EEIS BLM/FS	0.40	0.46	0.46	0.78	0.78	0.78	0.46	0.78	0.60
			UCRB BLM/FS	0.40	0.46	0.46	0.78	0.78	0.78	0.46	0.78	0.60
BSM	SMM	Northern flying squirrel	EEIS BLM/FS	0.30	0.83	0.70	0.86	0.83	0.80	0.72	0.80	0.68
			EEIS CumEff	0.32	0.80	0.39	0.57	0.49	0.59	0.67	0.61	0.71
			UCRB BLM/FS	0.30	0.83	0.82	0.80	0.85	0.73	0.86	0.71	0.85
			UCRB CumEff	0.32	0.77	0.59	0.50	0.64	0.73	0.50	0.72	0.71
BSM	SMM	Pygmy rabbit	EEIS BLM/FS	0.64	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			UCRB BLM/FS	0.64	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
BSM	SMM	White-tailed jackrabbit	EEIS BLM/FS	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
			EEIS CumEff	0.40	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
			UCRB BLM/FS	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
			UCRB CumEff	0.40	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
C&U	CAR	American marten	EEIS BLM/FS	0.50	0.84	0.75	0.84	0.84	0.57	0.70	0.57	0.64
			EEIS CumEff	0.50	0.84	0.64	0.72	0.73	0.77	0.64	0.78	0.88
			UCRB BLM/FS	0.76	1.01	0.79	0.88	0.88	0.64	1.00	0.64	0.64
			UCRB CumEff	0.76	0.87	0.75	0.83	0.83	0.81	0.79	0.87	0.79
C&U	CAR	Fisher	EEIS BLM/FS	1.01	0.44	0.39	0.58	0.59	0.85	0.35	0.85	0.75
			EEIS CumEff	1.01	0.40	0.27	0.40	0.24	0.40	0.24	0.40	0.70
			UCRB BLM/FS	0.75	0.75	0.70	0.67	0.67	0.67	0.75	0.67	0.70
			UCRB CumEff	0.75	0.44	0.51	0.48	0.42	0.49	0.42	0.59	0.72
C&U	CAR	Gray wolf	EEIS BLM/FS	0.64	0.68	0.70	0.67	0.70	0.67	0.70	0.69	0.71
			EEIS CumEff	0.70	0.78	0.72	0.78	0.72	0.82	0.72	0.89	0.93
			UCRB BLM/FS	0.52	0.75	0.79	0.75	0.79	0.75	0.78	0.76	0.78
			UCRB CumEff	0.52	0.99	0.63	0.68	0.66	0.68	0.63	0.72	0.77
C&U	CAR	Grizzly bear	EEIS BLM/FS	0.73	0.69	0.58	0.59	0.59	0.57	0.58	0.57	0.78
			EEIS CumEff	0.63	0.38	0.24	0.27	0.27	0.27	0.27	0.29	0.65
			UCRB BLM/FS	0.61	1.18	1.03	1.07	1.03	1.08	1.03	1.19	1.22
			UCRB CumEff	0.67	0.47	0.40	0.44	0.44	0.47	0.40	0.75	0.92
C&U	CAR	Lynx	EEIS BLM/FS	0.45	0.69	0.50	0.50	0.78	0.50	0.51	0.78	0.79
			EEIS CumEff	0.45	0.50	0.51	0.51	0.51	0.51	0.30	0.50	0.50
			UCRB BLM/FS	0.45	0.69	0.50	0.50	0.78	0.50	0.51	0.85	0.78
			UCRB CumEff	0.45	0.49	0.51	0.51	0.51	0.51	0.30	0.50	0.50
C&U	CAR	Wolverine	EEIS BLM/FS	0.45	0.69	0.58	0.59	0.59	0.57	0.58	0.57	0.64
			EEIS CumEff	0.84	0.49	0.00	0.22	0.00	0.24	0.00	0.24	0.79
			UCRB BLM/FS	0.45	0.83	0.89	0.90	0.89	0.92	0.90	0.92	0.86
			UCRB CumEff	0.84	0.20	0.14	0.30	0.14	0.27	0.14	0.30	0.85

Panel[1]	Group[2]	Species Name	Area[3]	Period / Alternative[4] H	C	A1	A2	A3	A4	A5	A6	A7
C&U	UNG	California bighorn sheep	EEIS BLM/FS	0.50	0.49	0.49	0.50	0.49	0.49	0.50	0.49	0.30
			EEIS CumEff	0.50	0.46	0.46	0.49	0.46	0.46	0.49	0.46	0.30
			UCRB BLM/FS	0.50	0.49	0.49	0.50	0.49	0.49	0.50	0.49	0.30
			UCRB CumEff	0.50	0.46	0.46	0.49	0.46	0.46	0.49	0.46	0.30
C&U	UNG	Pronghorn	EEIS BLM/FS	0.45	0.50	0.63	0.63	0.49	0.46	0.63	0.46	0.63
			EEIS CumEff	0.45	0.70	0.64	0.64	0.64	0.64	0.64	0.64	0.64
			UCRB BLM/FS	0.45	0.67	0.64	0.64	0.48	0.46	0.64	0.46	0.64
			UCRB CumEff	0.45	0.49	0.64	0.64	0.64	0.64	0.64	0.64	0.64
C&U	UNG	Woodland caribou	EEIS BLM/FS	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			EEIS CumEff	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			UCRB BLM/FS	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
			UCRB CumEff	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50

[1]Panel - BSM - bat and small mammal panel; CAV - cavity nesting woodpeckers, swifts, and nuthatches; C&U - mammalian carnivore and ungulate panel; HER - amphibian and reptile panel; PAS - passerine and other birds; RGB - raptor and game bird panel; WAT - waterbird and shorebird panel.

[2]Group - Group within panel: AMP - amphibian; REP - reptile; FOR - forest passerine; WD - woodland passerine; GS - grassland & shrub passerine; RIP - riparian passerine; RAP - raptor; GMB - gamebird; BAT - bat; SMM - small mammal; CAR - carnivore; UNG - ungulate.

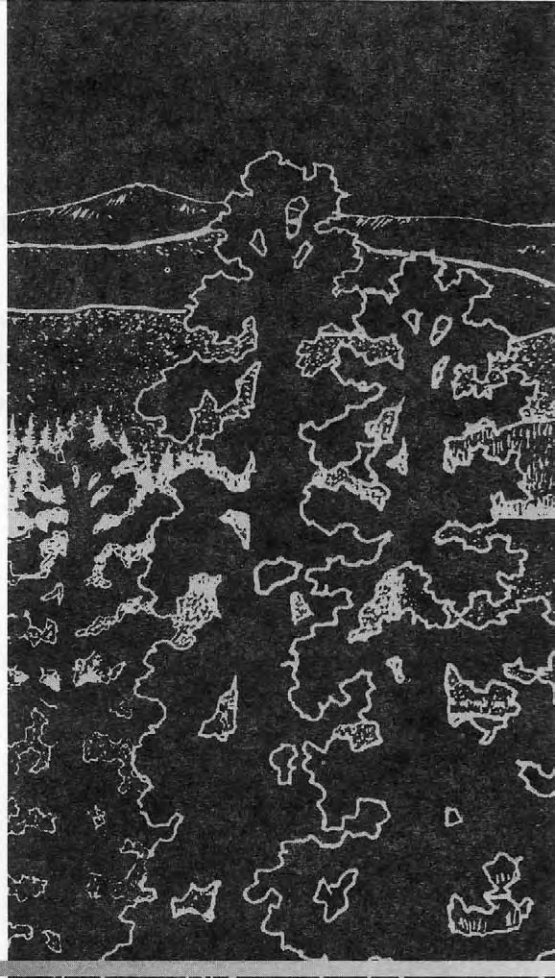
[3]Area - EEIS BLM/FS - Eastern Oregon and Washington planning area, BLM and Forest Service lands only; EEIS CumEff - all lands in Eastern Oregon and Washington planning area; UCRB BLM/FS - Upper Columbia Basin planning area, BLM and Forest Service lands only; UCRB CumEff - all lands in Upper Columbia Basin planning area.

[4]Period / Alternative - H - historical pre-European settlement period; C - current; A1 - alternative 1; A2 - alternative 2; etc.

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CHAPTER 5

Economic Evaluation of the Preliminary Draft EIS Alternatives

Richard W. Haynes
Amy L. Horne
Nicholas E. Reyna



Richard W. Haynes and **Amy L. Horne** are research foresters with the USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon 97208.

Nicholas E. Reyna is a forester with the USDA Forest Service, Pacific Northwest Region, Walla Walla, Washington 99362.

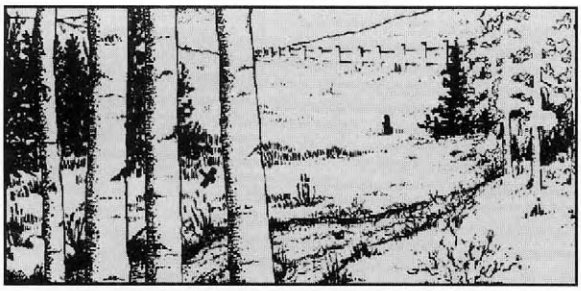


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Economic Overview

This economic evaluation of the preliminary draft Environmental Impact Statement (EIS) alternatives is based on data, methods, and analysis reported in the Economic Assessment chapter (Haynes and Horne, in press) of the *Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Quigley and Arbelbide, in press). It begins with a summary of our findings about the current economic condition of the Basin.[1] We then examine the primary and secondary effects of each alternative using measures of outputs provided by the EIS teams [animal unit months (AUMs), Recreation Opportunity Spectrum (ROS) acres, timber harvest, and unroaded areas].[2] We identify effects on specific economic sectors for the Basin as a whole and for particular counties. Using the concept of economic resiliency, we discuss the impact of the alternatives against the backdrop of the changing Basin economy. We then evaluate the effect of the alternatives on efficient use of Federal land resources in which efficiency is defined as the benefits provided, not cash flows. In the final section, we discuss the effects of the alternatives on the distribution of costs and benefits among the American people.

The Basin is currently enjoying robust economic growth. Per capita income is growing faster than the national rate in Idaho, Oregon, and Washington (but not in Montana). Poverty rates are lower than the United States average. Unemployment rates in Idaho and Montana are lower than the U.S. average. Earnings per job are increasing faster than the U.S. average in all of the Basin states except Idaho (Haynes and Horne, in press). Except for Montana, the difference in per capita income between metropolitan and non-metropolitan counties is less than the average for the United States. Employment growth in the Basin has averaged 2 percent per year for the past two decades.

The Basin supports a diversity of lifestyles, but those based on agriculture are a significantly higher proportion than in the nation. Farm owners, tenants, rural farm-town families, and ranch families represent 19 percent of all households in the Basin, compared with 2 percent in the nation (Claritas Corporation 1994). This supports the perception that the Basin is more rural in character than are other regions in the United States.

An important determinant of recent economic growth in the Basin is population change. Between 1990 and 1994, 96 of the 100 counties increased in population, reversing the trend of the 1980s (McCool and Haynes 1996). The fastest growing economic sectors are services (including health, business, education, and law), trade, FIRE (finance, insurance, and real estate), and transportation. Manufacturing (including timber, plywood, and paper), farming, and especially the government sector continue to hold steady or to lose jobs. These trends have been viewed by some as a general decoupling of rural economies from traditional resource extraction and associated manufacturing activities (Galston and Baehler 1995). Regulatory and management challenges are increasingly driven by population growth and its associated residential developments and demand for public services. For the Forest Service (FS) and Bureau of Land Management (BLM), the increase in residences adjacent to Federal lands elevates the costs and political stakes of fire suppression.

This recent population growth is changing the economic character of the Basin by diversifying its human capital[3] and increasing its economic

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades in Oregon and Washington and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Unless otherwise noted output measures come from other staff areas and are described in project documents and science materials; on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[3]Economists consider capital to broadly include how new knowledge increases human ability to produce goods and services.

resiliency.[4] Twenty-one non-metropolitan counties with significant recreation opportunities have very high growth rates due to in-migration (Johnson and Beale 1995). The six metropolitan counties have more moderate growth rates. The 77 counties that are in neither the recreation nor the urban category are experiencing slower rates of growth. The 21 recreation counties account for 24 percent of the total population increase in the Basin and 29 percent of the total net migration (McCool and others, in press). Some rural counties are growing rapidly because they attract retirees and people whose lifestyles appear to be more oriented toward the natural environment, who have occupations related to natural resources, or who enjoy recreation activities.

Of the Federal land uses in the Basin that we could evaluate, recreation has the highest value, followed by timber, and then range. Fifteen percent of employment in the Basin is attributable to recreation and FS- and BLM-administered lands supply 80 percent of the recreation net economic benefit (Haynes and Horne, in press). Traditional natural-resources jobs (mining, wood products manufacturing, and ranching) currently account for 4 percent of employment in the Basin. Further detail on each of these sectors is described in the following sections.

Recreation supports more than 200,000 jobs in the Basin and provides approximately $1.2 billion in economic benefits when measured using willingness to pay (Haynes and Horne, in press). Hunting, motor viewing, and day use are the recreational activities that support the greatest number of jobs, while recreational fishing, day use, winter sports, hunting, and camping provide the greatest value in terms of willingness to pay (Haynes and Horne, in press). Although these economic effects are considerable, the Federal Government and other local governments in the Basin receive little financial benefit for providing recreational experiences. The financial benefits of recreational spending accrue mainly to private sector enterprises that provide food, lodging, equipment, supplies, or outfitting/guiding services. Per acre value of recreation use in the Basin is highest on the eastern slope of the Cascade Mountains—the area closest to the population centers in western Oregon and Washington. The overall condition of scenery in the Basin contributes to the quality of recreational experiences; five Ecological Reporting Units (ERUs) (Northern Great Basin, Owyhee Uplands, Upper Snake, Snake Headwaters, and Central Idaho Mountains) may be the most visually intact, unmodified areas in the contiguous United States (McCool and others, in press).

Livestock grazing has been a longstanding use of Federal lands in the region. In the past two decades, ranching industry consolidations and a long-term shift to grain-fed beef have reduced the number of producers in the Basin. About 21,000 people are currently employed in ranching operations. Ranchers in the Basin rely on Federal lands for 7 percent of their annual forage needs, although the reliance on Federal forage is higher during the spring and summer seasons.

Employment in mining and manufacturing are less important in the Basin than for the nation as a whole. Timber manufacturing accounts for roughly 40,000 jobs or approximately 20 percent of the manufacturing jobs in the Basin. It is most important in the eastern Oregon economy as well as locally significant in a number of small communities in northern and central Idaho, northeastern Washington, and western Montana. In 1991, the Basin accounted for 12 percent of softwood harvest in the United States. That year, the National Forests provided 46 percent of the timber harvest in the Basin (the contribution of BLM-administered lands to timber harvest in the Basin was negligible).

[4]Resiliency is defined as adaptability to change (Haynes and others 1996). Economic systems with high resiliency are those capable of absorbing external shocks, such as a recession, and rebounding in terms of system indicators, such as total employment and per capita income.

Evaluation of the Alternatives

This evaluation of the seven preliminary draft EIS alternatives answers three questions which together constitute a comprehensive economic analysis of the alternatives. The first question is "what would be the effect of the alternatives on economic well-being in the Basin?" The traditional measure of effects on economic well-being is job impacts. This, however, is a poor proxy because it fails to adequately consider the dynamic, temporal dimension of economies. We attempt to incorporate this dimension using the measure of economic resiliency. The second question is "what would be the effect of the alternatives on economic efficiency, or the values provided to society by the FS- and BLM-administered lands in the Basin?" Our answer provides a rough benefit-cost analysis of the alternatives. The third, "what would be the effect of the alternatives on equity, or the distribution of benefits throughout society?" addresses the question of who gains and who loses.

Haynes and Horne (in press) conducted analyses at three spatial scales: national, the study area (the Basin), and two sets of subregions [ERUs for summarizing ecosystem outputs, and Bureau of Economic Analysis (BEA) areas[5] for evaluating economic activity]. We add a fourth spatial scale in this analysis, the county, in order to identify more local impacts under the preliminary draft EIS alternatives. For reference, map 5.1 shows the counties found within the Basin. This evaluation considers results of the first decade of implementation (1995-2005) because it is the standard timeframe for evaluating EIS alternatives, and because we have greater confidence in our projections over a 10-year period than for longer time spans. We considered Alternative 2 closest to continuation of current activity since it set harvest at 1993 levels, and maintained existing road networks and grazing levels expected under current policy. Alternatives 1 and 5 assumed higher levels of timber harvest. The road building that would accompany these higher levels would also affect recreation activity and unroaded areas.

Economic Activity

The effects of the seven preliminary draft EIS alternatives on the regional economies of the Basin are subtle. The alternatives affect 0.1 percent of all jobs in the Basin, or 1.0 percent of those based on FS- and BLM-administered lands. Differences in economic resiliency may be observable during the first decade after implementation in 4 of the 100 counties in the Basin (Adams County, Idaho; Lincoln County, Montana; and Grant and Lake Counties, Oregon). However, larger and more numerous differences might be observable over several decades, depending on which alternative is chosen. The question of the impacts on economic activity can be divided into three parts: direct job impacts; counties; and economic resiliency.

Direct jobs—The alternatives will probably have little effect on the total number of jobs supported by resources from BLM- and FS-administered lands. In 1990 there were 1.5 million jobs in the Basin, and jobs were expected to increase by 110,000 during the 1990s (Haynes and Horne, in press). Of that 1.5 million, FS- and BLM-administered lands support roughly 240,000 jobs, of which 94 percent is in recreation, 5 percent in timber, and 1 percent in range. The number of jobs associated with the various alternatives is within 1 percent of the number expected under continuation of current plans (Alternative 1). The main effect of the alternatives would be to switch relatively few jobs between those in the range and timber sectors, to those supported by recreation activity.

Our focus on employment is as a proxy for economic well-being. It also does not recognize the potential for timber-sector jobs to have higher incomes than jobs in the recreation sector. Often timber jobs are thought to have a more positive impact on local economies than recreation jobs because they have higher income multipliers. But

[5]These are multi-county areas based on commuting patterns defined by the Bureau of Economic Analysis (BEA).

this approach is static, assuming no change in the economy other than that affected by policy. This ignores the reality that economies are dynamic and interactions at regional, national, and international scales may overwhelm or offset any impact of FS and BLM decisions. Because of this, we are more concerned about the effect of FS and BLM decisions on the ability of an economy to adapt to change. Further, a complete comparison of the economic development impacts of recreation versus manufacturing requires consideration of more than income multipliers. This is because personal income is derived from investments and transfers as well as from earned income. In recreation counties, per capita income is higher than in manufacturing counties in part because they attract people who derive a greater proportion of their income from non-salary sources (Haynes and Horne, in press).

Range jobs—The alternatives would probably have relatively small effects on ranching jobs over the next decade because FS- and BLM-administered lands provide only 7 percent of the forage for cattle and sheep in the Basin. Small reductions from current levels are expected even with no change in policy (Alternative 2) reflecting recent unrelated changes in management. For the Basin as a whole, Alternatives 3, 4, and 6 do not affect range jobs relative to Alternative 2. Alternative 5 may increase range jobs by 100, while Alternative 7 may decrease range jobs by 400. In the EEIS, Alternative 5 may increase range jobs by 100, and Alternative 7 may decrease range jobs by 100. In the UCRB, no effect on range jobs is foreseen for any Alternative except 7 which may decrease range jobs by 300.

Range jobs were calculated by multiplying the number of animal unit months (AUMs) after 10 years under each alternative by the number of jobs per AUM. The midpoints of reductions in Federal AUMs for each alternative were:[6]

Alternatives	AUMs	Reduction
	Thousands	Percent
1	272	9.5
2	315	11
3	287	10
4	315	11
5	100	3.5
6	315	11
7	1,433	50

The number of AUMs after a decade was then determined by subtracting their reductions from our most recent number of AUMs on BLM- and FS-administered lands in the Basin (2.86 million AUMs in 1993[7]). The projected number of AUMs was apportioned between the two EIS planning areas and federal agencies according to the 1993 distribution:

	UCRB	EEIS	Total
	------ Millions ------		
FS	1.01	0.29	1.30
BLM	1.10	0.46	1.56
Total	2.11	0.75	2.86

The number of jobs per AUM was calculated to be 0.00036. This was determined by multiplying an earlier estimate of 0.0003 (Haynes and others 1992) by 1.2 to account for the seasonal pattern of Federal allotments. The factor of 1.2 was derived by assuming: a constant herd size, that Federal grazing reductions during spring and summer grazing seasons could be offset from other feed sources by 10 percent, and a fixed seasonal pattern for Federal grazing allotments.[8] This means that there would be no forage substitution for 20 percent of the AUMs, and there would be a consequent 20 percent increase in the effect on

[6]Thomas G. Miles and Michael G. Karl developed these estimates. Their assumptions and methods are documented in a February 26, 1996 memo. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[7]Data on file with: the U.S. Department of Agriculture, Forest Service, Forestry Sciences Laboratory, 1221 SW Yamhill, PO Box 3890, Portland, OR 97208.

[8]The seasonal distribution of public grazing allotments for Oregon, Washington, Idaho, and Montana average 34, 33, 23, and 10 percent in the spring, summer, fall, and winter seasons (see table 6.15 in Haynes and Horne, in press).

jobs of a reduction in Federal AUMs. We also assumed that jobs per AUM would remain constant over the next decade.

Recreation jobs—The alternatives may have a more substantial and positive effect on jobs associated with recreation activity over the next decade. Alternatives 3, 4, 6, and 7 would have no effect relative to Alternative 2. Alternative 1 would decrease jobs by 8,000, 75 percent of which would occur in the UCRB planning area (see table 5.1). The 6,600 decrease in recreation jobs associated with Alternative 5 would be more modest, 80 percent of which would occur in the UCRB planning area. These near-term decreases would result because Alternatives 1 and 5 assume more road construction than Alternative 2. As the population becomes more elderly in the future, lower road densities may decrease recreation activity.

Recreation jobs were calculated by multiplying estimates of recreation activity after 10 years under each alternative by the number of jobs supported by that activity. Recreation activity was determined from estimates of the number of acres in each Recreation Opportunity Spectrum[9] class under each alternative and population projections for Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming in the year 2005 (U.S. Department of Commerce 1992). Alternatives 2, 3, 4, 6, and 7 would maintain the current distribution of ROS acres. Roaded natural acres would increase under Alternative 5 and even more so under Alternative 1. With these inputs of population and ROS acres, we used a recreation model described in Haynes and Horne (in press), to calculate the number of activity days occurring on FS- and BLM-administered lands in each ERU for each of the 12 recreation activities. These numbers were then apportioned from ERUs to BEA areas.

The recreation response coefficients, or number of jobs per recreation activity day for each of 12 recreation activities for each BEA area, were obtained from Greg Alward (see appendix 6-B in Haynes and Horne, in press). These were computed from direct expenditures for items such as food, lodging, transportation, fishing guides, and ski lift tickets. These response coefficients are quite small; for example, 1,000 camping activity days in the Boise BEA area generate half of one job. In some parts of the Basin, however, the magnitude of recreation activity generates a substantial number of jobs. To simplify this calculation, we assumed that expenditures that do not occur in the same BEA area as recreation activities will offset each other.

We can infer a barrier to implementation from our analysis. Recreation and unroaded areas are highly valuable outputs from FS- and BLM-administered lands in the Basin (Haynes and Horne, in press; also see the following "Economic Efficiency" section of this chapter). If the chosen alternative is perceived as a threat to the recreation opportunities and unroaded areas provided by these lands, negative public opinion may inhibit implementation.

For two reasons we are less certain about the absolute magnitude of recreation jobs illustrated in our analysis results than the relative differences between alternatives. The first reason is that we believe that more acres would shift from roaded natural to primitive/semi-primitive settings than are shown in this analysis. These numbers were derived by assuming no decrease in roaded natural settings from current conditions under Alternatives 2, 3, 4, 6, and 7, minor increases under Alternative 5, and the largest increases under the continuation of current management. Yet, National Forests are currently implementing policies to close roads and there are concerns about maintaining the existing road network given limited budgets. The second reason is that we think the recreation response coefficients probably overestimate the number of jobs associated with recreation activity.

[9]There were three ROS classes used: natural, primitive/semi-primitive, and rural/urban. The FS- and BLM-administered lands in the Basin were divided among the three classes as 59, 40, and 1 percent, respectively.

Map 5.1 — Map of the counties found within the Basin.

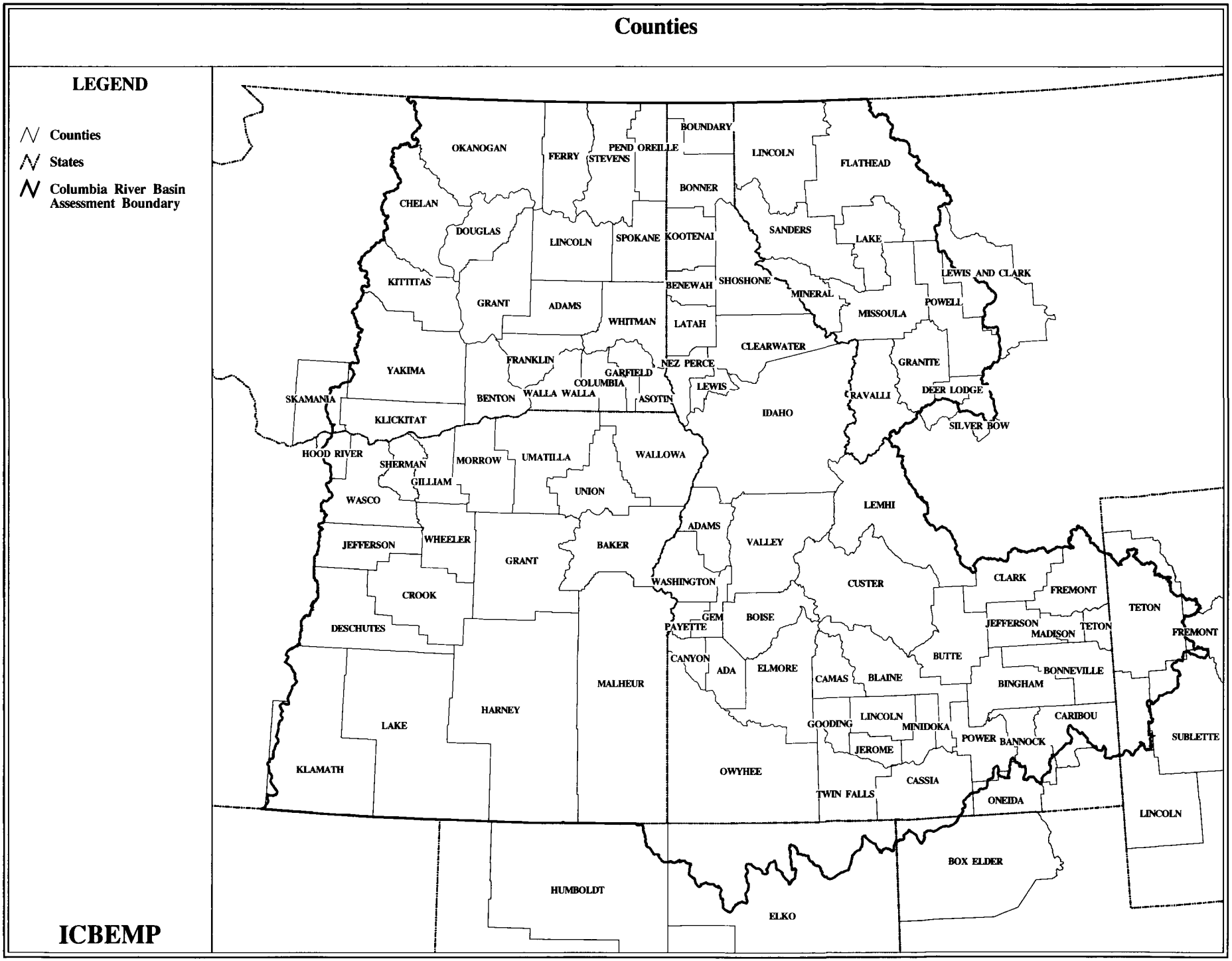


Table 5.1— Employment levels based on Federal lands in the Basin[1] by EIS planning area (EEIS, UCRB), and employment sectors.

Area[2]/Sectors	Alternative 1	2	3	4	5	6	7
	Thousands of jobs						
EEIS							
Range	0.2	0.2	0.2	0.2	0.3	0.2	0.1
Recreation	105.9	107.9	107.9	107.9	106.6	107.9	107.9
Timber (SIC 24)[3]	13.1	6.1	5.6	5.9	7.1	4.8	2.4
Total EEIS	119.2	114.2	113.7	114	114	112.9	110.4
UCRB							
Range	0.7	0.7	0.7	0.7	0.7	0.7	0.4
Recreation	113.4	119.3	119.3	119.3	119.3	119.3	119.3
Timber (SIC 24)[3]	8.6	6.4	8.7	7.3	10.8	4.7	3.4
Total UCRB	122.7	126.4	128.7	127.3	130.8	124.7	123.1
Basin							
Range	0.9	0.9	0.9	0.9	1.0	0.9	0.5
Recreation	219.3	227.3	227.3	227.3	225.9	227.3	227.3
Timber (SIC 24)[3]	21.7	12.5	14.3	13.2	17.9	9.5	5.8
Timber (SIC 08)[4]	0.2	0.1	0.1	0.1	0.1	0.1	0
Total Basin	242.1	240.8	242.6	241.5	244.9	237.8	233.6

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2]Area: EEIS - Eastern Oregon and Washington planning area; UCRB - Upper Columbia River Basin planning area.

[3]SIC 24 Employment computed using midpoint values for timber harvest from the EIS activity tables.

[4]SIC 08 Number of forestry workers.

Timber jobs—The effects on timber jobs over the next decade would be of similar magnitude as recreation but would vary more widely. Using Alternative 2 as an approximation of current harvest, estimates range from a loss of 6,700 jobs to a gain of 5,400 jobs depending on the alternative (table 5.1). This approach estimates only the direct employment effects, and does not assume offsetting increases in harvest from non-Federal lands. In the EEIS planning area, all alternatives (except for Alternative 5) would reduce wood products employment levels relative to those expected under Alternative 2. The situation in the UCRB planning area would be quite different however, where only Alternatives 6 and 7 would have negative impacts on employment. Alternatives 3, 4, and 5 would have positive impacts on timber employment relative to the 1993 employment levels.

Timber jobs were calculated using the same approach used in FEMAT (1993) by multiplying the estimates of timber harvest by the number of jobs per thousand board feet. We assumed no offsetting increases in harvests from non-Federal lands. Initial estimates of the average annual timber harvest for each ERU were projected for the next decade using the Columbia River Basin

SUccession Model (CRBSUM).[10] We used the midpoints of the Federal timber harvests estimated by the EIS team (based on the data in table 5.2) for each alternative.

The direct employment multiplier, or number of jobs per thousand board feet, was determined by dividing current employment in the wood and forest products industry [Standard Industrial Code (SIC) 24] by current timber harvest. The number of forestry workers (SIC 08) required for the precommercial thinning assumed in the CRBSUM model runs was estimated using 30 jobs per $1 million of labor expenditures.[11] As in the FEMAT approach, we assumed no job changes for the pulp and paper industry (SIC 26) because this sector would not be directly affected by change in timber harvest from FS- and BLM-administered lands.

To put these timber job impacts in perspective, it should be noted that the variability among alternatives is within the range of recent industry changes. Jobs attributable to total timber harvest and from FS- and BLM-administered lands are shown in the following tabulation:

	EEIS		UCRB	
Year	Total	Federal	Total	Federal
	- - - - - - - - - Thousands - - - - - - - - -			
1982	16.5	7.4	18.2	5.7
1986	20.5	12.1	21.2	7.8
1990	23.1	11.3	21.8	7.7
1993	21.2	7.5	21.0	5.6

For several reasons, we are not sure that the timber harvest levels estimated for the preliminary draft EIS alternatives will be realized. First, some of the timber harvest projected by CRBSUM assumed helicopter logging that at current (Spring, 1996) prices and costs will not likely be sold. This volume could amount to between 9 and 15 percent of the potential sale volume. Consideration may need to be given to other, less costly, logging systems.

A second reason that this timber may not be sold is because of low average harvest diameters. We examined this by subtracting precommercial thinnings from total harvest (because these trees are not taken to mills) and calculating the diameter at breast height (DBH) of the remainder. The resulting average harvest diameters (in inches) are:

	Alternative						
	1	2	3	4	5	6	7
EEIS	8.9	9.3	9.1	9.2	9.1	9.2	NA
UCRB	8.8	9.0	9.3	9.3	9.1	9.4	NA

Given these diameters, many sales will not meet current standards for economic viability in which sales must have at least 40 percent of their volume in sawtimber (12 inches DBH or greater), either green or recently dead. Commercial viability of salvage sales is even more questionable because the value of dead sawtimber drops rapidly, especially for pines. Trees with diameters less than 8 inches are likely to sell only during periods with high chip prices (such as in 1994 and early 1995).

Third, the costs of the management actions assumed in various alternatives may be prohibitive. The precommercial thinning contained in the CRBSUM model runs are extremely costly. Assuming $110 per acre, the annual costs of precommercial thinning for the alternatives are $7.29, $2.98, $4.76, $4.86, $4.81, $4.11, and $0.06 millions of dollars, respectively. Alternative 1 would cost $72.9 million for the first decade.

Managers should not assume that rising stumpage prices will increase revenues sufficiently to cover the costs of such management actions. We do not expect the rapid stumpage price increases of the early 1990s to continue. Rather, for the next few

[10]Steve Rheinberger developed a PARADOX database from volume and stand information sampled from selected CRBSUM pixels throughout the forested areas of the Basin. His assumptions are documented in reports dated November 6, 1995 and March 3, 1996. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[11]Total expenditures were reduced by 20 percent for non-labor costs.

years prices are expected to increase by 1 to 2 percent per year (in real terms) (Haynes and others 1995). Given the difficulty that the FS and BLM had selling timber early in 1996, agency revenue may be difficult to maintain through timber sales.

Counties—The second question concerning the impacts on economic activity focuses on the effects of changes in Federal land management in various counties in the Basin. Estimating the economic impacts associated with the preliminary draft EIS alternatives is only one step in the process. The next step involves identifying where these impacts might be concentrated, so that eventually the effectiveness of specific actions to mitigate impacts can be assessed. To identify the location of impacts, we focused on the 63 counties in the Basin that the Economic Research Service has classified as "Federal land"—meaning at least 33 percent of their area is managed by federal agencies. We used information from Haynes and Horne (in press) to identify those counties in which activities associated with FS and BLM range, recreation, or timber outputs are important components of the Basin economy. Counties reliant on Federal range were those in which at least 12 percent of total agriculture sales were dependent on forage from Federal lands.[12] For recreation, we used those counties within the Basin identified by Johnson and Beale (1995) as having a significant component of the economy associated with recreation activity. We assumed that impacts would be felt in recreation counties within BEA areas where recreation jobs might change by more than 4 percent. Changes experienced at the BEA level are likely to be most pronounced in recreation counties. We assumed Federal timber harvest levels could affect the economies of counties in which the 29 isolated timber-dependent communities are located (see Haynes and Horne, in press, for details).

Effects—Using assumptions described above, we found that 39 counties may be affected by federal land management actions. Ten of these counties may be affected by decisions regarding grazing on FS- and BLM-administered lands (table 5.3). Given that a maximum difference of 500 range jobs across the entire Basin may result from the alternatives, potential impacts are not likely to be significant except to the economies of the 10 counties reliant on range. These 10 counties share some interesting characteristics. In addition to their reliance on Federal forage, they are sparsely populated, having an average population density of 1.7 people per square mile. Reflecting higher Federal forage use in the UCRB planning area, 8 out of 10 range counties are in the UCRB area. There are two important differences between these counties. First, three counties (Sublette County, Wyoming; and Lemhi and Valley Counties, Idaho) have medium levels of economic resiliency, while the other counties have low economic resiliency. The second important difference is that 4 of these 10 range counties are also classified as recreation counties (Valley and Lemhi Counties, Idaho; and Sublette and Teton Counties, Wyoming). Of these counties, only Teton County, Wyoming has low economic resiliency.

For the 21 recreation counties, jobs associated with recreation activity in 8 may decrease under Alternative 1 compared with Alternative 2 (table 5.4). This is because of the assumption that this alternative would result in less primitive and semiprimitive acres than under Alternative 2. Alternative 5 would result in more modest job decreases, thus only five counties are identified as experiencing a negative impact (Bonner, Kootenai, Benewah, Blaine, and Camas Counties, Idaho). We were unable to estimate job impacts in four counties (Fremont and Sublette Counties, Wyoming; and Humboldt and Elko Counties, Nevada) because they lie outside the BEA areas, the units for which we could calculate effects.

[12]Originally we used 10 percent, but in sorting the counties there was a natural break between 10 and 12 percent reliance. Three counties (Ferry County, Washington; and Wallowa and Lake Counties, Oregon) were greater than 10 percent but fell just below the break in data. Given the number of prospective job losses, we decided to focus on fewer rather than more counties.

Table 5.2 — Timber harvest in the Basin[1] by ecological reporting unit (ERU), EIS planning area (EEIS, UCRB), preliminary draft EIS alternatives (1 through 6),[2] and annual average 1995 to 2005.

Area[3]	Alternative					
	1	2	3	4	5	6
	Million cubic feet					
Northern Cascades	33.99	10.90	21.05	20.89	20.24	18.83
EEIS	33.99	10.90	21.05	20.89	20.24	18.83
UCRB	0	0	0	0	0	0
Southern Cascades	48.22	35.18	22.00	21.70	25.06	21.42
EEIS	48.22	35.18	22.00	21.70	25.06	21.42
UCRB	0	0	0	0	0	0
Upper Klamath	51.48	30.85	27.43	27.63	27.63	27.38
EEIS	51.48	30.85	27.43	27.63	27.63	27.38
UCRB	0	0	0	0	0	0
Northern Great Basin	33.72	20.24	13.72	13.87	13.87	14.23
EEIS	33.72	20.24	13.72	13.87	13.87	14.23
UCRB	0	0	0	0	0	0
Columbia Plateau	31.15	14.62	17.34	17.48	18.20	15.58
EEIS	25.17	12.81	14.78	14.90	15.57	13.22
UCRB	5.98	1.81	2.56	2.580	2.63	2.36
Blue Mountains	84.16	48.34	36.89	37.46	37.59	36.39
EEIS	82.48	47.96	36.04	36.54	36.76	35.67
UCRB	1.68	0.38	0.85	0.92	0.83	0.72
Northern Glaciated Mountains	179.12	113.95	94.23	67.90	129.36	62.10
EEIS	48.88	34.43	20.73	17.98	30.96	15.79
UCRB	130.24	79.52	73.50	49.92	98.40	46.31
Lower Clark Fork	150.67	61.80	96.77	63.60	105.79	60.92
EEIS	0	0	0	0	0	0
UCRB	150.67	61.80	96.77	63.60	105.79	60.92
Upper Clark Fork	25.42	11.34	13.38	13.59	12.62	9.96
EEIS	0	0	0	0	0	0
UCRB	25.42	11.34	13.38	13.59	12.62	9.96
Owyhee Uplands	0.55	0.37	0.39	0.39	0.39	0.35
EEIS	0.20	0.24	0.08	0.08	0.08	0.08
UCRB	0.35	0.13	0.31	0.31	0.31	0.27
Upper Snake	0.50	0.04	0.07	0.07	0.06	0.20
EEIS	0	0	0	0	0	0
UCRB	0.50	0.04	0.07	0.07	0.06	0.20
Snake Headwaters	1.53	0.27	0.59	0.66	0.60	0.49
EEIS	0	0	0	0	0	0
UCRB	1.53	0.27	0.59	0.66	0.60	0.49
Central Idaho Mountains	152.08	47.37	56.36	58.54	50.89	48.55
EEIS	0	0.11	0.03	0.03	0.03	0
UCRB	152.08	47.26	56.33	58.51	50.86	48.55
Total	792.59	395.27	400.22	343.78	442.30	316.40
EEIS	324.14	192.72	155.86	153.62	170.20	146.62
UCRB	468.45	202.55	244.36	190.16	272.10	169.78

[1] The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

[2] Alternative 7 is not included in this table because there is no timber harvest activity under that alternative.

[3] Area: EEIS - Eastern Oregon and Washington planning area; UCRB - Upper Columbia River Basin planning area.

Table 5.3 — Economic evaluation of the preliminary draft EIS alternatives for their effects in 13 counties reliant on Federal forage within the Basin.[1]

	Alternative						
County	1	2	3	4	5	6	7
Custer, ID	0	0	0	0	0	0	–
Sublette, WY	0	0	0	0	0	0	–
Adams, ID	0	0	0	0	0	0	–
Teton, WY	0	0	0	0	0	0	–
Harney, OR	0	0	0	0	0	0	–
Lemhi, ID	0	0	0	0	0	0	–
Valley, ID	0	0	0	0	0	0	–
Camas, ID	0	0	0	0	0	0	–
Grant, OR	0	0	0	0	0	0	–
Owyhee, ID	0	0	0	0	0	0	–
Wallowa, OR	0	0	0	0	0	0	0
Ferry, WA	0	0	0	0	0	0	0
Lake, OR	0	0	0	0	0	0	0

0 = No Change; – = Negative Impact; + = Positive Impact

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

Assumptions:
(1) The bulk of the impacts are assumed to affect counties in the UCRB, as 74% of the Federal AUMs are there.
(2) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(3) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

As mentioned previously, four recreation counties are also identified as reliant on Federal range. This suggests a possible complementary relation between ranching and recreation, as ranching can provide attractive settings in keeping with the western image. None of the identified timber-reliant counties are also classified as recreation counties.

We identified 16 counties in which the 29 timber-dependent communities are located: 8 counties have 1 timber-dependent community; 5 have 2 dependent communities; 1 has 3 dependent communities (Lincoln County, Montana); and, 2 have 4 dependent communities (Idaho County, Idaho; and Grant County, Oregon). The economic impacts are shown by county in table 5.5. Alternatives 4, 6, and 7 would have negative impacts on between 9 and 11 counties, most of which are in the EEIS area. The more modest timber reductions assumed under Alternatives 3 and 5 suggest more mixed results, with an increase in timber jobs in one-third of the counties, all of which are in the UCRB EIS area. We found reduced impacts either because of minor changes in Federal timber harvest levels (for example, in the Northern Glaciated Mountains ERU) or because some area mills have greater access to timber from private timberlands.

Economic resiliency—The third type of impact is the effect of changes in Federal land management on economic resiliency. In Haynes and Horne (in press), economic resiliency is defined in terms of economic diversity—the greater the diversity of economic sectors, the higher the economic resiliency. Greg Alward computed the basic indexes from diversity of employment data.[13] We divided the diversity indices into three

[13]Personal communication. 1995. Greg Alward, Land Management Planning Staff, U.S. Forest Service, Fort Collins, CO. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

categories, such that a third of the counties in the United States fell into each group: low diversity (0-70), medium diversity (71-77), and high diversity (78-100). Using the ranges established in this manner, we assigned ratings for the economic resiliency of each of the 100 counties in the Basin. We examined economic resiliency of the Basin in two ways: (1) weighted by its population, and (2) weighted by land area (see fig. 5.1). To judge the effects of the preliminary draft EIS alternatives, we used the population weighted measure of economic resiliency because it varied directly with population levels and attributes.

Effects—In general, the economic resiliency of the Basin is high relative to other parts of the United States, although it varies across different subregions in the Basin due in part to the size of the area and diversity of existing biophysical conditions. In figure 5.1, the bar chart on the left shows economic resiliency weighted by population. It shows that 53 percent of the human population lives in counties with high economic resiliency. The bar chart on the right of figure 5.1 shows resiliency weighted by area; it shows that 55 percent of the land area of the Basin has low economic resiliency. The 53 percent of the population that enjoys high economic resiliency lives on 15 percent of the Basin's area (fig. 5.1).

Table 5.4 — Economic evaluation of the preliminary draft EIS alternatives for their effects in counties identified as recreation counties by Johnson and Beale (1995).

	Alternative						
County	1	2	3	4	5	6	7
Bonner, ID	–	0	0	0	–	0	0
Kootenai, ID	–	0	0	0	–	0	0
Benewah, ID	–	0	0	0	–	0	0
Flathead, MT	0	0	0	0	0	0	0
Teton, ID	–	0	0	0	0	0	0
Lemhi, ID	–	0	0	0	0	0	0
Teton, WY	–	0	0	0	0	0	0
Blaine, ID	–	0	0	0	–	0	0
Valley, ID	0	0	0	0	0	0	0
Hood River, OR	0	0	0	0	0	0	0
Deschutes, OR	0	0	0	0	0	0	0
Wasco, OR	0	0	0	0	0	0	0
Lewis and Clark, MT	0	0	0	0	0	0	0
Fremont, ID	NA	NA	NA	NA	NA	NA	NA
Sublette, WY	NA	NA	NA	NA	NA	NA	NA
Okanogan, WA	0	0	0	0	0	0	0
Chelan, WA	0	0	0	0	0	0	0
Custer, ID	–	0	0	0	0	0	0
Elko, NV	NA	NA	NA	NA	NA	NA	NA
Humboldt, NV	NA	NA	NA	NA	NA	NA	NA
Camas, ID	0	0	0	0	–	0	0

0 = No Change; – = Negative Impact; + = Positive Impact; NA = Not Available

Assumptions:
(1) If BEA area experiences + 100 jobs, consider impact significant.
(2) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(3) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

The employment diversity indexes for 1991 that were used as measures of economic resiliency by BEA area are:

BEA area	Diversity index
Boise, ID	0.94
Butte, MT	0.88
Idaho Falls, ID	0.92
Missoula, MT	0.92
Pendleton, OR	0.91
Redmond-Bend, OR	0.92
Spokane, WA	0.94
Tri-Cities, WA	0.92
Twin Falls, ID	0.91

These results indicate that the regional economies within the Basin are diverse (the highest possible score is 1.0), and consequently have high economic resiliency. Little variation in economic diversity is found across the Basin at the scale of BEA areas. These relatively high indexes reflect the consequence of rapid economic growth in the Basin since the mid 1980s. Furthermore, the economy of the Basin has shown resistance to national recessions except when they greatly affect the agricultural sector.

The highest diversity ratings are in BEA areas containing metropolitan counties (for example, counties containing Boise, Idaho; and Spokane and Richland, Pasco, Kennewick, Washington). The BEA economies in which employment associated with recreation is substantial also have high diversity, suggesting that they have high resilience to fluctuations in recreation activity (for example, Idaho Falls, Idaho; Missoula, Montana; and Redmond-Bend, Oregon). The two BEA areas in which timber plays a major role (Redmond-Bend and Pendleton, Oregon) also have fairly diverse economies, suggesting that they are resistant to fluctuations in that industry. The low diversity number for the Butte, Montana BEA area is misleading because diversity is calculated for only that portion of the BEA area lying within the Basin.

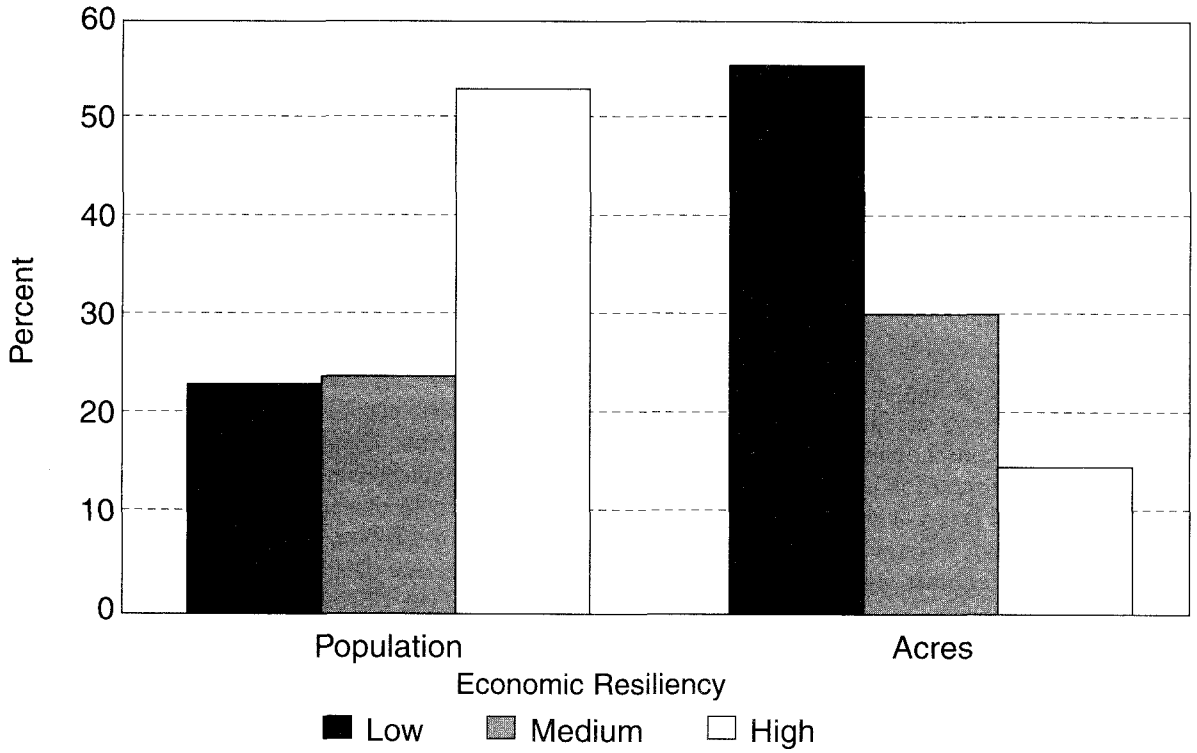
Table 5.5 — Economic evaluation of the preliminary draft EIS alternatives for their effects in 16 counties reliant on timber from Federal lands.

	Alternative						
County	1	2	3	4	5	6	7
Ferry, WA	+	0	–	–	0	–	–
Stevens, WA	+	0	–	–	0	–	–
Pend Orielle, WA	+	0	–	–	0	–	–
Boundary, ID	+	0	0	–	+	–	–
Lincoln, MT	+	0	0	–	+	–	–
Sanders, MT	+	0	+	0	+	0	0
Mineral, MT	+	0	+	0	+	0	0
Missoula, MT	+	0	+	0	+	0	0
Ravolli, MT	+	0	0	0	0	0	–
Idaho, ID	+	0	+	+	0	0	0
Clearwater, ID	+	0	+	0	0	0	–
Adams, ID	+	0	+	+	0	–	0
Grant, OR	+	0	–	–	–	–	–
Morrow, OR	+	0	–	–	0	0	–
Lake, OR	+	0	–	–	–	–	–
Harney, OR	+	0	–	–	–	–	–

0 = No Change; – = Negative Impact; + = Positive Impact

Assumptions:
(1) Counties with timber dependent communities were assigned to ERUs to take advantage of ERU-specific timber harvest numbers.
(2) Alternative 7 was evaluated at 60 percent of Alternative 3.
(3) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
(4) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

Figure 5.1 — Economic resiliency of 100 counties within the Basin, weighted by population and by land area.



The size of an area over which economic diversity is measured is important. The larger the area considered, the greater the economic diversity and expected economic resiliency, especially if it includes a large metropolitan area that serves as a trade center. Neither counties nor communities are considered to be "functional" economies in and of themselves because they do not include enough parts of the economy to constitute a complete system. A multi-county region may be identified as economically strong and resilient, while individual counties may not be. It is difficult to characterize with confidence the economic effects of changing Federal land use on individual counties or communities.

With these caveats in mind, the economic resiliency ratings calculated for the 100 counties in the Basin are shown in map 5.2. The average diversity index for the 100 counties in the Basin is 0.70, slightly lower than the national county average of 0.73. The average county-level diversity is lower than the average diversity (0.80) of the BEA areas in the Basin. The economic resiliency of the 63 "Federal lands" counties varies considerably: 9 are high, 19 are medium, and 35 are low.

Finally, we caution against concluding that low to high ratings are equivalent to bad or good ratings; the intent is to describe the adaptability or vulnerability of these counties, not to rate them as good or bad. Generally, most of the people in the Basin (82%) live in counties that are medium or high in their degree of adaptability, as measured by economic resiliency. Most of the land area (68%) in the Basin, however, is in the low category for economic resiliency.

We used the following rule set to identify those counties in which FS and BLM decisions resulting

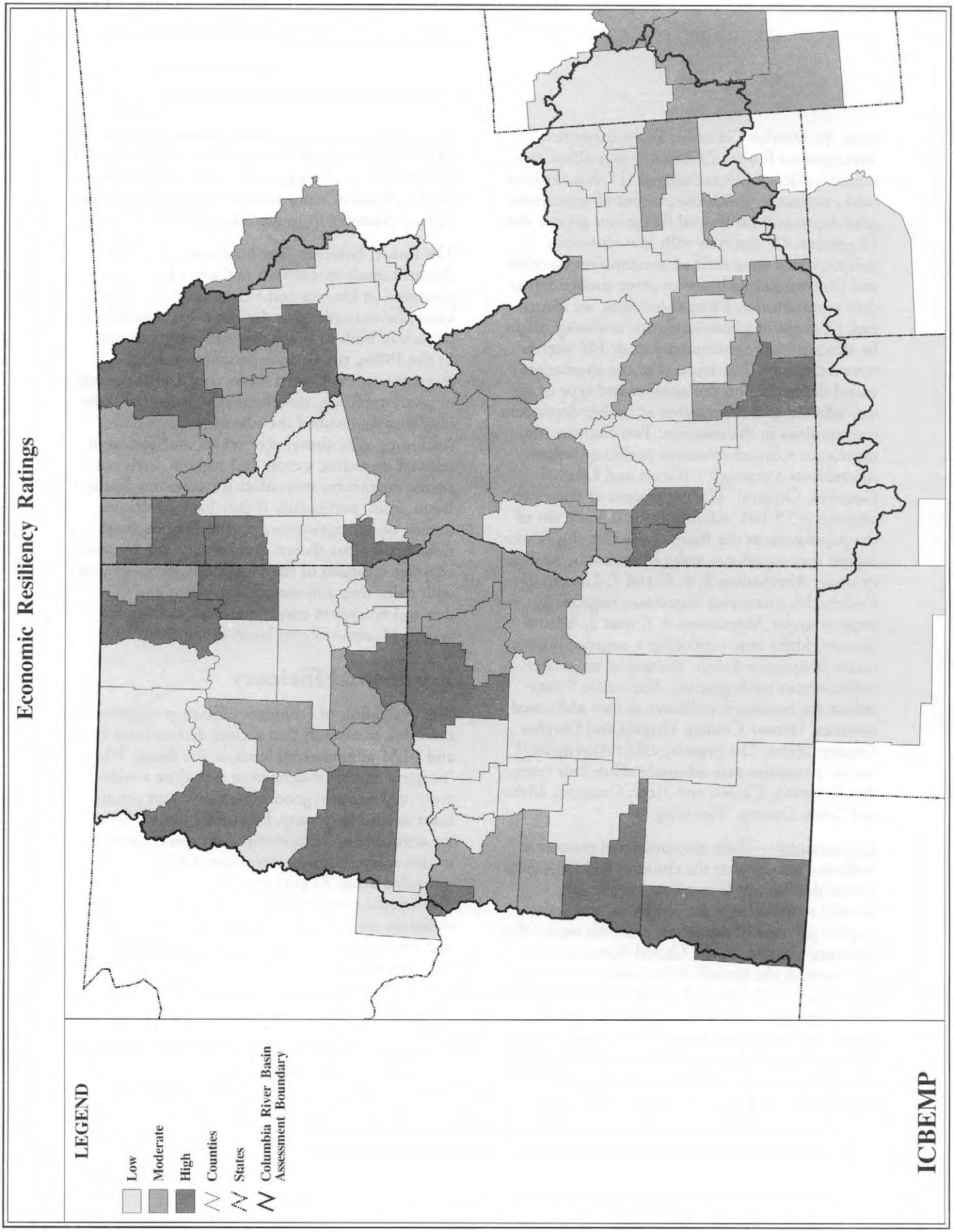
from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) may affect economic resiliency. We considered (1) those Federal land counties in which the percent of agricultural sales dependent on Federal forage was greater than 12 percent, (2) counties with low economic resiliency that were defined as recreation counties, and (3) counties with two or more timber dependent communities. Using these rules, we identified 17 counties whose economic resiliency might be affected by the preliminary draft EIS alternatives (table 5.6). The impacts of the alternatives varied depending on the number and type of sectors affected and the number of timber-dependent communities in the counties. Two counties may experience reduced economic resiliency under Alternatives 2 through 7 (Grant and Lake Counties, Oregon). The population of these two counties is 15,104 individuals, or 0.5 percent of the population in the Basin. Ferry County, Washington may experience reduced economic resiliency under Alternatives 3, 4, 6, and 7. Lincoln County, Montana may experience negative impacts under Alternatives 4, 6, and 7. Adams County, Idaho may experience a negative impact under Alternative 6 only. Because of its greater reductions in cattle grazing, Alternative 7 may reduce the economic resiliency of two additional counties: Harney County, Oregon and Owyhee County, Idaho. The negative effect Alternative 1 has on recreation may adversely affect four counties (Benewah, Custer, and Teton Counties, Idaho; and Teton County, Wyoming).

Uncertainty—These assessments of economic resiliency assume that the counties and BEA areas within the Basin will continue (in the next decade) to experience the economic and demographic patterns of the recent past. We expect that structural changes in the United States economy (for example the growth in the trade and service sectors) and technological changes (for example in telecommunications) will continue to affect economic and social well-being. These changes have allowed individuals greater choices about where and how to live. In the Basin, this freedom has led some people to argue that quality of life will increasingly drive social and economic changes. Our notions of economic resiliency are based on the experience of the past five years, which has been a period of rapid economic growth fueled in part by extensive in-migration.

The future, however, may hold some surprises that will result in different outcomes than were presented in Haynes and Horne (in press). We know, for example, that the Basin has experienced periods of both in-migration and out-migration. In the 1980s, the Basin experienced net out-migration as the United States coped with periods of severe recession, structural changes in the economy that diminished the role of resource based (including agriculture) economies, and booms in selected economic sectors and regions. Such economic downturns may affect the economy in the Basin again, particularly if they have significant impact on the agricultural sector. Despite these risks, history has shown that humans are the most adaptive creatures in the Basin's ecosystems. Faced with risks, they will continue to adapt and demand ecosystem goods and services from FS- and BLM-administered lands in the Basin.

Economic Efficiency

Our evaluation of economic efficiency examines the value of outputs that society derives from FS- and BLM-administered lands in the Basin. While "outputs" could be defined as including a wide array of ecosystem goods, functions, and conditions desired by society, because of limited data we were able to include only four specific outputs in this analysis: range, recreation, timber, and unroaded areas. To perform this evaluation, we developed a series of assumptions. All of our calculations are for the year 2005. Range, recreation, and timber values are placed on the site at which they are used, thus they are "on forest" (National Forest) or "on BLM district." All values were taken from the 1990 Resource Planning Area (RPA) (USDA 1990), inflated to 1994 dollars, then indexed to real price in 2005 (table 5.7). For range, we used AUM numbers calculated for each alternative. The value for range includes both its value as forage, and consumer surplus.



Map 5.2 — Map showing economic resiliency ratings calculated for 100 counties within the Basin.

Table 5.6 — Economic evaluation of the preliminary draft EIS alternatives on economic resiliency of selected counties in the Basin.[1]

	Alternative						
County	1	2	3	4	5	6	7
Ferry, WA	0	0	–	–	0	–	–
Lincoln, MT	0	0	0	–	0	–	–
Mineral, MT	0	0	0	0	0	0	0
Ravolli, MT	0	0	0	0	0	0	0
Clearwater, ID	0	0	0	0	0	0	0
Adams, ID	0	0	0	0	0	–	0
Grant, OR	0	–	–	–	–	–	–
Morrow, OR	0	0	0	0	0	0	0
Lake, OR	0	–	–	–	–	–	–
Harney, OR	0	0	0	0	0	0	–
Custer, ID	–	0	0	0	0	0	0
Adams, WA	0	0	0	0	0	0	0
Teton, WY	–	0	0	0	0	0	0
Camas, ID	0	0	0	0	0	0	0
Owyhee, ID	0	0	0	0	0	0	–
Benewah, ID	–	0	0	0	0	0	0
Teton, ID	–	0	0	0	0	0	0

0 = No Change; – = Negative Impact; + = Positive Impact

[1]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

Rule set for determining identified inputs on economic resiliency.
(1) Counties with two or more timber-dependent communities.
(2) Counties with grazing dependency of more than 12 percent.
(3) Nontimber and grazing-dependent counties with low economic resiliency, low population density, and not designated as a recreation county.

Assumptions:
1) Alternative 1 represents a continuation of activity levels, standards, and guidelines from the late 1980s.
2) Alternative 2 represents a continuation of current (1994, 1995) levels and interim directions.

For recreation, we evaluated the preliminary draft EIS alternatives based on their effect on the number of acres in various ROS classes. We assumed that the people recreating in the Basin live in seven northwestern states (Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming). We used standard projections of population and their characteristics in these states for the year 2005 (U.S. Department of Commerce 1990). We used a model to project recreation activity (Haynes and Horne, in press). Coefficients were tailored to replicate behavior of residents of the Northwest (Hospodarsky 1989). We used recreation values developed for the 1990 RPA (USDA 1990) which show differences depending on where in the Basin the recreation activity occurs, and higher values for some activities taking place in unroaded areas.

For timber, we used projections of timber harvest shown in table 5.2. Timber values depicted in table 5.8 reflect volume-weighted averages of prices paid for timber harvested from National Forests in each ERU.

We assumed changes in unroaded areas in each ERU were in direct proportion to the existing ratio between primitive/semi-primitive acres and unroaded acres. Value, in this case, refers to what

Table 5.7 — Willingness-to-pay values[1] in the year 2005 for range and recreation outputs by Basin ecological reporting unit (ERU).

Output	ERU 1-6	ERU 7-9	ERU 10-13
	1994 dollars		
Range (per AUM)[2]	9.25	9.25	9.25
Recreation (per person activity day)[3]			
Camping	9.36	6.50	7.32
Day use	9.36	6.50	7.32
Fishing	61.47	42.66	42.35
Hunting	47.65	49.71	48.65
Motor boating	2.46	2.46	6.16
Motor viewing	4.88	4.12	3.40
Nonmotorized boating	3.70	9.85	8.62
Off-road vehicle use	4.88	4.12	3.40
Snowmobiling	4.83	4.08	3.36
Trail use	7.43	7.05	6.94
Viewing wildlife	32.10	30.71	31.55
Winter sports	40.66	40.66	40.66
Wilderness[4]	44.16	31.55	31.55

Source: 1989 RPA unless otherwise noted, inflated to 1994 dollars using consumer price index.

[1]All willingness-to-pay values are determined "on forest" (National Forest) and do not include other production costs associated with the activity.

[2]Personal communication. 1995. Linda Langer, U.S. Forest Service Economist, Washington, D.C. On file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362. Inflated from 1993 dollars using producer price index.

[3]Source: USDA 1990, inflated from 1989 to 1994 dollars using consumer price index. An "activity day" is the average amount of time spent during 24 hours pursuing that activity. These values include fees, but exclude expenditures that represent a cost of production, such as travel costs.

[4]Value when camping, day use, nonmotorized boating, or trail use takes place in wilderness area.

people are willing to pay for unroaded areas to simply exist. This value is separate from that of recreation in unroaded areas, which is included in the recreation value. Using the value of unroaded areas as described in studies by Walsh and others (1984), and Pope and Jones (1990) (in Haynes and Horne, in press), we assumed that households are willing to pay $40 per year for the 5.8 million unroaded hectares (14.3 million acres) in the Basin. In this evaluation we were requested to make an additional assumption that undesignated, unroaded areas are half the value of designated wilderness areas.[14] We then multiplied that value by the 116 million households expected to exist in the United States in the year 2005 (USDA 1990). We used the number of U.S. households because unroaded areas are a classic public good and demand is properly viewed from the national scale.

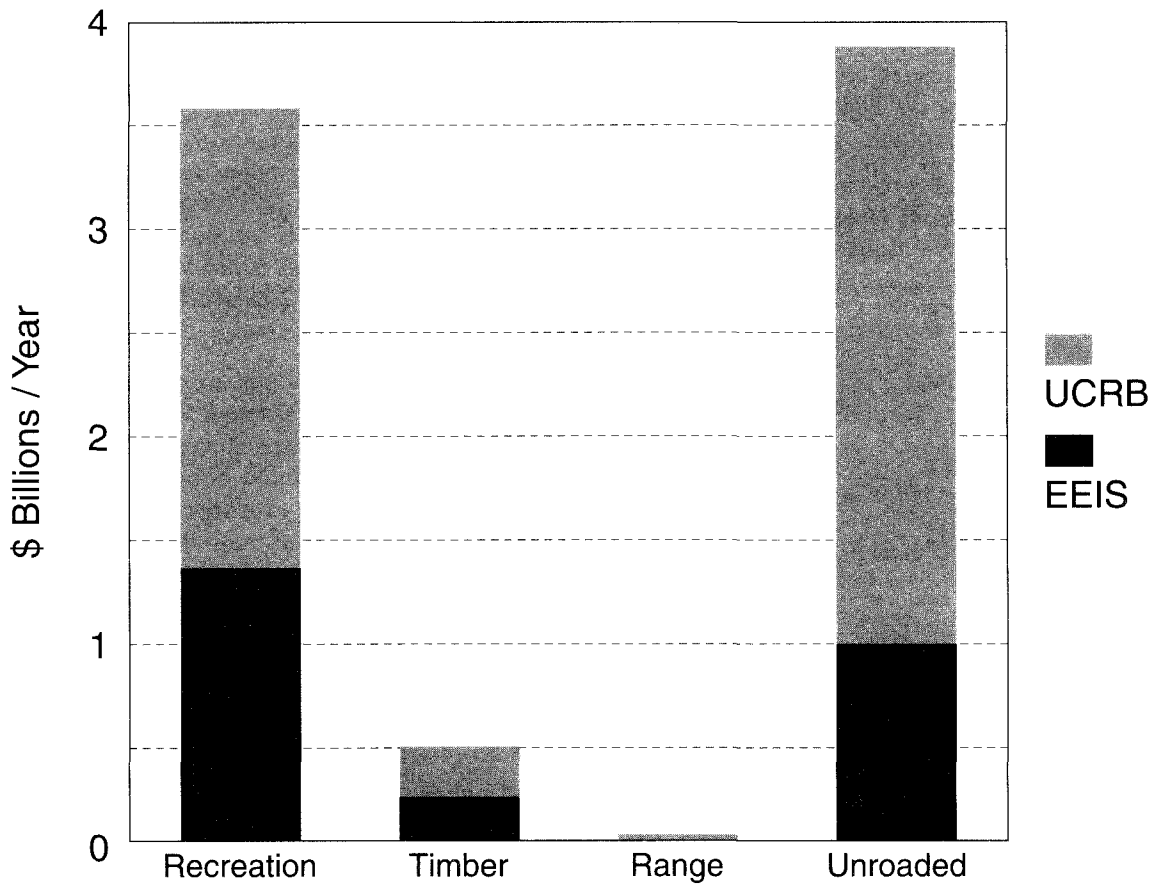
Effects—Using these assumptions, we calculated the value to society of the four outputs from the FS- and BLM-administered lands in the Basin. This calculation is not without controversy in that it involves the different notions of value and the effectiveness of expressing different types of values (such as market, non-market, and existence values) in dollar denominated units. In keeping with the principles of economic welfare analysis, we included as many sources of value provided to society by these lands as possible (Field 1994,

[14]Designated wilderness in the UCRB and EEIS planning areas are 56 and 90 percent of the unroaded areas, respectively.

Krutilla and Haigh 1978). In an economic sense, an examination of the full array of ecosystem management benefits requires a conscious attempt to place value on intangible benefits. The outputs discussed here are the only ones for which we had both output measures and values.

In the EEIS planning area (fig. 5.2), recreation ranks highest in value, followed (in order) by unroaded areas, timber, and range. In the UCRB planning area (fig. 5.2), the ranking of outputs, from highest to lowest is unroaded areas, recreation, timber, and range. The value of unroaded areas can be viewed as a proxy for the unroaded character and the species composition, "old-growth" forest, and other ecosystem characteristics that people associate with such areas. These rankings explain what lies at the heart of the economic-choice question concerning the consequences of FS and BLM land management in the Basin: while the values of recreation and unroaded areas are not expressed in the marketplace, they exceed those of range and timber. These findings are consistent with other studies (for example, Haynes and others 1992). The 1990 RPA found for FS-administered lands that while "timber and minerals benefits dominate the receipts... recreation and wildlife and fish program benefits dominate the market-

Figure 5.2 — Partial net economic benefit of continuation of current, year 2005, in the EEIS and UCRB planning areas.



clearing price benefits" (USDA 1990). This calculation did not include the benefits or existence value of unroaded areas, as does our analysis. It is unlikely that addressing the controversial details of the methods used to derive these numbers would change the relative rankings we found. The significance of this information is that in the big picture, the non-market outputs from the FS- and BLM-administered lands in the Basin provide more benefits than do the market outputs. Regarding the preliminary draft EIS alternatives, if decision makers explicitly acknowledge the relative importance of the various outputs provided society by these lands, then management plans may become more socially acceptable.

When compared to Alternative 2, overall net economic value is little affected by any alternative, increasing at most by 5 percent (under Alternative 1) and decreasing no more than 3 percent (under Alternative 7) (table 5.9). Net economic value is calculated as the sum of the values of range, recreation, timber, and unroaded areas—an admittedly partial accounting. For the EEIS area, Alternatives 3 through 7 would represent a loss to society of $33 to $136 million per year, or 1 to 5 percent of the value provided by these FS- and BLM-administered lands. For the UCRB area, at one extreme Alternative 3 represents a gain of $48 million per year (1 percent), while at the other Alternative 7 represents a loss in value of $83 million per year or 2 percent of the value provided by these FS- and BLM-administered lands. To choose any alternative with a negative change, decision makers would have to determine that either they preferred the distributional effects, or that the gain from unquantified and unvalued outputs of ecosystem management were at least equal to the losses. Examples of such unquantified and unvalued outputs include stronger fish populations, acres of old-growth, improved water quality, reduced flooding, reduced risk of fire, or improved ecosystem health.

Table 5.8 — Willingness-to-pay values in the year 2005 for timber, by Basin ecological reporting unit (ERU), using 1994[1] dollars.

Ecological Reporting Unit	Timber[2]
	Dollars per MBF
Northern Cascades	148
Southern Cascades	130
Upper Klamath	440
Northern Great Basin	262
Columbia Plateau	370
Blue Mountains	232
Northern Glaciated Mountains	226
Lower Clark Fork	178
Upper Clark Fork	136
Owyhee Uplands	14
Upper Snake	58
Snake Headwaters	62
Central Idaho Mountains	444

[1]Personal communication. 1995. Richard Haynes, Economist, USDA, Forest Service, Pacific Northwest Research Station, Portland, OR 97208.
[2]Willingness-to-pay is calculated by adding stumpage price and consumer surplus (estimated as 10% of stumpage price).

Most of the change in net economic value between alternatives is due to different timber values, $5 million to $556 million higher in Alternatives 1, 3, and 5; $48 million to $199 million lower in Alternatives 4, 6, and 7. In Alternatives 1 and 5, increased timber values are at the expense of $71 million to $131 million in recreation values, and $4 million to $7 million in unroaded areas. The value of range is most significantly affected by Alternative 2 in which it is reduced by $10 million per year.

In the EEIS area, overall net economic values are lower in Alternatives 3 through 7 primarily because timber values are reduced by $27 million to $123 million. Recreation values decrease by $4 million and $5 million in Alternatives 1 and 5, respectively. The value of range is reduced by $3 million in Alternative 7, and the value of unroaded areas is reduced by $2 million and $1 million in Alternatives 1 and 5 respectively.

In the UCRB area, Alternatives 1, 3, and 5 increase net economic value relative to Alternative 2 by $4 million to $256 million, while Alternatives 4, 6, and 7 decrease value from $3 million to $83 million. The patterns for range, recreation, timber, and unroaded are similar to those for the Basin as a whole.

Table 5.9 — Net economic value of alternatives in the year 2005 for range, recreation, timber, and unroaded areas, for total Basin, EEIS, and UCRB.

	Alternative						
	1	2	3	4	5	6	7
	Millions of dollars per year						
Basin	8,373	7,955	7,960	7,907	7,926	7,867	7,746
Range	24	24	24	24	26	24	13
Recreation	3,434	3,565	3,565	3,565	3,494	3,565	3,565
Timber	1,061	505	510	457	550	417	306
Unroaded	3,854	3,861	3,861	3,861	3,857	3,861	3,861
EEIS	2,747	2,585	2,542	2,540	2,552	2,531	2,459
Range	6	6	6	6	7	6	3
Recreation	1,322	1,326	1,326	1,326	1,321	1,326	1,326
Timber	441	244	201	199	217	190	121
Unroaded	1,007	1,009	1,009	1,009	1,008	1,009	1,009
UCRB	5,626	5,370	5,418	5,367	5,374	5,335	5,287
Range	18	17	18	17	19	17	10
Recreation	2,111	2,239	2,239	2,239	2,173	2,239	2,239
Timber	650	261	309	258	333	227	186
Unroaded	2,847	2,852	2,852	2,852	2,849	2,852	2,852

Equity

The benefits derived from FS- and BLM-administered lands in the Basin are distributed widely—to people living inside and outside the Basin, the rich and poor, and blue-collar workers and professional managers. Alternatives 4, 6, and 7 would reduce the benefits to consumers of timber products from Alternative 2. Alternative 7 would slightly reduce the value of cattle grazing on FS- and BLM-administered lands in the Basin. Alternatives 1 and 5 also would decrease benefits to recreationists overall, but some of the recreationists would gain while others would lose. In the EEIS area, the road assumptions suggest that Alternatives 1 and 5 would increase benefits to anglers and increase benefits to day and trail users (see table 5.10). This has to do with roads and access, but it does not include feedbacks between road building and levels of fish populations. In the UCRB area (table 5.10), the impacts on recreationists would be more complex. The overall decrease in recreation benefits would include increased benefits to anglers, hunters, and motor viewers under Alternatives 1 and 5. The recreationists that would lose from Alternatives 1 and 5 would be campers, skiers, and day and trail users.

Summary

Regarding economic development, the effects of the preliminary draft EIS alternatives on jobs Basin-wide would be within 1 percent of those resulting from FS- and BLM-administered lands under continuation of current management. As a percent of all jobs in the Basin, the impact would be 0.1 percent. Alternatives 1 and 5 would decrease Basin-wide employment in jobs resulting from recreation activity by 0.5 percent and 0.25 percent respectively of the total current Basin employment. Under Alternatives 1 and 5, in the EEIS area, the increase in timber employment would be offset by losses in recreation employment. Under Alternatives 3, 4, 6, and 7, timber jobs are reduced with no offsetting gains in recreation. Jobs associated with recreation activity do tend to pay less than timber jobs, but economic indicators of recreation counties are stronger than those of manufacturing counties (Haynes and Horne, in press).

Table 5.10 — Change in net economic value of recreation by activity, from Alternative 2 to Alternatives 1 and 5.

Area/Alternative	Camping	Day use	Fishing	Hunting	Motor viewing	Trial use	Viewing wildlife	Winter sports
	Millions of dollars per year							
Basin								
1	-38.98	-87.07	110.83	30.38	12.63	-89.63	-3.24	-71.26
5	-23.84	-54.40	62.96	16.85	7.71	-48.19	-0.48	-34.89
EEIS								
1	-6.00	-11.13	21.98	2.67	2.17	-11.14	1.82	-5.62
5	-5.30	-9.59	18.32	2.07	1.50	-9.74	1.73	-5.25
UCRB								
1	-32.98	-75.94	88.85	27.71	10.46	-78.49	-5.06	-65.65
5	-18.54	-44.81	44.64	14.78	6.20	-38.45	-2.21	-29.64

Ten counties might experience negative effects from the range management direction proposed under Alternative 7, but not from the other alternatives. Twenty-one counties might experience negative economic effects from road management decisions under Alternatives 1 and 5 through their impact on recreation activity. Four of these counties are among the 10 range counties. All 16 timber counties might experience negative impacts on their timber sector with the exception of Alternatives 1 and 5. Combining this information with measures of economic resiliency, we found two counties (Grant and Lake Counties, Oregon) whose economies may experience impacts from these alternatives; about 0.5 percent of the Basin population lives in these two counties.

Given these numbers, it is difficult to argue that FS and BLM decisions broadly affect economic development in the Basin. Rather, the effects are more limited and local in nature. For most people in the Basin, expansion in other economic sectors means that the impact of FS and BLM decisions on their employment and income will be negligible. If the agencies wish to minimize their impact on economic resiliency, they can focus attention on their actions in the two identified counties.

The conclusions from the economic welfare analysis are quite different. The FS- and BLM-administered lands provide society with greater benefits from recreation and the existence of unroaded areas than from their production of timber and cattle forage. Yet, at the margin, most of the impact under all of the alternatives would involve reduced timber production. From this standpoint, to justify choosing any alternative that generates fewer benefits relative to Alternative 2 (continuation of current), decision makers would have to prefer their distributional effects, or believe that the value of the ecosystem outputs gained under these alternatives that are not included in the analysis are worth at least $33 to $136 million per year in the EEIS area, and $3 to $83 million per year in the UCRB area. Examples of such outputs include fish populations, "old-growth" forests, water quality, risk of wildfires and floods, and ecosystem health.

As best we can determine, the effects on people who recreate in the Basin, who value the existence of unroaded areas, and who consume cattle raised on BLM- and FS-administered lands will be minor. Purchasers of lumber products will experience only minor changes in the price of lumber products. The most significant negative effects will be experienced by people employed by the timber industry in the Basin. It is hard to say how long they will experience these impacts, but given compensating increases in harvests from private land and the pace of recent economic growth these transitions should be short lived.

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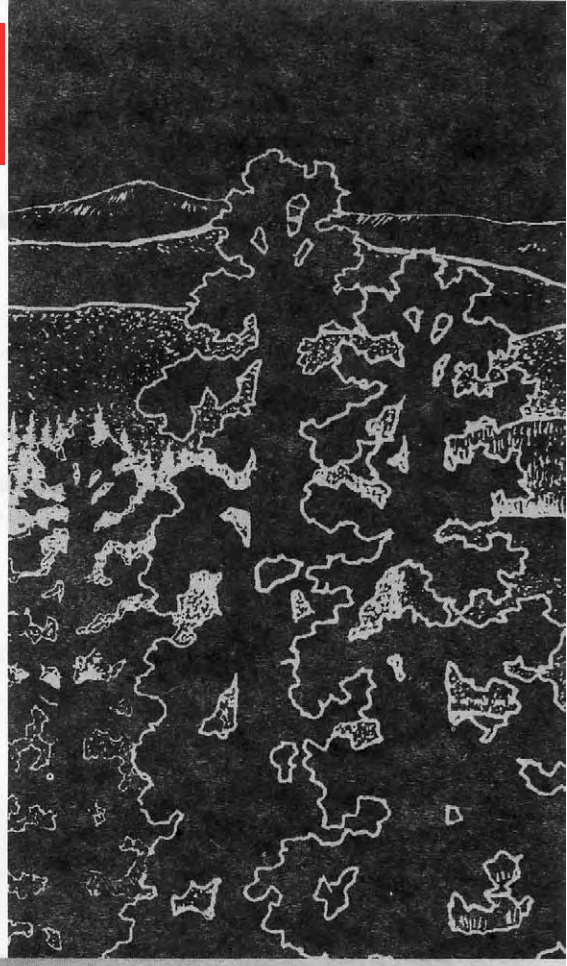
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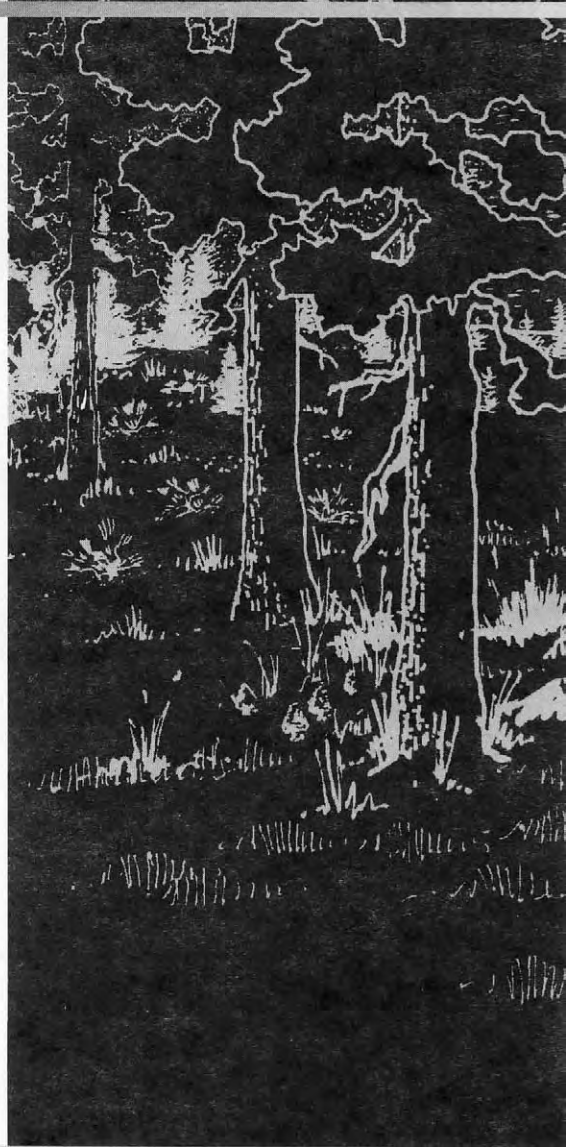
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CHAPTER 6

An Estimate of the Social Consequences of Alternatives in the Eastside and Upper Columbia River Basin Preliminary Draft Environmental Impact Statements

James A. Burchfield
Stewart D. Allen
Stephen F. McCool



James A. Burchfield, Sociologist, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Stewart D. Allen, Sociologist, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Stephen F. McCool, Social Scientist, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

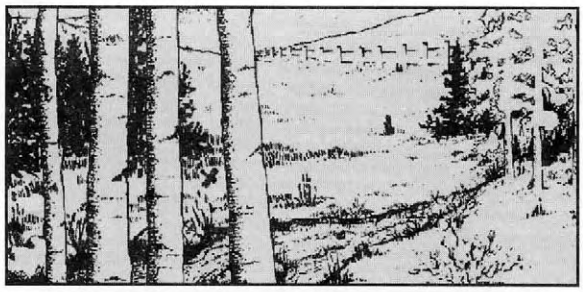


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Introduction

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) is a combined science and management effort of the Forest Service (FS) and Bureau of Land Management (BLM). The project developed two large-scale Environmental Impact Statements (EISs) in two planning areas called the Eastside (EEIS) and Upper Columbia River Basin (UCRB). The Eastside area covers lands administered by the Forest Service or BLM in eastern Oregon and Washington, while the UCRB area covers lands in nearly all of Idaho, western Montana, and small portions of adjacent states. The EISs were written in response to a variety of complex and controversial situations on these federally administered lands, including declines in forest health, increasing scarcity of anadromous and inland cold-water fisheries, rangeland reform, increasing risk of catastrophic fire, and the social and economic consequences of these conditions. The EISs describe seven alternatives, five of which are approaches to implementing ecosystem management.

The project's Science Integration Team (SIT) evaluated the consequences of these alternatives as defined in the *Preliminary Draft Environmental Impact Statements* (EISs) (USDA, USDI 1996a, 1996b).[1] The ICBEMP contracted with The Bolle Center for People and Forests, University of Montana, to conduct an evaluation of the social consequences of the alternatives. The contract report, available to the public as part of the project record,[2] begins by discussing the framework used to assess social consequences, followed by the criteria used to evaluate the alternatives and a description of the panel process conducted for the evaluation. An overview of the panels' conclusions provides context for interpreting their comments. The main section of the report is the evaluation of consequences, organized by the evaluation criteria. A short conclusions section provides direction for future efforts. In addition, the report contains detailed descriptions of the panel process, notes taken during the panels, workbooks completed by panelists, and written information provided panelists to help guide their judgments. Most of the information in this chapter is extracted from that report.

The Bolle Center report's authors state that readers should be aware that their discussion of social consequences should be considered preliminary because little of the information essential in predicting social consequences was available at the time of their involvement. Additional information on impacts and outputs from the other SIT evaluations of alternatives (economics, terrestrial, aquatics, landscape ecology) would be needed before changes in those systems could be translated into effects on people and social systems. Even with the availability of additional information, however, estimating the effects of the alternatives on people and social systems was hampered by lack of information on how, when, where, and by whom ecosystem management activities on public lands would take place. The ICBEMP's large scope and scale, in addition to the programmatic nature of the decisions to be made, prevented accurate estimation of many effects that are commonly addressed in social impact assessments at smaller scales of analysis. Public comment on the project's Draft EISs[3] should provide additional insight and data on peoples' expectations and perceptions regarding likely social effects.

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[1]Analysis of the seven alternatives is based on the definitions found in the preliminary draft version of the Environmental Impact Statements (February 1996). Detailed information cited in this chapter pertaining to the *Preliminary Draft EISs* is reproduced in appendix I of this document.

[2]The Bolle Center for People and Forests contract report (Burchfield and others 1996), on file with: U.S. Department of Agriculture, Forest Service, U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

[3]The Draft Eastside and Upper Columbia River Basin Environmental Impact Statements are slated to be released to the public for comment in 1997.

The first section of this chapter summarizes methods used to evaluate the social consequences of the alternatives, including the evaluation variables used and the evaluation process (how the social panels explored likely social effects of the alternatives). The second portion of this chapter presents the results organized by evaluation criterion. Suggested strategies for monitoring social effects are also included in each "Results" section.

Methodology

The social evaluation of alternatives was guided by recent literature on social impact assessment and review of major issues confronting BLM- and FS-administered lands within the Basin.[4] While the scientific and technical literature is increasingly extensive, it indicates that social impact assessment processes should use a variety of information sources and consider certain dimensions of human experience. This section describes the framework, criteria, and methods used to evaluate the alternatives.

Evaluation Variables

The literature on large-scale, programmatic, EIS, social evaluation variables could not be described as voluminous. In the limited number of analyses that have been conducted, the evaluation tends to be qualitative and not quantitative because data and modeling techniques, particularly with respect to direct social effects, are not available. The literature, however, does suggest the types of variables that should be evaluated in a broad-scale social impact assessment.

Jakes and Harms (1995) conducted a roundtable to assess the socioeconomic effects of implementing ecosystem management throughout the National Forest system. As part of this exercise, they identified 13 key impact variables, which they grouped into six classes (table 6.1). Roundtable participants also made recommendations for appropriate use of a variety of tools to assess impacts. Focus groups and expert opinion were two methods specifically identified as appropriate or recommended tools for examining all 13 variables listed in table 6.1.

The Forest Ecosystem Management Assessment Team (FEMAT) (1993) examined the consequences of ten management options in response to problems of Pacific Northwest National Forests. The social assessment focused on impacts of the options on communities, American Indians, recreation opportunities, scenery, amenities, and subsistence. A major conclusion of the assessment was that "communities desire stability, predictability and certainty (FEMAT 1993)." In addition, it was reported that "communities feel they are not a part of decisions that affect their well-being; they want agencies to be more responsive to their concerns (FEMAT 1993)." These conclusions point to the need to consider impacts of Federal land management options on community viability and access to federal decision-making processes.

In implementing the recommendations of FEMAT, its accompanying Final Supplemental EIS (FEMAT 1994) also completed an assessment of impacts to the human population. That analysis included quantitative estimates of impacts to timber-based employment, but did not address recreation-based industry employment. Consideration was given to the impacts to communities judged to be at "higher risk" and more likely to "experience unemployment, increased poverty, and social disruption in the absence of assistance." The Final Supplemental EIS also examined impacts to American Indian peoples and cultures, particularly with respect to impacts of disturbance on fisheries and cultural sites.

The Forest Service Economic and Social Analysis Handbook (FSH 1909.17) also identifies a number of variables to be included when assessing social impacts. These variables include lifestyles, attitudes, beliefs and values, social organization (including community stability), population,

[4]The Basin is defined as those portions of the Columbia River basin inside the United States east of the crest of the Cascades and those portions of the Klamath River basin and the Great Basin in Oregon.

land-use patterns, and civil rights. This handbook also specifies that "the concern is not whether data are quantitative or qualitative in nature but with the direction of the impact (as opposed to the increment)."

Perceptions of the participants in the social panels, as described below, and the literature, and the EIS scoping sessions were used to develop the list of variables used to evaluate the alternatives. The SIT proposed a set of criteria involving communities, recreation and scenery, and quality of life as starting points for discussion of effects. The social panels (described in detail in the next section) validated several criteria, rejected some, and added still others in the development of a final set of variables. This process was conducted specifically to identify the issues considered important to the panelists: (1) effects on small, rural communities and quality of life; (2) effects on predictability of flows of goods and services from public lands; (3) effects on public access to federal decision making; (4) effects on private property; and (5) effects on additional concerns specific to American Indians. The section "Estimates of Social Consequences" discusses each of these variables in greater detail.

Evaluation Process

The principal method used by the Bolle Center to evaluate impacts was the use of panels consisting of members of the public selected to represent the diversity of values and interests potentially affected by the proposed alternatives. In addition, members representing many American Indian tribes with interests in natural resources also formed a panel to examine the alternatives. Two of the panels focused on each of the EIS planning areas [Eastside (EEIS) and Upper Columbia River Basin (UCRB)] and the third panel focused on American Indian issues. The evaluation and discussions of these three panels provided the primary, but not the sole, source of social impacts data.

Panel participants included members of affected public groups, consultants, academic scientists, sociologists, state agency representatives, county commissioners, representatives from various public land management industries, and members of 14 American Indian tribes (see appendix 6-A for a list of panel members).

The panels were designed to provide the Bolle Center with an understanding of the types of

Table 6.1. Types of socioeconomic variables of interest for evaluation when implementing ecosystem management.

Variable Class	Variable
Impacts on the Economy	Employment Economic Health Economic Structure/Activity
Impacts on Recreation and Aesthetics	Recreation/Aesthetics Amenity Values
Impacts on Social and Cultural	Quality of Life Social Vitality/Stability
Impacts on Forest Products	Timber Product Outputs Non-timber Product Outputs
Impacts on Management	Participatory Planning Leadership in Management Economic Efficiency
Impacts on Ecosystem Health and Productivity	Ecosystem Health and Productivity

Source: Jakes and Harms 1995.

social effects likely to result from implementation of the preliminary draft EIS alternatives from the standpoints of a broad range of people and interests who care about the Basin and public land management. Panel members were asked to make individual evaluations regarding the desirability of those anticipated effects, and then to discuss them with other panel members. The intent was not to have panelists reach any type of consensus regarding likely effects or their acceptability, but instead to become better acquainted with a range of attitudes, beliefs, and values regarding the alternatives and their social effects. The resulting discussions, as shown in the Bolle Center report transcripts, provide great insight into peoples' concerns.

Several days prior to convening the panel, participants were provided informational briefings describing the purpose and the need for the EISs, the proposed ICBEMP action, descriptions of each of the seven alternatives, and summaries of additional information. Panelists also were given two chapters from McCool and others (in press) (one dealing with communities, and the other with environmentally-based amenities) that included appropriate scientific literature, and primary and secondary data. They also received primary data on changes in recreation opportunities, road densities, scenic integrity, timber volume, grazing animal unit months (AUMs), and associated jobs for review prior to convening the panel (The Bolle Center report appendices contain the complete set of information provided to panelists; Burchfield and others 1996).

As part of the panel's working process, participants were requested to complete workbooks concerning each of the alternatives; questions were based on the original evaluation criteria. Once each panel commenced, the agenda was modified based on panelists' concerns. They established personal concerns of importance and qualitatively identified an array of potential social impacts, doing their best to identify the range of probable social impacts rather than precisely quantifying them. Issues that panel participants identified as important (for example, access to decision-making processes) tended to be effects that were not easy to quantify.

Two primary assumptions inherent to the panel process were: (1) panelists could understand each alternative and its implications, and (2) budget to implement each alternative would be provided, except for timber harvesting when a flat-line budget assumption was used.

Effects identified in the social analysis of the alternatives have high levels of uncertainty, primarily because the EISs cover a broad geographic scope, yet project implementation that results in specific outcomes would be applied on a local level. Information on implementation was not available, resulting in much uncertainty in panelists' evaluations of individual alternatives. Panelists believed that the methods used to implement the alternative objectives were as critical to understanding social consequences as the objectives themselves.

The SIT recognized that panel participants may have difficulty attaining an understanding of the project subject matter at a level that would enable them fully to judge outcomes given the short period of time allowed. Considering this, the panel process effectively narrowed the scope of concerns into a defined set of issues and provided insight into perceptions and values held by stakeholders. This was considered invaluable to the SIT, which has the final responsibility for judgments on outcomes.

In addition to information from the panel process, the results discussed below were derived from the draft version of the economic and social assessments (Haynes and Horne, in press; McCool and others, in press) in *An Assessment of Ecosystem Components in the Interior Columbia River Basin and Portions of the Klamath and Great Basins* (Quigley and Arbelbide, in press) and data outputs produced from computer simulations of the alternatives dealing with scenic integrity, road density, and recreation opportunities.

Estimates of Social Consequences

This section identifies potential social consequences of the alternatives, both in terms of responses from panelists and through the application of other available information. Potential social consequences are presented via descriptions of each of the evaluation criteria identified by the panels.

Effects on Predictability

The predictability of flows of goods and services resulting from the alternatives is an issue apart from the actual periodic amount of goods and services that would be provided under each alternative. This is an issue for ecosystem management in particular for two main reasons. First, ecosystem management recognizes that limits to predictability exist (Haynes and others 1996); this acknowledgment then raises into question the ability to predict flows of goods and services from those ecosystems accurately. Second, ecosystem management is based on the principle of managing to achieve desired ecosystem conditions, functions, and processes—not to achieve targeted levels of goods and services, which are viewed as byproducts of restoring and maintaining healthy ecosystems. Ecosystem management deals with these issues through adaptive management—continual adjustment of management activities based on newly acquired knowledge. This continual adjustment implies a lack of long-term predictability regarding flows of goods and services, as well as ecosystem conditions.

These, and other factors such as recent wide fluctuations in flows of goods and services, emphasize the importance of predictability as an ecosystem management issue. This is reflected in the purpose and need, issues, and goal statements in the preliminary draft Environmental Impact Statements.

During the ICBEMP, the issue of predictability has been voiced by diverse interests, although the issue is most commonly brought up in the context of timber harvest levels. Past confusions about variables such as annual sale quantity (ASQ), which has been viewed by the Forest Service as a maximum capability but by others as an actual target, have compounded the issue.

Random, fluctuating patterns of outputs and conditions on public lands can pose many social problems not just for industries and their ability to plan and adapt to market conditions, but for workers and others affected. Ranchers who graze cattle on Federal lands have come to view allotments as a property right, suggesting that high levels of predictability come with this right. However, others have suggested that this is not an accurate perception, and that allotments should be more flexible. Recreation industries and visitors are also concerned about predictability. Outfitting and guiding industries depend on Federal management to allow their businesses to continue, both in terms of their ability to use Federal lands as well as the conditions of those lands. Recreational visitors assume that the places they have always visited and cared about on Federal lands will continue to provide the types of experiences they have had in the past, sometimes for generations.

Predictability is also an important concern to American Indians, who have seen subsistence, ritual, and cultural resources dwindle away, and in some cases be eliminated altogether. Panelists representing counties expressed concerns about the predictability of payments to counties through various revenue-sharing programs—money used by local governments to support roads and schools. A lack of predictability in payments to counties, as well as a drop in the actual payment level, has been and will continue to be a problem for those counties that depend on revenue sharing for significant portions of their budgets.

Criteria — There are many ways to address predictability of natural resource flow or availability. The variability in the supply of timber or other resource commodities being extracted from Federal lands is one way to address predictability. Increased levels and types of opportunities for public involvement provide another manner of

addressing predictability. The rationale behind this assumes that stakeholders, working in concert with the agencies over time, will come to common understandings regarding the likelihood that various activities will actually be implemented. For example, timber industry representatives would gain a better understanding of the likelihood that a given timber sale would be appealed, and could work with the agency and potential appellants to reduce this likelihood.

A third way to address predictability of resource flow is through the various measures proposed to restore ecosystem health. One way this could affect predictability is to reduce the risk of catastrophic fires that have the potential to change anticipated flows of many types of goods and services suddenly. A fourth way is that by achieving better compliance with endangered species laws, resource flows would be less likely to be disrupted by successful appeals based on agency non-compliance. A related hypothesis is that by achieving long-term ecosystem health, resource uses at sustainable levels would be more likely to be achieved over the long term. One philosophy of ecosystem management is that long-term health would lead to greater predictability of a wider range of societal benefits, including not just commodity production opportunities but recreation and amenities, fish and wildlife habitat, and clean water.

Relevant objectives and standards — Alternatives 3 through 7 contain an objective that directly addresses the predictability of timber harvest levels:

> SE-03[5]: Avoid large shifts in commercial activity that cause rapid changes in demand for labor (gain or loss of jobs) and capital (investments in plant and equipment) by offering commercial timber for sale at an amount consistent with the volume available from the acreage of timber harvest planned in tables 3-12 (Guideline SE-G1[6]). Limit annual variations in timber production by no more than plus or minus 15 percent for Alternatives 3 and 5, plus or minus 25 percent for Alternative 4, plus or minus 50 percent for Alternative 7, and plus 10 or minus 20 percent for Alternative 6.

The accompanying Standard SE-S1 mandates achieving this direction unless an exemption is granted from the Regional Foresters or Bureau of Land Management State Director based on "circumstances which make the objective "unattainable." The wording of this objective appears to accept the greatest uncertainty (that is, lack of predictability) under Alternative 7 because timber production would have the widest allowable range of variability; predictability would be allowed to vary second-most under Alternative 4. Alternatives 3 and 5 are designed to allow the greatest predictability, while Alternative 6 is designed to allow more predictability under rather than over anticipated harvest levels. The wording of Objective SE-O3 appears to value stability in harvest levels over increases in them, capping increases over anticipated harvest levels as well as limiting reductions.

The alternatives would address predictability through public participation with one objective that would apply only to Alternatives 3 through 7:

> SE-O11: To help achieve greater predictability for outcomes from lands managed by the FS or BLM and better public ownership of decisions, by providing increased levels and types of opportunities for involvement of the public. Within 1 year develop and implement a systematic approach to seeking the knowledge and opinions of a broad range of stakeholders through methods that encourage discussion, understanding, and resolution of issues.

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[5]SE-03 indicates Social and Economic - Objective, followed by the specific objective number cited (Chapter 3, *Preliminary Draft EISs;* appendix I in this document) (USDA and USDI 1996a, 1996b).

[6]SE-G1 indicates Social and Economic - Guideline, followed by the specific guideline number cited (USDA and USDI 1996a, 1996b).

The Economics chapter (5) of this document, while containing several analyses relevant to the predictability issue, did not directly address it as a factor that would vary by alternative. The alternatives were expected to differ in the levels of employment or other measures produced, but estimates about the relative predictability of those outputs were not made. The perceptions of panel participants regarding predictability constitute the main source of information about potential effects.

Results — Several panel participants questioned the value of the predictability criterion, while others felt it was very important. Although the panel discussion focused on predictability of the supply of timber harvest, grazing opportunities and, to some extent, recreation opportunities, the predictability of achieving desired biophysical conditions also was a primary social concern. Readers should consult the Aquatic, Terrestrial, and Landscape chapters of this document for predictability projections of those conditions.

The predictability of supplies of goods and services would tend to be consistent across the alternatives. The exception is that Alternatives 3 to 7 would differ in the amount of variability in timber production, with Alternative 7 showing the greatest allowable annual variance (± 50%) and Alternatives 3, 5, and 6 showing the least annual variance (± 25% for Alternatives 3 and 5, and +10 or -20% for Alternative 6).

In completing the workbooks, panelists rated the likelihood of alternatives achieving stability in outputs from federally administered lands. Stability implies that flows would be consistent and predictable, rather than simply flowing predictably (that is, output flows could fluctuate widely, but would do so in predictable cycles). The concepts are similar because the issue is not the level of goods and services provided but the extent to which they are assured.

Panelists rated Alternatives 1, 2, and 7 as the least likely to produce stable flows of outputs. The low ratings of Alternatives 1 and 2 were based on the lack of predictability in timber harvest levels over recent years (for example, when actual harvest levels were far lower than the levels anticipated due in large part to likely or successful appeals over threatened and endangered species and habitat conditions). Panelists saw little potential for this scenario to change under the existing management direction. The ratings of Alternative 7 appeared to be predicated on the likelihood that this would be a socially divisive alternative that could lead to uncertainty regarding implementation. Of the remaining alternatives, Alternative 4 was judged to provide the most stable levels of outputs, although still in the moderate rather than the high range. Uncertainty about output stability was highest in Alternative 5 due to panelists' uncertainties about general applications and results under this alternative. Alternatives 3 and 6 were rated between these extremes.

Panelists' conversations reflected this same pattern, as did the UCRB planning area panelists' completion of the worksheet evaluating the predictability of goods and services under Alternatives 2, 4, and 7. Nearly all of the UCRB area panelists rated Alternative 4 as more likely to produce predictable levels of goods and services than Alternative 2, especially over the long term. It was generally thought that Alternative 4 would be more likely to produce predictable (and high) levels of goods and services over the short term as well, because of the higher anticipated levels of activity. Nearly all panelists, however, made it clear that this was based on the assumption that adequate funding would be available—which many panelists doubted would actually be the case. This is a clear example of the difficulty in predicting social effects in the absence of specific information regarding a proposed action.

Monitoring and mitigation — One of the main issues addressed by past planning efforts in the Basin is the relationship of planned to actual activities, outputs, and consequences. Given that predictability is a great concern, monitoring becomes a critical element of the ecosystem-based alternatives. Monitoring is needed not only to

assess whether resource outputs are within the range expected, but also to determine if predicted annual outputs are close to those actually occurring. A major question revolves around the geographical scale of predictability; should it be monitored at the EIS area level, or at some finer scale? A possible mitigation strategy would be to convene a panel of experts and publics to deal with this question.

Effects on Access to Decision-Making

In *Social Assessment of the Basin*, McCool and others (in press) concluded that social scientists, members of the public, and federal agencies concur that ecosystem management requires greater levels of public participation, especially for collaborative efforts that foster mutual learning and the search for consensus on complex, contentious natural resource and public land management issues. A related debate is the role of the public, local and state governments, and other stakeholders in public land management—specifically whether the appropriate role is to provide information, work toward consensus, or share in the decision process.

Wondolleck and Yaffee (1994), among others, have identified many ongoing efforts, some initiated by the agencies and some that began as grassroots efforts of citizens concerned about resource management in a given region, that have successfully expanded public participation in resource management decisions and implementation. Current trends suggest that the public is demanding more meaningful participation in public-land decisions, which suggests that agencies can either choose to accommodate these desires or ignore them, with the latter choice presenting substantial risks to the maintenance of public support.

Criteria — The UCRB area panel called this public involvement criterion "enfranchisement," while the EEIS area panel called it "access to decision making," but it was significant that both groups used terms other than "public involvement" or "participation." This shows that the role of the public is being redefined through societal discourse. Members of all three panels expressed frustration, saying the current decision-making process has left people behind, resulting in management practices that are not acceptable. Panelists believed that involving people in meaningful ways calls for effectively documenting and responding to public concerns, providing adequate opportunities to listen, and showing a commitment to follow through with public decisions about public lands. These elements are viewed as the cornerstones of successful, implementable management, and are especially important given that ecosystem management cannot be accomplished without people working together across agencies, jurisdictions, and ownerships (Smith and others 1995). A clear preference was shown among panelists not to rely on the court system to make decisions, but to work things out jointly on a local level.

Relevant objectives and standards — Alternatives 1 and 2 address public involvement and participation in a variety of ways. Techniques and commitment to involving the public vary widely across the Basin, from the minimum required by National Environmental Policy Act (NEPA) of 1970 to substantial efforts designed to actively seek out public knowledge, values, and opinions for application to public land management decisions. For areas of the Basin that overlap regions covered by the Northwest Forest Plan (USDA and USDI 1994), Province Advisory Committees have been formed to address resource management issues. For other portions of the project area, the Forest Service and BLM have created Resource Advisory Committees (RACs) to provide recommendations on a subregional scale.

Alternatives 3 through 7 contain additional direction. Several objectives directly mention new ways to promote public involvement:

> SE-09: To increase public ownership of decisions, begin greater collaboration through increased intergovernmental coordination with local, state, and tribal governments, and interagency coordination with other federal agencies in planning, implementation, and

monitoring efforts in order to seek the knowledge and opinions from governmental agencies.

The related Standard (SE-S4) requires national forests and BLM districts to sign memorandums of understanding (MOUs) or similar agreements with local, state, and tribal governments within 2 years, to describe how they will work together to accomplish mutual objectives. Another objective (SE-O11) directs agencies to provide increased levels of opportunities for involvement; methods that encourage discussion, understanding, and resolution of issues are especially emphasized.

Alternatives 3 through 7 contain additional provisions for public participation, including ecosystem analysis at the watershed scale. The goal is to involve people who care about a given watershed in the inventory of social, economic, physical, and biological resources in individual watersheds, and also to help set objectives for the management of those watersheds. Alternative 3's theme contains an additional emphasis on the involvement of local residents but without additional standards, while Alternative 5 contains language about coordination at the regional scale.

Results — EEIS and UCRB area panel members did not view Alternatives 1 and 2 as making changes in existing patterns of access to decision making, one of the most important reasons why these alternatives were viewed as unacceptable. The additional provisions of Alternatives 3 through 7 at least provided hope that significant changes would be made. The groups were not talking about holding more public meetings, but about the need for dramatic change in how decisions are made. Panelists were concerned that the details of public participation were not provided in an implementation plan, so they could not judge the actual level of agency commitment. Until these details are known, for many the role of the public will remain words on paper that have little meaning. Panelists viewed Alternative 4 as more likely than Alternative 2 to promote local participation and ownership in federal land management decisions, but only if faithfully carried out. Alternative 7 was viewed less positively due to the restricted decision space available—the reserves, with most activities prohibited, were perceived to have little or no room for public participation in management decisions.

One of the most important concerns expressed by American Indian panel members was consultation, which was viewed not as an event, but as an ongoing process. Indian panelists emphasized the importance of agency willingness to sit at the same table and discuss how trust and treaty responsibilities could be met through public land management activities. Their primary message, repeated again and again, was "You have not listened, and even when you have, we have not been heard." Regarding planning actions on Federal lands, panelists said that tribes need to be involved on an ongoing basis, with consultation extending beyond the requirements of NEPA. Panelists indicated that from the tribal perspective, NEPA is not a tribal law and consultation with the tribes should not be forced into this context. Panelists perceived consultation to be a continual dialogue that results in decisions that reflect tribal concerns, treaty rights, and trust responsibilities; within this stream of dialogue, there is room to talk about NEPA and individual projects. Tribal panelists were especially concerned that tribes had been consulted late in the process, after many decisions had been made and the scope of the decision already narrowed.

Alternatives 3 through 7, if implemented as planned and followed through with regard to public participation, may ultimately result in greater social acceptability and public ownership of decisions. Even if decisions are not completely acceptable, they would be better understood.

McCool and others (in press) found support at the national as well as the local level for paying more attention to the people who would be most affected by local public land management decisions—perceived by most to be local and regional residents. However, national organizations have raised concerns about equity if an increased emphasis is placed on local participation. In evalu-

ating this concern for possible inequity, it is important to recognize that agencies cannot legally abdicate decision authority. In addition, the Federal Advisory Committee Act of 1972 (FACA)[7] was designed to mitigate this and similar concerns by providing balanced membership in advisory groups. The issue of local, regional, and national balance is always a consideration even in groups not formally chartered under FACA, and a number of approaches to addressing this concern have been successfully implemented.

Mitigation and monitoring — Monitoring public access to decision making should involve not just counting the number of meetings or participants, but measures of the perceptions of participants regarding their role in the decision-making process and acceptability of the outcome. Mechanisms for sharing decision making could be explored and implemented on a trial basis. Paying public participants for their time and energy, as well as their actual expenses, may be needed to obtain consistent, high levels of participation. Monitoring is an especially effective way of involving the public; people may not always have the time to become involved in lengthy planning efforts, but may wish to be active in checking whether the agencies did what they agreed to do, and whether those actions were effective.

Although recent changes in FACA make involvement of local, state, and tribal governments more possible, there are no additional provisions for public participation on an ongoing basis. The agencies could explore possible changes to FACA that would allow groups of stakeholders to meet with agencies regularly, while still maintaining the balance of representation and avoiding the abuses that FACA was designed to prevent. In the absence of legislative change, the agencies could explore the need for additional advisory groups established under FACA. However, the real need may be for additional institutions and mechanisms for cross-jurisdictional coordination of management activities, including public representation.

The commitment to consultation with American Indian tribes will have to be demonstrated before it can become effective. As one panelist described, "We cannot have trust without responsibility, and the Federal Government has not behaved responsibly." This is one reason tribal panelists were extremely skeptical of objectives related to consultation. The effectiveness of consultation needs to be measured by tribal members' evaluation of whether consultation goals are being met.

Effects on Private Lands

The ICBEMP is designed to result in new direction for management of lands administered by the FS or BLM in the Basin, through eventual amendment of some or all of the 74 plans currently used to manage these lands. Information released by the project has repeatedly stated that there will be no attempts to address management of private lands through the process. However, the alternatives may affect private lands in several ways. First, changes in management of public lands can affect the supply of and demand for goods and services – not just on public lands but on those private lands capable of providing similar goods and services. An example provided by the panelists was that greatly reduced timber harvest on public lands can increase pressure to harvest private lands. These interactions may be complex, and depend on many factors outside the control

[7]Federal Advisory Committee Act of 1972 (P.L. 92-463, 86 Stat. 770; 5 U.S.C. Appendix 2) was passed to control the growth and operation of the numerous boards, committees, commissions, councils and other similar groups that had been established to advise officers and agencies in the Executive Branch of the Federal Government. Advisory committees are a group, established or utilized by the Executive Branch, to obtain advice or recommendations for the Executive Branch. FACA requires the group to be chartered and that it operate in accordance with the terms of FACA. The functions of guiding and coordination the administration of FACA reside with the Administrator of the General Services Administration (E.O. 12024 of 12/1/77; reprinted at 5 U.S.C. Appendix 2). GSA has issued regulations for agencies on management of advisory committees [41 CFR 101-6.1001 to 101-6.1035 (1990)]. The Unfunded Mandates Reform Act of 1995 (P.L. 104-4, § 204) exempts intergovernmental communications with federal officials and state, local and tribal elected officials for purposes of exchanging views, information, or advice relating to intergovernmental responsibilities or administration.

of federal land management agencies. Second, private lands adjacent to public lands may be more directly affected; the preliminary draft EISs describe many emerging difficulties in managing the urban/wildland interface area, including fire protection, trespass, and wildlife conflicts. This issue gains importance given the current and projected population increases in the Basin, much of which is likely to occur in interface areas.

Because ecosystems do not necessarily start and stop at public land boundaries, achieving the goals of restoring ecosystem health may not be possible by managing public lands alone. In the project area, just over half the acreage is administered by the FS or BLM. FEMAT (1993) recommended that "federal agencies be encouraged to provide leadership by moving beyond the limits of federal jurisdictions to engage states, tribes, forest industry, and other private forest managers as equal and essential partners in discussing their relative roles in sustaining the region's forests and communities." Such statements, however, inspire great concern among some segments of the public, who view ecosystem management as a possible intrusion on private property rights.

Criteria — Because the intent is to refine management on Forest Service- and BLM-administered lands only, there is little mention of objectives addressing private lands. This and the lack of some types of critical information (such as species viability) make it difficult to distinguish the effects of the alternatives on private property beyond the concerns expressed by panelists. However, some criteria that could indirectly help gauge the effects of alternatives include the degree to which actions are coordinated between public and private ownerships, the degree to which wildland fire risks are reduced, and the number and type of incentives extended to private landowners to attain mutually beneficial objectives.

Relevant objectives and standards — One of the only directly applicable objectives applies to Alternatives 3 through 7:

> SE-O8: Reduce the risk of life and property loss due to wildfire and decrease future wildfire suppression costs by actively managing wildland fuels on areas of FS- and BLM-administered lands within or adjacent wildland/urban interface areas.

A related Standard (SE-S3) calls for coordinating this objective with local governments. The alternatives do not propose any other processes for direct involvement of private lands, such as incentives for landowners to work toward mutual ecosystem health objectives.

Other activities called for in Alternatives 3 through 7 indirectly involve private lands; for example, ecosystem assessment at the watershed scale involves inventory of resources and conditions in watersheds at the local level. Conditions across watersheds are studied in this process to provide a context for management of Federal lands by assessing interactions with resources and conditions located on non-Federal lands. It is recognized that just "studying" conditions on non-Federal lands can be controversial.

Results — Panelists identified a mix of potential effects on private lands. In particular, Alternative 7 was viewed as having a greater effect compared with the existing situation, because it could shift the social burden of providing timber, grazing, and some types of recreation opportunities to private lands. One panelist commented that when private lands have previously become the dominant source of timber, the incentive has been to over cut while prices are high, leading to long-term effects on forest productivity and ecosystem health.

Creation of large reserves could increase the attraction of the Basin for quality of life migrants who would enjoy the recreational and scenic amenities and other characteristics associated with reserves. This could increase land values, which might encourage subdivision and settlement of the interface areas and lead to loss of agricultural land in some locations. It also was viewed as having the potential to increase conflicts between

long-time residents and newcomers who may have different value systems. Other effects mentioned included increased smoke from wildfires left to burn.

Some of the same effects were projected under Alternative 4, in part due to its decrease from current levels of timber harvest and grazing opportunities. Panelists also mentioned that tightening regulation of Federal lands to protect endangered species could have the effect of allowing less restriction on private lands. In addition, greater predictability of resource supply and the reduced risk of catastrophic fires could allow private timber owners to better manage their lands. Over the long term, improvements in ecosystem health were viewed as increasing property values and the desirability of the Basin as a place to live and visit. Alternative 4, then, was generally viewed as having fewer adverse effects on private property compared with Alternative 7.

American Indian panelists voiced great concern at the prospect of being asked to "shoulder the conservation burden that the United States left by the wayside of resource exploitation." Panelists cited a planned U.S. Fish and Wildlife Service (USFWS) rule that describes contributions from non-Federal lands as necessary to meet conservation objectives. One member put it this way: "USFWS plans to include Indian lands without regard to the special status of Indian trust lands under Federal law." A critical and related issue for the tribes was the severe restrictions on treaty-protected fisheries that have been made because of past and ongoing resource exploitation for economic purposes.

The potential for shifting impacts from public to private lands could be mitigated by close coordination with local landowners and local governments. Alternative 3, which would focus attention on local coordination (but in unspecified ways), could prove more successful at accomplishing this.

Increased protection of wildland/urban interface areas from wildfire would undoubtedly protect property and lives, but could also have the effect of encouraging additional development in the interface areas, increasing the likelihood that other problems and conflicts could develop.

The success of restoring ecosystem health under all alternatives may depend in part on actions taken by private landowners. The lack of positive incentives for private landowners to participate voluntarily may detract from this effort. The success of public participation efforts undertaken under Alternatives 3 through 7 has the potential to determine local landowners' willingness to participate in ecosystem management. Involvement of local governments in a meaningful way also could advance cooperation among Federal and non-Federal land managers. Successful consultation with Indian tribes could lead to increased coordination of management activities.

Monitoring and mitigation — As suggested previously, the presence of positive incentives to help achieve ecosystem health voluntarily, coupled with a strong and effective public participation program and increased access to decision making, could encourage private landowners to work with Federal, state, and local governments to identify and achieve mutually agreeable ecosystem objectives.

Monitoring effects on private lands would have to be tempered by desires of private landowners to maintain privacy. Data collection efforts would need to be accomplished by individuals who are trusted and not associated with regulatory authority; participation could be voluntary to assure that individuals maintain proprietary decision-making authority over any actions taken on their lands.

Monitoring efforts would benefit from an initial dialogue with private landowners and their associations on what types of information would be mutually agreeable to track over time. An examination of existing arrangements of public/private partnerships could be helpful to understand the conditions that have led to successful cooperation in the past.

Effects on Communities and Quality of Life

As described in McCool and others (in press), there are many definitions of "community." In this chapter, as in the above-cited document, the primary definition is a spatially-defined place such as a town, and specifically the nearly 500 small, rural communities within the Basin. Management of Federal lands could potentially affect communities in several ways: (1) through provision of employment and income opportunities; (2) through support of community attractiveness and general quality of life via provision of recreation, scenery, healthy forests and wildlife populations, and clean air and water; (3) through revenue sharing payments; and (4) through the placement of federal employees that share their skills and energies in civic affairs.

Quality of life can be loosely identified as the combination of economic, political, psychological, social, cultural, and environmental characteristics that contributes to residents' well-being. An area with a high quality of life contributes positively to the functioning of individuals, resulting in the person being satisfied with the living experience in the community. Areas with high quality of life tend to attract new residents. A serious concern among residents of small, rural communities related to quality of life is the question of equity, that is, who loses and who benefits under each of the proposed alternatives.

Federal lands also play a role in quality of life for nonresidents of the Basin. As discussed in McCool and others (in press) and Haynes and others (in press), people may visit or move to the Basin in the future, based in part on the presence and management of Federal lands. Even if people do not visit the Basin, they can value its resources and conditions for many reasons, including the possibilities of visiting there in the future, the knowledge that Basin resources will be available for future generations, and the value associated with knowing Basin public lands and resources are there. Chapter 5 of this document (Economics) demonstrated that these non-use values can be substantial, such as in the case of unroaded areas.

Generalizing the effects of the alternatives on communities and quality of life must be recognized as highly problematic. Not only do communities vary greatly in terms of size, economic structure, setting, and relationship to federally managed natural resources, they are nested within larger levels of social organization. A host of exogenous factors—in addition to Federal land management policy—may affect their future. Even communities in close proximity to FS- or BLM-administered lands may experience entirely different effects from the same alternative. Because of high levels of uncertainty about implementation of the alternatives and how they will translate into effects at the community scale, predictions of the consequences of federal land management actions on specific communities, or even categories of communities, cannot be made with confidence at the Basin scale.

The next sections describe concerns at the community scale, and how they are addressed by the alternatives for five relevant quality-of-life factors: (1) jobs and income, (2) payments to counties, (3) recreation and access to public lands, (4) scenery, and (5) community resiliency. Following this is a discussion of the panel evaluations and other data relevant to estimating the types of changes likely to occur under each alternative and the panels' evaluations of those changes.

Jobs and income — Communities in the Basin tend to rely heavily on natural resources as a critical component of economic diversity. For example, 71 of the communities in the Basin were determined to have high employment (10% or greater) in wood products industries, while 321 of the communities in the project area were determined to have high employment (10% or greater) in agriculture. Reliance on Federal lands varies, but is especially substantial for timber harvest in counties identified in the Economics chapter (5) of this document. The changes in employment likely to result from the alternatives have many corresponding effects within communities. The

main effects are on workers employed by affected industries, their families, and on other employment sectors that derive secondary income from those workers. A broader concern is how those changes translate into effects on communities.

The effects of changes in jobs on community vitality are influenced by several intervening variables. These include the resiliency of the community, the presence of wood processing and manufacturing facilities in the community, availability of job retraining programs, community activities to prepare for change and/or strategies to attract new business and industry, proportion of the county budget dependent on federal resource revenue sharing programs, population growth and migration patterns into and out of the community, and the stability of projected harvestable timber flows. As mentioned previously, however, the number and variability of these intervening variables coupled with the sheer number of small communities in the Basin prohibit identifying employment impacts of the alternatives on specific communities.

The alternatives would call for a wide variety of activities that would generate employment opportunities, including new types and levels of restoration activities. Most traditional employment-generating activities would also continue under the alternatives, although with some changes in levels and types of outputs.

The preliminary draft EISs propose additional objectives and standards for economic opportunities on federally administered lands, specifically targeting communities and areas judged most at risk because of their location, economic structure, and reliance on resources managed by the BLM or FS:

> SE-O5: Emphasize customary economic uses in rural communities or geographic areas identified as less economically diverse and more dependent on outputs of goods and services from Forest Service- and BLM-administered lands based on: (1) where these uses generate a substantial percent of local employment; (2) that are geographically isolated; and (3) that are not gaining substantial employment opportunities in other industries. These areas are henceforth referred to as priority areas. Prioritize activities on tables 3-12 and 3-13 in these areas to promote such customary uses as well as new activities in these priority areas.
>
> SE-S2: Priority areas shall be established in the Record of Decision. Changes to priority areas shall occur by amendments to land use plans. Priority areas shall be reassessed every 5 years to determine if conditions warrant a change in priority areas designation.

These reflect a concern for distributive effects, recognizing that some communities will be more strongly affected than others.

Payments to Counties — County governments provide many community services in rural areas, from police and fire protection to road maintenance, libraries, and other social services. Local school districts, which operate as independent units of government in each of the seven states in the Basin, are an additional institutional fixture within communities. Schools offer highly important focal points for community cohesion, since they supply community educational needs as well as cultural and athletic events that draw the community together. Both county governments and school districts in the Basin are the recipients of federal revenue sharing payments, based on the amount of Federal land in the county and the value of the commodities extracted in a given year. The higher the harvest value, the more money returned to roads and to schools.

Schmidt (1995) examined levels of federal revenue sharing in counties within the Basin over recent years to understand the significance of both PILT (payments in lieu of taxes) and 25 Percent Fund payments in supporting these important community institutions. Schmidt reported that 31 counties in the Basin receive additional benefits based on the receipts from the 25 Percent Fund. The majority of counties in the Basin receive baseline

PILT payments of $0.75 per acre regardless of harvest revenue.

Analyses conducted for the preliminary draft EISs showed that at least 20 counties in the project area (6 in eastern Oregon, 1 in eastern Washington, and 13 in Idaho; analysis not completed for Montana and other Basin states) rely on federal revenue sharing payments for more than 10 percent of their total budgets. Of these 20 counties, 15 were rated as low on an economic diversity scale, suggesting that they are particularly vulnerable to changes in federal revenue sharing.

Alternatives 1 and 2 do not propose any new objectives or standards relating to revenue sharing from Federal lands, but Alternatives 3 through 7 contain one objective that is based on the assumption that ecosystem management leads to increased predictability regarding activities that generate income on Federal lands:

> SE-O10: Improve stability of Federal payments to local governments to contribute to long-term budget consistency and planning of local government revenues through increased predictability (SE-O1) of goods and services from Federal lands.

Recreation and access to public lands — Access to public lands and recreation opportunities are important components of quality of life and contribute to the vitality of small communities in the Basin. Many residents live in the Basin because they enjoy recreational opportunities found on federally administered lands. The economic effects of recreation activity are considerable in the Basin, and Haynes and Horne (in press) identified recreation as the highest value use of Federal lands in the Basin. The Recreation Opportunity Spectrum (ROS) was the tool used in this analysis to measure variation among alternatives in recreation opportunities in the Basin. The ROS identifies the type of recreational experience available to a visitor. Within the ICBEMP the seven standard ROS categories have been collapsed to three groupings: primitive/semi-primitive, roaded natural, and rural/urban (see appendix 6-B, table 6B.1 for ROS projections within the Basin by alternative). The presence or absence of roads is the primary determinant in ROS classifications, and blocks of land greater than 2,500 acres (1,012 ha) in size that are more than one-half mile (0.8 km) from a road are classified as primitive/semi-primitive.

In their *Economics Assessment of the Basin,* Haynes and Horne (in press) stated that roaded natural opportunities are used for about 75 percent of the recreational use on Federal lands in the Basin. However, the large amount of primitive and semi-primitive recreation opportunity in the Basin is noteworthy and provides substantial economic value. From a national perspective the region has a comparative advantage in the amount of primitive/semi-primitive recreation opportunities—the Basin has more large areas in this wildland-type classification than any other region in the continental United States. These areas combine exceptional scenery with an experience of solitude that draws visitors from a national and international constituency.

Changes in road management, such as closures and decommissioning, may decrease accessibility for both roaded natural and primitive/semi-primitive opportunities. An additional issue surrounding the question of access deals with the capability of people with disabilities to use facilities and programs provided on federally administered lands. The alternatives do not address the concern of access for people with disabilities.

The preliminary draft EISs have several objectives and one standard that relate to provision of recreation opportunities. Alternatives 1 and 2 do not contain new objectives or standards (except for SE-O12), so the objectives SE-O13 through SE-O15 apply only to Alternatives 3 through 7. Alternatives 1 and 2 anticipate that the recreation objectives in existing plans will be carried out.

> SE-O12: (Alternatives 1-3) Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and

outcomes. (Alternative 4) In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism. (Alternative 5) In areas where recreation is the primary emphasis, emphasize the most appropriate recreation and tourism opportunities that reflect current and projected demand and from which public lands are best suited. (Alternative 6) Same as Alternative 4; in addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism. (Alternative 7) In areas outside reserves, same as Alternatives 1, 2, and 3. Provide additional opportunities for primitive and semi-primitive recreation in reserves.

SE-S5: (Alternatives 1, 2, 3, 4, and 6) Use the ROS or other appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences. (Alternative 7) Outside reserves, same as above. Manage reserves for primitive and semi-primitive settings.

SE-O13: Identify opportunities to provide public access for land and water-based recreation purposes.

SE-O14: Foster and strengthen partnerships between public and private sectors to raise the quality and quantity of recreation and tourism facilities and services, to avoid duplication, and to share resources.

SE-O15: Take actions that will lead to recreation programs operating in a financially self-supporting manner.

Scenery — Communities are affected by the surrounding scenic condition because an attractive natural setting contributes to perceptions of community desirability. Overall, scenic conditions within the Basin are very good, with several major portions of the Basin representing perhaps the most visually intact areas within the contiguous United States (Galliano and Loeffler 1995). A high quality scenic backdrop helps to attract new businesses, and growth in the Basin can be related to the high quality amenities in the region, of which scenery is an integral part (Rasker 1995). Population growth in high amenity recreation counties in the Basin (Johnson and Beale 1995) has been a major driver of economic growth and job opportunities (Haynes and Horne, in press).

Scenic integrity is the tool used in this analysis to measure variation among alternatives of the quality of scenery in the Basin. Scenic integrity refers to the visual "intactness" of a landscape, which is based largely on the evidence of human disturbance. The more evident the human alterations of naturally evolving or naturally appearing landscapes are, the lower the scenic integrity. In developing an existing scenic integrity inventory for the ICBEMP, classifications used five categories: very high (settings where the landscape is visually intact with only minute deviations), high (settings where the landscape appears intact), moderately high (settings where the landscape appears slightly fragmented), moderately low (settings where the landscape appears fragmented) and low (settings where the landscape appears heavily fragmented) (see appendix 6-B, table 6B.2 for scenic integrity projections by alternative).

The preliminary draft EISs contain several objectives that directly address scenery as it relates to quality of life in the Basin. Note that there is one objective for Alternatives 1 and 2, but three different objectives for Alternatives 3 through 7.

SE-O17: (Alternatives 1 and 2) Meet established visual quality objectives based on management principles and techniques from the applicable agency visual landscape management system.

Objectives for Alternatives 3 through 7 include:

SE-O16: Enhance scenic integrity in areas currently rated as low or moderately low by implementing management activities for forest and range vegetation and road densities at the levels described in tables 3-12.

SE-O17: Maintain the highest level of scenic integrity and decrease short- and long-term risks from wildfire by implementing activities for forest and range vegetation and road densities at the levels described in tables 3-12.

SE-O18: Protect human health and decrease short- and long-term risks of degraded air quality from wildfire by implementing vegetation management activities at the levels in tables 3-12.

Community resiliency — The ICBEMP has used the term "community resiliency" to refer to a community's ability to respond and adapt to change. In their literature review of critical community characteristics, Harris and others (1996) identified a number of characteristics that could help to determine a community's resiliency: community character; cohesiveness; services and infrastructure; autonomy; economic diversity; resource dependence; attractiveness to business; quality of life; leadership; effectiveness of community government; and preparedness for the future.

Community resiliency is an important intervening variable in the assessment of the impacts of alternatives on communities. However, the resiliency of some communities could also be affected directly by the alternatives, particularly due to changes in opportunities for employment. The focus here on smaller communities is based on the assumption that larger communities with currently high levels of resiliency will not be greatly affected by Federal land management actions within the range of activity proposed under the alternatives. This does not mean that groups of families or individual members of larger communities are not affected by changes in flows of resource commodities and other goods and services from federally administered lands, but simply that smaller communities, because of their tendency to possess lower levels of economic diversity and resiliency, may be more sensitive as a whole to changing conditions.

Objectives and standards specific to community resiliency relate to Alternatives 3 through 7:

SE-O6: Within 3 years support rural communities in their efforts to become more resilient by implementing policies which favor local labor, resources, and knowledge and local use of resources, from Forest Service and BLM-administered lands in the implementation of Objectives SE-O1, SE-O2, SE-O3, SE-O8, and SE-O18.

SE-O7: Within 3 years support local strategies that enhance social and economic conditions in rural communities. Define a federal agency role which assists in providing developmental, tourism, and recreational activities that help diversify rural economies and improve quality of life.

Results — This section discusses some of the likely social effects of the alternatives on communities, based on the panels' evaluations, the economic evaluation of alternatives (Chapter 5), and estimates of outputs generated by the ICBEMP. The discussion is a running narrative rather than discrete sections with their own estimates, although an attempt is made to follow the organization of the previous section. This was done because so many effects either parallel or overlap with others that it seemed inaccurate to treat them as distinct elements. Another consideration was the imprecision associated with estimating effects at such a small scale (communities) based on such a broad scale of actions (the Basin), coupled with the lack of information about critical implementation variables.

In the Economics chapter of this document, Haynes and Horne provide analysis of effects on jobs and income for several natural resource-related economic sectors under the alternatives. Although those data are presented at the county level rather than the community level, which can mask differential effects on diverse communities within the same county, they have implications for community-scale effects.

Haynes and Horne (in the Economics chapter of this document) conclude that effects of the alternatives on jobs within the range industry would

be relatively small (< 100 jobs for all alternatives except Alternative 7), although all alternatives would lead to fewer jobs related to changes in federal range management. The greatest effects identified would be loss of approximately 300 jobs within the UCRB planning area under Alternative 7. Effects on recreation-related activity on Federal lands was expected to be positive under all alternatives, ranging from 3,700 more jobs provided under Alternative 5 to 8,000 more jobs provided under Alternatives 2, 3, 4, 6, and 7. Effects on timber-related employment showed the greatest variability by alternative. Alternatives 2 through 7 would reduce employment levels from those expected under Alternative 1, from 5,900 fewer jobs under Alternative 5 to about 9,200 fewer jobs under Alternative 7. In their economic analysis, the authors go on to suggest that job losses may be greater than these numbers indicate, based on the assumption that between 9 and 15 percent of the timber volume projected may not actually be sold, and due to other factors such as the relatively small size of timber expected to be offered.

Given the current and projected economic growth in the Basin and the total number of current jobs (approximately 1.5 million), the changes projected to result from the alternatives are not likely to create significant social effects associated with employment opportunities, when measured at the Basin or EIS planning area scales. The economic evaluation of alternatives (Chapter 5) suggests that changes will be negligible at the trade center scale as well. The authors identified 17 counties whose economic resiliency is likely to be affected by the alternatives, with about half of those counties losing and about half gaining resiliency (measured by economic diversity). That evaluation also identified 16 counties containing 29 timber-dependent communities; Alternatives 2, 3, 4, 6, and 7 are expected to have negative effects on the timber sectors in those counties; Alternative 5 is expected to lead to less negative effects in eight counties.

Given this information, it is reasonable to expect that the most significant positive and negative effects will manifest themselves at the community scale, not directly discussed in the above-cited Economics chapter. In particular, the greatest risks would be expected in timber-dependent communities that are relatively isolated and that do not have diverse economic structures. This is a cumulative impact, because in most cases timber sectors in those communities have already experienced downturns, with the accompanying social stress for workers, families, and other community residents: "persistent poverty, increased commuting, emigration of community members, the breaking up of family and community support networks, changes in leadership, low morale, uncertainty, heightened conflicts among groups within communities, deep cuts in school budgets are all factors that result from shifts in forest policies if community needs are not addressed" (FEMAT 1993). A community's resiliency is a critical intervening variable in determining the length and the intensity of negative effects. These effects are most likely to be evident in communities having the lowest relative levels of social and economic resiliency which, as described in McCool and others (in press), is estimated to be about 5 percent of all small, rural communities in the Basin.

Panelists in the EEIS and UCRB areas were uncertain how the alternatives may affect communities, although there was a general sentiment that the current plans, as represented by Alternatives 1 and 2, did not resolve key issues. Declines of forest health and fish populations, and the potential negative consequences of wildland fires did not appear to be adequately addressed by Alternatives 1 and 2, making it likely that these alternatives would be less socially acceptable than Alternatives 3 through 7. Panelists recognized that vitality of small communities is partly a function of their economic activity, which is in turn affected by the number of people that reside or visit a community. Haynes and Horne (in press) have identified population growth as an important indicator in predicting economic activity, and since population growth in the 1990s has been strong in the Basin, it provides one piece of evidence that the economy, on a regional scale, is performing well. More important to panelists was the anticipated change

in the relationship of people to the landscape that could be brought by in-migration, especially in terms of recreation pressure. None of the alternatives appeared to panelists to be adequately addressing recreation demand and the pressure it would place on resource management.

For small rural communities in the Basin, continued removal of timber from Federal lands and access to rangelands for grazing is viewed as a significant issue. Alternative 1, which is the no action alternative in both the EEIS and UCRB planning areas, represents a policy direction that has been significantly modified and to which a return is not possible. At the Basin level, harvestable timber volume is expected to decline over the current situation (see the Economics chapter of this document) under all alternatives, although we note that information supplied by the EIS teams displays such a range of timber volume that the alternatives may or may not differ on this variable. In the EEIS area, Alternative 2 (which can be more realistically described as the current policy direction) yields the highest average timber harvest volume. Of the ecosystem-based alternatives, Alternative 5 results in the lowest decrease in volume from Alternative 2. In the UCRB area, Alternatives 3 and 5 yield the highest volumes, which are significantly above levels in Alternative 2. In terms of range forage (see the Economics chapter of this document), all alternatives, except for Alternative 7, show modest declines in animal unit months and Federal range dependent jobs.

Alternative 1 has not been implemented as planned, resulting in substantial decreases in employment in the wood products industry and increased uncertainty for communities. Some panel participants felt that the social impacts of reductions in timber harvesting in the Basin have already occurred. Other participants suggested that trade offs between timber jobs and commercial fishing jobs were implied in the alternatives. Implementation of Alternative 1 may negatively affect recreation and tourism because of declines in fish habitat. Alternative 1 also does not fit into the philosophy of ecosystem-based management, and therefore is contrary to direction of the project. Alternative 1 may have provided more government revenue sharing funds, but it is questionable that this could have been sustained in the long run. There are no proposed objectives and standards dealing with enhancing community resiliency in either Alternative 1 or 2, reinforcing perceptions that small communities no longer can access decision-making processes affecting their futures.

Some panelists argued that the focus on the production of timber as a measure to identify community impacts only continued a management emphasis that traditionally has been unbalanced and has favored commodities over investments in amenities, while recreation may be the biggest growth area in the Basin (a perception confirmed by data reported in Haynes and Horne, in press). However, under current federal mechanisms for collections, recreation does not pay its way, and thus, remains under-valued.

If funded at appropriate levels and if systems for income from recreation were established, recreation could be viewed as a commodity. The lack of revenue returns to counties from the 25-Percent-Fund payment creates disincentives for local officials to support alternatives to reduce timber harvest volumes. Alternative 7 would create a significant drop-off in funds to those counties receiving revenue sharing payments in excess of PILT. Decreases in timber volume that would occur under Alternative 7 could be counterbalanced by increases in prices, thus the effects are uncertain. Only Alternative 1 would provide levels of revenue sharing in the 25-Percent-Fund that are close the fund's payments to counties provided over the past decade. It is unclear what the effects of Alternative 4 may be on revenue sharing. While timber harvest levels are projected to decrease from the current situation, prices may rise, leading to potentially no net change in revenues to county governments, depending on market conditions.

Panelists also identified that the extraction of non-traditional forest resources and the access to these resources are becoming more of an economic issue. Greater returns to the Federal Treasury may be

provided by some non-timber forest products than by the harvest of wood products. These "special" forest products also present cross-cultural conflicts, based on different uses and/or harvesting techniques associated with ethnic groups. None of the alternatives addressed the contributions to communities of non-timber forest products. Impacts to cultural groups (such as Hispanics and Asians/ Pacific Islanders), who may use federally administered natural resources for non-traditional forest products, are unknown because estimates of harvestability of culturally salient plants and animals were not available from the ICBEMP.

Road density measures provide de facto estimates of access to federally administered lands for a variety of purposes, including access to plant and animal species and culturally important sites for American Indian tribes, access to non-traditional forest products and access to a variety of recreational opportunities. In the EEIS area, the proportion of land in the highest road-density classes (> 1.7 miles /sq. mile) would decrease significantly under Alternatives 3, 4, and 7. There are no major changes in road densities in the other alternatives (see appendix 6-B, table 6B.3 for road density projections by alternative). Under all of the alternatives there would be no increases in the lowest road-density classes, suggesting that access in general would continue at current levels. Apparently much of this decrease would come from relatively small timber harvest on spur roads, while major thoroughfares would remain open. In the UCRB area, only Alternatives 6 and 7 result in changes in road densities. These alternatives would lead to 12 and 14 percent reductions, respectively, in the proportion of roads in the "high/extremely high" density classes, with no changes in the lower road-density classes.

The amount of area and number of roadless areas, would be unaffected by the proposed alternatives. Under Alternative 7, 40 percent of the federally administered land in the Basin would be designated as reserves. This designation, accompanied by lack of prescribed fire management, may significantly change the vegetative composition and character of these roadless areas. No projections were made specifically for the existing roadless areas, so this conclusion is speculative.

Changes in amounts of area in both primitive/ semi-primitive and roaded/natural ROSs are relatively modest under all alternatives and are localized to the Lower Clark Fork and Southern Cascades Ecological Reporting Units in Alternative 5 (see appendix 6-B). Across the Basin, Alternative 5 represents a reduction of approximately 77,000 hectares (214,890 acres) in primitive/semi-primitive classes over the current situation. Data provided by the economics staff suggests that this amount of conversion will have little effect on net economic benefits of recreation at the Basin level.

Recreational use is projected to increase dramatically, partly in response to rising populations within the Basin and partly because of increased tourism, which is an economic development policy of all the states in the Basin. Changes in road management involve decommissioning or obliteration of the road surface, therefore, reductions in roads do not provide for increased opportunities for hiking, hunting, fishing or mountain biking that have been dependent on a road-like trail surface. Reductions in road density could potentially increase road traffic, as demand for natural resource-based recreation increases, but fewer miles of road are available. Such increases may lead to congestion, conflict, and decreased air quality because of increased dust production. Such obliterations, however, may lead to less sedimentation entering streams, which subsequently could have a positive affect on fish populations and result in greater fishing opportunities. The alternatives may have no discernable affect on access for disabled persons.

Panelists commented that the effect of management actions on communities has often been cast as a trade off between recreation and traditional uses; this does not reflect the complementary effects of roads to recreation access, the funding for road maintenance from timber harvests, and the new types of harvest techniques to maintain scenic characteristics.

Related to scenic condition, Alternatives 3, 4, and 7 would lead to relatively sizeable proportional increases in lands of "high" and "very high" scenic integrity classes in the next decade within the EEIS planning area (appendix 6-B). These alternatives then would be expected to enhance the viability of communities located in the nearby area by making their surrounding settings more visually attractive. In the UCRB planning area, the situation is somewhat more complex. Nearly two-thirds of the federally administered lands in this area are currently rated as "high" or "very high" in scenic integrity with many of these lands lying within designated wilderness and other protected areas. Alternatives 3, 4, and 5 would cause somewhat of a decrease in scenic integrity and Alternative 7 would promote a modest increase (appendix 6-B). Therefore, in the UCRB area, we would expect to see community viability affected only in a minor way, from shifts in scenic integrity.

It would be useful to group communities based on the five scales that were used to define resiliency (economic structure, civic leadership, social cohesion, preparedness for the future, and amenities), in order to identify the different paths to achieving resiliency and the implications for dealing with change. As a preliminary step in this effort, ICBEMP staff conducted a series of cluster analyses (SPSS Inc. 1989). The results suggested that it is useful to think of three types or groups of communities with respect to resiliency.

The first group had the highest scores for all five factors that make up the resiliency index; these were communities viewed by their leaders as attractive, economically diverse, socially cohesive, and having strong civic leadership. These communities also tend to be larger in population and exhibit the greatest economic diversity. This group tends to contain a larger number of communities than the other two groups. These communities presumably have a number of different characteristics that will allow them to meet new challenges successfully.

The second group of communities had comparably high scores on civic leadership and amenity values, but much lower scores on social cohesion and economic diversity. Towns in this group have considerably less population than those in the first group. The number of towns in this group is slightly lower than the number in the first group. This type of community may lack the economic base to deal with change successfully, but this could be compensated for by forward-thinking civic leaders and the presence of amenities.

The third type of community identified tends to have the lowest scores on all of the measures. They are intermediate in population (though closer in size to the smallest rather than the largest towns). These communities may find it difficult to cope with change because they have few current strengths on which to build. This group contains far fewer towns than either of the other groups. Mitigation could be targeted to these communities, following further analysis.

Much of the panels' discussion centered on Alternatives 1, 2, 4, and 7 because they seemed to have the most meaning and were understood best. Panelists tended to have a more difficult time identifying the unique elements of Alternatives 3, 5, and 6. Alternative 4 was viewed by panelists as having higher social acceptability than either Alternatives 1 or 2. It was suggested that Alternative 4 may likely result in greater economic diversity because needed restoration efforts would be accomplished. This alternative could also increase in-migration to the Basin and its smaller communities, which could result in higher levels of social conflict because new residents may bring with them different value systems. Because Alternative 4 involves substantial restoration activity, and such activity requires a funding level that is uncertain, it is difficult to evaluate its effects on employment and communities, although objectives and standards identify a preference for local hiring (as they do for Alternatives 3 through 7). Not enough information was provided to determine if marketed timber volume under restoration-focused management would be profitable or of sufficient stability for the private sector to make long-term investments such as the development of new processing plants. Alternative 4, however,

may provide employment opportunities by the government and private sectors, thereby keeping youth residing in smaller communities at home and reducing out-migration. Restoration of rangelands may increase forage availability, thereby resulting in a positive effect to ranchers, assuming the increased forage can be utilized by cattle.

Alternative 7 was viewed by the panelists as having many potentially negative impacts. It was felt that Alternative 7 carried a greater likelihood of catastrophic events that could move outside the reserves. This would increase uncertainty for humans. Alternative 7 may increase scenic integrity and quality of life for many, yet could also lead to potential increases in in-migration. Such increases in population growth may lead to more subdivisions, thereby increasing population density, habitat fragmentation, and wildfire hazard. Panelists were concerned that such subdivisions would not pay for the government services needed by residents. Alternative 7 may also involve much smaller staffing levels for the FS and BLM, which could lead to negative effects such as the availability of skills and knowledge for managing change in local communities, and substantial reductions in resource-based revenue sharing. On the other side, some panelists felt that Alternative 7 may force communities to reconsider their economic futures, thereby increasing their resiliency.

Finally, there may be an inequitable distribution of costs and benefits among the alternatives. Under Alternative 1, smaller rural communities may receive much of the economic benefit (in terms of jobs and employment) generated by timber harvesting activity and the use of below-cost timber sales. Alternative 2, because of the restrictive interim measures (such as those in PACFISH 1995), could place more of the cost on small communities, primarily because jobs would be lost in the resource commodity industries. Specific objectives for enhancing community resiliency are established under Alternatives 3 through 7, in order to confront potential changes in the distribution of costs and benefits.

However, panelists disagreed about establishing priority areas based on isolation and employment growth in other industries, suggesting that these criteria were too limiting for mitigation programs, and implying that the Federal Government was forsaking small communities. Under Alternative 3 small communities would receive a larger share of the benefits because they would have a strong voice in local resource management decisions. This does not necessarily mean that increased timber harvesting would result, only that it is more likely that local needs would be addressed. If the jobs created by Alternative 4 materialize, and if a priority is given to local labor to accomplish restoration, then smaller communities may benefit as well.

The distribution of effects under Alternatives 5 and 6 are unclear. Alternative 6 may have the same effects as Alternative 4, but they would occur over a longer timeframe. Longer timeframes may increase the uncertainty associated with implementation of this alternative, reducing its social acceptability. Alternative 7 could shift benefits well away from smaller communities to the nation as a whole. The costs, in terms of resource commodity processing jobs, increased variability in commodity flows, and increased risk of wildfire, may be borne by smaller communities. Communities that currently have low levels of resiliency may be particularly affected. However, some communities would be expected to benefit, and much would depend on how reserves and matrix lands were actually managed.

Monitoring and mitigation — The ability to monitor changes will require agreeing about appropriate indicators of community vitality among agencies and representatives of other public and private institutions. The very process of identifying these indicators could be a positive first step in understanding the manner in which Federal lands interact with communities and effect quality of life at finer scales. Measurement would be advanced by cooperative efforts to collect and communicate information among a wide range of stakeholders, such that greater trust in the quality of information collected could be generated.

Policy decisions about the appropriateness of federal agency interventions to mitigate changes in resource flows to rural communities will need to be made via a process that is open to public participation and addresses the issue of equity—both within and between the community groups identified in the previous section of this chapter. Typically, efforts to deal with a changing business environment involve retraining programs supported with public funds. Yet, a climate of declining budgets across government programs will require realistic projections of available funds and their potential distribution. Past experience suggests that retraining programs, although they may ultimately provide economic benefits, still have their social costs, especially for people whose occupations and lifestyles are intertwined with natural resources and public lands.

An evaluation of programs that have been offered to former timber workers in western Oregon and Washington as a result of the President's Forest Plan (USDA and USDI 1994) may be helpful in the design of transition strategies. Additional research, such as surveying workers who have and have not participated in retraining, would help to further define the costs and benefits of such programs. Monitoring federal payments to counties and the resulting effects, especially on counties most dependent on federal revenue sharing, could suggest targets and approaches for mitigation strategies. Local governments should be active participants in this process.

The Community Self-Assessment workshops held in one-half of the Basin's small, rural communities (Harris and others 1996) provide a starting point for further efforts that could involve more community residents and work toward finding collective solutions to collective problems. Such groups could also play a valuable role in monitoring the effects of implementation, working to reduce negative effects and capitalizing on positive ones. The role of the FS and BLM in this effort could be determined on a community-by-community basis, depending on the needs and desires of community leaders and other participants.

Effects of Alternatives on American Indian Tribes

American Indian tribes have long occupied the Basin and their interests and rights are defined in a series of treaties signed in the Nineteenth Century. These rights and interests have been interpreted and enforced in a variety of court decisions and congressional actions. Each tribe has an individual identity and relationship with the United States Government. Aggregating individual tribal interests for the entire Basin may overshadow specific concerns of individual tribes. Nevertheless, American Indian tribes have a number of common interests and concerns which may be affected differently by the alternatives.

In examining tribal interests in the West, Hanes (1995) recognized that key issues revolve around sovereignty, trust status, self-determination, self-governance, access to sacred places, and harvest of traditional foods and medicine. Several of these same issues were brought forward in the panel session of tribal representatives to assess the consequences of implementing the EEIS and UCRB EISs. The areas of interest that the panel addressed in relation to these two EISs focused on seven major areas: (1) trust responsibilities, (2) access to public lands, (3) quality of water and land, (4) opportunities for economic growth, (5) culturally significant plant and animal communities, (6) air quality, and (7) places. Each of these interest areas will be examined below as criteria for evaluating the proposed alternatives.

The tribal panel had difficulty accepting not only the format of the EISs, but the evaluation process as well. The panel entered the evaluation process at the "end" of the initial developmental phase of the project and within a context of a long history of what they view as inequitable solutions of their interests. Not only had Indians lost their traditional uses of lands over the period of conquest and forced relocation to reservations, they felt they had not been treated fairly in the application of management decisions. Executive Orders by the President to live up to obligations to the tribes are perceived to have been ignored or applied in incon-

sistent fashion. There appears to be little accountability when transgressions occur, and no incentives have been proposed to evaluate whether or not tribal interests are being addressed. Plans and programs for management are perceived as driven by the supply of outputs that are valued by others, but these programs are not holistic or guided by objectives to support the lifeways of the tribes.

Whole system divisions that are inherent in the structure of an EIS document and the paradigm of science run counter to the manner in which tribes view themselves and their relationship with the environment. Although several panelists appreciated the fact that a watershed approach was being used in the ICBEMP, there was a strong sentiment that an EIS was a clumsy and inappropriate vehicle to make decisions about the diverse interests of people.

Trust responsibilities — The Federal Government's obligation to honor its trust relationship and fulfill its treaty commitments is known as its trust responsibility (Pevar 1992). The competition and conflict between native and Euro-American people in the 1800s resulted in a treaty-making period between tribes and the United States Government. Upon signing treaties with American Indians, the government assumed a legal obligation in which the Indians trusted the United States to fulfill promises given in exchange for their land. In the 1831 Supreme Court decision, *Cherokee Nation v. Georgia*,[8] Chief Justice Marshall characterized American Indian tribes as "domestic dependent nations" with a government or nation-state status and a special relationship to the United States (Cohen 1982). Pre-existing rights which were not specifically granted to the United States through treaties or agreements or which were not expressly terminated by Congress continue to this day, and even a treaty that is silent regarding hunting and fishing rights implicitly reserves those rights (*Menominee Tribe v. United States*;[9] see Getches and others 1993).

Trust responsibilities in the Basin are related to: (1) natural resources on reservations and ceded lands, and in traditional use areas regardless of their location; (2) rights associated with access to certain areas, plants and animals off-reservation; (3) the right to self-determination (self-governance); and (4) the right to social well-being. These responsibilities are applied to many resources and lands administered by the FS and BLM.

Evaluation of alternatives — The effects of alternatives can be only understood within the context of historical relationships between the tribes and the U.S. Government. Therefore, this section contains substantial description of tribal viewpoints on this relationship and how it influences estimates of effects.

The EEIS and UCRB preliminary draft EISs contain two objectives to guide federal agency actions regarding their relationship to tribal interests for Alternatives 3 through 7. Each of these objectives contains one standard that identifies a process by which federal management actions are to be undertaken. The objectives and standards do not apply to Alternatives 1 or 2.

> T-O1[10]: To help meet the Federal Government's responsibility (to) maintain a government-to-government relationship with affected federally recognized tribes (agencies will) develop meaningful relationships to understand and incorporate tribal needs, interests, and expectations in Federal land management (and will) allow cooperative activities where there are shared goals.
>
> T-S1: (1) Agencies shall consult with all affected federally recognized tribes on projects at the proposal stages, and at other stages as appropriate. (2) Agencies should consult with all federally affected Indian tribes/communities on (a) project at proposal stages, and at other stages as appropriate.

[8] *Cherokee Nation v. State of Georgia*, 30 U.S. (5 Pet.) 1, 8 L.Ed. 25 (1831).

[9] *Menominee Tribe of Indians v. United States*, 391 U.S. 404, 88 S.Ct. 1705, 20 L.Ed.2d 697 (1968).

[10] T-O1 indicates Tribal Interests - Objective, followed by the specific objective number cited (Chapter 3, *Preliminary Draft EISs*; see appendix I in this document) (USDA and USDI 1996a, 1996b).

T-O2: To help meet the Federal Government's responsibility toward tribes, maintain and/or restore habitat conditions at or above a level capable of supporting healthy, sustainable, and usable quantities of species/resources by implementing activities in Tables 3-12 and 3-13.

T-S1: (1) Agencies shall assess habitat conditions (using biological evaluations or other means) and discuss assessments with affected tribes at the earliest practical stage in planning a project. (2) Agencies shall assess habitat conditions (using biological evaluations or other means) where a habitat has an identified social or traditional importance to an affected tribe or American Indian community, such as root fields or fishing grounds.

Consultation with the tribes is an essential component of operationalizing trust responsibilities but there may be significant differences in what consultation means to the tribes and the U.S. Government. Undoubtedly, consultation may vary according to the norms and cultural preferences of individual tribes. The tribal panel felt that consultation on this project was not achieved because their input was not incorporated until late in the project, thereby calling into question the sincerity of the proposed objectives and standards.

The American Indian tribal panel unanimously agreed that none of the proposed alternatives would meet the Federal Government's trust responsibilities to the tribes in the Basin. The tribes communicated clearly that "trust" is a term that they interpret as responsible behaviors in the management of natural resources. In the view of the panel, the U.S. Government has allowed unacceptable levels of degradation of the lands and waters entrusted to federal agencies for management.

From the perspective of the tribal panel, the alternatives do little to address fundamental treaty-identified concerns regarding the quantity and quality of water, the harvestability of fish populations, deer hunting opportunities, and the availability of roots and berries. Further, as long-term residents of the Basin with a tradition of evaluating actions over multiple generations, the tribal representatives on the panel see the FS and BLM approach as transitory, fulfilling the bureaucratic needs of the current situation instead of the needs of future generations.

An additional issue of concern regarding the fulfillment of trust responsibilities related to the capacity for federal land management agencies to intervene with state governments on behalf of the tribes. Particularly concerning the issue of water quality, tribal representatives believe that they are operating at a disadvantage with state government agencies, and that Federal trust responsibilities regarding the maintenance of water quality and quantity should extend to advocacy activities with other institutional units of government.

Alternatives 1 and 2 were the least acceptable to the tribes in meeting the trust responsibility criterion. They do not explicitly provide mechanisms for a consultation process and continued the business-as-usual approach to establishing priorities for management action. Current plans do not contain mechanisms to improve working relationships between the Forest Service, BLM, and the tribes, and from their perspective this lack of a cooperative framework is unacceptable. Alternatives 3 through 7 were viewed as an improvement in the respect that they at least acknowledged a need to involve tribes in management planning. The tribes have been exempted from restrictions of the Federal Advisory Committee Act but feel that they have yet to witness collaborative planning efforts.

Access to public lands — Access to federally administered lands is important for American Indian tribes in order to uphold the rights to resource uses that are reserved under treaties. These resource uses involve, but are not limited to, activities such as gathering culturally significant plant species, engaging in hunting practices, and the use of ceremonial sites. Since the form of access to these resources has evolved to include the use of motor vehicles, the opportunities for tribal members to use roads have become a point

of interest to tribes when issues of road management arise.

Access also involves the ability of tribes to continue usual and customary uses in places where administrative restrictions have been placed for other management objectives. For example, the restrictions placed on land uses in Research Natural Areas may constrain traditional tribal-use patterns. Special designations of places may also be accompanied by behavioral constraints, such that limits on the types of uses (for example, horseback riding and camping), the number of visitors, or the duration of visitation may be considered a restriction of access.

Evaluation of alternatives — Panelists thought that Alternatives 1 and 2 would not meet tribal interests for adequate access. Tribal representatives view these alternatives as flawed, since the existing plans were not produced with provisions for adequate tribal consultation over access and other important issues. Panelists felt that opportunities for Indians to hunt or use resources in traditional ways were not considered in current plans; these plans created zones for resource emphases that did not coincide with tribal-use patterns. As a result, panelists felt that traditional pathways to resources have been obliterated by activities such as the fencing-off land or other developments; this has particularly disrupted activities such as grazing. Land exchanges with other private property owners or special use provisions have blocked access to places of cultural significance. Fees charged for camping and other use restrictions have placed limitations on the ability of tribes to use locations that retain cultural significance.

Panelists stated that current plans contain restrictions on access that should not apply to the tribes. For example, one panelist stated that the restriction of parties on horseback to no more than 12 horses (in designated wilderness) has constrained the usual and customary uses of certain areas, since tribes did not necessarily travel in groups with 12 horses or less. Although Alternatives 3 through 7 offer additional consultation assurances, there is no visible mechanism in any of the alternatives to provide redress for administrative restrictions or the location of developments that have presented barriers to tribal uses. Alternatives 1 and 2 could provide increased recreational access and use of culturally important sites, potentially harming these sites.

Individual responses of panelists to the acceptability of alternatives regarding access reveal that respondents are either very certain or somewhat certain that Alternatives 1, 2, and 3 will harm tribal interests (Alternative 3 was viewed by panelists as largely a continuation of current management practices with only slight modifications). Panelists felt that Alternatives 4 through 7 were more acceptable, perhaps due to the changes that are anticipated in resource conditions through restoration and conservation measures.

Quality of water and land — The effects of current land-use activities on water quality and quantity are of paramount interest to the tribes in the Basin, as water is viewed as the most sacred of substances (Hanes 1995). Water is often characterized as the bloodline that runs through the land (Meyer 1983). Ritual activities almost always involve water, and the supply of clean water is seen as the foundation of a sustained tribal lifeway. Clean water is also used in processing food, since immersion in water for leaching is a common practice. Factors such as sediment delivery to streams, channel morphology, water temperature, streamside riparian zones, point and non-point contamination, water quantity, and flow timing are of key interest.

Water rights issues are fundamental to water quality and quantity concerns. Two types of water rights are pertinent to tribal water issues. One is related directly to water associated with reservations to sustain tribal lifeways, and the second is instream flow to sustain off-reservation treaty resources (most notably fisheries). Although certain water rights in the Basin have been established by case law (see Winters Doctrine versus Winans[11] case), many water rights issues remain unresolved.

[11]Winters Doctrine refers to *Winters v. United States*, 207 U.S. 564 (1908); the Winans case, *United States v. The Winans*, 198 U.S. 371, helped define the nature and extent of Indian reserved water rights.

The next decade or two may reveal to what extent reserved rights are defined (Hanes 1995).

Although land quality was identified as a concern of the tribal panelists, it was not thoroughly addressed in evaluating alternatives. Issues of interest regarding land quality included the maintenance of site productivity and the containment of erosion, as well as concerns over forest health conditions.

Evaluation of alternatives — Panelists did not observe substantial differences among alternatives in meeting their interests in the maintenance of water and land quality. Alternatives 4 through 7 would promote a higher level of restoration than current plans. None of the alternatives would deal directly with the states regarding their regulatory authority over the management of water resources. The panelists expressed a preference for broadly applied standards across the Basin to ensure not only instream flows and water quality protection, but also oversight to protect the quality of groundwater and the recharge of subsurface aquifers.

The protection of soil structure and long-term productivity of terrestrial resources is a concern of the tribes. Alternatives 1 and 2 would do little to address these concerns in terms of controlling erosion from roads and streambank stabilization. Alternatives 4, 6, and 7 would offer greater opportunity to prevent soil erosion and sedimentation in streams via the effort to restore and/or conserve major portions of the landscape. Current plans, as represented by Alternative 1, would not effectively achieve conditions more suitable for fish, although the direction in Alternative 2 would provide greater protection for riparian and aquatic habitats. Alternatives 1 to 3, because of their less pervasive approach in addressing cumulative effects of past actions, would not be as acceptable to tribes as the other alternatives.

Opportunities for economic growth — Economic conditions for tribal members are some of the most difficult for any population group within the Basin. High unemployment rates and low incomes characterize the living conditions of families on tribal reservations in the Basin, and the vitality of rural tribal communities is a major concern of tribal representatives. Tribal business enterprises include wood processing facilities and other businesses associated with resource extractions. The decline in fish populations has had negative effects on the potential to derive income from fisheries, and it has hurt the subsistence potential of tribal members.

From a tribal perspective, economic analyses that focus solely on monetary returns from investments do not represent a full accounting of the contributions of natural resources to the human experience. There is a sentiment among tribes that there is an inequitable access to economic opportunities and revenue sharing payments that result from the management of Federal lands—counties receive payments based on the 25-Percent-Fund and PILT, but the tribes do not receive similar benefits. Revenue to support the education of children was identified as an important need.

Evaluation of alternatives — Estimates of the effects of alternatives on employment in the timber or recreation sectors were not available for consideration by panelists. While information about range employment was provided, it was not disaggregated below the EIS planning area. The continuation of the current land- and resource-use patterns, as expressed under Alternatives 1 to 3, would not meet panelists' expectations for economic growth opportunities. With fish populations and other productive elements of the natural landscape in decline, tribal panelists indicated that excessive levels of extractions are beginning to take their toll on natural systems. One panelist commented, "We are against logging on steep slopes, on overgrazing, and extractions on sacred lands. I would object to more logging and road building."

At the same time, some tribes chose to manage timber, and the timber resources on reservations provide income to some of the tribes. The actions expressed under Alternative 4 (to provide for restoration via commercial timber harvests) were more acceptable to panelists than the other alter-

natives. However, panelists felt that there was not enough information about appropriate levels of harvests, the location of harvests, and the mix of uses to evaluate the effects of Alternative 4 fully. Tribal panelists also had concerns about Alternative 4 being implemented so that it would not adversely affect tribal interests.

None of the alternatives appear to contain objectives or standards that focus on the economic diversification of tribal communities. The fact that objectives were presented for "timber-dependent communities" suggested to the panelists that there continues to be an inequitable amount of attention being focused on one type of community versus another.

Culturally significant plant and animal communities — Plant and animal communities form but one part of the whole set of relationships between a group of people, their culture, and the environment. Culturally significant elements of the Indian lifeway cannot be identified, categorized, and managed separately. The importance of plants and animals can only be measured in the cultural context in which they occur.[12] The concept of ethno-habitat refers to how a culture classifies and organizes a landscape, and the health of this habitat may reflect its capacity to support naturally evolving plant and animal communities.

In the context of ecosystem management on Federal lands in the Basin, culturally important plant and animal communities can be understood as those places where useable and adequate quantities of culturally significant species are obtainable for American Indian tribes. Huckleberry patches, root fields, fishing grounds and stations, and hunting districts represent these places in the Basin.

Evaluation of alternatives — Information indicating how the harvestability of culturally important plant and animal communities would be affected under each of the alternatives was not provided to panelists. Alternatives 1 to 3 were recognized by all tribal panelists as alternatives that would least meet the needs of tribes, since it is anticipated that under current plans habitat conditions would continue to decline. Panelists felt that Alternatives 4 through 7 would provide the most acceptable effects on native plant, animal, and fish species when panelists provided individual responses to the alternatives. Alternatives 4 through 7 would not explicitly promote the improvement of habitat for grizzly bears, but the maintenance of bear populations was identified by panelists as highly important. Alternative 7 is viewed by some tribal representatives as the most positive approach to deal with the management of habitat for wide ranges of species, since it would provide reserve areas that would reduce the impacts of management.

The active management approach to restoration as proposed under Alternative 4 may contain both possible negative and positive impacts, and tribal representatives expressed a desire for more thorough consultation and analysis. Some tribal members expressed concern about "active" management, based on the past track record of FS and BLM management interventions. Alternative 4 may be moving in a positive direction regarding riparian management and other activities affecting aquatic concerns, but panelists thought there would need to be a reorientation on the focus of restoration toward tribal concerns. In general, panelists thought restoration would not go far enough, and because of the flexibility built into the watershed analysis under Alternative 4, the effort to mimic natural processes had the potential to go either way. Restoration activities could be unsuccessful, and there was a concern that they could create further damage. It was observed that the time needed for restoration is much longer than the timeframe of the plan.

Air quality — Air quality standards identified under the Clean Air Act of 1955 provide a useful context for the maintenance of air quality, but

[12]Personal communication. 1996. Mary Keith. Tribal Liaison, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, Washington, 99362.

there are different cultural differences in how various types of pollutants or particulate matter are interpreted. For example, smoke from some forest fires is not viewed as pollution by tribes, since fire is a natural process providing renewal and regeneration. On the other hand, excessive levels of smoke, which is produced by wildfires that consume high levels of accumulated fuels in overstocked forest stands, are not perceived to be healthy. Another contributor to air quality degradation is dust, which has been introduced mainly through roads. The lack of maintenance of roads or the lack of proper surfacing increases dust and raises concerns for tribes on the quality of the environment.

Evaluation of alternatives — Information on smoke production was not available to panelists for any of the alternatives. Panelists felt, however, that Alternatives 1 to 3 could produce excessive amounts of smoke during large-scale wildfire events. Restoration activities in Alternatives 4 through 7 were perceived by tribes to be an improvement over current conditions, and the long-term effects of restoration would improve air quality. In the short term, restoration efforts under Alternatives 4 through 6 would keep more roads open than Alternative 7, which could create additional levels of dust.

Tribal representatives in the panel session related a concern that there is little coordination between the BLM, FS, state agencies, and the Bureau of Indian Affairs (BIA) regarding the operational aspects of prescribed burning. Among the tribes, this lack of coordination allows for little predictability in expectations for smoke emission or the resulting habitat conditions for species that may benefit from burning. There was a feeling that prescribed burns frequently do not create food and forage for animals. The Forest Service is perceived to be motivated to practice prescribed burning in order to help livestock operations or to promote forest regeneration for plantations, and not to benefit deer, elk, and other native ungulates of interest to tribes.

Places — To American Indian tribes the totality of the regional landscape has importance, and all landscape components participate in a system of complex inter-relationships. Places of importance are created by an intersection of nature, social relations, and meaning (Hanes 1995, Williams 1995). The Indian population of the northern montane region is characterized by a strong, long-term, spiritual attachment to the land. The full range of resources needed to sustain lives and culture was found each in its own place, and Indian people have accrued a "detailed, encyclopedic knowledge of their environment" (Hunn 1990).

Localism, or the identification of a person and a place, has been a key factor in the traditional northern montane Indian lifeway. Place names relay traditional knowledge of land and resources by referring to plants and animals that characterize a location, the actions of people at a location, the spiritual role of the location, or some other important attribute of the site. The historical depth of these relationships and strong cultural identifications must be acknowledged as they reflect more than a place name veneer on the landscape. The importance of place to tribes in the region can be viewed as a hierarchical ordering, from the broadest geographic scale to the smallest. Expectations of what "meaning" each order place conveys to the community and individual are shared within each group and create an image of how these places should be and what they should provide (Tuan 1977).

The FS and BLM are responsible for the protection of cultural sites on lands under their management (as these are protected by law); but there is a poor inventory of cultural sites and frequently these cultural values, the panelists felt, are not sufficiently respected to generate protective measures.

Evaluation of alternatives — The tribal panelists felt that the effects of resource development on the spiritual and cultural qualities of the land have damaged the relationships between tribes and the land. The change in the character of the land through management interventions and

developments as represented by Alternatives 1 and 2 would diminish the value of places to tribes, since the important features that made many places special to tribes have been irreversibly altered. For instance, root fields have been replaced by grazing uses, or berry production areas have been converted to production forestry. Campgrounds have been placed on usual and customary sites. One panelist described an example where a telecommunications site has completely transformed a tribal sacred site, destroying its cultural value.

The panelists felt that the continuation of current plans, as reflected in Alternatives 1 and 2, would not acknowledge the significance of place attachment or create mechanisms to inventory places so that significant cultural values could be maintained. None of the alternatives attempt to recover the damage done to resources from road building and the other cumulative effects of management. They also do not identify policies to recover or restore damage to culturally important sites, nor do they contain standards to ensure more complete historical interpretations of the use of land resources over time; although there is legislation that is designed to provide such direction. Tribal panelists believe that culturally significant trails, as well as places, are not explicitly recognized, protected, or interpreted.

Mitigation and monitoring — Indian interests in regard to public land management issues are pervasive, and because of the diversity of tribal groups in the region and the many legal events that have occurred in the past, a more detailed and systematic accounting of tribal interests for each tribal government would be more appropriately performed as individual administrative units of federal agencies pursue subsequent land-use planning exercises.

Objectives and standards under Alternatives 3 through 7 would provide for consultation, but additional standards may be needed to furnish assurances to the tribes. For example, a standard could address development and implementation of tribal advisory groups for consultation purposes. Standards could deal with how tribal consultation will proceed, assuming such standards are jointly developed with the tribes. These more localized efforts would offer tribes a more prominent role in describing tribal interests and assessing the potential effects posed by proposed actions.

Tribal interests are in conflict with the current definition over the beneficial uses of water, which appear from the tribal perspective to be strongly biased toward consumptive uses. Water management across states is not consistent, with some state laws offering greater levels of regulation of water flows and quality than others, and some providing useful operational guidelines, such as Best Management Practices (BMPs), to protect water resources. Objectives and standards could be developed requiring greater interaction among the tribes, states and Federal Government about water quality and quantity issues.

Monitoring could include processes to assess what progress the tribes and Federal Government have made in consultative venues, the ways to improve such protocols, and methods to evaluate them.

Conclusions

The SIT examined the results of the panel processes addressing social consequences and was in agreement with the major outcomes. Table 6.2 summarizes these major outcomes using qualitative descriptors to show how the alternatives would likely affect the social indicators if implemented. These judgments were based heavily on the results of the panels but also on McCool and others (in press), and Haynes and Horne (in press) and the authors' understanding of the alternatives.

Table 6.2 uses social acceptability, defined as an increased likelihood of a favorable public attitude toward an alternative and its social effects, as its standard. This does not mean that all segments of the public will feel this way, but that on balance, more people and interests are likely to express positive attitudes than negative ones. Making a

summary judgment on social acceptability is an uncertain task at best; responses received during the public comment period on the Draft EISs are obviously a better indicator of acceptability. In addition, each of the evaluation criteria has many facets, some of which may be viewed more positively or negatively than others; this also makes it difficult to summarize acceptability with a single index. For example, each of the criteria includes considerations about equity—who is expected to benefit, who is expected to not be affected, and who is expected to suffer from a given action or condition—which is problematic to summarize with a single index.

Acceptability also is not a dichotomous variable, but one that should be thought of as having several levels. Past projects have defined levels used to describe effects of public land management. For example, one project defined the levels as: effect is unacceptable without significant mitigation; effect is acceptable with minor changes; effect is acceptable without mitigation; and effect is acceptable and desirable (USDA 1991).

Despite these caveats and considerations, it is a valid task to consider social acceptability at this point. It would make sense to do this not just for the social variables, but for all other evaluation criteria as well. Another option for summarizing social consequences would have been to rate the effects themselves, such as estimating whether predictability would increase or decrease under a given alternative, and then provide an independent rating of its acceptability.

Finally, it should be clear that the language and tone of this evaluation are more suggestive of the types of effects likely to occur, rather than conclusive. In addition, many typical evaluation criteria used in social impact assessments at the project level are not possible to address adequately at this scale. However, the resulting uncertainty about social effects could be mitigated through monitoring social indicators developed jointly through public and private coordination at the project scale. Because ecosystem management is designed to be an adaptive process, monitoring plays a critical role in adjusting activities or objectives to meet existing or emerging social, economic, and biophysical objectives.

Table 6.2. Summary of social evaluation of the alternatives. This table summarizes the major panel outcomes using qualitative descriptors (social acceptability[1]) to show how the alternatives would likely affect the social indicators if implemented.

Evaluation Criteria	Alternative 1	2	3	4	5	6	7
Effects on Predictability	⇓	⇓	Uncertain	⇑	⇓	Uncertain	⇓
Effects on Access to Decision Making	⇓	⇓	⇑	⇑	⇑	⇑	⇓
Effects on Private Land	⇓	⇓	⇑	Uncertain	Uncertain	Uncertain	⇓
Effects on Communities and Quality of Life	⇓	⇓	⇑	⇑	Uncertain	Uncertain	⇓
Effects on American Indian Tribes:							
Trust Responsibilities	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Access to Public Lands	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Quality of Water and Lands	⇓	⇓	⇓		Uncertain	⇑	⇑
Opportunities for Economic Growth	⇓	⇓	⇓	⇑	Uncertain	⇑	Uncertain
Culturally Significant Plant and Animal Communities	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Air Quality	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑
Culturally Significant Places	⇓	⇓	⇓	⇑	Uncertain	⇑	⇑

[1]Social acceptability is defined as an increased likelihood of a favorable public attitude toward an alternative and its social effects.

⇓ = negative effect; ⇑ = positive effect; Uncertain = uncertain of the effect.

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Appendix 6-A.

List of Panel Participants.

American Indian Tribal Panel:

Tony Atkins, Colville Confederated Tribes, Nespelem, Washington

Kim Sullivan, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon

Eric J. Quaempts, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon

Michael J. Farrow, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon

James F. Coburn, Klamath Tribes, Warm Springs, Oregon

Don Gentry, Klamath Tribes, Chiloquin, Oregon

Alex Whistler, Bureau of Indian Affairs, Portland, Oregon

Ron Torretta, Kalispel Tribe of Indians, Usk, Washington

Lillian Maynard, Burns Paiute Tribe, Burns, Oregon

Allen V. Pinkham, Nez Perce Tribe, Lapwai, Idaho

Nathan S. Jim Sr., Confederated Tribes of the Warm Springs Reservation of Oregon, Warm Springs, Oregon

John Kelley, Confederated Tribes of the Warm Springs Reservation of Oregon, Warm Springs, Oregon

Tom Branson, Confederated Salish and Kootenai Tribes, Ronan, Montana

Richard Hanes, Bureau of Land Management, Eugene, Oregon

Cliff Walker, U.S. Forest Service, Northern Region, Missoula, Montana

Alfred M. Nomee, Coeur d'Alene Tribe, Plummer, Idaho

Roy Hall, Quartz Valley Reservation, Fort Jones, California

Lee Carlson, Yakama Tribes, Toppenish, Washington

James Burchfield, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Stephen McCool, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Eric Schultz, School of Forestry, University of Montana, Missoula, Montana

Eastside Panel:

Rick Brown, National Wildlife Federation, Portland, Oregon

Chuck Burley, Northwest Forestry Association, Bend, Oregon

Tom Burns, County Commissioner, Chiloquin, Oregon

Jim Eychaner, Washington State Parks, Olympia, Washington

Joan Frey, Klickitat County Commission, Goldendale, Washington

Tom Goodall, Boise Cascade, La Grande, Oregon

Dick Hansis, Washington State University, Vancouver, Washington

Arleigh Isley, County Commissioner, Enterprise, Oregon

Jim Keniston, District Ranger, U.S. Forest Service, Ochoco National Forest, Snow Mountain Ranger District, Hines, Oregon

Wayne Ludeman, Weyerhauser Company, Bend, Oregon

Jan Mejer, Whitman College, Walla Walla, Washington

Shirley Muse, Whitman College, Walla Walla, Washington

Kevin Scribner, Commercial Fisherman, Walla Walla, Washington

Mark Simmons, Northwest Timber Workers, Elgin, Oregon

James Burchfield, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Stephen McCool, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Eric Schultz, School of Forestry, University of Montana, Missoula, Montana

Upper Columbia Basin Panel:

Marlene Bear-Walter, Tribal Council Woman Blackfeet Nation, Browning, Montana

Jill Belsky, Sociology, University of Montana, Missoula, Montana

James Burchfield, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

Neal Christensen, Institute for Tourism and Recreation Research, University of Montana, Missoula, Montana

Kurt Danison, Okanogan, Washington

Rich Day, National Wildlife Federation, Missoula, Montana

Seth Diamond, Intermountain Forest Industry Association, Missoula, Montana

Smoke Elser, Outfitter, Missoula, Montana

George Enneking, Idaho County Commissioner, Cottonwood, Idaho

Mike Fish, Weyerhauser Company, Coeur d'Alene, Idaho

Floyd Heavy Runner, Blackfeet Nation, Browning, Montana

Eric Hovee, Private Consultant, Vancouver, Washington

Peter Johnston, U.S. Forest Service, Payette National Forest, Council Ranger District, Council, Idaho

Jim Jordan, Hartman Associates, Inc., Seattle, Washington

Stephen McCool, U.S. Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, Washington

John Mundinger, Montana Fish, Wildlife, and Parks, Helena, Montana

Ray Rasker, Wilderness Society, Bozeman, Montana

Don Reading, Ben Johnson Association, Boise, Idaho

Hank Robison, Economic Modeling Specialists, Moscow, Idaho

Jeff Tiberi, Helena, Montana

Noel Williams, County Commissioner, Eureka, Montana

Table 6-B.1. Recreation opportunity spectrum (ROS) classes for EEIS and UCRB BLM/FS[1]-administered lands by management region, management class, and simulation year 10.

Entire EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares[3])	4,561,800	4,452,000	4,561,800	4,561,800	4,561,800	4,524,300	4,561,800	4,561,800
Percent Change from Current	NA[4]	-2	0	0	0	-1	0	0
Percent of Region /Class Total	38.8	37.8	38.8	38.8	38.8	38.4	38.8	38.8
Roaded / Natural (hectares)	7,206,600	7,316,400	7,206,600	7,206,600	7,206,600	7,244,100	7,206,600	7,206,600
Percent Change from Current	NA	2	0	0	0	1	0	0
Percent of Region /Class Total	61.2	62.2	61.2	61.2	61.2	61.6	61.2	61.2
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
BLM/FS EEIS Total (hectares)	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**

Entire UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	9,928,300	9,836,200	9,928,300	9,928,300	9,928,300	9,878,700	9,928,300	9,928,300
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	58.5	57.9	58.5	58.5	58.5	58.2	58.5	58.5
Roaded / Natural (hectares)	7,050,300	7,142,400	7,050,300	7,050,300	7,050,300	7,099,900	7,050,300	7,050,300
Percent Change from Current	NA	1	0	0	0	1	0	0
Percent of Region /Class Total	41.5	42.1	41.5	41.5	41.5	41.8	41.5	41.5
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
BLM/FS UCRB Total (hectares)	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**
Grand Total of EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Table 6B.1 (continued)

Blue Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	887,100	868,000	887,100	887,100	887,100	887,100	887,100	887,100
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	35.1	34.3	35.1	35.1	35.1	35.1	35.1	35.1
Roaded / Natural (hectares)	1,642,700	1,661,800	1,642,700	1,642,700	1,642,700	1,642,700	1,642,700	1,642,700
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	64.9	65.7	64.9	64.9	64.9	64.9	64.9	64.9
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	50,700	50,700	50,700	50,700	50,700	50,700	50,700	50,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Roaded / Natural (hectares)	57,400	57,400	57,400	57,400	57,400	57,400	57,400	57,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Central Idaho Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	93.3	93.3	93.3	93.3	93.3	93.3	93.3	93.3
Roaded / Natural (hectares)	600	600	600	600	600	600	600	600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**	**9000**

Table 6B.1 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	4,575,400	4,565,900	4,575,400	4,575,400	4,575,400	4,575,400	4,575,400	4,575,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	70.8	70.7	70.8	70.8	70.8	70.8	70.8	70.8
Roaded / Natural (hectares)	1,886,900	1,896,400	1,886,900	1,886,900	1,886,900	1,886,900	1,886,900	1,886,900
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	29.2	29.3	29.2	29.2	29.2	29.2	29.2	29.2
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**

Columbia Plateau Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	201,100	195,200	201,100	201,100	201,100	201,100	201,100	201,100
Percent Change from Current	NA	-3	0	0	0	0	0	0
Percent of Region /Class Total	19.2	18.7	19.2	19.2	19.2	19.2	19.2	19.2
Roaded / Natural (hectares)	844,500	850,400	844,500	844,500	844,500	844,500	844,500	844,500
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	80.8	81.3	80.8	80.8	80.8	80.8	80.8	80.8
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Roaded / Natural (hectares)	79,600	79,600	79,600	79,600	79,600	79,600	79,600	79,600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	94.6	94.6	94.6	94.6	94.6	94.6	94.6	94.6
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**

Table 6B.1 (continued)

Lower Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	344,100	319,800	344,100	344,100	344,100	319,800	344,100	344,100
Percent Change from Current	NA	-7	0	0	0	-7	0	0
Percent of Region /Class Total	19.8	18.4	19.8	19.8	19.8	18.4	19.8	19.8
Roaded / Natural (hectares)	1397500	1421800	1397500	1397500	1397500	1421800	1397500	1397500
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	80.2	81.6	80.2	80.2	80.2	81.6	80.2	80.2
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**

Northern Cascades Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	792,700	780,600	792,700	792,700	792,700	787,700	792,700	792,700
Percent Change from Current	NA	-2	0	0	0	-1	0	0
Percent of Region /Class Total	57	56.1	57	57	57	56.6	57	57
Roaded / Natural (hectares)	598,500	610,600	598,500	598,500	598,500	603,800	598,500	598,500
Percent Change from Current	NA	2	0	0	0	1	0	0
Percent of Region /Class Total	43	43.9	43	43	43	43.4	43	43
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**

Northern Glaciated Mountains Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	90,400	88,300	90,400	90,400	90,400	88,300	90,400	90,400
Percent Change from Current	NA	-2	0	0	0	-2	0	0
Percent of Region /Class Total	15.2	14.9	15.2	15.2	15.2	14.9	15.2	15.2
Roaded / Natural (hectares)	503,500	505,600	503,500	503,500	503,500	505,600	503,500	503,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	84.8	85.1	84.8	84.8	84.8	85.1	84.8	84.8

Table 6B.1 (continued)

Northern Glaciated Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**

UCRB Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	846,000	817,600	846,000	846,000	846,000	820,700	846,000	846,000
Percent Change from Current	NA	-3	0	0	0	-3	0	0
Percent of Region /Class Total	40.3	38.9	40.3	40.3	40.3	39	40.3	40.3
Roaded / Natural (hectares)	1,255,700	1,284,100	1,255,700	1,255,700	1,255,700	1,281,000	1,255,700	1,255,700
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	59.7	61.1	59.7	59.7	59.7	61	59.7	59.7
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Northern Great Basin Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	1,484,900	1,477,500	1,484,900	1,484,900	1,484,900	1,484,900	1,484,900	1,484,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	48.5	48.2	48.5	48.5	48.5	48.5	48.5	48.5
Roaded / Natural (hectares)	1,579,700	1,587,100	1,579,700	1,579,700	1,579,700	1,579,700	1,579,700	1,579,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	51.5	51.8	51.5	51.5	51.5	51.5	51.5	51.5
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,00**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB & EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Table 6B.1 (continued)

Owyhee Uplands Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	736,800	736,800	736,800	736,800	736,800	736,800	736,800	736,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9
Roaded / Natural (hectares)	868,600	868,600	868,600	868,600	868,600	868,600	868,600	868,600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300	2,375,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	66.2	66.2	66.2	66.2	66.2	66.2	66.2	66.2
Roaded / Natural (hectares)	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400	1,214,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	33.8	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB & EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	172,000	171,800	172,000	172,000	172,000	172,000	172,000	172,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	57.3	57.2	57.3	57.3	57.3	57.3	57.3	57.3
Roaded / Natural (hectares)	128,000	128,200	128,000	128,000	128,000	128,000	128,000	128,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0

Table 6B.1 (continued)

Snake Headwaters Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Southern Cascades Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	219,600	181,100	219,600	219,600	219,600	189,500	219,600	219,600
Percent Change from Current	NA	-18	0	0	0	-14	0	0
Percent of Region /Class Total	27.6	22.8	27.6	27.6	27.6	23.8	27.6	27.6
Roaded / Natural (hectares)	576,100	614,600	576,100	576,100	576,100	606,200	576,100	576,100
Percent Change from Current	NA	7	0	0	0	5	0	0
Percent of Region /Class Total	72.4	77.2	72.4	72.4	72.4	76.2	72.4	72.4
Rural / Urban (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Upper Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	714,000	684,300	714,000	714,000	714,000	714,000	714,000	714,000
Percent Change from Current	NA	-4	0	0	0	0	0	0
Percent of Region /Class Total	58	55.6	58	58	58	58	58	58
Roaded / Natural (hectares)	517,700	547,400	517,700	517,700	517,700	517,700	517,700	517,700
Percent Change from Current	NA	6	0	0	0	0	0	0
Percent of Region /Class Total	42	44.4	42	42	42	42	42	42
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Table 6B.1 (continued)

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	140,800	116,100	140,800	140,800	140,800	140,800	140,800	140,800
Percent Change from Current	NA	-18	0	0	0	0	0	0
Percent of Region /Class Total	19.2	15.8	19.2	19.2	19.2	19.2	19.2	19.2
Roaded / Natural (hectares)	592,400	617,100	592,400	592,400	592,400	592,400	592,400	592,400
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	80.8	84.2	80.8	80.8	80.8	80.8	80.8	80.8
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Upper Snake Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Primitive / Semi-primitive (hectares)	846,300	846,300	846,300	846,300	846,300	846,300	846,300	846,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3
Roaded / Natural (hectares)	513,100	513,100	513,100	513,100	513,100	513,100	513,100	513,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB & EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Area: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the look up tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

[3]hectare=2.47 acres

[4]NA=Not Applicable

Table 6B.2. Scenic integrity classes for EEIS and UCRB BLM/FS[1]-administered lands by Ecological Reporting Unit (ERU), management region, management class, and simulation year 10.

Entire EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
Agricultural/Developed Lands[3] (hectares[4])	100	100	100	100	100	100	100	100
Percent Change from Current	NA[5]	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	2,877,600	2,971,800	3,042,000	3,005,600	3,005,000	2,98,800	3,008,100	3,041,500
Percent of Change from Current	NA	3	6	4	4	4	5	6
Percent of Region /Class Total	19.1	25.3	25.8	25.5	25.5	25.3	25.6	25.8
High Scenic Integrity (hectares)	2,246,600	2,129,000	2,089,500	3,417,300	3,419,000	2,118,200	2,208,600	3,558,500
Percent of Change from Current	NA	-5	-7	52	52	-6	-2	58
Percent of Region /Class Total	19.1	18.1	17.8	29.0	29.1	18.0	18.8	30.2
Moderately High Scenic Integrity (hectares)	5,003,300	4,926,800	4,927,800	4,233,800	4,552,100	4,946,800	4,896,900	4,166,500
Percent Change from Current	NA	-2	-2	-15	-9	-1	-2	-17
Percent of Region /Class Total	42.5	41.9	41.9	36.0	38.7	42.0	41.6	35.4
Moderately Low Scenic Integrity (hectares)	1,478,300	1,537,700	1,52,200	983,600	686,000	1,526,300	1471,100	891,500
Percent Change from Current	NA	4	3	-33	-54	3	0	-40
Percent of Region /Class Total	12.6	13.1	13.0	8.4	5.8	13.0	12.5	7.6
Low Scenic Integrity (hectares)	162,600	203,100	184,900	128,100	106,300	195,300	183,700	110,400
Percent Change from Current	NA	25	14	-21	-35	20	13	-32
Percent of Region /Class Total	1.4	1.7	1.6	1.1	0.9	1.7	1.6	0.9
BLM/FS EEIS TOTAL (hectares)	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,768,500**	**11,786,500**

Entire UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very High Scenic Integrity (hectares)	6,049,100	6,094,100	6,179,200	6,028,500	5,026,500	6,045,300	6,096,400	6,209,500
Percent Change from Current	NA	1	2	0	0	0	1	3
Percent of Region /Class Total	35.6	35.9	36.4	35.5	35.5	35.6	35.9	36.6
High Scenic Integrity (hectares)	5,343,800	5,199,900	5,178,800	5,347,900	5,359,600	5,236,700	5,572,000	5,613,900
Percent Change from Current	NA	-3	-3	0	0	-2	4	5
Percent of Region /Class Total	31.5	30.6	30.5	31.5	31.6	30.8	32.8	33.1

Table 6B.2 (continued)

Entire UCRB Management Region

BLM/FS Management Class	Current Year[2]	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Moderately High Scenic Integrity (hectares)	4,439,700	4,342,800	4,375,700	4,309,700	4,334,200	4,384,400	4,173,800	4,126,700
Percent Change from Current	NA	-2	-1	-3	-2	-1	-6	-7
Percent of Region /Class Total	26.1	25.6	25.8	25.4	25.5	25.8	24.6	24.3
Moderately Low Scenic Integrity (hectares)	974,000	1,144,500	1,060,500	1,099,500	1,069,200	1,116,900	963,600	869,000
Percent Change from Current	NA	18	9	13	10	15	-1	-11
Percent of Region /Class Total	5.7	6.7	6.2	6.5	6.3	6.6	5.7	5.1
Low Scenic Integrity (hectares)	172,000	197,300	184,400	193,000	189,100	195,300	172,800	159,500
Percent Change from Current	NA	15	7	12	10	14	0	-7
Percent of Region /Class Total	1.0	1.2	1.1	1.1	1.1	1.2	1.0	0.9
BLM/FS UCRB TOTAL (hectares)	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**	**16,978,700**
Grand Total EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Blue Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	577,400	580,800	598,100	579,400	579,400	579,800	580,800	591,300
Percent Change from Current	NA	1	4	0	0	0	1	2
Percent of Region /Class Total	22.8	23.0	23.6	22.9	22.9	22.9	23.0	23.4
High Scenic Integrity (hectares)	495,600	479,300	468,700	1165,600	1165,700	479,400	484,900	1,186,200
Percent Change from Current	NA	-3	-5	135	135	-3	-2	139
Percent of Region /Class Total	19.6	18.9	18.5	46.1	46.1	19.0	19.2	46.9
Moderately High Scenic Integrity (hectares)	1,016,700	1,012,400	1,009,200	658,300	668,000	1,012,400	1,011,600	642,300
Percent Change from Current	NA	0	-1	-35	-34	0	-1	-37
Percent of Region /Class Total	40.2	40.0	39.9	26.0	26.4	40.0	40.0	25.4
Moderately Low Scenic Integrity (hectares)	400,600	404,900	409,000	106,400	97,400	405,600	401,300	91,900
Percent Change from Current	NA	1	2	-73	-76	1	0	-77
Percent of Region /Class Total	15.8	16.0	16.2	4.2	3.9	16.0	15.9	3.6
Low Scenic Integrity (hectares)	39,500	52,400	44,800	20,100	19,300	52,600	51,200	18,100
Percent Change from Current	NA	33	13	-49	-51	33	30	-54
Percent of Region /Class Total	1.6	2.1	1.8	0.8	0.8	2.1	2.0	0.7
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	43,600	44,200	44,500	44,000	44,000	44,000	44,300	44,500
Percent Change from Current	NA	1	2	1	1	1	2	2
Percent of Region /Class Total	40.3	40.9	41.2	40.7	40.7	40.7	41.0	41.2
High Scenic Integrity (hectares)	17,100	16,500	16,800	16,400	16,400	16,400	16,400	16,700
Percent Change from Current	NA	-4	-2	-4	-4	-4	-4	-2
Percent of Region /Class Total	15.8	15.3	15.5	15.2	15.2	15.2	15.2	15.4
Moderately High Scenic Integrity (hectares)	27,900	28,700	27,800	28,000	28,000	28,000	27,700	27,900
Percent Change from Current	NA	3	0	0	0	0	-1	0
Percent of Region /Class Total	25.8	26.5	25.7	25.9	25.9	25.9	25.6	25.8
Moderately Low Scenic Integrity (hectares)	17,500	16,700	16,900	17,500	17,500	17,500	17,500	17,100
Percent Change from Current	NA	-5	-3	0	0	0	0	-2
Percent of Region /Class Total	16.2	15.4	15.6	16.25	16.2	16.2	16.2	15.8
Low Scenic Integrity (hectares)	2,000	2,000	2,100	2,200	2,200	2,200	2,200	1,900
Percent Change from Current	NA	0	5	10	10	10	10	-5
Percent of Region /Class Total	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.8
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Central Idaho Mountains Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	4,900	5,700	5,600	5,100	5,100	5,100	5,100	5,100
Percent Change from Current	NA	16	14	4	4	4	4	4
Percent of Region /Class Total	54.4	63.3	62.2	56.7	56.7	56.7	56.7	56.7
High Scenic Integrity (hectares)	3,500	2,700	2,800	3,300	3,300	3,300	3,900	3,900
Percent Change from Current	NA	-23	-20	-6	-6	-6	11	11
Percent of Region /Class Total	38.9	30.0	31.1	36.7	36.7	36.7	43.3	43.3
Moderately High Scenic Integrity (hectares)	600	600	600	600	600	600	0	0
Percent Change from Current	NA	0	0	0	0	0	-100	-100
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	0.0	0.0
Moderately Low Scenic Integrity (hectares)	0	0	0	0	0	0	0	0
Percent Change from Current	0	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	2,908,500	3,040,300	3,049,100	2,950,800	2,950,000	2,986,400	2,994,200	3,061,200
Percent Change from Current	NA	5	5	1	1	3	3	5
Percent of Region /Class Total	45	47	47.2	45.7	45.6	46.2	46.3	47.4
High Scenic Integrity (hectares)	2,250,500	2,101,100	2,113,500	2,209,200	2,209,800	2,149,000	2,324,700	2,326,500
Percent Change from Current	NA	-7	-6	-2	-2	-5	3	3
Percent of Region /Class Total	34.8	32.5	32.7	34.2	34.2	33.3	36	36
Moderately High Scenic Integrity (hectares)	983,900	968,000	96,600	962,300	962,000	979,400	860,800	818,800
Percent Change from Current	NA	-2	-1	-2	-2	0	-13	-17
Percent of Region /Class Total	15.2	15	15	14.9	14.9	15.2	13.3	12.7
Moderately Low Scenic Integrity (hectares)	27,500	304,500	28,5700	292,000	292,400	298,800	241,900	219,200
Percent Change from Current	NA	9	0	8	8	10	-8	-18
Percent of Region /Class Total	4.3	4.7	4.4	4.5	4.5	4.6	3.7	3.4
Low Scenic Integrity (hectares)	44,400	48,400	44,400	48,000	48,100	48,700	40,700	36,600
Percent Change from Current	NA	9	0	8	8	10	-8	-18
Percent of Region /Class Total	0.7	0.7	0.7	0.7	0.7	0.8	0.6	0.6
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**

Columbia Plateau Ecological Reporting Unit

EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	171,300	168,900	172,300	171,300	171,500	171,600	172,300	172,300
Percent Change from Current	NA	-1	1	0	0	0	1	1
Percent of Region /Class Total	16.4	16.2	16.5	16.4	16.4	16.4	16.5	16.5
High Scenic Integrity (hectares)	68,400	78,400	66,600	135,800	135,700	67,100	67,600	138,200
Percent Change from Current	NA	15	-3	99	98	-2	-1	102
Percent of Region /Class Total	6.5	7.5	6.4	13	13	6.45	6.5	13.2
Moderately High Scenic Integrity (hectares)	419,200	403,200	408,600	373,200	656,000	411,000	409,800	376,600
Percent Change from Current	NA	-4	-3	-11	56	-2	-2	-10
Percent of Region /Class Total	40.1	38.6	39.1	35.7	62.7	39.3	39.2	36
Moderately Low Scenic Integrity (hectares)	358,300	366,000	369,000	340,400	77,900	366,300	367,400	334,700
Percent Change from Current	NA	2	3	-5	-78	2	3	-7
Percent of Region /Class Total	34.3	35	35.3	32.6	7.5	35	35.1	32

Table 6B.2 (continued)

Columbia Plateau Ecological Reporting Unit								
EEIS Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	28,400	29,100	29,100	24,900	4,500	29,600	28,500	23,800
Percent Change from Current	NA	2	2	-12	-84	4	0	-16
Percent of Region /Class Total	2.7	2.8	2.8	2.4	0.4	2.8	2.7	2.3
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**
UCRB Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	3,900	3,900	3,900	3,900	3,900	3,900	3,900	3,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
High Scenic Integrity (hectares)	1,500	1,600	1,500	1,400	1,400	1,400	40,300	4,400
Percent Change from Current	NA	7	0	-7	-7	-7	2587	2833
Percent of Region /Class Total	1.8	1.9	1.8	1.7	1.7	1.7	47.9	52.3
Moderately High Scenic Integrity (hectares)	61,000	56,200	58,900	56,300	56,300	56,200	33,700	31,100
Percent Change from Current	NA	-8	-3	-8	-8	-8	-45	-49
Percent of Region /Class Total	72.5	66.8	70	66.9	66.9	66.8	40.1	37
Moderately Low Scenic Integrity (hectares)	1,500	18,700	16,600	18,900	18,900	19,000	4,800	3,600
Percent Change from Current	NA	25	11	26	26	27	-68	-76
Percent of Region /Class Total	17.8	22.2	19.7	22.5	22.5	22.6	5.7	4.3
Low Scenic Integrity (hectares)	2,700	3,700	3,200	3,600	3,600	3,600	1,400	1,500
Percent Change from Current	NA	37	19	33	33	33	-48	-44
Percent of Region /Class Total	3.2	4.4	3.8	4.3	4.3	4.3	1.7	1.8
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**
Lower Clark Fork Ecological Reporting Unit								
UCRB Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	227,500	222,800	241,800	236,600	236,600	222,200	240,600	243,300
Percent Change from Current	NA	-2	6	4	4	-2	6	7
Percent of Region /Class Total	13.1	12.8	13.9	13.6	13.6	12.8	13.8	14

Table 6B.2 (continued)

Lower Clark Fork Ecological Reporting Unit
UCRB Management Region

BLM/FS Management Class	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
High Scenic Integrity (hectares)	404,300	380,600	382,500	377,900	382,400	383,200	378,400	390,600
Percent Change from Current	NA	-6	-5	-7	-5	-5	-6	-3
Percent of Region /Class Total	23.2	21.9	22	21.7	22	22	21.7	22.4
Moderately High Scenic Integrity (hectares)	878,400	835,000	855,600	829,300	846,500	837,600	846,900	863,400
Percent Change from Current	NA	-5	-3	-6	-4	-5	-4	-2
Percent of Region /Class Total	50.4	47.9	49.1	47.6	48.6	48.1	48.6	49.6
Moderately Low Scenic Integrity (hectares)	213,200	280,900	240,800	272,900	253,600	273,500	253,300	225,400
Percent Change from Current	NA	32	13	28	19	28	19	6
Percent of Region /Class Total	12.2	16.1	13.8	15.7	14.6	15.7	14.5	12.9
Low Scenic Integrity (hectares)	18,200	22,300	20,900	24,900	22,500	25,100	22,400	18,900
Percent Change from Current	NA	23	15	37	24	38	23	4
Percent of Region /Class Total	1	1.3	1.2	1.4	1.3	1.4	1.3	1.1
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**	**1,741,600**

Northern Cascades Ecological Reporting Unit
EEIS Management Region

BLM/FS Management Class	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	367,300	516,600	513,800	504,300	504,300	502,100	505,300	517,200
Percent Change from Current	NA	41	40	37	37	37	38	41
Percent of Region /Class Total	26.4	37.1	36.9	36.2	36.2	36.1	36.3	37.2
High Scenic Integrity (hectares)	582,100	442,800	451,500	458,200	458,400	456,800	475,900	467,400
Percent Change from Current	NA	-24	-22	-21	-21	-22	-18	-20
Percent of Region /Class Total	26.4	37.1	36.9	36.2	36.2	36.1	36.3	37.2
Moderately High Scenic Integrity (hectares)	301,400	305,600	307,900	301,000	301,100	304,900	299,400	299,400
Percent Change from Current	NA	1	2	0	0	1	-1	-1
Percent of Region /Class Total	21.7	22.0	22.1	21.6	21.6	21.9	21.5	21.5
Moderately Low Scenic Integrity (hectares)	127,600	113,500	108,000	115,900	115,600	115,500	100,700	99,200
Percent Change from Current	NA	-11	-15	-9	-9	-9	-21	-22
Percent of Region /Class Total	9.2	8.2	7.8	8.3	8.3	8.3	7.2	7.1
Low Scenic Integrity (hectares)	12,800	12,700	10,000	11,800	11,800	11,900	9,900	8,000
Percent Change from Current	NA	-1	-22	-8	-8	-7	-23	-38
Percent of Region /Class Total	0.9	0.9	0.7	0.8	0.8	0.9	0.7	0.6

Table 6B.2 (continued)

Northern Cascades Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**

Northern Glaciated Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	71,600	69,000	71,000	72,000	71,300	69,000	71,400	71,800
Percent Change from Current	NA	-4	-1	-1	0	-4	0	0
Percent of Region /Class Total	12.1	11.6	12.0	12.1	12.0	11.6	12.0	12.1
High Scenic Integrity (hectares)	85,700	82,100	85,700	83,700	84,400	84,600	86,300	88,100
Percent Change from Current	NA	-4	0	-2	-1	-1	1	3
Percent of Region /Class Total	14.4	13.8	14.4	14.1	14.3	14.2	14.5	14.8
Moderately High Scenic Integrity (hectares)	299,400	285,000	289,700	292,900	294,300	291,300	293,100	304,400
Percent Change from Current	NA	-5	-3	-25	-2	-3	-2	2
Percent of Region /Class Total	50.4	48.0	48.8	49.3	49.6	49.0	49.4	51.3
Moderately Low Scenic Integrity (hectares)	126,100	144,200	135,300	133,000	131,000	136,500	130,900	120,200
Percent Change from Current	NA	14	7	5	4	8	45	-5
Percent of Region /Class Total	21.2	24.3	22.8	22.4	22.1	23.0	22.0	20.2
Low Scenic Integrity (hectares)	11,100	13,600	12,200	12,300	12,500	12,500	12,200	9,400
Percent Change from Current	NA	23	10	11	13	13	10	-15
Percent of Region /Class Total	1.9	2.3	2.1	2.1	2.1	2.1	2.1	1.6
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**

UCRB Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	728,800	697,900	727,100	707,000	707,000	701,100	72,1100	727900
Percent Change from Current	NA	-4	0	-3	-3	-4	-1	0
Percent of Region /Class Total	34.7	33.2	34.6	33.6	33.6	33.4	34.3	34.6

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
High Scenic Integrity (hectares)	357,600	357,300	340,000	361,200	368,000	348,200	379,000	385,500
Percent Change from Current	NA	0	-5	1	3	-3	6	8
Percent of Region /Class Total	17.0	17.0	16.2	17.2	17.5	16.6	18.0	18.3
Moderately High Scenic Integrity (hectares)	740,100	696,600	711,200	706,300	713,700	722,800	697,200	720,200
Percent Change from Current	NA	-6	-4	-5	-4	-2	-6	-3
Percent of Region /Class Total	35.2	33.1	33.8	33.6	34.0	34.4	33.2	34.3
Moderately Low Scenic Integrity (hectares)	248,900	310,000	289,700	293,900	281,400	294,900	273,400	242,400
Percent Change from Current	NA	25	16	18	13	18	10	-3
Low Scenic Integrity (hectares)	26,300	39,900	33,700	33,300	31,600	34,700	31,000	25,700
Percent Change from Current	NA	52	28	27	20	32	18	-2
of Region /Class	1.3	1.9	1.6	1.6	1.5	1.7	1.5	1.2
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Northern Great Basin Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	861,600	854,000	860,200	858,800	858,700	858,700	858,600	860,600
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	28.1	27.9	28.1	28.0	28.0	28.0	28.0	28.1
High Scenic Integrity (hectares)	652,400	655,100	652,100	749,000	749,100	652,700	652,900	761,600
Percent Change from Current	NA	0	0	15	15	0	0	17
Percent of Region /Class Total	21.3	21.4	21.3	24.4	24.4	21.3	21.3	24.9
Moderately High Scenic Integrity (hectares)	1,391,200	1,376,600	1,378,600	1,345,200	1,345,200	1,376,400	1,375,600	1,334,400
Percent Change from Current	NA	-1	-1	-3	-3	-1	-1	-4
Percent of Region /Class Total	45.4	44.9	45.0	43.9	43.9	44.9	44.9	43.5
Moderately Low Scenic Integrity (hectares)	121,100	134,700	128,500	79,800	79,800	134,100	134,500	76,000
Percent Change from Current	NA	11	6	-34	-34	11	11	-37
Percent of Region /Class Total	4.0	4.4	4.2	2.6	2.6	4.4	4.4	2.5
Low Scenic Integrity (hectares)	38,300	44,200	45,200	31,800	31,800	42,700	43,000	32,000
Percent Change from Current	NA	15	18	-17	-17	11	12	-16
Percent of Region /Class Total	1.2	1.4	1.5	1.0	1.0	1.4	1.4	1.0

Table 6B.2 (continued)

Northern Great Basin Ecological Reporting Unit								
EEIS Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB and EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Owyhee Uplands Ecological Reporting Unit								
EEIS Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	549,300	549,300	549,100	549,300	549,300	549,300	549,300	549,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2
High Scenic Integrity (hectares)	189,800	189,600	190,100	193,100	193,100	189,800	189,700	193,100
Percent Change from Current	NA	0	0	2	2	0	0	2
Percent of Region /Class Total	11.8	11.8	11.8	12.0	12.0	11.8	11.8	12.0
Moderately High Scenic Integrity (hectares)	848,300	848,700	848,700	845,200	845,200	848,500	848,500	845,200
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	52.8	52.9	52.9	52.6	52.6	52.9	52.9	52.6
Moderately Low Scenic Integrity (hectares)	12,900	12,700	12,400	12,700	12,700	12,700	12,800	12,700
Percent Change from Current	NA	-2	-4	-2	-2	-2	-1	-2
Percent of Region /Class Total	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Low Scenic Integrity (hectares)	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

UCRB Management Region								
BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	929,300	928,900	929,300	928,900	928,900	929,100	929,200	929,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9

Table 6B.2 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
High Scenic Integrity (hectares)	1,459,700	1,458,900	1,459,700	1,460,000	1,460,000	1,458,700	1,459,500	1,458,900
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	40.7	40.6	40.7	40.7	40.7	40.6	40.7	40.6
Moderately High Scenic Integrity (hectares)	1,073,400	1,074,200	1,073,300	1,072,900	1,073,000	1,074,000	1,073,100	1,074,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
Moderately Low Scenic Integrity (hectares)	78,400	78,800	78,500	79,000	78,900	79,000	79,000	78,600
Percent Change from Current	NA	1	0	1	1	1	1	0
Percent of Region /Class Total	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Low Scenic Integrity (hectares)	4,8900	48,900	48,900	48,900	48,900	48,900	48,900	489,00
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	153,700	144,400	145,200	146,100	144,800	145,500	145,800	147,000
Percent Change from Current	NA	-6	-6	-5	-6	-5	-5	-4
Percent of Region /Class Total	51.2	48.1	48.45	48.7	48.3	48.5	48.6	49.0
High Scenic Integrity (hectares)	85,700	90,900	91,900	91,100	91,000	89,900	88,300	89,600
Percent Change from Current	NA	6	7	6	6	5	3	5
Percent of Region /Class Total	28.6	30.3	30.6	30.4	30.3	30.0	29.4	29.9
Moderately High Scenic Integrity (hectares)	50,200	52,000	50,000	49,800	50,500	51,600	51,900	50,500
Percent Change from Current	NA	4	0	-1	1	3	3	1
Percent of Region /Class Total	16.7	17.3	16.7	16.6	16.8	17.2	17.3	16.8
Moderately Low Scenic Integrity (hectares)	9,400	11,400	11,700	11,500	12,300	11,700	12,900	11,800
Percent Change from Current	NA	21	24	22	31	24	37	26
Percent of Region /Class Total	3.1	3.8	3.9	3.8	4.1	3.9	4.3	3.9

Table 6B.2 (continued)

Snake Headwaters Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	1,000	1,300	1,200	1,500	1,400	1,300	1,100	1,100
Percent Change from Current	NA	30	20	50	40	30	10	10
Percent of Region /Class Total	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Southern Cascades Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Agricultural/Developed Lands (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	0	0
Very High Scenic Integrity (hectares)	149,000	131,600	155,000	151,400	151,400	132,200	151,200	155,400
Percent Change from Current	NA	-12	4	2	2	-11	1	4
Percent of Region /Class Total	18.7	16.5	19.5	19.0	19.0	16.6	19.0	19.5
High Scenic Integrity (hectares)	102,200	111,100	99,000	206,900	207,200	110,000	161,600	270,200
Percent Change from Current	NA	9	-3	102	103	8	58	164
Percent of Region /Class Total	12.8	14.0	12.4	26.0	26.0	13.8	20.3	34.0
Moderately High Scenic Integrity (hectares)	319,300	310,800	299,400	269,300	268,400	318,600	280,000	237,800
Percent Change from Current	NA	-3	-6	-16	-16	0	-12	-26
Percent of Region /Class Total	40.1	39.1	37.6	33.8	33.7	40.0	35.2	29.9
Moderately Low Scenic Integrity (hectares)	202,900	206,700	211,800	150,100	150,700	204,100	177,700	120,900
Percent Change from Current	NA	2	4	-26	-26	1	-12	-40
Percent of Region /Class Total	25.5	26.0	26.6	18.9	18.9	25.6	22.3	15.2
Low Scenic Integrity (hectares)	22,300	35,500	30,500	18,000	18,000	30,800	25,200	11,400
Percent Change from Current	NA	59	37	-19	-19	38	13	-49
Percent of Region /Class Total	2.8	4.5	3.8	2.3	2.3	3.9	3.2	1.4
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Table 6B.2 (continued)

Upper Clark Fork Ecological Reporting Unit
UCRB Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	603,400	564,400	589,000	562,100	562,100	563,800	567,900	603,900
Percent Change from Current	NA	-6	-2	-7	-7	-7	-6	0
Percent of Region /Class Total	49.0	45.8	47.8	45.6	45.6	45.8	46.1	49.0
High Scenic Integrity (hectares)	355,400	378,900	360,500	417,600	417,600	377,100	472,800	489,200
Percent Change from Current	NA	7	1	18	18	6	33	38
Percent of Region /Class Total	28.9	30.8	29.3	33.9	33.9	30.6	38.4	39.7
Moderately High Scenic Integrity (hectares)	207,800	214,800	212,600	187,900	187,900	217,700	165,900	124,000
Percent Change from Current	NA	3	2	-10	-10	5	-20	-40
Percent of Region /Class Total	16.9	17.4	17.3	15.3	15.3	17.7	13.5	10.1
Moderately Low Scenic Integrity (hectares)	60,400	66,600	63,500	57,300	57,300	66,100	24,000	13,700
Percent Change from Current	NA	10	5	-5	-5	9	-60	-77
Percent of Region /Class Total	4.9	5.4	5.2	4.7	4.7	5.4	1.9	1.1
Low Scenic Integrity (hectares)	4,700	7,000	6,100	6,800	6,800	7,000	1,100	900
Percent Change from Current	NA	49	30	45	45	49	-77	-81
Percent of Region /Class Total	0.4	0.6	0.5	0.6	0.6	0.6	0.1	0.1
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Upper Klamath Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	603,400	564,400	589,000	562,100	562,100	563,800	567,900	603,900
Percent Change from Current	NA	-6	-2	-7	-7	-7	-6	0
Percent of Region /Class Total	49.0	45.8	47.8	45.6	45.6	45.8	46.1	49.0
High Scenic Integrity (hectares)	355,400	378,900	360,500	417,600	417,600	377,100	472,800	489,200
Percent Change from Current	NA	7	1	18	18	6	33	38
Percent of Region /Class Total	28.9	30.8	29.3	33.9	33.9	30.6	38.4	39.7
Moderately High Scenic Integrity (hectares)	207,800	214,800	212,600	187,900	187,900	217,700	165,900	124,000
Percent Change from Current	NA	3	2	-10	-10	5	-20	-40
Percent of Region /Class Total	16.9	17.4	17.3	15.3	15.3	17.7	13.5	10.1
Moderately Low Scenic Integrity (hectares)	60,400	66,600	63,500	57,300	57,300	66,100	24,000	13,700
Percent Change from Current	NA	10	5	-5	-5	9	-60	-77
Percent of Region /Class Total	4.9	5.4	5.2	4.7	4.7	5.4	1.9	1.1

Table 6B.2 (continued)

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Low Scenic Integrity (hectares)	4,700	7,000	6,100	6,800	6,800	7,000	1,100	900
Percent Change from Current	NA	49	305	45	45	49	-77	-81
Percent of Region /Class Total	0.4	0.6	0.5	0.6	0.6	0.6	0.1	0.1
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Upper Klamath Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	125,200	95,900	116,900	114,000	114,000	114,000	114,100	118,500
Percent Change from Current	NA	-23	-7	-9	-9	-9	-9	-5
Percent of Region /Class Total	17.1	13.15	15.9	15.5	15.55	15.55	15.6	16.2
High Scenic Integrity (hectares)	66,900	87,900	73,000	421,700	421,700	74,500	85,800	449,800
Percent Change from Current	NA	31	9	530	530	11	28	572
Percent of Region /Class Total	9.1	12.0	10.0	57.5	57.5	10.2	11.75	61.3
Moderately High Scenic Integrity (hectares)	407,200	383,900	385,100	148,100	173,300	383,100	378,900	126,400
Percent Change from Current	NA	-6	-5	-64	-57	-6	-7	-69
Percent of Region /Class Total	55.5	52.4	52.5	20.2	23.6	52.3	51.7	17.2
Moderately Low Scenic Integrity (hectares)	128,800	155,000	150,200	45,300	20,900	151,500	145,800	35,900
Percent Change from Current	NA	20	17	-65	-84	18	13	-72
Percent of Region /Class Total	17.6	21.1	20.5	6.2	2.9	20.7	19.9	4.9
Low Scenic Integrity (hectares)	5,100	10,500	8,000	4,100	3,300	10,100	8,600	2,600
Percent Change from Current	NA	106	57	-20	-35	98	69	-49
Percent of Region /Class Total	0.7	1.4	1.1	0.6	0.5	1.4	1.2	0.4
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Table 6B.2 (continued)

Upper Snake Ecological Reporting Unit UCRB Management Region BLM/FS Management Class	Current Year	Alternative/Simulation year 10 1	2	3	4	5	6	7
Very High Scenic Integrity (hectares)	450,400	447,300	449,300	449,100	449,200	449,300	449,400	448,500
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	33.1	32.9	33.1	33.0	33.0	33.1	33.1	33.0
High Scenic Integrity (hectares)	412,000	414,100	412,400	413,100	413,000	412,800	412,600	412,900
Percent Change from Current	NA	1	0	0	0	0	0	0
Percent of Region /Class Total	30.3	30.5	30.3	30.4	30.4	30.4	30.4	30.4
Moderately High Scenic Integrity (hectares)	417,000	417,300	416,700	416,900	416,300	417,100	416,600	416,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	30.7	30.7	30.7	30.7	30.6	30.7	30.6	30.7
Moderately Low Scenic Integrity (hectares)	56,200	56,900	57,100	56,500	56,900	56,400	56,800	57,200
Percent Change from Current	NA	1	2	1	1	0	1	2
Percent of Region /Class Total	4.1	4.2	4.2	4.2	4.2	4.1	4.2	4.2
Low Scenic Integrity (hectares)	23,800	23,800	23,900	23,800	24,000	23,800	24,000	24,000
Percent Change from Current	NA	0	0	0	1	0	1	1
Percent of Region /Class Total	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Areas: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

[3]Agricultural / Developed Lands–include crop/hay/pasture lands in both agriculture and closed herbland structures. Physiognomic Types were used for classification in this table rather than structures, which resulted in more hectares in agriculture than was calculated in McCool and others (1996).

[4]hectare=2.47 acres

[5]NA=Not Applicable

Table 6B.3. Road Density Classes for EEIS and UCRB BLM/FS[1]-administered lands by ecological reporting unit, management region, management class, and simulation year 10. The road density predictions for the preliminary draft Environmental Impact Statements alternatives are simulations created to model Environmental Impact Statement prescriptions. They are not meant to insinuate the desired road density or infer areas for highest priority closures. Local information needs to be taken into account prior to decisions concerning road closures.

Entire EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
None (hectares[3])	2,907,900	2,865,900	2,907,900	2,907,900	2,907,900	2,896,900	2,907,900	2,907,900
Percent Change from Current	NA[4]	-1	0	0	0	0	0	0
Percent of Region /Class Total	24.7	24.7	24.7	24.7	24.7	24.6	24.7	24.7
Very Low / Low (hectares)	1,653,900	1,586,100	1,653,900	1,653,900	1,653,900	1,627,400	1,653,900	1,653,900
Percent Change from Current	NA	-4	0	0	0	-2	0	0
Percent of Region /Class Total	14.1	13.5	14.1	14.1	14.1	13.8	14.1	14.1
Moderate (hectares)	3,237,800	3,347,600	3,237,600	4,822,800	5,140,900	3,275,300	3,367,800	4,952,800
Percent Change from Current	NA	3	0	49	59	1	4	53
Percent of Region /Class Total	27.5	28.4	27.5	41.0	43.7	27.8	28.6	42.1
High / Extremely High (hectares)	3,968,900	3,968,900	3,,968,900	2,383,900	2,065,800	3,968,900	3,838,900	2,253,900
Percent Change from Current	NA	0	0	-40	-48	0	-3	-43
Percent of Region /Class Total	33.7	33.7	33.7	20.3	17.6	33.7	32.6	19.2
BLM/FS EEIS Total (hectares)	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**	**1,1768,500**

Entire UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year[2]	1	2	3	4	5	6	7
None (hectares)	6,093,500	5,855,900	6,093,500	6,093,500	6,093,500	6,040,700	6,093,500	6,093,500
Percent Change from Current	NA	-4	0	0	0	-1	0	0
Percent of Region /Class Total	35.9	34.5	35.9	35.9	35.9	35.6	35.9	35.9
Very Low / Low (hectares)	3,834,800	3,980,300	3,834,800	3,834,800	3,384,800	3,838,000	3,834,800	3,834,800
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	22.6	23.4	22.6	22.6	22.6	22.6	22.6	22.6
Moderate (hectares)	3,455,100	3,547,200	3,455,100	3,529,200	3,529,200	3,504,700	3,877,300	3,951400
Percent Change from Current	NA	3	0	2	2	1	12	14
Percent of Region /Class Total	20.3	20.9	20.3	20.8	20.8	20.6	22.8	23.3
High / Extremely High (hectares)	3,595,300	3,595,300	3,595,300	3,521,200	3,521,200	3,595,300	3,173,100	3,099,000
Percent Change from Current	NA	0	0	-2	-2	0	-12	-14
Percent of Region /Class Total	21.2	21.2	21.2	20.7	20.7	21.2	18.7	18.3
BLM/FS UCRB Total (hectares)	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**	**1,6978,700**
Grand Total of EEIS & UCRB BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

Table 6B.3 (continued)

Blue Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	652,500	637,700	652,500	652,500	652,500	652,500	652,500	652,500
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	25.8	25.2	25.8	25.8	25.8	25.8	25.8	25.8
Very Low / Low (hectares)	234,600	230,300	234,600	234,600	234,600	234,600	234,600	234,600
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	9.3	9.1	9.3	9.3	9.3	9.3	9.3	9.3
Moderate (hectares)	453,300	472,400	453,300	1279,600	1289,400	453,300	463,400	1,289,700
Percent Change from Current	NA	4	0	182	184	0	2	185
Percent of Region /Class Total	17.9	18.7	17.9	50.6	51	17.9	18.3	51
High / Extremely High (hectares)	1,189,400	1,189,400	1,189,400	363,100	353,300	1189,400	1179,300	353,000
Percent Change from Current	NA	0	0	-69	-70	0	-1	-70
Percent of Region /Class Total	47	47	47	14.4	14	47	46.6	14
Blue Mountains EEIS BLM/FS Total (hectares)	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**	**2,529,800**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Very Low / Low (hectares)	34,700	34,700	34,700	34,700	34,700	34,700	34,700	34,700
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Moderate (hectares)	28,100	28,100	28,100	28,100	28,100	28,100	28,100	28,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	26	26	26	26	26	26	26	26
High / Extremely High (hectares)	29,300	29,300	29,300	29,300	29,300	29,300	29,300	29,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Blue Mountains UCRB BLM/FS Total (hectares)	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**	**108,100**
Blue Mountains UCRB EEIS FS/BLM Total (hectares)	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**	**2,637,900**

Table 6B.3 (continued)

Central Idaho Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.2
Very Low / Low (hectares)	100	100	100	100	100	100	100	100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Moderate (hectares)	0	0	0	0	0	0	,600	600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	0	0	0	0	0	0	6.7	6.7
High / Extremely High (hectares)	600	600	600	600	600	600	0	0
Percent Change from Current	NA	0	0	0	0	0	-100	-100
Percent of Region /Class Total	6.7	6.7	6.7	6.7	6.7	6.7	0	0
Central Idaho Mountains EEIS BLM/FS Total (hectares)	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	3,606,600	3,562,600	3,606,600	3,606,600	3,606,600	3,606,600	3,606,600	3,606,600
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	55.8	55.1	55.8	55.8	55.8	55.8	55.8	55.8
Very Low / Low (hectares)	968,800	1003,300	968,800	968,800	968,800	968,800	968,800	968,800
Percent Change from Current	NA	4	0	0	0	0	0	0
Percent of Region /Class Total	15	15.5	15	15	15	15	15	15
Moderate (hectares)	914,500	924,000	914,500	943,200	943,200	914,500	1,138,000	1,166,700
Percent Change from Current	NA	1	0	3	3	0	24	28
Percent of Region /Class Total	14.2	14.3	14.2	14.6	14.6	14.2	17.6	18.1
High / Extremely High (hectares)	972,400	972,400	972,400	943,700	943,700	972,400	748,900	720,200
Percent Change from Current	NA	0	0	-3	-3	0	-23	-26
Percent of Region /Class Total	15	15	15	14.6	14.6	15	11.6	11.1
Central Idaho Mountains UCRB BLM/FS Total (hectares)	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6,462,300**	**6462300**
Central Idaho Mountains UCRB & EEIS FS/BLM Total (hectares)	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471,300**	**6,471300**

Table 6B.3 (continued)

Columbia Plateau Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	113,200	112,000	113,200	113,200	113,200	113,200	113,200	113,200
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	10.8	10.7	10.8	10.8	10.8	10.8	10.8	10.8
Very Low / Low (hectares)	87,900	83,200	87,900	87,900	87,900	87,900	87,900	87,900
Percent Change from Current	NA	-5	0	0	0	0	0	0
Percent of Region /Class Total	8.4	8	8.4	8.4	8.4	8.4	8.4	8.4
Moderate (hectares)	265,200	271,100	265,200	351,000	634,100	265,200	266,200	352,000
Percent Change from Current	NA	2	0	32	139	0	0	33
Percent of Region /Class Total	25.4	25.9	25.4	33.6	60.6	25.4	25.5	33.7
High / Extremely High (hectares)	579,300	579,300	579,300	493,500	210,400	579,300	578,300	492,500
Percent Change from Current	NA	0	0	-15	-64	0	0	-15
Percent of Region /Class Total	55.4	55.4	55.4	47.2	20.1	55.4	55.3	47.1
Columbia Plateau EEIS BLM/FS Total (hectares)	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**	**1,045,600**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	1,400	1,300	1,400	1,400	1,400	1,400	1,400	1,400
Percent Change from Current	NA	-7	0	0	0	0	0	0
Percent of Region /Class Total	1.7	1.5	1.7	1.7	1.7	1.7	1.7	1.7
Very Low / Low (hectares)	3,100	3,200	3,100	3,100	3,100	3,100	3,100	3,100
Percent Change from Current	NA	3	0	0	0	0	0	0
Percent of Region /Class Total	3.7	3.8	3.7	3.7	3.7	3.7	3.7	3.7
Moderate (hectares)	4,400	4,400	4,400	4,400	4,400	4,400	54,900	54,900
Percent Change from Current	NA	0	0	0	0	0	1148	1,148
Percent of Region /Class Total	5.2	5.2	5.2	5.2	5.2	5.2	65.3	6,5.3
High / Extremely High (hectares)	75,200	75,200	75,200	75,200	75,200	75,200	24,700	24,700
Percent Change from Current	NA	0	0	0	0	0	-67	-67
Percent of Region /Class Total	89.4	89.4	89.4	89.4	89.4	89.4	29.4	29.4
Columbia Plateau UCRB BLM/FS Total (hectares)	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**	**84,100**
Columbia Plateau UCRB & EEIS FS/BLM Total (hectares)	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**	**1,129,700**

Table 6B.3 (continued)

Lower Clark Fork Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
None (hectares)	221,200	192,100	221,200	221,200	221,200	192,100	221,200	221,200
Percent Change from Current	NA	-13	0	0	0	-13	0	0
Percent of Region /Class Total	12.7	11	12.7	12.7	12.7	11	12.7	12.7
Very Low / Low (hectares)	122,900	127,700	122,900	122,900	122,900	127,700	122,900	122,900
Percent Change from Current	NA	4	0	0	0	4	0	0
Percent of Region /Class Total	7.1	7.3	7.1	7.1	7.1	7.3	7.1	7.1
Moderate (hectares)	374,200	398,500	374,200	374,200	374,200	398,500	374,200	374,200
Percent Change from Current	NA	6	0	0	0	6	0	0
Percent of Region /Class Total	21.5	22.9	21.5	21.5	21.5	22.9	21.5	21.5
High / Extremely High (hectares)	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300	1,023,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
Lower Clark Fork UCRB BLM/FS Total (hectares)	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**
Lower Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1741,600**	**1,741600**

Northern Cascades Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class — Alternative/Simulation year 10

	Current Year	1	2	3	4	5	6	7
None (hectares)	653,900	641,700	653,900	653,900	653,900	648,200	653,900	653,900
Percent Change from Current	NA	-2	0	0	0	-1	0	0
Percent of Region /Class Total	47	46.1	47	47	47	46.6	47	47
Very Low / Low (hectares)	138,800	138,900	138,800	138,800	138,800	139,200	138,800	138,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	10	10	10	10	10	10	10	10
Moderate (hectares)	225,300	237,400	225,300	225,300	225,300	230,600	251,300	251,300
Percent Change from Current	NA	5	0	0	0	2	12	12
Percent of Region /Class Total	16.2	17.1	16.2	16.2	16.2	16.6	18.1	18.1
High / Extremely High (hectares)	373,200	373,200	373,200	373,200	373,200	373,200	347,200	347,200
Percent Change from Current	NA	0	0	0	0	0	-7	-7
Percent of Region /Class Total	26.8	26.8	26.8	26.8	26.8	26.8	25	25
Northern Cascades EEIS BLM/FS Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391200**
Northern Cascades UCRB & EEIS FS/BLM Total (hectares)	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391,200**	**1,391200**

Table 6B.3 (continued)

Northern Glaciated Mountains Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	72,600	70,300	72,600	72,600	72,600	70,300	72,600	72,600
Percent Change from Current	NA	-3	0	0	0	-3	0	0
Percent of Region /Class Total	12.2	11.8	12.2	12.2	12.2	11.8	12.2	12.2
Very Low / Low (hectares)	17,800	18,000	17,800	17,800	17,800	18,000	17,800	17,800
Percent Change from Current	NA	1	0	0	0	1	0	0
Percent of Region /Class Total	3	3	3	3	3	3	3	3
Moderate (hectares)	84,400	86,500	84,400	84,400	84,400	86,500	84,400	84,400
Percent Change from Current	NA	2	0	0	0	2	0	0
Percent of Region /Class Total	14.2	14.6	14.2	14.2	14.2	14.6	14.2	14.2
High / Extremely High (hectares)	419,100	419,100	419,100	419,100	419,100	419,100	419,100	419,100
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	70.6	70.6	70.6	70.6	70.6	70.6	70.6	70.6
Northern Glaciated Mountains EEIS BLM/FS Total (hectares)	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593,900**	**593900**

UCRB Management Region

BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	599,200	561,900	599,200	599,200	599,200	575,500	599,200	599,200
Percent Change from Current	NA	-6	0	0	0	-4	0	0
Percent of Region /Class Total	28.5	26.7	28.5	28.5	28.5	27.4	28.5	28.5
Very Low / Low (hectares)	246,800	255,700	246,800	246,800	246,800	245,200	246,800	246,800
Percent Change from Current	NA	4	0	0	0	-1	0	0
Percent of Region /Class Total	11.7	12.2	11.7	11.7	11.7	11.7	11.7	11.7
Moderate (hectares)	294,400	322,800	294,400	294,400	294,400	319,700	326,800	326,800
Percent Change from Current	NA	10	0	0	0	9	11	11
Percent of Region /Class Total	14	15.4	14	14	14	15.2	15.5	15.5
High / Extremely High (hectares)	961,300	961,300	961,300	961,300	961,300	961,300	928,900	928,900
Percent Change from Current	NA	0	0	0	0	0	-3	-3
Percent of Region /Class Total	45.7	45.7	45.7	45.7	45.7	45.7	44.2	44.2
Northern Glaciated Mountains UCRB BLM/FS Total (hectares)	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**	**2,101,700**
Northern Glaciated Mountains UCRB & EEIS FS/BLM Total (hectares)	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**	**2,695,600**

Table 6B.3 (continued)

Northern Great Basin Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
None (hectares)	727,000	725,600	727,000	727,000	727,000	727,000	727,000	727,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7
Very Low / Low (hectares)	757,900	751,900	757,900	757,900	757,900	757,900	757,900	757,900
Percent Change from Current	NA	-1	0	0	0	0	0	0
Percent of Region /Class Total	24.7	24.5	24.7	24.7	24.7	24.7	24.7	24.7
Moderate (hectares)	1,237,000	1,244,400	1,237,000	1,365,300	1,365,300	1,1237,000	1,237,000	1,365,300
Percent Change from Current	NA	1	0	10	10	0	0	10
Percent of Region /Class Total	40.4	40.6	40.4	44.6	44.6	40.4	40.4	44.6
High / Extremely High (hectares)	342,700	342,700	342,700	214,400	214,400	342,700	342,700	214,400
Percent Change from Current	NA	0	0	-37	-37	0	0	-37
Percent of Region /Class Total	11.2	11.2	11.2	7	7	11.2	11.2	7
Northern Great Basin EEIS BLM/FS Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**
Northern Great Basin UCRB & EEIS FS/BLM Total (hectares)	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**	**3,064,600**

Owyhee Uplands Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
None (hectares)	434,500	434,500	434,500	434,500	434,500	434,500	434,500	434,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Very Low / Low (hectares)	302,300	302,300	302,300	302,300	302,300	302,300	302,300	302,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
Moderate (hectares)	846,400	846,400	846,400	846,400	846,400	846,400	846,400	846,400
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7
High / Extremely High (hectares)	22,200	22,200	22,200	18,900	18,900	22,200	22,200	18,,900
Percent Change from Current	NA	0	0	-15	-15	0	0	-15
Percent of Region /Class Total	1.4	1.4	1.4	1.2	1.2	1.4	1.4	1.2
Owyhee Uplands EEIS BLM/FS Total (hectares)	**1605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**	**1,605,400**

Table 6B.3 (continued)

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	677,800	677,800	677,800	677,800	677,800	677,800	677,800	677,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Very Low / Low (hectares)	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500	1,697,500
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3
Moderate (hectares)	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074,600	1,074600
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
High / Extremely High (hectares)	139,800	139,800	139,800	139,800	139,800	139,800	139,800	139,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Owyhee Uplands UCRB BLM/FS Total (hectares)	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**	**3,589,700**
Owyhee Uplands UCRB & EEIS FS/BLM Total (hectares)	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195,100**	**5,195100**

Snake Headwaters Ecological Reporting Unit

UCRB Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	99,400	97,600	99,400	99,400	99,400	99,400	99,400	99,400
Percent Change from Current	NA	-2	0	0	0	0	0	0
Percent of Region /Class Total	33.1	32.5	33.1	33.1	33.1	33.1	33.1	33.1
Very Low / Low (hectares)	72,600	74,200	72,600	72,600	72,600	72,600	72,600	72,600
Percent Change from Current	NA	2	0	0	0	0	0	0
Percent of Region /Class Total	24.2	24.7	24.2	24.2	24.2	24.2	24.2	24.2
Moderate (hectares)	75,000	75,200	75,000	76,900	76,900	75,000	75,000	76,900
Percent Change from Current	NA	0	0	3	3	0	0	3
Percent of Region /Class Total	25	25.1	25	25.6	25.6	25	25	25.6
High / Extremely High (hectares)	53,100	53,100	53,100	51,200	51,200	53,100	53,100	51,200
Percent Change from Current	NA	0	0	-4	-4	0	0	-4
Percent of Region /Class Total	17.7	17.7	17.7	17.1	17.1	17.7	17.7	17.1
Snake Headwaters UCRB BLM/FS Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**
Snake Headwaters UCRB & EEIS FS/BLM Total (hectares)	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**	**300,100**

Table 6B.3 (continued)

Southern Cascades Ecological Reporting Unit

EEIS Management Region

BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	152,600	145,700	152,600	152,600	152,600	149,600	152,600	152,600
Percent Change from Current	NA	-5	0	0	0	-2	0	0
Percent of Region /Class Total	19.2	18.3	19.2	19.2	19.2	18.8	19.2	19.2
Very Low / Low (hectares)	67,000	35,400	67,000	67,000	67,000	39,900	67,000	67,000
Percent Change from Current	NA	-47	0	0	0	-40	0	0
Percent of Region /Class Total	8.4	4.4	8.4	8.4	8.4	5	8.4	8.4
Moderate (hectares)	54,000	92,500	54,000	195,400	195,400	84,100	132,000	273,400
Percent Change from Current	NA	71	0	262	262	56	144	406
Percent of Region /Class Total	6.8	11.6	6.8	24.6	24.6	10.6	16.6	34.4
High / Extremely High (hectares)	522,200	522,200	522,200	380,800	380,800	522,200	444,200	302,800
Percent Change from Current	NA	0	0	-27	-27	0	-15	-42
Percent of Region /Class Total	65.6	65.6	65.6	47.9	47.9	65.6	55.8	38
Southern Cascades EEIS BLM/FS Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**
Southern Cascades UCRB & EEIS FS/BLM Total (hectares)	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**	**795,800**

Upper Clark Fork Ecological Reporting Unit

UCRB Management Region

BLM/FS Management Class

	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
None (hectares)	523,600	398,300	523,600	523,600	523,600	523,600	523,600	523,600
Percent Change from Current	NA	-24	0	0	0	0	0	0
Percent of Region / Class Total	42.5	32.3	42.5	42.5	42.5	42.5	42.5	42.5
Very Low / Low (hectares)	190,400	286,000	190,400	190,400	190,400	190,400	190,400	190,400
Percent Change from Current	NA	50	0	0	0	0	0	0
Percent of Region /Class Total	15.5	23.2	15.5	15.5	15.5	15.5	15.5	15.5
Moderate (hectares)	266,600	296,300	266,600	310,100	310,100	266,600	382,300	425,800
Percent Change from Current	NA	11	0	16	16	0	43	60
Percent of Region /Class Total	21.6	24.1	21.6	25.2	25.2	21.6	31	34.6
High / Extremely High (hectares)	251,100	251,100	251,100	207,600	207,600	251,100	135,400	91,900
Percent Change from Current	NA	0	0	-17	-17	0	-46	-63
Percent of Region /Class Total	20.4	20.4	20.4	16.9	16.9	20.4	11	7.5
Upper Clark Fork UCRB BLM/FS Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**
Upper Clark Fork UCRB & EEIS FS/BLM Total (hectares)	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**	**1,231,700**

Table 6B.3 (continued)

Upper Klamath Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
None (hectares)	93,300	90,100	93,300	93,300	93,300	93,300	93,300	93,300
Percent Change from Current	NA	-3	0	0	0	0	0	0
Percent of Region /Class Total	12.7	12.3	12.7	12.7	12.7	12.7	12.7	12.7
Very Low / Low (hectares)	47,500	26,000	47,500	47,500	47,500	47,500	47,500	47,500
Percent Change from Current	NA	-45	0	0	0	0	0	0
Percent of Region /Class Total	6.5	3.5	6.5	6.5	6.5	6.5	6.5	6.5
Moderate (hectares)	72,200	96,900	72,200	472,100	497,300	72,200	86,500	486,400
Percent Change from Current	NA	34	0	554	589	0	20	574
Percent of Region /Class Total	9.8	13.2	9.8	64.4	67.8	9.8	11.8	66.3
High / Extremely High (hectares)	520,200	520,200	520,200	120,300	95,100	520,200	505,900	106,000
Percent Change from Current	NA	0	0	-77	-82	0	-3	-80
Percent of Region /Class Total	70.9	70.9	70.9	16.4	13	70.9	69	14.5
Upper Klamath EEIS BLM/FS Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**
Upper Klamath UCRB & EEIS FS/BLM Total (hectares)	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**	**733,200**

Upper Snake Ecological Reporting Unit
EEIS Management Region
BLM/FS Management Class

	Current Year	Alternative/Simulation year 10						
		1	2	3	4	5	6	7
None (hectares)	348,300	348,300	348,300	348,300	348,300	348,300	348,300	348,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6
Very Low / Low (hectares)	498,000	498,000	498,000	498,000	498,000	498,000	498,000	498,000
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6
Moderate (hectares)	423,300	423,300	423,300	423,300	423,300	423,300	423,300	423,300
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1
High / Extremely High (hectares)	89,800	89,800	89,800	89,800	89,800	89,800	89,800	89,800
Percent Change from Current	NA	0	0	0	0	0	0	0
Percent of Region /Class Total	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6

Table 6B.3 (continued)

Upper Snake Ecological Reporting Unit EEIS Management Region BLM/FS Management Class	Alternative/Simulation year 10							
	Current Year	1	2	3	4	5	6	7
Upper Snake UCRB BLM/FS Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Upper Snake UCRB & EEIS FS/BLM Total (hectares)	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**	**1,359,400**
Grand Total of UCRB & EEIS BLM/FS Lands (hectares)	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**	**28,747,200**

[1]Planning Areas: EEIS BLM/FS–Eastern Oregon and Washington, BLM and FS-administered lands only; UCRB BLM/FS–Upper Columbia River Basin, BLM and FS-administered lands only.

[2]The "current year" data portrayed in this table is from an early version of the alternatives (preliminary draft Environmental Impact Statements, fall 1995). Due to changes in the tables (classification of cover types to cover type codes) used for the latest CRBSUM model vegetation predictions, the current year baseline was changed when the model was initialized. However, this new modeled current year will not be reported since this would change the baseline and many other analyses that have already been completed. The project time line did not allow sufficient time to redo all previous work. The overall impact of using the old current baseline is that differences between alternatives and current hectares may appear to be larger than they should be.

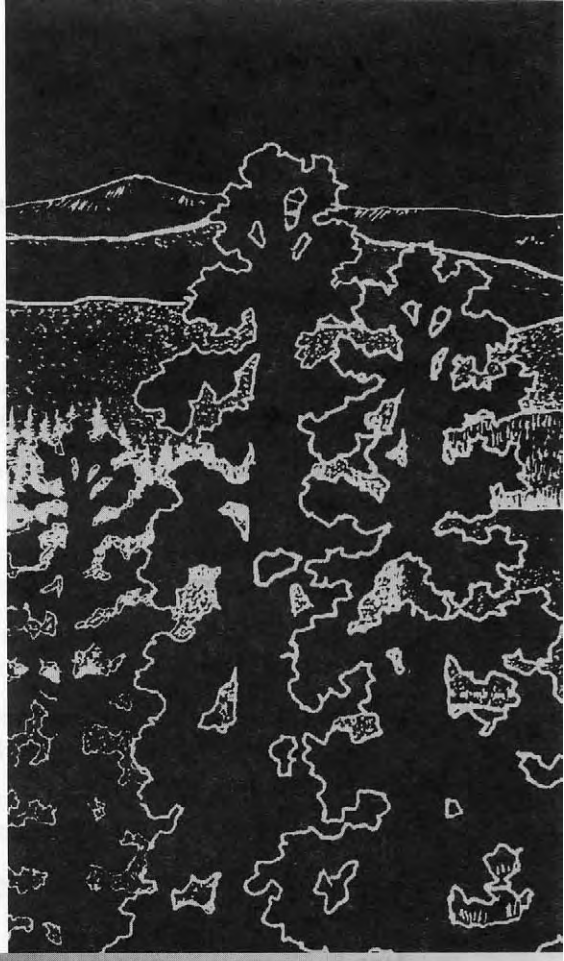
[3]hectare=2.47 acres

[4]NA=Not Applicable

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CHAPTER 7

Ecological Integrity, Socioeconomic Resiliency, and Trends in Risk

Thomas M. Quigley
Danny C. Lee
Richard W. Haynes
James R. Sedell
Richard S. Holthausen
Wendel J. Hann
Bruce E. Rieman
Bruce G. Marcot
Amy L. Horne



Thomas M. Quigley is a range scientist/economist with the USDA Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA.

Danny C. Lee is a research biologist with the USDA Forest Service, Intermountain Research Station, Forestry Sciences Laboratory, Boise, ID.

Richard W. Haynes is a research forester with the USDA Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, Portland, OR.

James R. Sedell is a principal research biologist with the USDA Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, Corvallis, OR.

Richard S. Holthausen is a wildlife biologist with the USDA Forest Service, Washington Office, Terrestrial Habitat Ecology Program, Corvallis, OR.

Wendel J. Hann is a landscape ecologist with the Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA/Boise, ID.

Bruce E. Rieman is a research fisheries biologist with the USDA Forest Service, Intermountain Research Station, Forestry Sciences Laboratory, Boise, ID.

Bruce G. Marcot is a wildlife ecologist with the USDA Forest Service, Pacific Northwest Research Station, Portland, OR

Amy L. Horne is a research forester with the USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

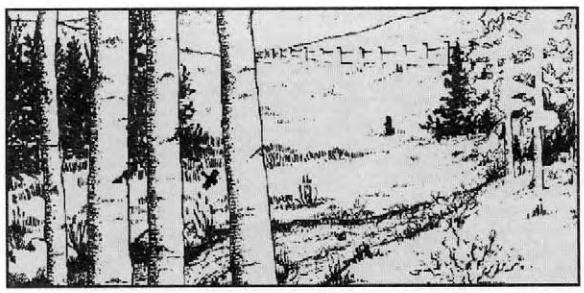


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The Draft Environmental Impact Statements describe two primary needs underlying the proposed action: (1) restore and maintain long-term ecosystem health and integrity; and (2) support the economic and/or social needs of people, cultures, and communities, and provide sustainable and predictable levels of products and services. The needs are linked with specific goals selected by the EIS teams. The goals they identified include: 1) maintain, and where necessary restore, the long-term health and integrity of forest, rangeland, aquatic, and riparian ecosystems; 2) provide sustainable and predictable levels of products and services within the capability of the ecosystem; 3) provide opportunities for diverse cultural, recreational, and aesthetic experiences within the capability of the ecosystem; 4) contribute to the recovery and delisting of threatened and endangered species; and, 5) manage natural resources consistent with treaty and trust responsibilities to American Indian tribes (Preliminary Draft EISs 1996[1]). These needs and goals imply the desire to achieve and maintain ecological integrity at a high level. These needs and goals were examined by addressing ecological integrity, socioeconomic resiliency, and the risks associated with human ecological interactions.

A composite estimate of current ecological integrity was developed across the entire Basin for all FS- and BLM-administered land and the trend in ecological integrity was estimated for each alternative over the next 100 years. This required identification of the current condition of specific ecological integrity components (aquatic/riparian, forest, rangeland, and hydrologic) (Quigley and others 1996). Current socioeconomic resiliency was estimated for social and economic systems, and its variation across the Basin was described (Quigley and others 1996). The trends in risk associated with human ecological interaction represents the change expected to result from people interacting with the wildland system, and the change expected as disturbances within the wildland system come in conflict with human assets. These trends are projected for each alternative. They provide useful estimates to show how FS and BLM management as proposed in the alternatives might influence ecological integrity and socioeconomic resiliency. These estimates are not intended to be measures of final outcomes, but are an indication of the direction of movement brought on by the implementation of each EIS alternative. Each alternative was evaluated to project how the actions of the FS and BLM would contribute to integrity, socioeconomic resiliency, and human ecological interactions.

Ecological Integrity

It is recognized that there are no direct measures of ecological integrity and that assessing integrity requires comparisons against a set of ecological conditions and against a set of clearly stated management goals and objectives (Woodley, Kay, and Francis 1993). This process is not strictly a scientific endeavor (Wickium and Davies 1995), because to provide meaning, ecological integrity must be grounded to desired outcomes. The overriding ecological outcome expected, as articulated in the EIS Alternatives for FS- and BLM-administered lands within the Basin, is to maintain or enhance ecosystem or ecological integrity.

High levels of ecological integrity are dependent on: the maintenance of evolutionary and ecological processes, such as types and frequencies of disturbances, water cycling, energy flow, and nutrient cycling; ecosystem functions and processes that operate on multiple ecological domains and evolutionary time frames; and, viable populations of native and desired non-native species (see Haynes and others 1996 for a broader discussion). These processes and functions have transitioned from historic ranges of conditions to their present status. The basic components of ecological integrity

[1]On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar Street, Walla Walla, Washington 99362.

include the forest, range, and aquatic systems with a hydrologic system interconnecting the landscape into a whole. High integrity for these components can be defined:

> A forest and range (terrestrial environment) system that exhibits high integrity is defined here as a mosaic of plant and animal communities, consisting of well connected, high-quality habitats on FS- and BLM-administered lands that support a diverse assemblage of native and desired non-native species, the appropriate expression of potential life histories and taxonomic lineages, and the taxonomic and genetic diversity necessary for long-term persistence and adaptation in a variable environment.
>
> An aquatic system that exhibits high integrity is defined here as a mosaic of well connected, high-quality water and habitats that support a diverse assemblage of native and desired non-native species, the full expression of appropriate potential life histories and dispersal mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment.
>
> Landscapes jointly encompass the terrestrial and aquatic environments. A hydrologic network operates within basins on the landscape. A hydrologic system that exhibits high integrity is defined here as a network of streams, along with their unique ground water ecosystems, within the broader landscape where the upland, floodplain, and riparian areas have resilient vegetation, where the capture, storage, and release of water limits the effects of sedimentation and erosion, and where infiltration, percolation, and nutrient cycling provide for diverse and productive aquatic and terrestrial environments.

These estimates of integrity and resiliency are presented as initial estimates based on our understanding of the information available. Absolute levels of integrity or resiliency within the Basin are not presumed to have been measured nor revealed. Rather, these represent the first attempt at estimating relative integrity at this spatial level and undoubtedly will be refined as additional information becomes available. Given more time and information, integrity indices might have included direct consideration for elements such as recovery cycles, synergistic interactions between environmental components and biophysical linkages, and feedback mechanisms operating on different spatial and temporal scales within the area.

Composite Ecological Integrity

Subbasins (approximately 325,000 to 400,000 hectares in size) were rated as having high, medium, or low ecological integrity for: forest lands, rangelands, forest and rangeland hydrologic systems, and aquatic systems (Sedell and others 1996). Each of the 164 subbasins within the Basin was rated, and ratings considered all ownerships within the Basin. The actual ratings combined analysis based on descriptive data layers, empirical process models, trend analysis, and expert judgment. The basic data sets on which the ratings were based are aggregations of data from broad-scale map themes, subwatershed information, or model projections (Quigley and others 1996).

These basic layers provided the backdrop for estimating current composite ecological integrity for FS- and BLM-administered lands within each subbasin. The component integrity layers were used with the information brought forward through the assessment (Quigley and Arbelbide, in press), the evaluation of alternatives which included a discussion of landscape integrity, terrestrial integrity (Marcot 1996), and our understanding of conditions and trends, to estimate the current composite ecological integrity for each subbasin (map 7.1). Composite integrity was estimated by comparing the component integrity ratings and knowledge of actual on-the-ground conditions with how each subbasin met the definitions described previously for systems with high ecological integrity.

The composite ecological integrity ratings are relative measures within the Basin. High composite ecological integrity indicates that, relative to the other subbasins within the assessment area, a subbasin meets the definitions of high integrity more

than those subbasins rated as medium or low. At present 26 percent of the FS- and BLM-administered lands within the Basin are rated as high integrity, 29 percent are rated as medium, and 45 percent are in low ecological integrity (fig. 7.1a and 7.1b). Of the total area within the Basin that is rated as having high composite ecological integrity, 84 percent is on lands administered by the FS and BLM. A rating of low does not necessarily translate to "bad" or "poor". For instance, many of the subbasins rated as having low ecological integrity include large areas of farmland. These areas are important and may be functioning just as society would have them function.

Trends in Composite Ecological Integrity

Trends in ecological integrity for FS- and BLM-administered lands are dependent on current integrity, future management actions (such as timber harvest, prescribed fire, grazing, and restoration), and unplanned disturbance events (such as fire, flood, insects, disease, and climate variation). Basic rule sets were developed to predict trends in integrity for FS- and BLM-administered lands. No attempt was made to project the component integrity elements directly. The projections available through the evaluation of alternatives were examined to determine which ones might provide the most universal predictors of change in integrity. Three primary indicators were chosen to use; each is equally weighted in its contribution to composite ecological integrity trends: forest and rangeland vegetation (as integrated indicators of such elements as disturbance, succession, management activities, exotics, and habitat); riparian management (as indicators of such elements as aquatic environment, riparian communities, connectivity of riparian and aquatic ecosystems across the FS and BLM landscapes, fragmentation, and habitats); and, road density changes (as indicators of such elements as change in erosion, sediment, terrestrial habitat fragmentation, and exotic introductions). A broad array of elements contribute to integrity trends and are represented by these three proxies (table 7.1).

Methods — To identify expected trends in composite ecological integrity under each of the alternatives, a set of indices was generated based on expected changes in vegetation structure and composition, changes in road densities, and riparian management for each alternative. An intermediate score for vegetation was generated based on potential vegetation type (forest or range) and the prescription models (see the Landscape Ecology section of this report for detail concerning prescriptions) applied within each alternative (table 7.2). Intermediate scores were generated for each 1-square-kilometer pixel within the Basin using the rule set in table 7.2, and the potential vegetation maps and prescription allocations developed by the landscape staff. Mean scores were calculated for each subbasin based on an aggregation of FS- or BLM- administered land only. The mean intermediate scores were used in combination with the current rating of composite integrity to derive an index of expected change (table 7.3). This index (*vegidx*) assumed values of -1, 0, or +1, where the sign of the index refers to expected direction of change in ecological integrity (that is, -1 indicates that ecological integrity as reflected in vegetation is expected to decline; +1 suggests improvement, and 0 suggests no change). No attempt was made to quantify the magnitude of the expected change.

A similar index (*rdidx*) was constructed based on the projections of future road densities (resulting from the application of rule sets associating intensity of future management activity and current road densities) and our interpretation of the potential ecological ramifications of changing road densities. Two measures for each subbasin were calculated. One was the combined change in the proportion of FS- and BLM-administered lands within each subbasin with less than 0.1 miles of road per square mile (as projected by the spatial analysis team). This was referred to as the change in low road density. The second measure, change in high road density, measured an equivalent change in the FS- and BLM-administered area with greater than 1.7 road miles per square mile. These measures of change in road density were used along with the current composite integrity rating to assign *rdidx* values (table 7.4).

Map 7.1 – Composite ecological integrity ratings synthesized the forest, rangeland, forest and rangeland hydrologic, and aquatic component integrity ratings.

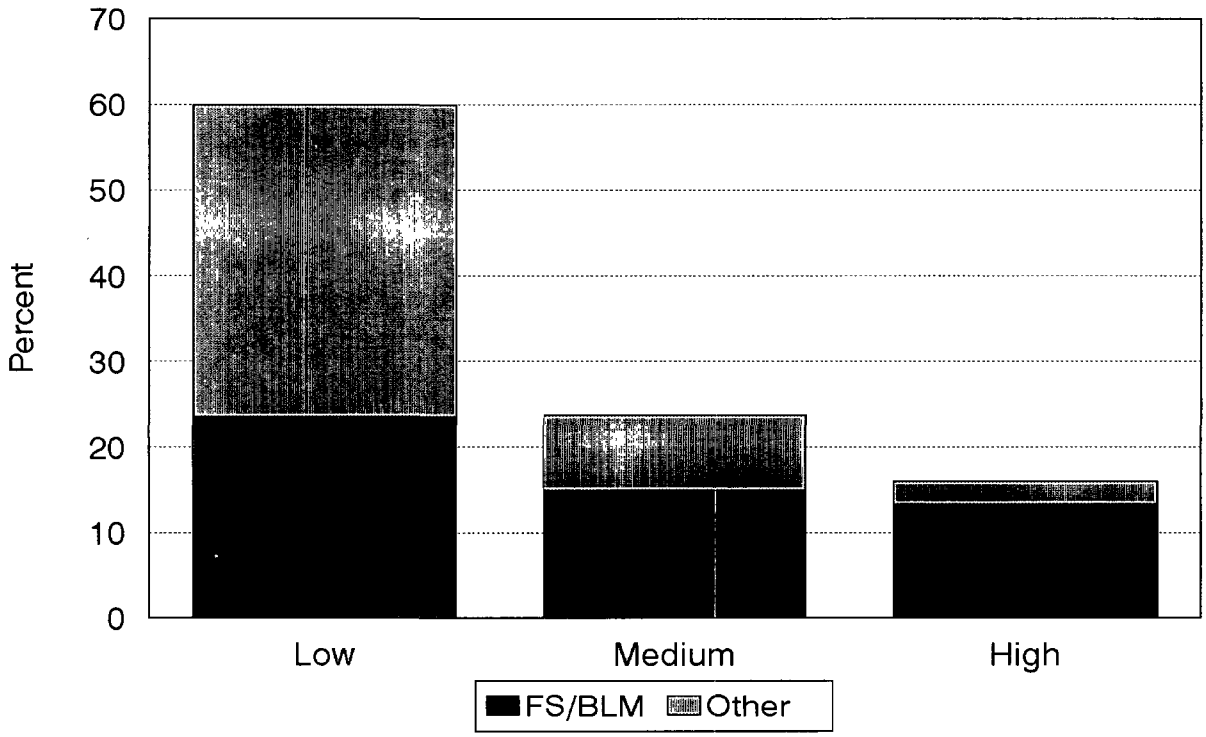


Figure 7.1a – Percent of the Basin by composite ecological integrity.

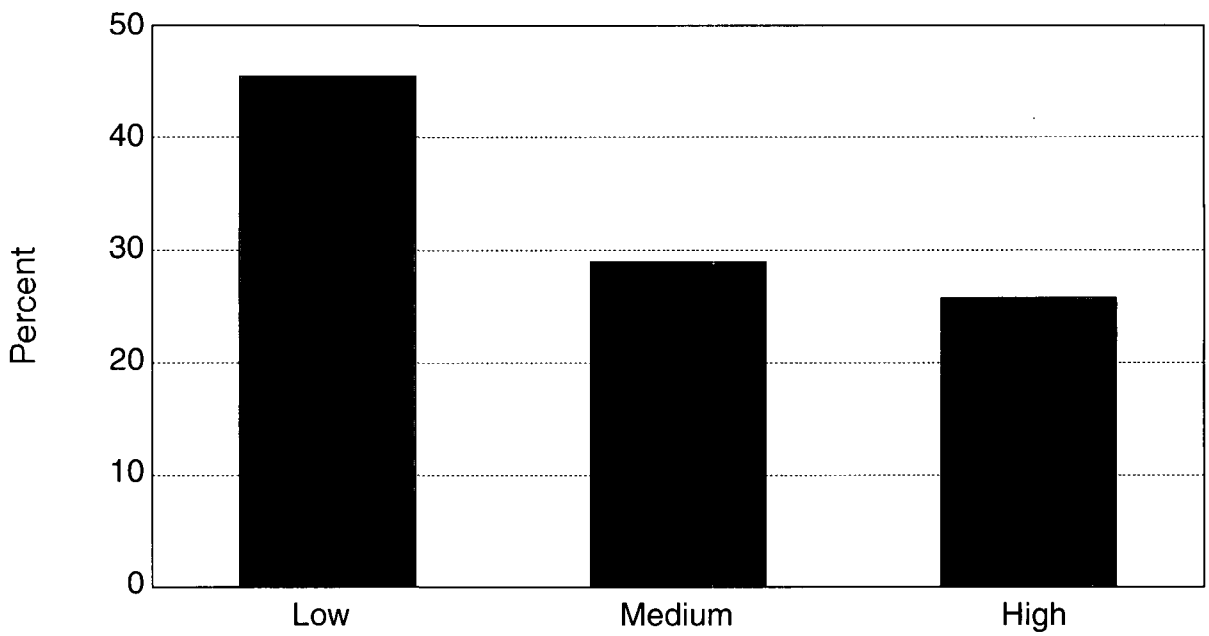


Figure 7.1b – Percent of FS- and BLM-administered land by composite ecological integrity.

Table 7.1– Proxies or indicators used to estimate trends in ecological integrity for the EIS alternatives.

Proxy	Represents
Forest and Range Vegetation	• Trends in susceptibility to severe and frequent fires • Trends in susceptibility to insect and disease outbreaks • Trends in stand structure and composition • Changes resulting from management activities - traditional commodity or conservation emphasis - ecological emphasis - thinning from below, grazing systems, prescribed fire, riparian management • Trends in containment and eradication of exotics
Riparian Management	•Trends in aquatic ecological function • Trends in water quality • Trends in riparian vegetation - Forested mature or late seral stage - Rangeland cover and density • Trends in habitat connectivity for riparian and aquatic ecosystems across the landscape • Trends in diverse habitats for riparian communities
Road density change	• Terrestrial habitat trajectories • Trends in hydrologic function • Trends in sedimentation and erosion • Trends in the introduction and spread of exotics • Trends in the risks for fire occurrence • Trends in habitat fragmentation

Table 7.2 – Intermediate scores used in the calculation of directional changes in integrity for each combination of prescription model and major vegetation group (forest or rangeland). Scores range from -5 (traditional production emphasis), to 0 (conserve existing structure and composition), to +5 (maximum restoration consistent with biophysical template).

Prescription Model	Forest score	Rangeland score
A1	+5	+1
A2	+4	+5
A3	+2	+3
C1	0	0
C2	-3	-3
C3	-4	-4
P1	-2	-2
P2	-3	-1
P3	-5	-5
N1	+1	+3
N2	-3	-2
N3	-4	-3
N4	-1	0
N5	-2	-1
N6	-4	-3
N7	-3	-2
N8	-4	-3

Table 7.3 – Rule set for determining the expected directional change (vegidx) in ecological integrity, based on current composite integrity rating and mean intermediate vegetation score for each subbasin.

Potential Vegetation	Current Composite Integrity Rating	Mean Intermediate Score	*Vegidx*
Forest	Low	-5 to 3	-1
		3 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
		3 to 5	+1
	High	-5 to 0	-1
		0 to 1	0
		1 to 5	+1
Rangeland	Low	-5 to 4	-1
		4 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
		3 to 5	+1
	High	-5 to 0	-1
		0 to 1	0
		1 to 5	+1

Table 7.4 – Rule set for determining directional change in integrity (rdidx) due to changes in area of low road density or high road density within each subbasin, and current composite integrity rating.

Change in low road densities	Change in high road densities	Current Composite Integrity Rating	*Rdidx*
any decrease	all	all	-1
0 to 5% increase	any increase	all	-1
	0 to 10% decrease	all	0
	> 10% decrease	low	0
		medium or high	+1
> 5% increase	any increase	low or medium	0
		high	-1
	0 to 10% decrease	low or medium	+1
		high	0
	> 10% decrease	all	+1

The third index of expected change (*sgidx*), was based on the level of riparian protection that would be provided on FS- and BLM-administered lands under each alternative. A simple rule set assigned values to each subbasin based on the alternative and whether the subbasin fell within one of several categories (table 7.5). This assignment was consistent with the evaluation of alternatives brought forward by the aquatic and terrestrial teams (see the aquatic and terrestrial sections of this report for a detailed description).

For each alternative and subbasin, we calculated a final index of change based simply on the sum of *vegidx, rdidx,* and *sgidx.* This composite index of change assumed values ranging from -3 to +3, where +3 indicates a strong improving trend in ecological integrity, 0 indicates no change in ecological integrity, and -3 indicates a strong declining trend in ecological integrity. Values of -2 and -1 indicate declining trends in integrity, but not as strong as a value of -3. The same logic applies to upward trends in integrity associated with +2 and +1 values.

Results and Discussion — Each alternative results in a different projection in composite ecological integrity trends (maps 7.2 through 7.8) (see appendix 7A for a listing of all values by subbasin). Summing across all the FS- and BLM-administered lands within the basin shows that the alternatives provide varying trends in composite integrity (fig. 7.2). Alternatives 1 and 5 are dominated by declining trends (approximately 95% and 70% respectively), while Alternatives 2, 3, and 7 have 20 percent, 10 percent, and 5 percent area with declining trends respectively. Alternatives 6 and 4 show all areas as either stable or improving trends. Over 70 percent of the area in Alternatives 4 and 6 show improving trends, while Alternative 1 has less than 3 percent of the area in improving trends. Alternatives 5 and 2 have 20 percent of the area in improving trends.

In the discussions that follow, integrity trends are described in terms of the proxies used in this analysis. The proxies represent many elements and a more complete discussion would not focus on the proxies but the elements they represent. Refer to table 7.1 for a partial listing of the elements represented by the proxies.

The moist forest vegetation types of western Montana and northern Idaho show declining trends in Alternatives 1, 2, 3, and 5 with mostly stable trends in Alternatives 4 and 6. The declining trends generally reflect that favorable contributions to integrity trends from riparian strategies are offset by forest and rangeland vegetation trends and/or road density trends. Attaining stable trends in this area would result from favorable riparian strategies and intensive management of road networks (decreasing road densities). The

forest and rangeland vegetation management strategies applied within the alternatives were generally not effective in restoring composition and structure to that which would be consistent with the long-term disturbance processes and the capabilities of the biophysical environment. More extensive treatments, focused specifically on the mid-seral vegetation types and prioritized within the area, might result in favorable trends for the vegetation component of integrity. The specific interactions that would occur with changing vegetation treatments would need to be explored if such a proposal were to come forward. Where this area shows improving trends in ecological integrity in Alternative 7 is related to decreasing road densities and favorable riparian strategies as opposed to vegetation conditions consistent with long-term disturbance processes and the capabilities of the biophysical environment.

The dry forest vegetation types of eastern Oregon show declining trends in Alternatives 1 and 5, stable trends in 2, 3, and 4, and improving trends in 6 and portions of 7. The rationale for these trends is similar to those for the moist forest types. In the action alternatives the improving-trend contribution from riparian strategies is generally offset by declining trends from road density changes. The forest and rangeland vegetation trends under the prescriptions of the alternatives did not result in improving trends in integrity. The forest and rangeland vegetation management strategies applied within the alternatives generally were not effective in restoring composition and structure to that consistent with the long-term disturbance processes and the capabilities of the biophysical environment. More extensive treatments, focused specifically on the mid-seral vegetation types, and prioritized within the area might result in favorable trends for the vegetation component of integrity. Alternative 6 shows improving trends for this area that reflect favorable riparian strategies and more aggressive road density management than the other alternatives.

In the action alternatives (3 through 7) declining trends on rangelands generally reflect the degree noxious weeds are contained or reduced, and the vegetation structure and cover type changes that result from grazing, disturbances, changes in fire regime, and woody species encroachment. Where aggressive management of noxious weeds, grazing management, watershed restoration, and road density reductions are planned, the trends are stable or improving.

The large reserves of Alternative 7 have areas where the integrity trend is projected to be declining. This declining trend reflects the timeframe (100-year projection), current conditions, and projected approach to fire management and road closures. Fire suppression during the last several decades has been effective in removing fire from many of the existing wilderness areas of central Idaho, resulting in the buildup of fuels in much of this area. This buildup of fuels is not projected to burn within the next decade, but is likely to burn with large fires in the next 100 years. For those areas showing declining trends in the 100-year timeframe in the reserves, the trend in the next decade might be stable and in a 400 year timeframe might be favorable.

The rationale for the riparian strategy contribution to trends is related to the management approach to existing roads within the reserves. Alternative 7 calls for the roads to be closed, but not necessarily obliterated or put to bed. Most, but not all, of the significant potential contributors to adverse ecological conditions from these closed roads would be addressed. This would likely contribute to problems during the 100 year timeframe as culverts become plugged and washouts occur, and erosion on road surfaces increases. Favorable trends in integrity for riparian strategies were not projected within reserves. Similar concerns are projected for rangeland areas within reserves related to noxious weed expansion and the influence of wildfire in the absence of substantial restoration. Fire suppression was projected to occur according to national fire policy, but projected wildfire size was larger than could be effectively controlled.

Table 7.5 – Rule set for assigning expected change (sgidx) in composite integrity due to implementation of riparian standards and guidelines under each of the proposed alternatives.

Alternative	Conditions	Sgidx
1	Protected under FEMAT	+1
	Greater than 50% in wilderness	0
	Otherwise	-1
2, 3, 4, 6, 7	Protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0
5	Livestock or timber emphasis areas	-1
	Otherwise, and protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0

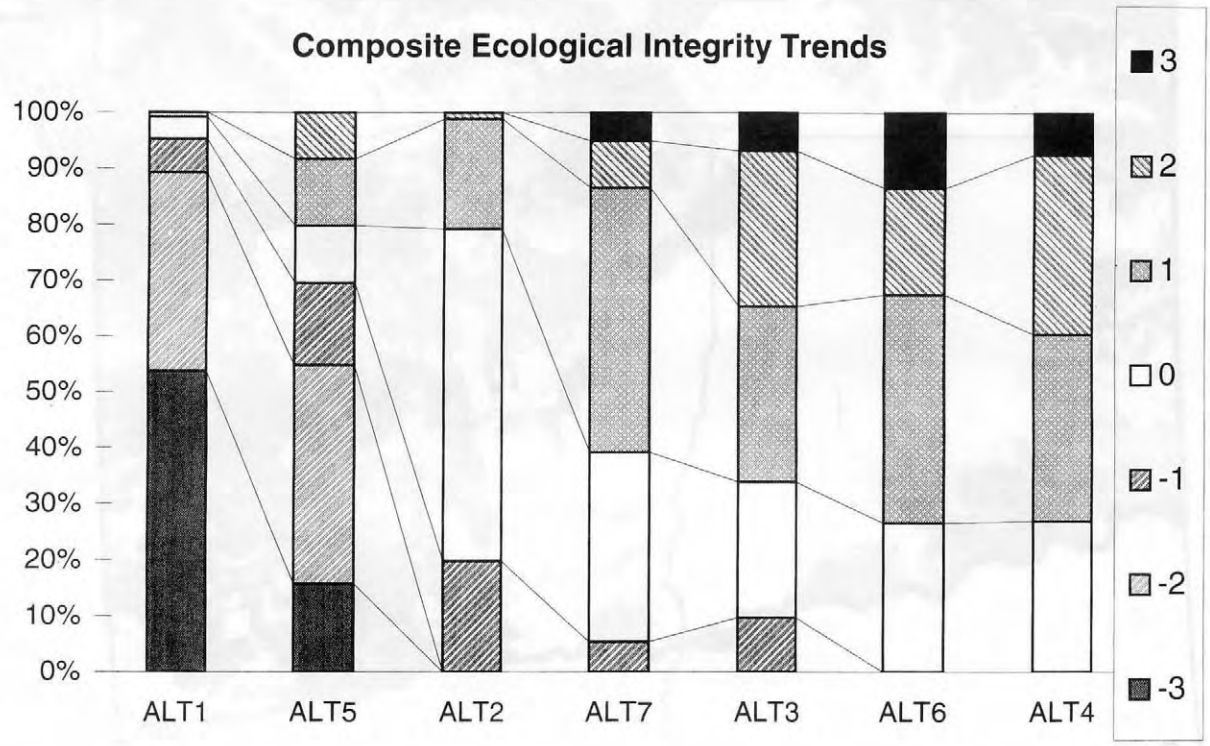


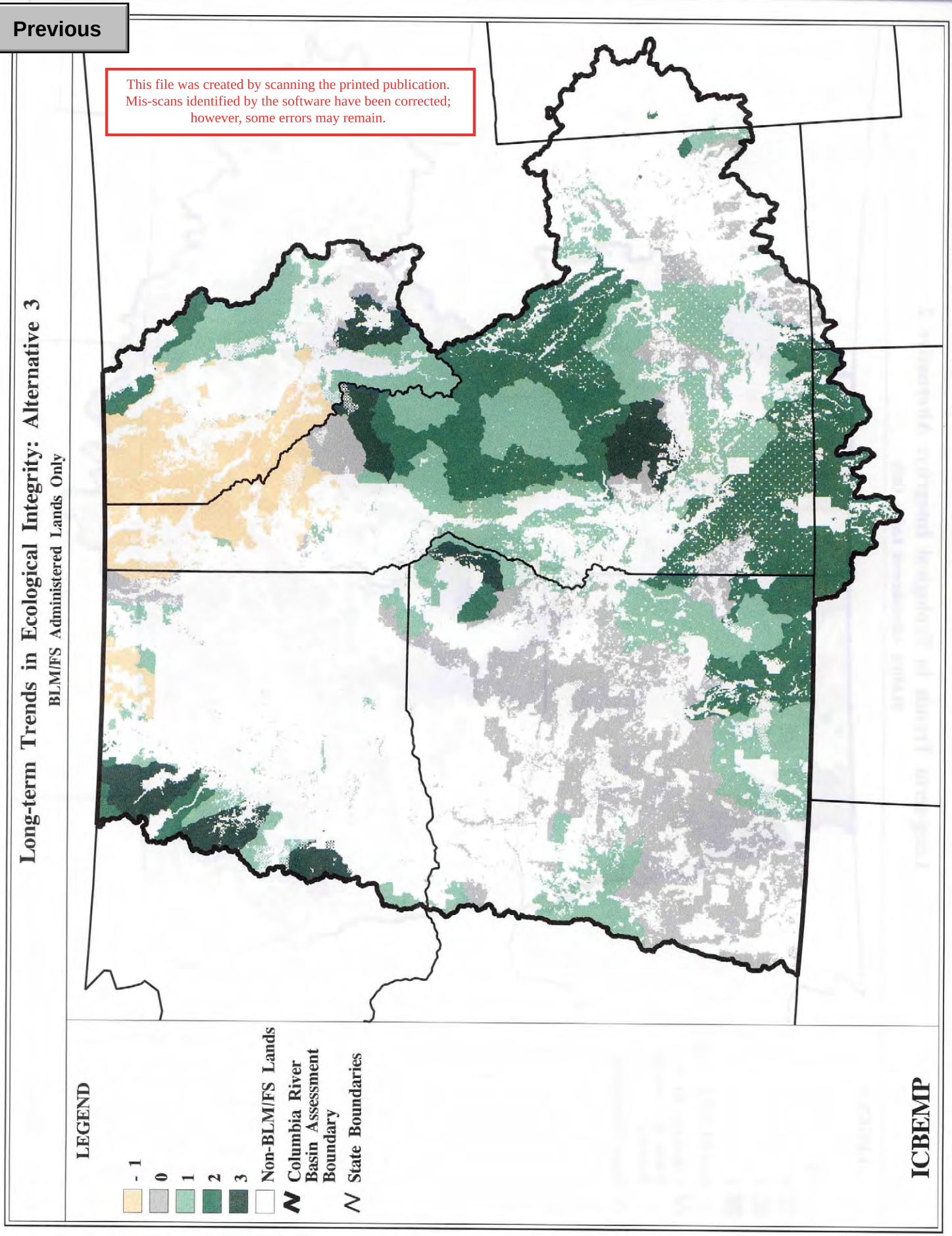
Figure 7.2 – Trends in composite ecological integrity projected for each alternative (-3 is strongly decreasing; 0 is stable; +3 is strongly increasing) on FS- and BLM-administered lands. Note that the alternatives are not in numerical order.

Map 7.2 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 1.

Map 7.3 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 2.

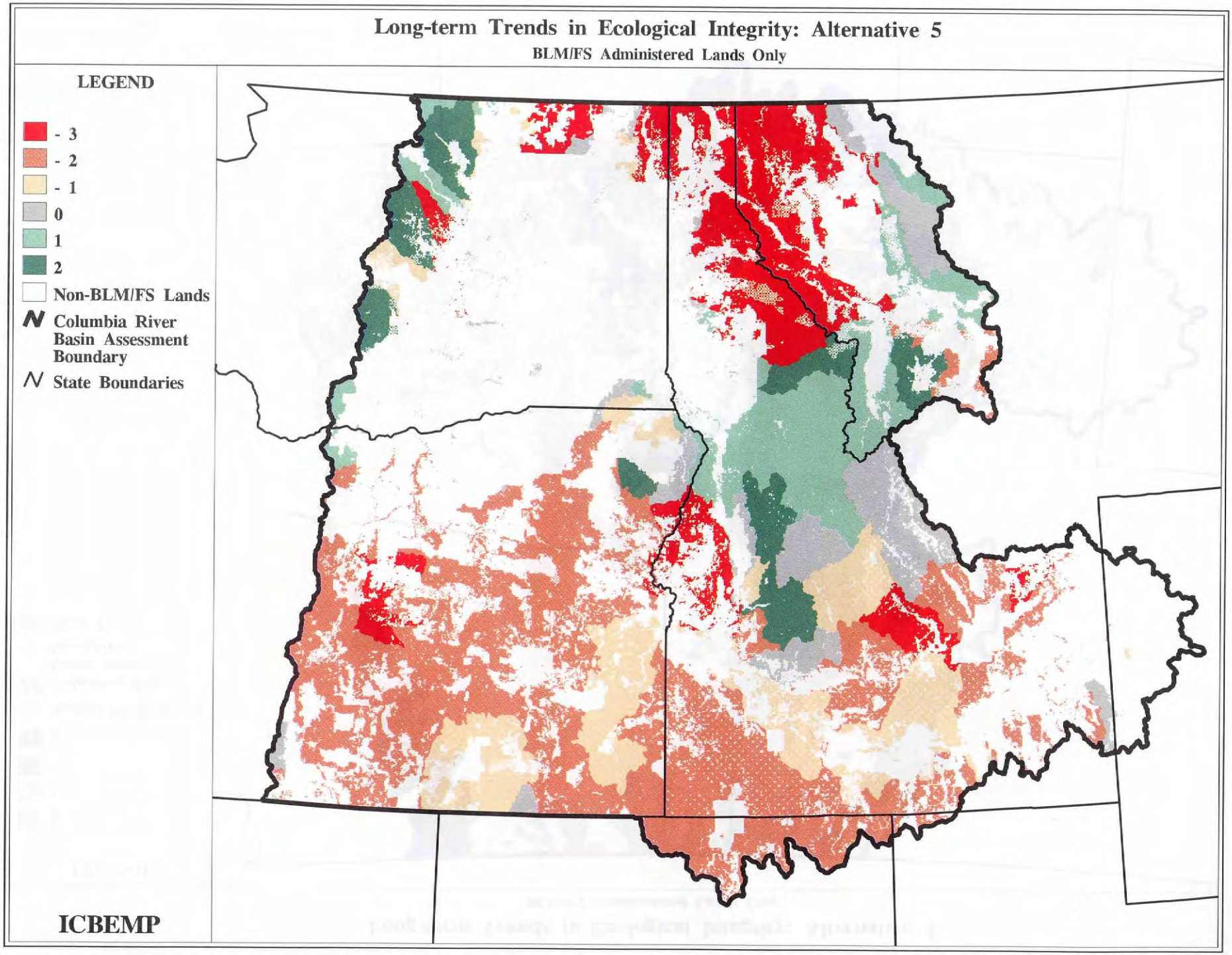
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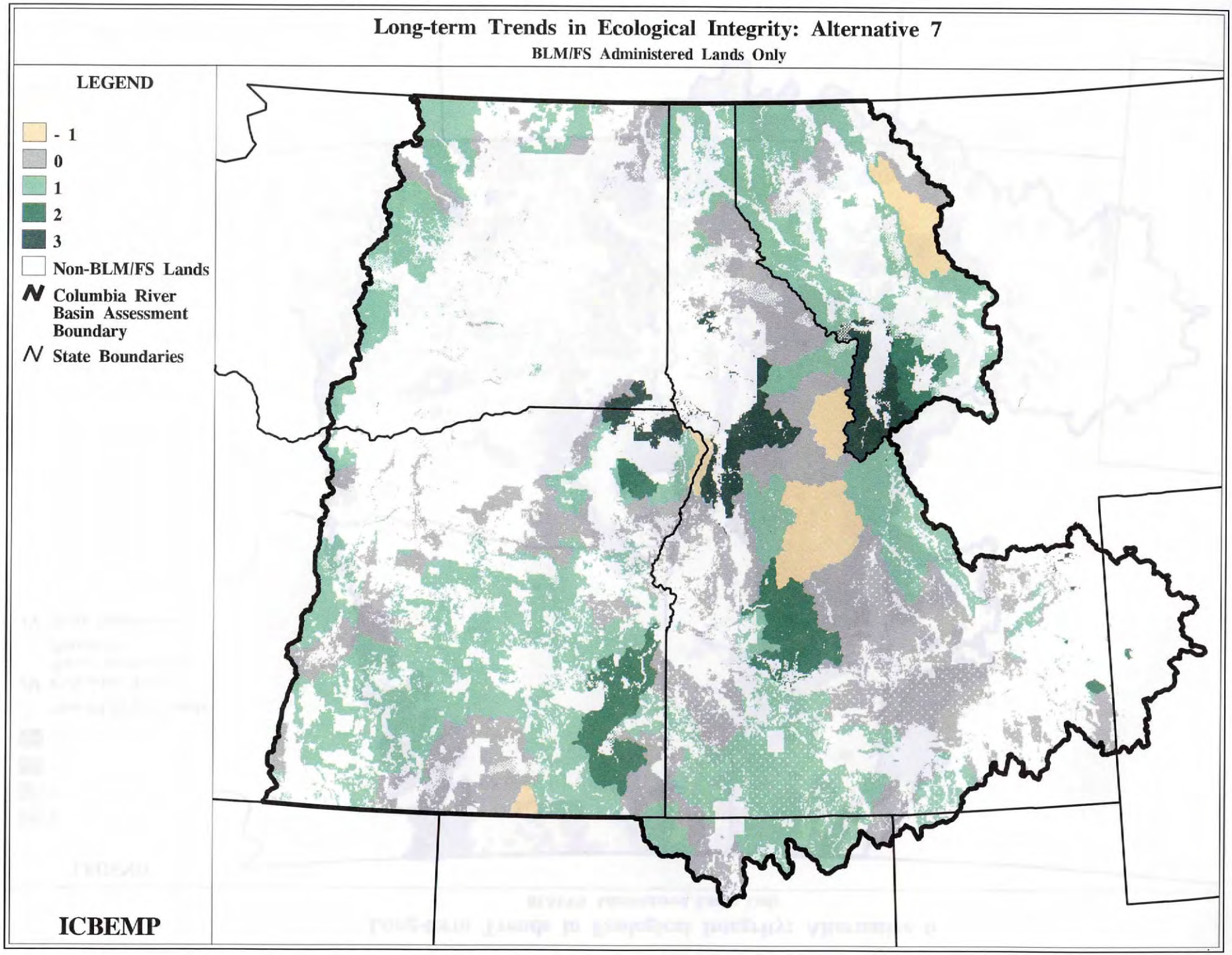
Map 7.4 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 3.

Map 7.5 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 4.



Map 7.6 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 5.

Map 7.7 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 6.



Map 7.8 – Long-term trends in ecological integrity for FS- and BLM-administered land: Alternative 7.

Alternatives 4 and 6 are projected to be successful in stabilizing or reversing negative trends in ecological integrity for FS- and BLM-administered lands. With more detailed and aggressive management it may be possible to project improving trends for some of the lands now predicted to be stable in these alternatives. The outcomes are inter-linked and would require additional analysis to determine the net effects. The basic strategies contained in Alternatives 4 and 6 include additional prioritization of management actions directed specifically at restoring ecological systems, managing vegetation within the capabilities of the biophysical environment, and attempting to achieve vegetation structure and composition consistent with the long-term disturbance processes operating on the landscape.

Social and Economic Resiliency

Both social and economic resiliency measure the adaptability of human systems. Social resiliency was measured using four composite factors: civic infrastructure (leadership, preparedness for change); economic diversity; social/cultural diversity (population size, mix of skills); and amenity infrastructure (attractiveness of the community and surrounding area). Economic resiliency was measured by the diversity among employment sectors (using the Shannon-Weaver index). People in highly resilient counties are assumed to have ready access to a range of employment opportunities if specific firms or business sectors experience downturns. Much like the biophysical components of the ecosystem, social and economic resiliency are affected by the size of the area measured (community, county, or trade regions) but reflect human ideas about the landscape rather than hydrologic subbasins. In general, larger units display greater economic diversity (and by extension, economic and social resiliency) than smaller areas. Further, since resiliency attempts to measure a capacity for human response, classifications of either social or economic resiliency serve as relative estimates of adaptability, rather than absolute descriptors.

When we look at the Basin from the socioeconomic perspective our basic frame of reference is how humans organize themselves both in a community sense and how they relate to their biophysical environment. One overarching feature of this perspective is the speed at which human communities, interests, values, and economies change. Given this feature, one useful relatively permanent administrative feature is the county. We observe that counties and available county data can be used to describe broad trends in socioeconomic resiliency. Another powerful argument for considering counties is their role as political entities in a political system that simultaneously relates federal/state/local interactions.

Current Socioeconomic Resiliency

Socioeconomic resiliency draws from measures of social and economic resiliency separately (Quigley and others 1996). These measures can be combined into a single measure and used to assess the EIS alternatives. This composite rating combines three factors that are included in discussions of social and economic resiliency: population density (defined as population per square mile), economic resiliency (defined as diversity of economic sectors), and lifestyle diversity (see Haynes and Horne, in press, for a more detailed discussion). We assigned the socioeconomic resiliency ratings based on the sum of the total ratings for each of the three factors where each was weighted equally. The ratings were developed for each of the 100 counties in the Basin (map 7.9). Counties are one of the few permanent geographic features of human systems.

Low socioeconomic resiliency rating — This includes the Basin counties with low population density (<11 people per square mile), low or medium economic resiliency and low or medium lifestyle diversity. There are 54 counties in the Basin in this category. These counties account for 68 percent of the area but only 18 percent of the population. As shown in map 7.9, many of the counties traditionally thought of as agricultural are in this category. There are 14 counties that have medium economic resiliency, but most of them are among the least densely populated counties in the Basin (fewer than 6 people per square mile) and most contain FS- and BLM-administered lands.

Map 7.9 – Socioeconomic resiliency ratings are the sum of ratings for economic resiliency, population density, and lifestyle diversity.

Medium socioeconomic resiliency rating — This includes the 20 Basin counties with mostly medium economic resiliency ratings and generally medium or high lifestyle diversity or population density ratings. Exceptions include Klickitat county, which has low economic resiliency and high lifestyle diversity; and Cassia county, which has low population density but medium economic and lifestyle diversity. Baker county has the lowest population density ratings, but a medium level of economic resiliency reflecting a diverse economy, and the highest level of lifestyle diversity reflecting greater adaptability of its social systems.

High socioeconomic resiliency rating — This rating includes the 26 Basin counties that are more densely populated (greater than 11 people per square mile), and have the highest level of economic resiliency. Counties with high social/economic resiliency typically have high population densities, medium economic resiliency, and medium to high lifestyle diversity values. The exceptions to these are Klamath county, which has low population density but high economic resiliency and high lifestyle diversity and Silver Bow county that has low economic resiliency, but high population density and high lifestyle diversity. High lifestyle diversities in these two counties suggest that there are higher infrastructure values than the low population densities would suggest.

This approach recognizes the 44 (of 100) counties with very low (less than 6 people per square mile) population densities, sometimes called "frontier counties." Typically these counties have low socioeconomic resiliency, and include many of the 60 Basin counties labeled "federal" in the sense that more than 33 percent of their area is in federal ownership. The interest in identifying these so-called "frontier counties" is a concern that they may lack sufficient population to sustain existing services or to develop necessary social services. A related concern is whether they are able to maintain the existing infrastructure both in the physical sense and in the social sense, especially in the sense of community. One example is counties that are too sparse to sustain a medical clinic. This relative isolation also stimulates some people to locate in these areas. That is, some people choose these counties specifically because they are sparsely settled.

We caution against concluding that low to high ratings are equivalent to bad to good ratings; the intent is to describe the adaptability or vulnerability of these counties, not to rate them as good or bad. Generally, most of the people in the Basin (82%) live in counties that are medium or high in the degree of adaptability, as measured by socioeconomic resiliency (fig. 7.3). Most of the land area (68%) in the Basin, however, is in the low category for socioeconomic resiliency.

Trends in Socioeconomic Resiliency

The only component of socioeconomic resiliency in which we have ability to project trends is population density. But we can use population density as a proxy for socioeconomic resiliency to make some broad assessments about future resiliency trends. We can do this because economic resiliency, lifestyle diversity and population density vary directly with each other. That is, these factors seem to be collinear which suggests that any one of these three factors can be used as a proxy for the others.

As of 1994, the population of the Basin was 3.1 million. Population projections suggest that the Basin's 100 counties may have 6.0 million people by 2040 (McCool and Haynes 1996). This is a growth rate higher than the population growth rate for the United States as a whole. In these projections, the population density ratings for 61 counties remained unchanged. The remaining 39 counties shifted to a higher category of population density. Figure 7.4 illustrates these trends in terms of both the distribution of population density categories by population and by area. By 2040, nearly 80 percent of the population (up from 60 percent currently) is projected to live in relatively urbanized environments. The proportion of the people living in the most rural parts of the Basin falls by 50 percent. The area in the lowest population density category changes from 68 percent to 45 percent of the Basin.

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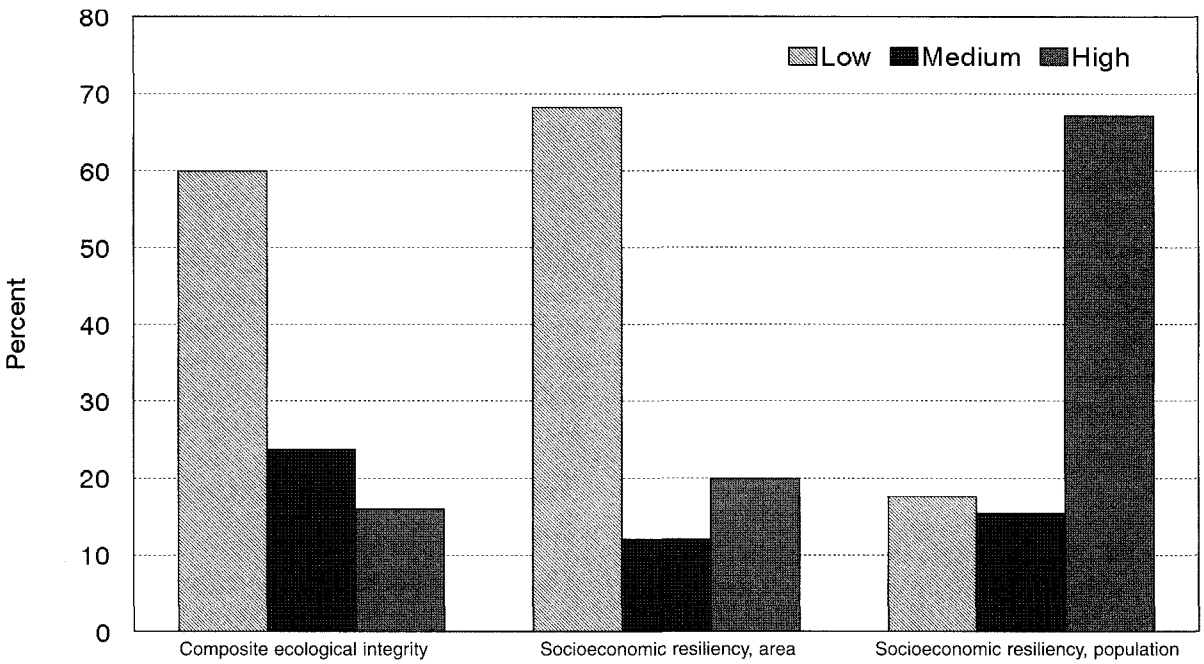


Figure 7.3 – Percentage of the Basin by ecological integrity and socioeconomic resiliency ratings.

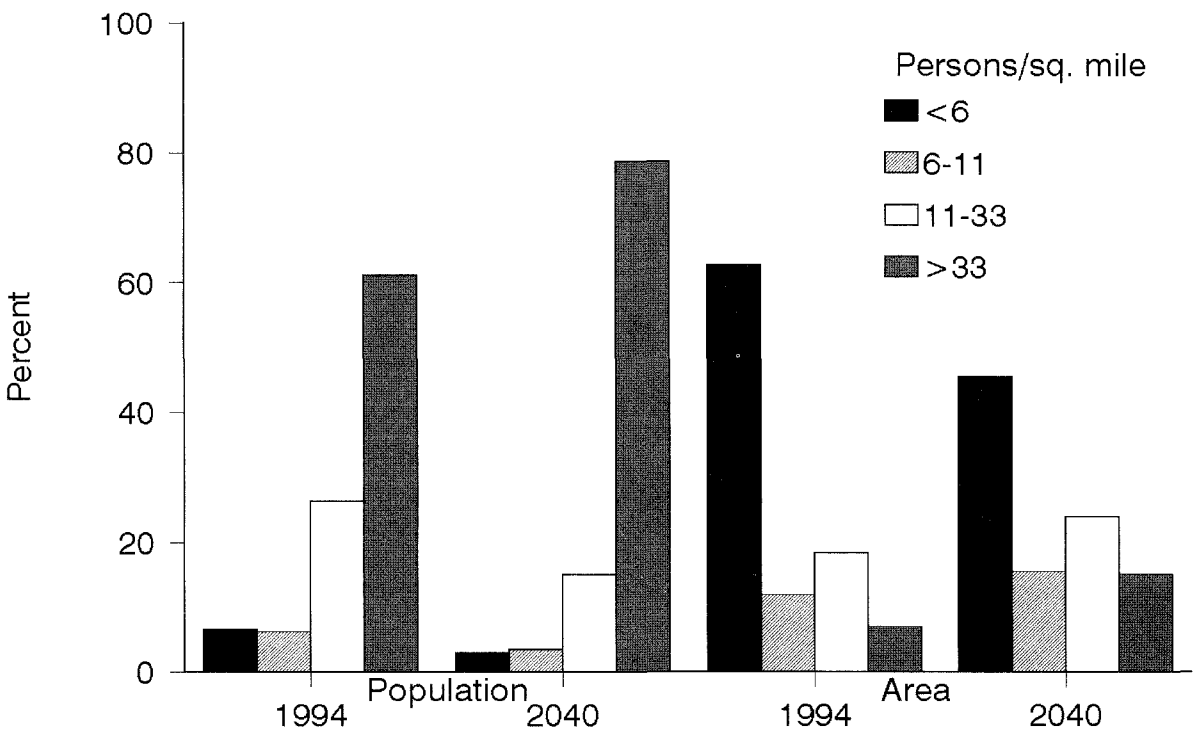


Figure 7.4 – Distribution of population density categories by area and population of 1994 and 2040.

Because of the projected increase in Basin population, there are likely to be more people in the high density counties. This is particularly true in "recreation" counties that are projected to attract a disproportionate numbers of in-migrants (McCool and Haynes 1996). In terms of socioeconomic resiliency, this means a continued shift toward higher socioeconomic resiliency throughout the Basin, with the exception of the "frontier" counties that are not recreation counties or that have low economic resiliency. None of the 100 counties are projected to lose population between 1995 and 2040; less than 10 percent of the counties are projected to have only minor increases. As other areas become more densely populated, these few counties (less than 10%) are likely to become increasingly isolated and to have difficulty attracting infrastructure and investments. On the other hand, they are likely to be more apparent as "refuges" for people seeking solitude.

Predicting trends for socioeconomic resiliency is difficult because of the inherit uncertainty in social systems (because of both the speed at which they change and the uncertainties inherit in the underlying assumptions). Ten year trends in county level economic resiliency that might be attributed to the adoption of alternative management strategies on FS- and BLM-administered lands are related to projected population growth, reliance on FS and/or BLM forage, reliance on harvest of FS and/or BLM timber, recreation opportunities, and initial levels of economic resiliency (see the Economic chapter of this report for further discussion). These trends show 17 counties that might experience possible change in economic resiliency within the Basin. Weighting these counties by the proportion of Basin population they represent shows that only a fraction of the population might experience a downturn in economic resiliency. This is not to downplay the significance of the potential impacts, but rather to place them in perspective. Comparing this small percentage of the population against the relatively large percentage of the Basin area that might experience a downturn in ecological integrity can be deceptive. Ecological integrity trends are judged with respect to forest, rangeland, and watershed conditions and management, with little interaction with prospective human impacts on either management or changes in the mix of ecosystem goods, services, and conditions. Economic resiliency trends speak to the entire economic system within the Basin. As such, they include goods, services, and conditions from forest and range ecosystems as well as the other parts of the Basin. They also only speak to the conditions in the first decade of the planning period (where the trends in ecological integrity speak to changes expected in the next 100 years).

In the long term, population changes are a proxy for expected economic changes in the Basin (see Haynes and Horne, in press, for projections of economic activity in the Basin for some of the major resources). Projected population shifts over the next 50 years suggest the Basin would come to look like much of the West in that it would become primarily urban. There would still be 45 percent of the Basin's area that would be in the lowest population class that we call "frontier" counties. Those counties would likely continue to generate concerns about their ability to provide social services without help from State and Federal governments. It is expected that concerns about social resiliency would be most pronounced in these counties. There is little that FS and BLM managers can do about this. Political factors are involved in each particular location in addition to the socioeconomic trends. Some people choose these counties specifically because they are sparsely settled.

There is often the concern about the link between human conditions (and well-being) and the condition of the underlying ecosystems. Comparing socioeconomic resiliency by area may cause some to conclude that people in the Basin have impoverished themselves and that ecosystem and human community sustainability is imperiled. Such a view at the Basin level leads to erroneous conclusions. First the forest and rangeland ecosystems do not themselves provide the economic foundations of the Basin. Second, many of the ecosystems have been modified by human action to increase

their production of native (for example, timber and grass) or exotic (for example wheat or cattle) crops or animals.

Risk Assessment: Human Ecological Interactions

We assessed future risk to ecological integrity in relation to people (growth in rural-urban areas and use patterns) and risk to people and their assets in relation to wildland areas. The underlying assumption is that risk to ecological integrity is generally higher in proximity to densely populated areas, and risk to people and their assets is generally higher in close proximity to wildland areas, rather than to agricultural or urban areas. Natural or human-induced events that occur within wildland areas may prove risky to people, homes, and other assets people value. Those risks are related to wildland areas and conditions associated with wildland areas. The integrity of ecosystems is also influenced by the presence of people and their activities.

Current Risks Associated with Human-wildland Interaction

We considered four population/wildland interface classes. The areas with moderate or greater road densities within a 60 mile radius of the metropolitan areas in the Basin were classified as very high. The concept was to identify the areas likely to be inhabited by commuting residents and experiencing strong pressure to expand subdivisions, developed recreation sites, and other structures. Areas with more than 1,000 persons were mapped using a 10- to 30-mile radius depending on the population of the city. Areas with fewer than 1,000 persons were classified as low, while the degree of overlap of the city buffers with each other resulted in moderate or high levels. Societal risk to ecological integrity and risk to human assets from interactions with wildland was estimated using a rule set that related population density to forest, non-forest, and agricultural wildland vegetation groups. Higher population densities in proximity to forest and rangeland vegetation types were rated as having higher risk than low population density areas. Agricultural lands were rated with lower risks than forest and rangeland areas (table 7.6).

To estimate the risk associated with the FS- and BLM-administered portion of the wildland areas, a rule set was developed that related urban-rural classes to FS and BLM vegetation groups (table 7.7). This relationship assumes a higher risk is associated with forested vegetation groups than with non-forested vegetation types and a higher risk with increasing population densities.

Trends in Risks Associated with Human-ecological Interaction

Trends in risk to ecological integrity on FS- and BLM-administered land from interactions with people, and trends in risks to human assets from FS- and BLM-administered lands were assumed to shift in relation to the future urban-rural classes and trends in composite ecological integrity. In general, the relationship assumes that if urban-rural classes become higher and if trends in ecological integrity are negative, then trends in risks generally increase (table 7.8). Future urban-rural classes (table 7.9) were based on projected population densities (very low, low, moderate, and high) that were calculated for each subbasin. The underlying projections of population change within the Basin were taken from McCool and Haynes (1996).

Results and Discussion

Floods, wildfire, road slumping, culvert plugging, cougars frequenting backyards, and deer and elk damaging ornamental shrubs are all examples of increasing risks associated with living in close proximity to wildland areas. Generally the more wild the area the higher the risk, and the more human populations increase in close proximity to wildland areas the greater the risk. A symmetric relationship was assumed to exist concerning the risks to the integrity of wildland areas from human influence and the risks faced by humans in proximity to wildland areas. Road building, fishing, camping, hiking, wood cutting, berry picking, and developed recreation sites are all examples of activities that tend to increase in wildland areas in close

Table 7.6 – Societal risk to ecological integrity from human interactions and risk to human assets from wildland areas.

	Urban-Rural Classes			
	Low	Moderate	High	Very high
Forest vegetation types	Low	Moderate	High	Very high
Non-forest vegetation types	Low	Moderate	Moderate	Very high
Agricultural types	Low	Moderate	Moderate	High

Table 7.7 – Risk to FS- and BLM-administered land ecological integrity from human interactions and risks to human assets from FS- and BLM-administered lands.

	Urban-Rural Classes			
	Low	Moderate	High	Very high
FS/BLM Forest vegetation types	Moderate	High	High	Very high
FS/BLM Non-forest vegetation types	Low	Moderate	High	Very high
FS/BLM Other	Low	Low	Moderate	High
Non-FS/BLM	None	None	None	None

Table 7.8 – Trends in risk to FS- and BLM-administered land ecological integrity from human interactions and trends in risks to human assets from FS- and BLM-administered lands under conditions of increasing, stable, and decreasing ecological integrity trends.

Trend in	Future Urban-Rural Classes			
Ecological Integrity	Low	Moderate	High	Very high
+3	Decreasing	Decreasing	No Change	Increasing
+2	Decreasing	Decreasing	No Change	Increasing
+1	Decreasing	No Change	Increasing	Increasing
0	Decreasing	No Change	Increasing	Increasing
-1	No Change	Increasing	Increasing	Increasing
-2	No Change	Increasing	Increasing	Increasing
-3	No Change	Increasing	Increasing	Increasing

Table 7.9 – Future urban-rural class given population increase class and current urban-rural class.

Current Urban-	Future Population Density Class			
rural class	Low	Moderate	High	Very high
Low	Low	Low	Moderate	High
Moderate	Moderate	High	High	Very high
High	Moderate	High	Very High	Very High
Very High	Very High	Very High	Very High	Very High

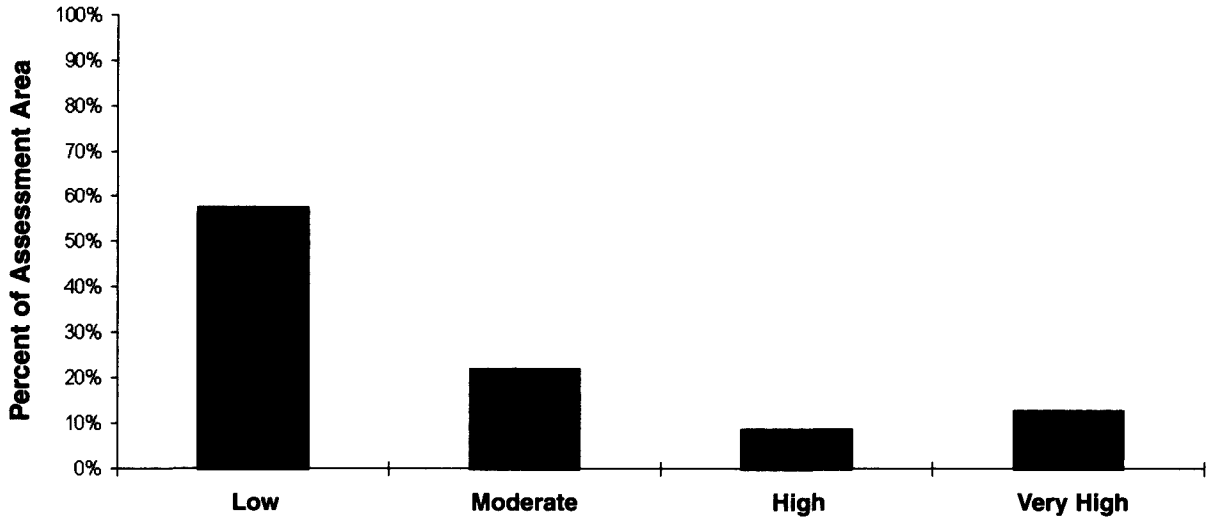


Figure 7.5 – Societal risk of human-ecological interaction: percent of the Basin with low, moderate, high, or very high risk associated with the management of human ecological interactions.

proximity to population centers. The larger the population center, the higher the activity levels. These activities tend to create risk to ecological integrity. Recreation tends more toward developed site recreation while still supporting increased dispersed recreation.

Risks associated with the interaction of urban and wildland areas are associated with the six major metropolitan areas within the Basin (Boise, Nampa/Caldwell, Missoula, Spokane, Kennewick/Pasco/Richland, and Yakima). Missoula, Boise, Nampa/Caldwell, and Yakima are in close proximity to FS- and BLM-administered lands and therefore are anticipated to have a greater risk associated with the interface of FS- and BLM-administered wildlands than Spokane or Kennewick/Pasco/Richland. Spokane does have substantial wildland interface risks, but they are mostly associated with private land. Kennewick/Pasco/Richland is a mixture of wildland and agricultural interfaces. Where these metropolitan areas are in close proximity to high integrity wildlands, risks to the maintenance or improvement of integrity would be high. Likewise these metropolitan areas would pose greater risk to areas of high integrity in close proximity than to areas of low integrity, suggesting the need for additional emphasis to manage the risks to attain and maintain high ecological integrity.

Considering all land within the Basin, approximately 58 percent of the area is classed as low urban/rural class with approximately 23 percent classed as high or very high. This reflects the low density of population within much of the Basin. Translating this societal risk to ecological integrity from interactions with humans and the risk to human assets from wildland areas, about 58 percent of the Basin has low risk and 21 percent has

high or very high risk (Figure 7.5). Thus the majority of the area in the Basin would be viewed as having low risk from a societal standpoint. Risks vary by location with very high risk associated with the major metropolitan areas in the Basin (map 7.10). Using this as a frame of reference, the view from a FS or BLM manager's frame of reference would be slightly different (map 7.11 and fig. 7.6). Removing the non FS- and BLM-administered lands from consideration and recalculating the risk to ecological integrity from human interactions and the risk to human assets from wildlands, shifts to greater risk in general. On FS- and BLM-administered lands nearly 50 percent of the land is classed as moderate risk while about 19 percent is classed as high or very high. Thus, from the FS/BLM perspective there are more risks involved with managing the wildland areas than might be viewed by society as a whole. Forested vegetation occurring in areas of moderate urban-rural classes results in high risk from the FS and BLM manager's perspective, while society might consider this as a moderate risk to all ownerships.

Managing risks in areas where populations are increasing becomes more complex as fewer options for treatment become available. Managing smoke from prescribed fire, reducing tree densities in areas with high scenic values, fencing riparian areas frequented by recreationists, and allowing flooding to occur naturally in stream channels are all examples of increasing complexity as human populations increase in proximity to wildland areas.

Nearly 60 percent of the Basin is rated as having low composite integrity (see map 7.1) with only

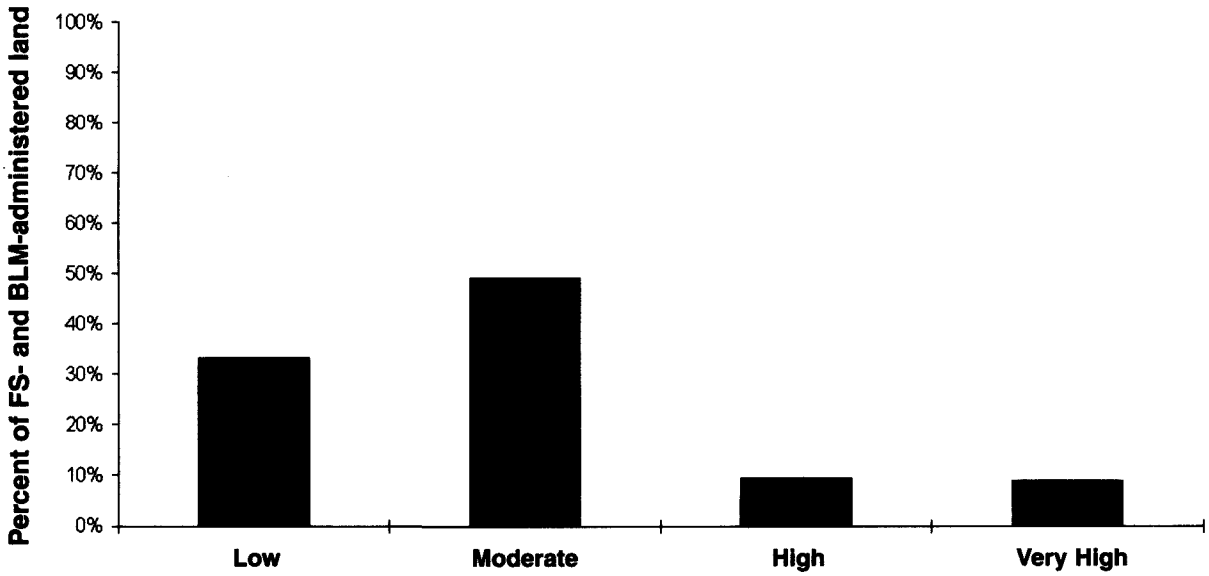


Figure 7.6 – FS/BLM risk of human-ecological interaction: percent of FS- and BLM-administered land with very high, high, moderate, and low risk associated with the management of human ecological interactions.

17 percent rated as high. The interaction across ownerships is important to consider as new management direction is proposed. Over 80 percent of the area rated as having high composite ecological integrity is on FS- and BLM-administered lands. If the long-term goal is to maintain high integrity areas and move more area into the high integrity class, FS- and BLM-administered lands become important resource areas because of their integrity.

The increasing population of the Basin results in trends toward more risks to ecological integrity from human interactions and risks to human assets from wildlands across each alternative (maps 7.12 through 7.18). This despite the stable or favorable trends in ecological integrity projected for Alternatives 4 and 6. All alternatives show at least 20 percent increasing risks; Alternatives 1 and 5 show more than 50 percent increasing risk. Alternative 1 shows no areas of decreasing risk. The areas generally showing increasing trends in risk are those near major population centers where populations are expected to increase rapidly, and in areas associated with downward trends in ecological integrity. [Alternatives 4 and 6 were projected to have stable or improving trends in ecological integrity, thus increasing risks in human ecological interactions are associated with increasing populations.] In Alternatives 1 and 5 where substantial areas were showing rapid declines in ecological integrity trends (values of -2 or -3), the trends in risk are originating from both increasing population and declining ecological integrity trends.

Risks to integrity are shown as increasing even in areas composed mostly of existing wilderness. This implies that human-ecological interactions in these areas result in increasing risk to ecological integrity if ecological integrity trends are decreasing. The arguments are that declining ecological integrity would place people at greater risk (more uncertain outcomes for flood, wildfire, and other events) and that people interacting with these areas would be increasing the risk to integrity (camping along streams that are not improving in integrity, more people accessing the wildland areas, increasing probability of noxious weed spread, and other risks). If ecological integrity is trending upward, the system is more resilient and trends in risk to human assets and risk to ecological integrity from human use would be less.

Even with improving trends in ecological integrity, risks to ecological integrity from people and risks to human assets from wildland areas will be increasing due to population increases in the Basin. Thus, FS and BLM managers can anticipate that managing for ecological integrity will involve managing increasing risks from the association of people with wildland areas and risks to human assets from wildland areas.

There is little difference between the alternatives for the Interstate 90 (Spokane, Washington-Missoula, Montana) or Interstate 84 (Ontario, Oregon-Twin Falls, Idaho) corridors. Alternatives 3, 4, 6, and 7 generally do make a difference by lowering the risks in the area east of the Cascades and in the area west of Yellowstone National Park. Risks to ecological integrity in the Kennewick/Pasco/Richland area with its large private land base and other Federal lands is unaffected by the various FS and BLM futures. In the area east of the Cascades there are two areas (west of Yakima, Washington and east of Bend, Oregon) where a growing human population may overwhelm management attempts to lower risks within the alternatives.

There are three additional geographic regions where different land management approaches are unable to alter the risks to ecosystems and where increasing human populations are not the source of increased risks. These are the areas east of Missoula, Montana along the continental divide, the area from Ontario, Oregon to Baker City, Oregon (along Interstate Highway 84), and the area further east of Bend, Oregon. In these areas the level of restoration actions envisioned in the alternatives are inadequate to reverse the increasing trends in ecological and human risks.

Risks to human assets from wildland areas and risks to ecological integrity are not restricted to metropolitan areas. Much of the Basin is expected to remain rural where risks are associated with res-

idents, and remain in primitive areas where risks are associated with visitors. Local publics would be expected to continue to express preferences for stability in scenery and lobby to have projects put in someone else's backyard. Recreation use is expected to increase sharply, leading to greater conflicts between recreation use and land management actions including the issue of road closures. The proportion of the Basin that is sparsely populated and where Federal agencies are a visible part of the communities is projected to change very little and would continue to place demands on Federal resources to be part of their community infrastructures. This would be the case especially in the area of risk management, where these counties have fewer resources to address risks or assist in control of natural events such as wildfire, flood, and insect outbreaks than exist in the more heavily populated areas.

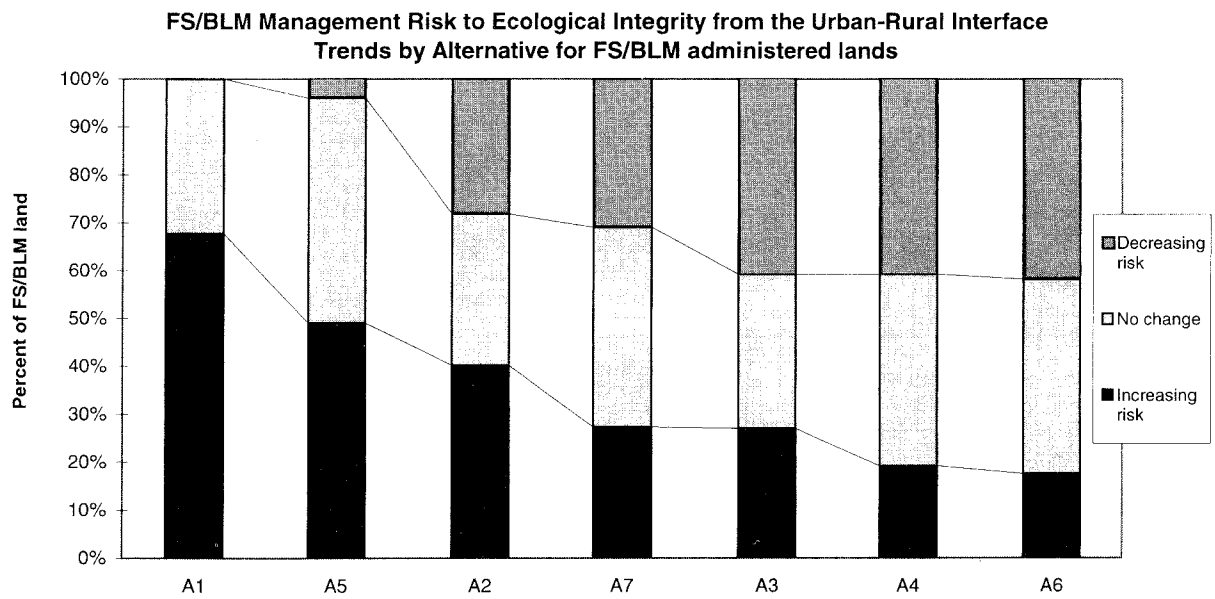


Figure 7.7 – Trends in risk to human assets and ecological integrity projected for each alternative for FS- and BLM-administered lands.

Map 7.10 – Level of societal risk associated with interactions of human and ecological systems.

Map 7.11 – Level of risk associated with the management of human ecological interactions on FS- and BLM-administered lands.

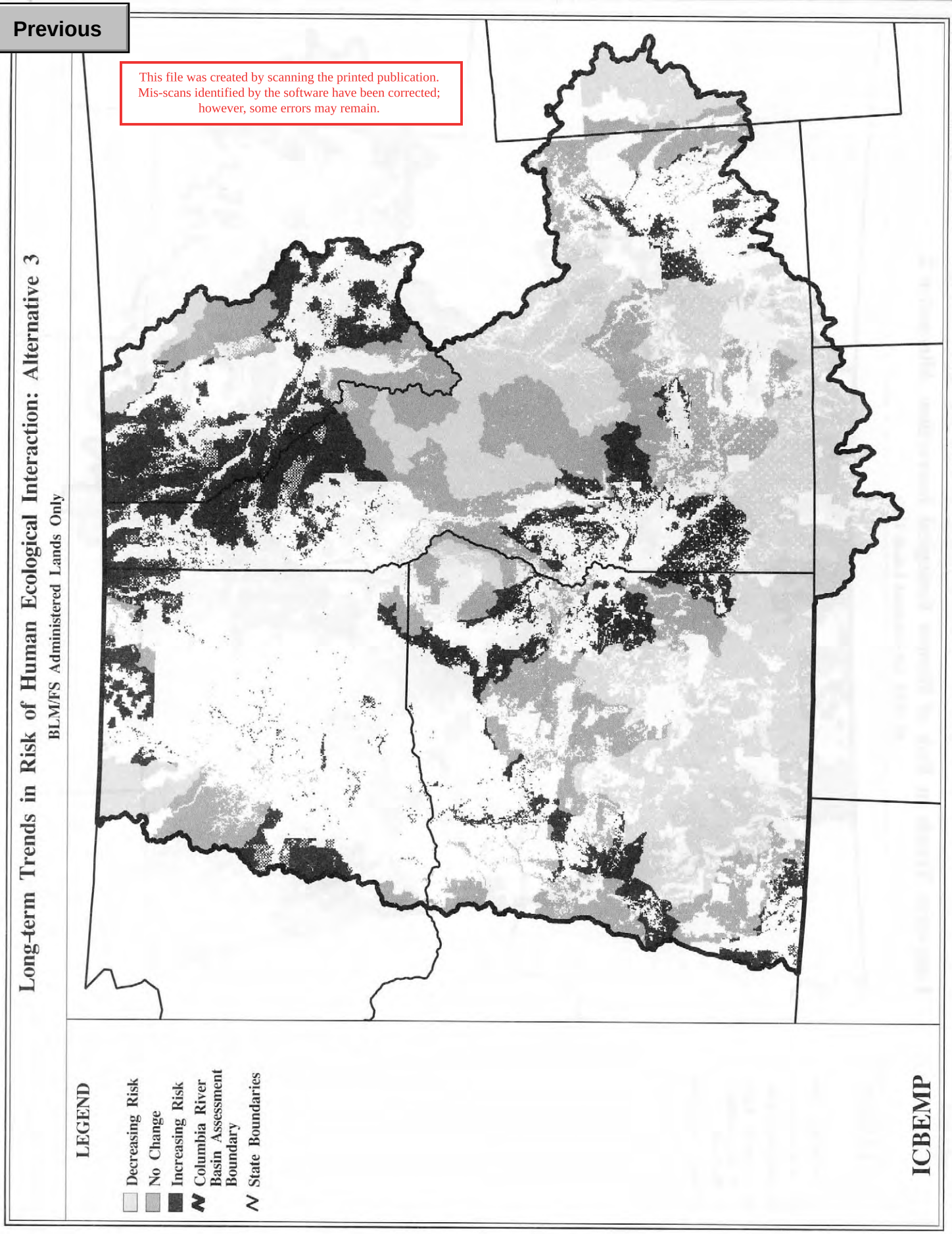
Map 7.12 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 1.

Map 7.13 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 2.

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Map 7.14 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 3.

Map 7.15 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 4.

Map 7.16 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 5.

Map 7.17 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 6.

Map 7.18 – Long-term trends in risk of human ecological interaction on FS- and BLM-administered lands only: Alternative 7.

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Appendix 7-A

Table 7A.1 – Integrity ratings for each subbasin within the Interior Columbia Basin Project area.

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
1	Alvord Lake		5		M	M		L	M
2	American Falls		6		L	L			L
3	Banks Lake		4		L	L		M	L
4	Beaver-Camas	6	6	M	L	L	L	H	L
5	Beaver-South Fork		1		L	L		H	L
6	Big Lost	6	5	H	M	L	H	L	L
7	Big Wood	6	6	H	M	M	M	H	L
8	Birch		5		M	L		M	M
9	Bitterroot	3	3	M		M	M		M
10	Blackfoot	3	3	M		M	L		M
11	Blackfoot		6		L	M			L
12	Boise-Mores	5	3	L		L	M		L
13	Brownlee Reservoir	6	5	M	M	L	L	L	L
14	Bruneau		5		M	M		M	M
15	Bully		6		L	L		H	L
16	Burnt	5	6	L	L	L	L	H	L
17	Butte	5	3	L		L	H		L
18	C. J. Strike Reservoir		6		L	L		M	L
19	Camas		6		M	L	L	H	L
20	Chief Joseph	6	4	M	L	L	L	M	L
21	Clearwater	3	3	L		M	L		M
22	Coeur d'Alene Lake	4		L		L	M		L
23	Colville	6	3	L		L	L		L
24	Crooked-Rattlesnake		6		M	L		L	M
25	Donner Und Blitzen		5		L	M		L	M
26	East Little Owyhee		5		H	L		L	M
27	Fisher	4		L		L	M		L
28	Flathead Lake	4	3	L		L	M		L
29	Flint-Rock	2	3	M		H	M		H
30	Franklin D. Roosevelt Lake	6	3	L		L	L		L
31	Goose		5		L	L		L	M
32	Goose Lake	5	1	L	L	M	L		L
33	Greys-Hobock	1	5	H	H	H	H		H
34	Gros Ventre	1	3	H		H	H		H
35	Guano		6		M	M		H	M
36	Hangman	6	3	L		L	L		L
37	Harney-Malheur Lakes		6		L	L		H	L
38	Hells Canyon	2	2	M	M	H	H	L	M
39	Idaho Falls		6		L	L			L
40	Imnaha	2	5	M	L	H	H	L	H
41	Jordan		6		L	L		L	M
42	Kettle	4	3	L		L	L		L
43	Klickitat	3	3	L		H	M		M
44	Lake Abert	5	6	M	L	L	H		L
45	Lake Chelan	1	2	H		M	H		H
46	Lake Walcott		6		L	L		H	L

Table 7A.1 (continued)

	Subbasin	Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
47	Lemhi	2	5	H	M	M	M	L	H
48	Little Deschutes	5	3	L		L	M		L
49	Little Lost		5		H	M		L	M
50	Little Salmon	3	3	L		M	M		M
51	Little Spokane	6	3	L		L	L		L
52	Little Wood		6		L	L		H	L
53	Lochsa	2		L		M	H		H
54	Lost	5	1	L	L	L	L	M	L
55	Lower Boise		6		L	L		H	L
56	Lower Clark Fork	4		L		L	H		L
57	Lower Crab		4		L	L		H	L
58	Lower Crooked	6	1	L	L	L	M	M	L
59	Lower Deschutes	5	1	L	L	M	M	L	L
60	Lower Flathead	6	3	L		L	L		L
61	Lower Grande Ronde	5	6	L	L	H	L	M	M
62	Lower Henrys	6	6	H	L	L	L		L
63	Lower John Day		1		L	M		M	L
64	Lower Kootenai	4		L		L	M		L
65	Lower Malheur		6		L	L		H	L
66	Lower Middle Fork Salmon	1	2	H		H	H		H
67	Lower North Fork Clearwater	4	3	L		M	M		L
68	Lower Owyhee		6		M	L		M	M
69	Lower Salmon	3	3	L		M	L		M
70	Lower Selway	2	2	M		M	H		H
71	Lower Snake		4		L	L		M	L
72	Lower Snake-Asotin	3	4	L	L	L	L	L	M
73	Lower Snake-Tucannon		4		L	L		M	L
74	Lower Spokane	6	3	L		L	L		L
75	Lower Yakima		4		L	L		M	L
76	Medicine Lodge	6	6	H	M	L	L	H	L
77	Methow	2	2	M		M	M		H
78	Middle Clark Fork	4		L		M	M		L
79	Middle Columbia-Hood	3	3	L		M	L		M
80	Middle Columbia-Lake Wallula		4		L	L		M	L
81	Middle Fork Clearwater	3	3	L		M	L		M
82	Middle Fork Flathead	1		H		M	H		H
83	Middle Fork John Day	5	6	L	L	M	M	M	L
84	Middle Fork Payette	6	3	L		L	M		L
85	Middle Owyhee		5		M	M		L	M
86	Middle Salmon-Chamberlain	2	2	H		H	H		H
87	Middle Salmon-Panther	2	5	H	M	M	H	L	H
88	Middle Snake-Payette		6		L	L		H	L
89	Middle Snake-Succor		5		L	L		M	M
90	Moses Coulee		4		L	L		M	L
91	Moyie	4		L		L	H		L
92	Naches	2	2	M		H	H		H
93	North And Middle Fork Boise	2	3	H		M	M		H
94	North Fork Flathead	1		H		M	H		H
95	North Fork John Day	5	3	L		M	M		L
96	North Fork Payette	6	3	L		L	L		L
97	Okanogan	6	4	L	L	L	L	L	L

Table 7A.1 (continued)

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
98	Pahsimeroi	2	5	H	H	M	H	L	H
99	Palisades	2	5	H	H	M	H		H
100	Palouse	4		L	L		M	L	
101	Payette	6	6	L	L	L	L	H	L
102	Pend Oreille	4		L		L	L		L
103	Pend Oreille Lake	4	3	L		M	H		L
104	Portneuf		6		L	M			L
105	Powder	5	3	L		L	L		L
106	Priest	4		L		L	M		L
107	Raft		6		L	L		M	L
108	Rock		4		L	L		H	L-NoOwn
109	Salmon Falls		5		M	L		L	M
110	Salt	6	3	H		M	M		L
111	Sanpoil	4	3	L		L	L		L
112	Silver		6		L	L		H	L
113	Silvies	5	6	L	L	L	M	H	L
114	Similkameen	1	2	H		L	M		H
115	Snake Headwaters	1	2	H		H	H		H
116	South Fork Boise	2	5	M	L	M	M	L	H
117	South Fork Clearwater	3	3	L		M	M		M
118	South Fork Coeur d'Alene	4		L		L	L		L
119	South Fork Flathead	1	2	H		H	H		H
120	South Fork Owyhee		5		H	L		L	M
121	South Fork Payette	2	3	H		M	H		H
122	South Fork Salmon	2	3	H		M	H		H
123	Sprague	5	3	L		M	H		L
124	St. Joe	4		L		M	H		L
125	Stillwater	4		L		L	M		L
126	Summer Lake	5	6	M	L	L	H		L
127	Swan	3		L		M	H		M
128	Teton	6	6	M	L	M	L		L
129	Thousand-Virgin		5		M	M		H	M
130	Trout		1		L	M		H	L
131	Umatilla	5	4	L	L	M	L	M	L
132	Upper Clark Fork	5	3	L		L	L		L
133	Upper Coeur d'Alene	4		L		M	H		L
134	Upper Columbia-Entiat	4	5	M	L	L	M	L	M
135	Upper Columbia-Priest Rapids		4		L	L		M	L
136	Upper Crab		4		L	L		M	L
137	Upper Crooked	5	1	L	L	L	L	H	L
138	Upper Deschutes	4	3	L		L	H		M
139	Upper Grande Ronde	5	3	L		M	L		L
140	Upper Henrys	4	6	H	M	M	M		M
141	Upper John Day	5	1	L	L	M	M	M	L
142	Upper Klamath	5	3	L		L	H		L
143	Upper Klamath Lake	3	3	M		L	M		L
144	Upper Kootenai	4		L		M	M		L
145	Upper Malheur	5	6	M	L	L	M	M	L
146	Upper Middle Fork Salmon	1		H		H	H		H
147	Upper North Fork Clearwater	4		M		M	M		L
148	Upper Owyhee		5		H	M		M	M

Table 7A.1 (continued)

Subbasin		Cluster #		Integrity Ratings					
ID#	Name	Forest	Range	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
149	Upper Quinn		5		M	L		L	M
150	Upper Salmon	1	5	H	M	M	H	L	H
151	Upper Selway	2	2	H		H	H		H
152	Upper Snake-Rock		6		L	L		H	L
153	Upper Spokane	6	3	L		L	L		L
154	Upper Yakima	3	5	L	L	M	M	L	M
155	Walla Walla		4		L	M	L	M	L
156	Wallowa	2	2	L		H	L		H
157	Warner Lakes		6		M	L		H	M
158	Weiser	6	6	L	L	L	L	H	L
159	Wenatchee	2	2	M		H	H		H
160	Williamson	5	3	L		M	M		L
161	Willow	5	6	L	L	M	M		L
162	Willow		6		L	L		H	L
163	Willow		4		L	L		M	L
164	Yaak	4		L		M	H		L

H = High integrity rating
M = medium integrity rating
L = low integrity rating
NoOwn = no BLM/FS ownership in subbasin
1,2,3,4,5,6 indicate forest or rangeland cluster numbers

Table 7A.2 – Social and economic resiliency ratings for each county within the Interior Columbia Basin Project area.

County	State	Typology	Economic Resiliency	Social Resiliency	Lifestyle Diversity	Socioeconomic Resiliency
Ada	ID	Metropolitan	H	H	H	H
Adams	WA	Other	L	L	M	L
Adams	ID	Other	L	L	L	L
Asotin	WA	Other	M	M	H	H
Baker	OR	Other	M	M	H	M
Bannock	ID	Other	M	M	H	H
Benewah	ID	Recreation	L	L	M	L
Benton	WA	Metropolitan	M	M	H	H
Bingham	ID	Other	L	L	H	M
Blaine	ID	Recreation	M	M	M	L
Boise	ID	Other	L	L	M	L
Bonner	ID	Recreation	H	H	H	H
Bonneville	ID	Other	M	M	H	H
Boundary	ID	Other	M	M	L	L
Box Elder	UT	Other	L	L	L	L
Butte	ID	Other	L	L	L	L
Camas	ID	Recreation	L	L	L	L
Canyon	ID	Metropolitan	H	H	H	H
Caribou	ID	Other	L	L	L	L
Cassia	ID	Other	M	M	M	M
Chelan	WA	Recreation	H	H	H	H
Clark	ID	Other	L	L	L	L
Clearwater	ID	Other	L	L	M	L
Columbia	WA	Other	L	L	L	L
Crook	OR	Other	L	L	H	L
Custer	ID	Recreation	L	L	L	L
Deer Lodge	MT	Other	L	L	M	M
Deschutes	OR	Recreation	H	H	H	H
Douglas	WA	Other	L	L	H	M
Elko	NV	Recreation	L	L	L	L
Elmore	ID	Other	L	L	M	L
Ferry	WA	Other	L	L	M	L
Flathead	MT	Recreation	H	H	H	H
Franklin	WA	Metropolitan	M	M	H	H
Fremont	WY	Recreation	M	M	L	L
Fremont	ID	Other	L	L	M	L
Garfield	WA	Other	L	L	L	L
Gem	ID	Other	M	M	M	M
Gilliam	OR	Other	L	L	L	L
Gooding	ID	Other	M	M	L	M
Granite	MT	Other	L	L	L	L
Grant	OR	Other	L	L	M	L
Grant	WA	Other	M	M	M	M
Harney	OR	Other	L	L	M	L
Hood River	OR	Recreation	H	H	M	H
Humboldt	NV	Recreation	L	L	L	L
Idaho	ID	Other	M	M	M	L
Jefferson	ID	Other	L	L	M	M
Jefferson	OR	Other	M	M	M	M
Jerome	ID	Other	M	M	M	M

Table 7A.2 (continued)

County	State	Typology	Economic Resiliency	Social Resiliency	Lifestyle Diversity	Socioeconomic Resiliency
Kittitas	WA	Other	L	L	H	M
Klamath	OR	Other	H	M	H	H
Klickitat	WA	Other	L	L	H	M
Kootenai	ID	Recreation	H	H	H	H
Lake	OR	Other	L	L	M	L
Lake	MT	Other	M	M	M	M
Latah	ID	Other	L	L	M	M
Lemhi	ID	Recreation	M	M	L	L
Lewis	ID	Other	L	L	L	L
Lewis and Clark	MT	Recreation	M	M	H	H
Lincoln	ID	Other	L	L	L	L
Lincoln	MT	Other	M	M	M	L
Lincoln	WY	Other	M	M	L	L
Lincoln	WA	Other	L	L	L	L
Madison	ID	Other	L	M	L	M
Malheur	OR	Other	L	L	M	L
Mineral	MT	Other	L	L	L	L
Minidoka	ID	Other	L	L	M	M
Missoula	MT	Other	H	H	H	H
Morrow	OR	Other	L	L	L	L
Nez Perce	ID	Other	H	H	H	H
Okanogan	WA	Recreation	L	L	M	L
Oneida	ID	Other	L	L	L	L
Owyhee	ID	Other	L	L	L	L
Payette	ID	Other	M	M	M	H
Pend Oreille	WA	Other	M	M	L	L
Powell	MT	Other	L	L	M	L
Power	ID	Other	L	L	L	L
Ravalli	MT	Other	L	L	M	M
Sanders	MT	Other	M	M	L	L
Sherman	OR	Other	L	L	L	L
Shoshone	ID	Other	L	L	L	L
Silver Bow	MT	Other	L	M	H	H
Skamania	WA	Other	L	L	M	L
Spokane	WA	Metropolitan	H	H	H	H
Stevens	WA	Other	H	H	M	H
Sublette	WY	Recreation	M	M	L	L
Teton	ID	Recreation	L	L	L	L
Teton	WY	Recreation	L	L	L	L
Twin Falls	ID	Other	H	H	H	H
Umatilla	OR	Other	H	H	H	H
Union	OR	Other	M	M	H	H
Valley	ID	Recreation	M	M	L	L
Walla Walla	WA	Other	H	H	H	H
Wallowa	OR	Other	M	M	L	L
Wasco	OR	Recreation	M	M	H	M
Washington	ID	Other	M	M	L	L
Wheeler	OR	Other	L	L	L	L
Whitman	WA	Other	L	L	M	M
Yakima	WA	Metropolitan	H	H	H	H

H = high resiliency rating
M = medium resiliency rating
L = low resiliency rating

Table 7A.3 – Long-term trends in ecological integrity projected for each subbasin within the Interior Columbia Basin Ecosystem Management Project area.

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
1	Alvord Lake	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
2	American Falls	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
3	Banks Lake	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
4	Beaver-Camas	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
5	Beaver-South Fork	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
6	Big Lost	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
7	Big Wood	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
8	Birch	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
9	Bitterroot	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
10	Blackfoot	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
11	Blackfoot	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
12	Boise-Mores	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
13	Brownlee Reservoir	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
14	Bruneau	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
15	Bully	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
16	Burnt	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
17	Butte	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
18	C. J. Strike Reservoir	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
19	Camas	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
20	Chief Joseph	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
21	Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
22	Coeur D'Alene Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
23	Colville	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
24	Crooked-Rattlesnake	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
25	Donner Und Blitzen	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
26	East Little Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
27	Fisher	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
28	Flathead Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
29	Flint-Rock	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
30	Franklin D. Roosevelt Lake	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
31	Goose	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
32	Goose Lake	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
33	Greys-Hobock	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
34	Gros Ventre	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
35	Guano	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
36	Hangman	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
37	Harney-Malheur Lakes	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
38	Hells Canyon	-1	0	-1	-2	0	0	0	0	1	0	0	1	1	0	0	1
39	Idaho Falls	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
40	Imnaha	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
41	Jordan	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1

Table 7A.3 (continued)

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
42	Kettle	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
43	Klickitat	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
44	Lake Abert	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
45	Lake Chelan	0	1	0	1	0	1	0	1	1	1	0	2	1	1	0	2
46	Lake Walcott	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
47	Lemhi	-1	-1	-1	-3	-1	1	0	0	1	1	0	2	1	1	0	2
48	Little Deschutes	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
49	Little Lost	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
50	Little Salmon	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
51	Little Spokane	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
52	Little Wood	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
53	Lochsa	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
54	Lost	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
55	Lower Boise	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
56	Lower Clark Fork	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
57	Lower Crab	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
58	Lower Crooked	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
59	Lower Deschutes	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
60	Lower Flathead	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
61	Lower Grande Ronde	-1	-1	-1	-3	-1	1	1	1	1	1	-1	1	1	1	-1	1
62	Lower Henrys	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
63	Lower John Day	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
64	Lower Kootenai	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
65	Lower Malheur	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
66	Lower Middle Fork Salmon	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
67	Lower North Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
68	Lower Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
69	Lower Salmon	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
70	Lower Selway	-1	0	-1	-2	0	0	0	0	1	0	1	2	1	0	1	2
71	Lower Snake	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
72	Lower Snake-Asotin	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
73	Lower Snake-Tucannon	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
74	Lower Spokane	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
75	Lower Yakima	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
76	Medicine Lodge	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
77	Methow	-1	1	-1	-1	0	1	0	1	1	1	1	3	1	1	1	3
78	Middle Clark Fork	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
79	Middle Columbia-Hood	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
80	Middle Columbia-Lake Wallula	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
81	Middle Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
82	Middle Fork Flathead	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
83	Middle Fork John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
84	Middle Fork Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
85	Middle Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2

Table 7A.3 (continued)

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
86	Middle Salmon-Chamberlain	0	0	-1	-1	0	0	0	0	1	0	1	2	1	0	1	2
87	Middle Salmon-Panther	-1	-1	-1	-3	-1	1	0	0	1	1	0	2	1	1	0	2
88	Middle Snake-Payette	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
89	Middle Snake-Succor	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
90	Moses Coulee	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
91	Moyie	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
92	Naches	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
93	North And Middle Fork Boise	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
94	North Fork Flathead	0	-1	0	-1	0	1	0	1	1	1	0	2	1	1	0	2
95	North Fork John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
96	North Fork Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
97	Okanogan	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
98	Pahsimeroi	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
99	Palisades	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
100	Palouse	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
101	Payette	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
102	Pend Oreille	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
103	Pend Oreille Lake	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
104	Portneuf	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
105	Powder	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
106	Priest	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
107	Raft	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
108	Rock	0	0	0	NA	0	0	0	NA	0	0	0	NA	0	0	0	NA
109	Salmon Falls	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
110	Salt	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
111	Sanpoil	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
112	Silver	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
113	Silvies	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
114	Similkameen	0	1	0	1	0	1	0	1	1	1	0	2	1	1	0	2
115	Snake Headwaters	0	-1	0	-1	1	1	0	2	1	1	0	2	1	1	0	2
116	South Fork Boise	-1	-1	-1	-3	-1	1	0	0	1	1	1	3	1	1	1	3
117	South Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
118	South Fork Coeur D'Alene	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
119	South Fork Flathead	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1
120	South Fork Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
121	South Fork Payette	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	1	3
122	South Fork Salmon	-1	-1	-1	-3	0	1	0	1	1	1	0	2	1	1	0	2
123	Sprague	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
124	St. Joe	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
125	Stillwater	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
126	Summer Lake	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
127	Swan	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
128	Teton	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
129	Thousand-Virgin	-1	0	0	-1	0	0	0	0	1	0	0	1	1	0	0	1
130	Trout	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0

Table 7A.3 (continued)

Subbasin		Alternative 1				Alternative 2				Alternative 3				Alternative 4			
ID #	Name	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
131	Umatilla	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
132	Upper Clark Fork	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
133	Upper Coeur D'Alene	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
134	Upper Columbia-Entiat	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
135	Upper Columbia-Priest Rapids	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
136	Upper Crab	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
137	Upper Crooked	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
138	Upper Deschutes	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
139	Upper Grande Ronde	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
140	Upper Henrys	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	1	1	-1	1
141	Upper John Day	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
142	Upper Klamath	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
143	Upper Klamath Lake	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
144	Upper Kootenai	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0
145	Upper Malheur	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
146	Upper Middle Fork Salmon	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
147	Upper North Fork Clearwater	-1	-1	-1	-3	-1	1	-1	-1	0	1	-1	0	0	1	-1	0
148	Upper Owyhee	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
149	Upper Quinn	-1	-1	0	-2	-1	1	0	0	1	1	0	2	1	1	0	2
150	Upper Salmon	-1	-1	0	-2	0	1	0	1	1	1	0	2	1	1	0	2
151	Upper Selway	0	0	-1	-1	1	0	0	1	1	0	0	1	1	0	0	1
152	Upper Snake-Rock	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
153	Upper Spokane	-1	-1	0	-2	-1	1	0	0	0	1	0	1	0	1	0	1
154	Upper Yakima	-1	-1	-1	-3	-1	1	-1	-1	1	1	-1	1	1	1	-1	1
155	Walla Walla	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
156	Wallowa	0	-1	-1	-2	1	1	0	2	1	1	0	2	1	1	0	2
157	Warner Lakes	-1	-1	0	-2	-1	1	0	0	0	1	0	1	1	1	0	2
158	Weiser	-1	-1	-1	-3	-1	1	0	0	0	1	0	1	0	1	0	1
159	Wenatchee	-1	-1	-1	-3	0	1	0	1	1	1	1	3	1	1	1	3
160	Williamson	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
161	Willow	-1	-1	-1	-3	-1	1	0	0	0	1	-1	0	0	1	-1	0
163	Willow	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	-1	1	0	0
162	Willow	-1	-1	0	-2	-1	1	0	0	-1	1	0	0	0	1	0	1
164	Yaak	-1	-1	-1	-3	-1	1	-1	-1	-1	1	-1	-1	0	1	-1	0

Veg = Forest/Range Vegetation
Rip = Riparian Management
Road = Road Density
Comp = Composite Ecological Integrity
Values assigned reflect either decreasing (-1), stable (0), or increasing (+1) trends for each index.

Table 7A.4 – Long term trends in ecological integrity projected for each subbasin within the Interior Columbia Basin Ecosystem Management Project area.

ID #	Subbasin Name	Alternative 5				Alternative 6				Alternative 7			
		Veg	Rip	Road	Comp	Veg	Rip	Road	Comp	Veg	Rip	Road	Comp
1	Alvord Lake	-1	-1	0	-2	0	1	0	1	0	1	0	1
2	American Falls	-1	-1	0	-2	0	1	0	1	-1	1	0	0
3	Banks Lake	-1	1	0	0	0	1	0	1	0	1	0	1
4	Beaver-Camas	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
5	Beaver-South Fork	-1	-1	0	-2	0	1	0	1	0	1	0	1
6	Big Lost	-1	-1	-1	-3	-1	1	0	0	-1	1	0	0
7	Big Wood	0	-1	-1	-2	0	1	0	1	-1	1	0	0
8	Birch	-1	-1	0	-2	-1	1	0	0	0	1	0	1
9	Bitterroot	1	1	-1	1	1	1	1	3	1	1	1	3
10	Blackfoot	1	1	-1	1	1	1	1	3	-1	1	1	1
11	Blackfoot	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
12	Boise-Mores	0	-1	-1	-2	0	1	0	1	0	1	0	1
13	Brownlee Reservoir	-1	-1	-1	-3	-1	1	0	0	-1	1	0	0
14	Bruneau	-1	-1	0	-2	-1	1	0	0	0	1	0	1
15	Bully	-1	-1	0	-2	0	1	0	1	-1	1	0	0
16	Burnt	0	-1	-1	-2	0	1	0	1	0	1	0	1
17	Butte	0	-1	0	-1	0	1	0	1	0	1	0	1
18	C. J. Strike Reservoir	0	-1	0	-1	0	1	0	1	0	1	0	1
19	Camas	-1	-1	0	-2	0	1	0	1	-1	1	0	0
20	Chief Joseph	-1	1	-1	-1	0	1	0	1	-1	1	0	0
21	Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
22	Coeur D'Alene Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
23	Colville	-1	1	-1	-1	-1	1	0	0	-1	1	0	0
24	Crooked-Rattlesnake	0	-1	0	-1	1	1	0	2	1	1	0	2
25	Donner Und Blitzen	-1	-1	0	-2	0	1	0	1	0	1	0	1
26	East Little Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1
27	Fisher	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
28	Flathead Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
29	Flint-Rock	1	1	0	2	1	1	1	3	0	1	1	2
30	Franklin D. Roosevelt Lake	0	1	-1	0	-1	1	0	0	-1	1	0	0
31	Goose	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
32	Goose Lake	0	-1	-1	-2	0	1	0	1	-1	1	0	0
33	Greys-Hobock	0	-1	0	-1	1	1	0	2	1	1	0	2
34	Gros Ventre	0	1	0	1	1	1	0	2	0	1	0	1
35	Guano	0	-1	0	-1	1	1	0	2	-1	1	0	0
36	Hangman	0	1	0	1	0	1	0	1	-1	1	0	0
37	Harney-Malheur Lakes	-1	-1	0	-2	0	1	0	1	0	1	0	1
38	Hells Canyon	1	0	0	1	1	0	0	1	-1	0	0	-1
39	Idaho Falls	-1	-1	0	-2	0	1	0	1	0	1	0	1
40	Imnaha	1	-1	0	0	1	1	1	3	-1	1	1	1
41	Jordan	-1	-1	0	-2	0	1	0	1	0	1	0	1
42	Kettle	-1	-1	-1	-3	0	1	-1	0	0	1	0	1

Table 7A.4 (continued)

ID #	Subbasin Name	Alternative 5 Veg	Rip	Road	Comp	Alternative 6 Veg	Rip	Road	Comp	Alternative 7 Veg	Rip	Road	Comp
43	Klickitat	1	1	-1	1	1	1	1	3	0	1	1	2
44	Lake Abert	0	-1	-1	-2	0	1	0	1	0	1	0	1
45	Lake Chelan	0	1	0	1	1	1	0	2	-1	1	0	0
46	Lake Walcott	0	-1	0	-1	0	1	0	1	-1	1	0	0
47	Lemhi	1	-1	0	0	1	1	0	2	0	1	0	1
48	Little Deschutes	0	-1	-1	-2	0	1	0	1	-1	1	0	0
49	Little Lost	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
50	Little Salmon	1	1	-1	1	1	1	1	3	1	1	1	3
51	Little Spokane	-1	1	-1	-1	0	1	0	1	-1	1	0	0
52	Little Wood	-1	-1	0	-2	0	1	0	1	-1	1	0	0
53	Lochsa	1	1	0	2	1	1	1	3	-1	1	1	1
54	Lost	0	-1	-1	-2	0	1	0	1	0	1	0	1
55	Lower Boise	0	-1	0	-1	0	1	0	1	-1	1	0	0
56	Lower Clark Fork	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
57	Lower Crab	-1	1	0	0	0	1	0	1	0	1	0	1
58	Lower Crooked	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
59	Lower Deschutes	0	-1	-1	-2	0	1	0	1	-1	1	0	0
60	Lower Flathead	-1	1	-1	-1	0	1	0	1	-1	1	0	0
61	Lower Grande Ronde	1	-1	-1	-1	1	1	1	3	1	1	1	3
62	Lower Henrys	0	-1	-1	-2	0	1	0	1	-1	1	0	0
63	Lower John Day	-1	-1	0	-2	0	1	0	1	-1	1	0	0
64	Lower Kootenai	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
65	Lower Malheur	0	-1	0	-1	0	1	0	1	0	1	0	1
66	Lower Middle Fork Salmon	1	0	0	1	1	0	0	1	-1	0	0	-1
67	Lower North Fork Clearwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
68	Lower Owyhee	0	-1	0	-1	1	1	0	2	1	1	0	2
69	Lower Salmon	1	1	-1	1	1	1	1	3	1	1	1	3
70	Lower Selway	1	0	0	1	1	0	1	2	-1	0	1	0
71	Lower Snake	-1	1	0	0	0	1	0	1	0	1	0	1
72	Lower Snake-Asotin	1	1	-1	1	1	1	1	3	1	1	1	3
73	Lower Snake-Tucannon	-1	1	0	0	-1	1	0	0	-1	1	0	0
74	Lower Spokane	-1	1	0	0	0	1	0	1	-1	1	0	0
75	Lower Yakima	-1	1	0	0	0	1	0	1	-1	1	0	0
76	Medicine Lodge	0	-1	-1	-2	0	1	0	1	-1	1	0	0
77	Methow	1	1	0	2	1	1	1	3	-1	1	1	1
78	Middle Clark Fork	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
79	Middle Columbia-Hood	1	1	-1	1	1	1	1	3	-1	1	1	1
80	Middle Columbia-Lake Wallula	-1	1	0	0	-1	1	0	0	-1	1	0	0
81	Middle Fork Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
82	Middle Fork Flathead	0	1	0	1	1	1	0	2	-1	1	0	0
83	Middle Fork John Day	0	-1	-1	-2	0	1	0	1	-1	1	0	0
84	Middle Fork Payette	-1	1	-1	-1	-1	1	0	0	-1	1	0	0
85	Middle Owyhee	-1	-1	0	-2	0	1	0	1	-1	1	0	0
86	Middle Salmon-Chamberlain	1	0	0	1	1	0	1	2	-1	0	1	0

Table 7A.4 (continued)

ID #	Subbasin Name	Alternative 5 Veg	Rip	Road	Comp	Alternative 6 Veg	Rip	Road	Comp	Alternative 7 Veg	Rip	Road	Comp
87	Middle Salmon-Panther	1	-1	0	0	1	1	0	2	0	1	0	1
88	Middle Snake-Payette	0	-1	0	-1	0	1	0	1	0	1	0	1
89	Middle Snake-Succor	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
90	Moses Coulee	-1	1	0	0	0	1	0	1	-1	1	0	0
91	Moyie	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
92	Naches	1	1	0	2	1	1	1	3	-1	1	1	1
93	North And Middle Fork Boise	1	1	0	2	1	1	1	3	0	1	1	2
94	North Fork Flathead	-1	1	0	0	1	1	0	2	0	1	0	1
95	North Fork John Day	0	-1	-1	-2	0	1	0	1	-1	1	0	0
96	North Fork Payette	0	1	-1	0	-1	1	0	0	-1	1	0	0
97	Okanogan	-1	1	-1	-1	0	1	0	1	-1	1	0	0
98	Pahsimeroi	1	-1	0	0	1	1	0	2	0	1	0	1
99	Palisades	1	-1	0	0	1	1	0	2	1	1	0	2
100	Palouse	-1	1	0	0	-1	1	0	0	-1	1	0	0
101	Payette	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
102	Pend Oreille	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
103	Pend Oreille Lake	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
104	Portneuf	-1	-1	0	-2	0	1	0	1	-1	1	0	0
105	Powder	0	-1	-1	-2	0	1	0	1	-1	1	0	0
106	Priest	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
107	Raft	-1	-1	0	-2	0	1	0	1	0	1	0	1
108	Rock	0	0	0	NA	0	0	0	NA	0	0	0	NA
109	Salmon Falls	-1	-1	0	-2	-1	1	0	0	0	1	0	1
110	Salt	0	1	-1	0	-1	1	0	0	-1	1	0	0
111	Sanpoil	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
112	Silver	-1	-1	0	-2	0	1	0	1	0	1	0	1
113	Silvies	0	-1	-1	-2	0	1	0	1	0	1	0	1
114	Similkameen	0	1	0	1	1	1	0	2	0	1	0	1
115	Snake Headwaters	1	1	0	2	1	1	0	2	1	1	0	2
116	South Fork Boise	1	-1	0	0	1	1	1	3	0	1	1	2
117	South Fork Clearwater	1	1	-1	1	1	1	1	3	1	1	1	3
118	South Fork Coeur D'Alene	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
119	South Fork Flathead	0	0	0	0	1	0	0	1	-1	0	0	-1
120	South Fork Owyhee	-1	-1	0	-2	-1	1	0	0	-1	1	0	0
121	South Fork Payette	1	1	0	2	1	1	0	2	0	1	1	2
122	South Fork Salmon	1	1	0	2	1	1	0	2	0	1	0	1
123	Sprague	0	-1	-1	-2	0	1	0	1	0	1	0	1
124	St. Joe	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
125	Stillwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
126	Summer Lake	0	-1	-1	-2	0	1	0	1	0	1	0	1
127	Swan	1	1	-1	1	1	1	1	3	-1	1	1	1
128	Teton	0	-1	-1	-2	-1	1	0	0	-1	1	0	0
129	Thousand-Virgin	0	0	0	0	0	0	0	0	-1	0	0	-1
130	Trout	-1	-1	0	-2	-1	1	0	0	0	1	0	1
131	Umatilla	0	-1	-1	-2	0	1	0	1	-1	1	0	0

Table 7A.4 (continued)

ID #	Subbasin Name	Alternative 5 Veg	Rip	Road	Comp	Alternative 6 Veg	Rip	Road	Comp	Alternative 7 Veg	Rip	Road	Comp
132	Upper Clark Fork	0	-1	-1	-2	0	1	0	1	0	1	0	1
133	Upper Coeur D'Alene	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
134	Upper Columbia-Entiat	-1	-1	-1	-3	1	1	-1	1	-1	1	1	1
135	Upper Columbia-Priest Rapids	-1	1	0	0	0	1	0	1	-1	1	0	0
136	Upper Crab	-1	1	0	0	0	1	0	1	0	1	0	1
137	Upper Crooked	0	-1	-1	-2	0	1	0	1	0	1	0	1
138	Upper Deschutes	0	-1	-1	-2	1	1	-1	1	-1	1	1	1
139	Upper Grande Ronde	0	-1	-1	-2	0	1	0	1	0	1	0	1
140	Upper Henrys	0	-1	-1	-2	1	1	-1	1	1	1	1	3
141	Upper John Day	0	-1	-1	-2	0	1	0	1	0	1	0	1
142	Upper Klamath	0	-1	-1	-2	0	1	0	1	0	1	0	1
143	Upper Klamath Lake	0	1	-1	0	0	1	0	1	-1	1	0	0
144	Upper Kootenai	-1	-1	-1	-3	0	1	-1	0	0	1	0	1
145	Upper Malheur	0	-1	-1	-2	0	1	0	1	0	1	0	1
146	Upper Middle Fork Salmon	0	0	0	0	1	0	0	1	-1	0	0	-1
147	Upper North Fork Clearwater	-1	-1	-1	-3	0	1	-1	0	-1	1	0	0
148	Upper Owyhee	-1	-1	0	-2	-1	1	0	0	0	1	0	1
149	Upper Quinn	-1	-1	0	-2	-1	1	0	0	0	1	0	1
150	Upper Salmon	0	-1	0	-1	1	1	0	2	-1	1	0	0
151	Upper Selway	1	0	0	1	1	0	0	1	-1	0	0	-1
152	Upper Snake-Rock	0	-1	0	-1	0	1	0	1	0	1	0	1
153	Upper Spokane	-1	1	0	0	0	1	0	1	-1	1	0	0
154	Upper Yakima	1	-1	-1	-1	1	1	1	3	-1	1	1	1
155	Walla Walla	-1	1	0	0	-1	1	0	0	-1	1	0	0
156	Wallowa	1	1	0	2	1	1	0	2	1	1	0	2
157	Warner Lakes	0	-1	0	-1	1	1	0	2	-1	1	0	0
158	Weiser	-1	-1	-1	-3	0	1	0	1	-1	1	0	0
159	Wenatchee	1	1	0	2	1	1	1	3	-1	1	1	1
160	Williamson	0	-1	-1	-2	0	1	0	1	0	1	0	1
161	Willow	0	-1	-1	-2	0	1	0	1	0	1	0	1
163	Willow	-1	1	0	0	-1	1	0	0	-1	1	0	0
162	Willow	-1	-1	0	-2	0	1	0	1	0	1	0	1
164	Yaak	-1	-1	-1	-3	0	1	-1	0	0	1	0	1

Veg = Forest/Range Vegetation
Rip = Riparian Management
Road = Road Density
Comp = Composite Ecological Integrity

Values assigned reflect either decreasing (-1), stable (0), or increasing (+1) trends for each index.

Table 7A.5 – Longterm trends in risks to ecological integrity by alternative.

Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Alvord Lake	0	-1	-1	-1	0	-1	-1
2	American Falls	+1	+1	+1	0	+1	0	+1
3	Banks Lake	+1	+1	+1	0	+1	0	0
4	Beaver-Camas	+1	+1	0	0	+1	0	+1
5	Beaver-South Fork	0	-1	-1	-1	0	-1	-1
6	Big Lost	+1	0	0	0	+1	0	0
7	Big Wood	+1	0	0	0	+1	0	0
8	Birch	0	-1	-1	-1	0	-1	-1
9	Bitterroot	+1	+1	0	0	0	0	0
10	Blackfoot	+1	+1	+1	+1	+1	+1	+1
11	Blackfoot	+1	0	0	0	+1	0	0
12	Boise-Mores	+1	+1	+1	+1	+1	+1	+1
13	Brownlee Reservoir	+1	+1	0	0	+1	+1	+1
14	Bruneau	0	-1	-1	-1	0	-1	-1
15	Bully	+1	+1	+1	0	+1	0	+1
16	Burnt	+1	0	0	0	+1	0	0
17	Butte	+1	+1	+1	+1	+1	+1	+1
18	C. J. Strike Reservoir	+1	+1	0	0	+1	0	0
19	Camas	+1	+1	+1	0	+1	0	+1
20	Chief Joseph	+1	+1	0	0	+1	0	+1
21	Clearwater	+1	+1	+1	+1	+1	+1	+1
22	Coeur D'Alene Lake	+1	+1	+1	+1	+1	+1	+1
23	Colville	+1	+1	+1	+1	+1	+1	+1
24	Crooked-Rattlesnake	0	-1	-1	-1	0	-1	-1
25	Donner Und Blitzen	0	-1	-1	-1	0	-1	-1
26	East Little Owyhee	0	-1	-1	-1	0	-1	-1
27	Fisher	+1	+1	+1	0	+1	0	0
28	Flathead Lake	+1	+1	+1	0	+1	0	0
29	Flint-Rock	+1	+1	+1	+1	+1	+1	+1
30	Franklin D. Roosevelt Lake	+1	+1	0	0	+1	+1	+1
31	Goose	0	-1	-1	-1	0	-1	-1
32	Goose Lake	+1	0	0	0	+1	0	0
33	Greys-Hobock	+1	0	-1	-1	+1	-1	-1
34	Gros Ventre	+1	0	-1	-1	0	-1	0
35	Guano	0	-1	-1	-1	0	-1	-1
36	Hangman	+1	+1	+1	+1	+1	+1	+1
37	Harney-Malheur Lakes	0	-1	-1	-1	0	-1	-1
38	Hells Canyon	+1	0	0	0	0	0	+1
39	Idaho Falls	+1	+1	+1	0	+1	0	0
40	Imnaha	+1	0	-1	-1	0	-1	0
41	Jordan	+1	+1	+1	+1	+1	+1	+1
42	Kettle	+1	+1	+1	0	+1	0	0
43	Klickitat	+1	+1	+1	+1	+1	+1	+1
44	Lake Abert	0	-1	-1	-1	0	-1	-1
45	Lake Chelan	0	0	0	0	0	0	+1
46	Lake Walcott	0	-1	-1	-1	0	-1	-1
47	Lemhi	+1	0	-1	-1	0	-1	0
48	Little Deschutes	+1	+1	+1	+1	+1	0	+1
49	Little Lost	0	-1	-1	-1	0	-1	-1
50	Little Salmon	+1	+1	0	0	0	-1	-1
51	Little Spokane	+1	+1	+1	+1	+1	+1	+1

Table 7A.5 (continued)

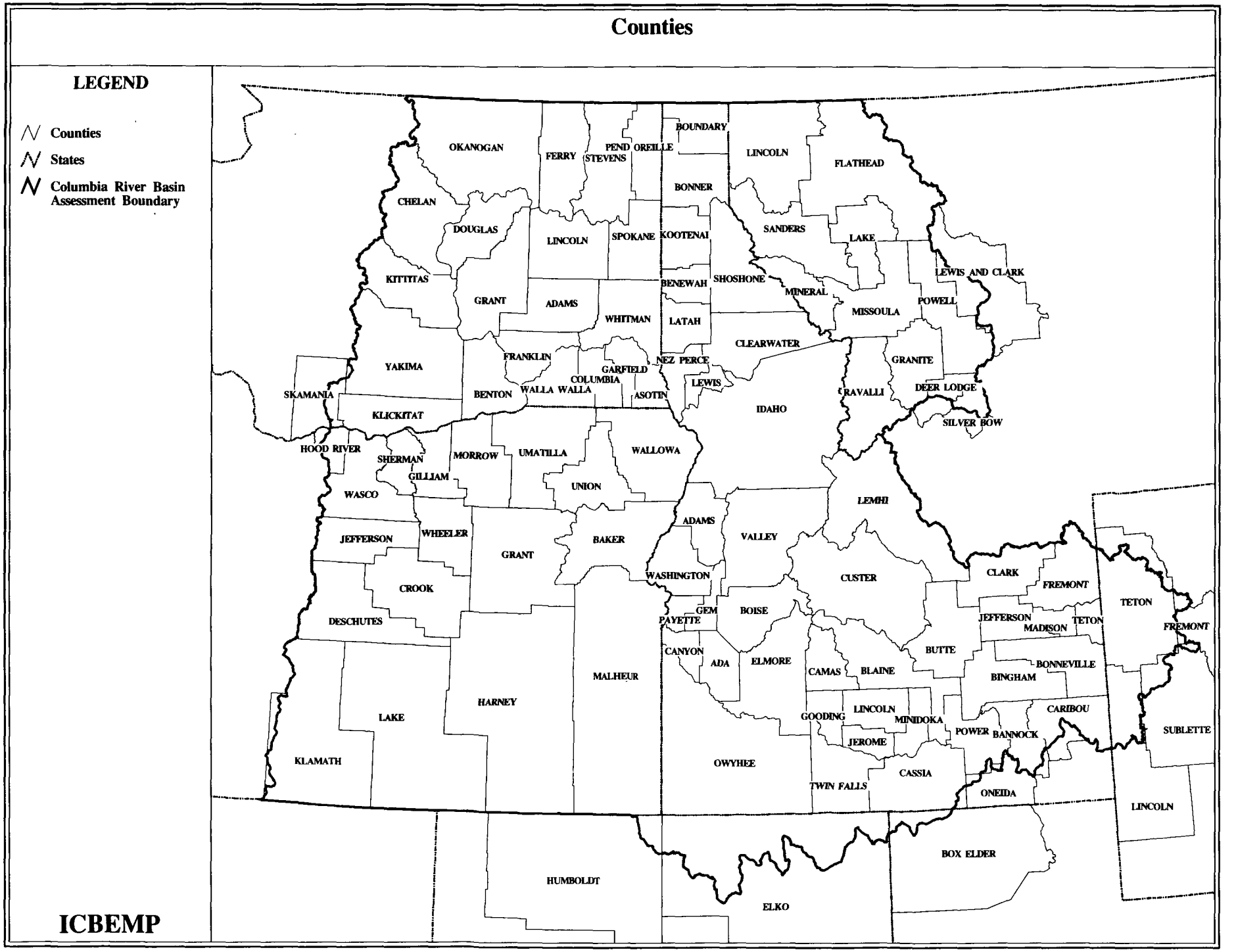
Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
52	Little Wood	0	-1	-1	-1	0	-1	-1
53	Lochsa	+1	0	0	0	0	0	0
54	Lost	+1	+1	+1	+1	+1	0	0
55	Lower Boise	+1	+1	+1	+1	+1	+1	+1
56	Lower Clark Fork	+1	+1	+1	0	+1	0	0
57	Lower Crab	+1	+1	+1	0	+1	0	0
58	Lower Crooked	+1	+1	+1	+1	+1	+1	+1
59	Lower Deschutes	+1	0	0	0	+1	0	0
60	Lower Flathead	+1	+1	+1	+1	+1	+1	+1
61	Lower Grande Ronde	+1	0	0	0	+1	-1	-1
62	Lower Henrys	+1	0	0	0	+1	0	0
63	Lower John Day	+1	+1	+1	+1	+1	0	+1
64	Lower Kootenai	+1	+1	+1	0	+1	0	0
65	Lower Malheur	+1	+1	+1	+1	+1	+1	+1
66	Lower Middle Fork Salmon	0	0	0	0	0	0	+1
67	Lower North Fork Clearwater	+1	+1	+1	0	+1	0	0
68	Lower Owyhee	+1	+1	0	0	+1	0	0
69	Lower Salmon	+1	+1	0	0	0	0	0
70	Lower Selway	+1	0	-1	-1	0	-1	0
71	Lower Snake	+1	+1	+1	+1	+1	+1	+1
72	Lower Snake-Asotin	+1	+1	0	0	0	0	0
73	Lower Snake-Tucannon	+1	+1	+1	+1	+1	+1	+1
74	Lower Spokane	+1	+1	+1	+1	+1	+1	+1
75	Lower Yakima	+1	+1	+1	+1	+1	+1	+1
76	Medicine Lodge	0	-1	-1	-1	0	-1	-1
77	Methow	+1	0	-1	-1	-1	-1	0
78	Middle Clark Fork	+1	+1	+1	+1	+1	+1	+1
79	Middle Columbia-Hood	+1	+1	0	0	0	0	0
80	Middle Columbia-Lake Wallula	+1	+1	+1	+1	+1	+1	+1
81	Middle Fork Clearwater	+1	+1	0	0	0	-1	-1
82	Middle Fork Flathead	+1	0	-1	-1	0	-1	0
83	Middle Fork John Day	+1	0	0	0	+1	0	0
84	Middle Fork Payette	+1	+1	+1	+1	+1	+1	+1
85	Middle Owyhee	0	-1	-1	-1	0	-1	-1
86	Middle Salmon-Chamberlain	+1	0	-1	-1	0	-1	0
87	Middle Salmon-Panther	+1	0	-1	-1	0	-1	0
88	Middle Snake-Payette	+1	+1	+1	+1	+1	+1	+1
89	Middle Snake-Succor	+1	+1	+1	+1	+1	+1	+1
90	Moses Coulee	+1	+1	0	0	+1	0	+1
91	Moyie	+1	+1	+1	0	+1	0	0
92	Naches	+1	+1	+1	+1	+1	+1	+1
93	North And Middle Fork Boise	+1	+1	+1	+1	+1	+1	+1
94	North Fork Flathead	+1	0	-1	-1	0	-1	0
95	North Fork John Day	+1	0	0	0	+1	0	0
96	North Fork Payette	+1	+1	0	0	+1	+1	+1
97	Okanogan	+1	+1	+1	+1	+1	+1	+1
98	Pahsimeroi	0	-1	-1	-1	-1	-1	-1
99	Palisades	+1	0	0	0	+1	0	0
100	Palouse	+1	+1	+1	+1	+1	+1	+1
101	Payette	+1	+1	+1	+1	+1	+1	+1
102	Pend Oreille	+1	+1	+1	+1	+1	+1	+1
103	Pend Oreille Lake	+1	+1	+1	+1	+1	+1	+1
104	Portneuf	+1	+1	+1	0	+1	0	+1

Table 7A.5 (continued)

Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
105	Powder	+1	+1	+1	+1	+1	0	+1
106	Priest	+1	+1	+1	+1	+1	+1	+1
107	Raft	0	-1	-1	-1	0	-1	-1
108	Rock				NA			
109	Salmon Falls	0	-1	-1	-1	0	-1	-1
110	Salt	+1	0	0	0	0	0	0
111	Sanpoil	+1	+1	+1	0	+1	0	0
112	Silver	0	-1	-1	-1	0	-1	-1
113	Silvies	+1	0	0	0	+1	0	0
114	Similkameen	0	0	-1	-1	0	-1	0
115	Snake Headwaters	+1	-1	-1	-1	-1	-1	-1
116	South Fork Boise	+1	+1	0	0	+1	0	0
117	South Fork Clearwater	+1	+1	0	0	0	0	0
118	South Fork Coeur D'Alene	+1	+1	+1	+1	+1	+1	+1
119	South Fork Flathead	0	0	0	0	0	0	+1
120	South Fork Owyhee	0	-1	-1	-1	0	-1	-1
121	South Fork Payette	+1	0	0	0	0	0	0
122	South Fork Salmon	+1	0	-1	-1	-1	-1	0
123	Sprague	+1	0	0	0	+1	0	0
124	St. Joe	+1	+1	+1	+1	+1	+1	+1
125	Stillwater	+1	+1	+1	0	+1	0	0
126	Summer Lake	0	-1	-1	-1	0	-1	-1
127	Swan	+1	+1	0	0	0	0	0
128	Teton	+1	+1	0	0	+1	+1	+1
129	Thousand-Virgin	0	-1	-1	-1	-1	-1	0
130	Trout	+1	0	0	0	+1	0	0
131	Umatilla	+1	+1	+1	+1	+1	0	+1
132	Upper Clark Fork	+1	+1	+1	+1	+1	+1	+1
133	Upper Coeur D'Alene	+1	+1	+1	+1	+1	+1	+1
134	Upper Columbia-Entiat	+1	+1	0	0	+1	0	0
135	Upper Columbia-Priest Rapids	+1	+1	+1	+1	+1	+1	+1
136	Upper Crab	+1	+1	+1	0	+1	0	0
137	Upper Crooked	+1	0	0	0	+1	0	0
138	Upper Deschutes	+1	+1	0	0	+1	0	0
139	Upper Grande Ronde	+1	+1	+1	+1	+1	0	0
140	Upper Henrys	+1	+1	0	0	+1	0	-1
141	Upper John Day	+1	0	0	0	+1	0	0
142	Upper Klamath	+1	+1	+1	+1	+1	+1	+1
143	Upper Klamath Lake	+1	+1	+1	+1	+1	0	+1
144	Upper Kootenai	+1	+1	+1	0	+1	0	0
145	Upper Malheur	0	-1	-1	-1	0	-1	-1
146	Upper Middle Fork Salmon	0	0	0	0	0	0	+1
147	Upper North Fork Clearwater	+1	+1	+1	+1	+1	+1	+1
148	Upper Owyhee	0	-1	-1	-1	0	-1	-1
149	Upper Quinn	0	-1	-1	-1	0	-1	-1
150	Upper Salmon	+1	0	-1	-1	+1	-1	0
151	Upper Selway	+1	0	0	0	0	0	+1
152	Upper Snake-Rock	+1	+1	0	0	+1	0	0
153	Upper Spokane	+1	+1	+1	+1	+1	+1	+1
154	Upper Yakima	+1	+1	+1	+1	+1	+1	+1
155	Walla Walla	+1	+1	+1	+1	+1	+1	+1
156	Wallowa	+1	0	0	0	0	0	0
157	Warner Lakes	0	-1	-1	-1	0	-1	-1

Table 7A.5 (continued)

Subbasin ID#	Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
158	Weiser	+1	+1	+1	+1	+1	+1	+1
159	Wenatchee	+1	0	0	0	0	0	0
160	Williamson	+1	0	0	0	+1	0	0
161	Willow	+1	+1	+1	+1	+1	0	0
163	Willow	+1	+1	+1	+1	+1	+1	+1
162	Willow	+1	+1	+1	0	+1	0	0
164	Yaak	+1	+1	+1	0	+1	0	0



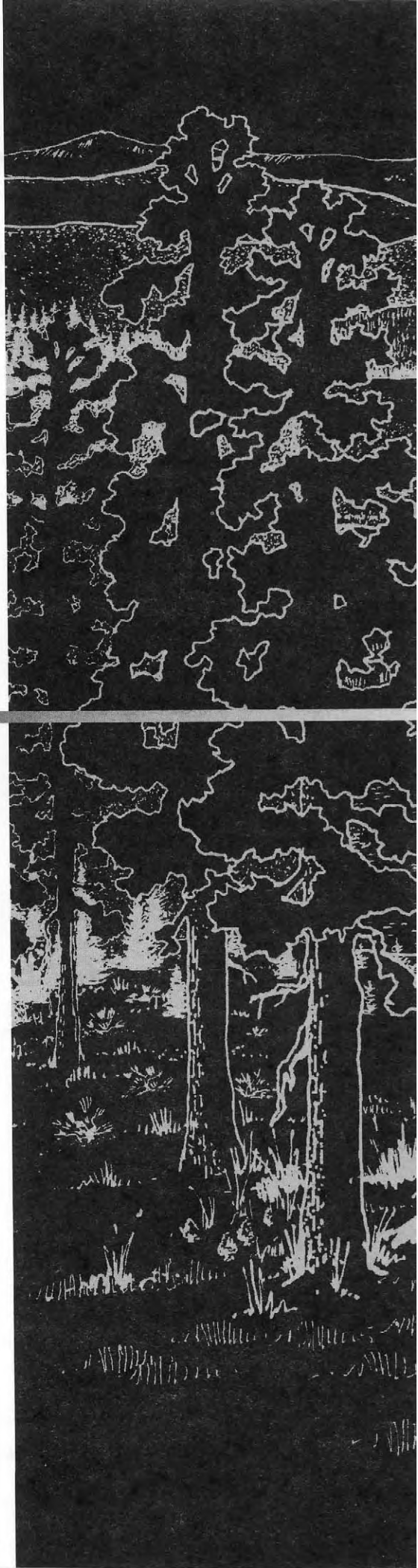
Map 7A.1 – Counties within the Basin.

Map 7A.2 – Distribution of subbasins by identification number as referenced in tables 7A.1, 7A.3, 7A.4, and 7A.5.

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CHAPTER 8

February 1996 and February 1997 EIS Versions: Changes in Effects

Thomas M. Quigley
Technical Editor

Thomas M. Quigley is a range scientist/economist with the USDA Forest Service, Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA.

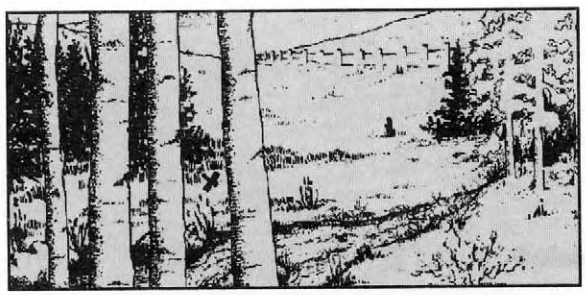


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Introduction

The EIS Teams provided the Science Integration Team (SIT) with preliminary Draft Environmental Impact Statements (DEISs) in October 1995 containing chapters on the purpose and need, affected environment, and objectives and standards of alternatives for initial evaluation of effects and consequences. This version of the DEISs did not contain enough detail to make a complete evaluation of effects and consequences. The SIT provided a preliminary analysis of effects to the EIS Teams. In February 1996 the EIS Teams provided an updated version of the preliminary DEISs for evaluation of alternatives by the SIT. Interactions with public groups, other agencies, county and state officials and internal Forest Service and Bureau of Land Management staff continued during the period of alternative development. This resulted in continued evolution of the EIS standards and objectives. The February 1996 preliminary DEISs were the versions on which the SIT focused its analysis of consequences and effects. This publication documents the analysis of the February 1996 version. Nearing completion of the DEISs in February 1997, the EIS Team provided updated versions of the DEISs for final review by the SIT before publication in May 1997. Because of the fluid nature of the alternatives, it is essential to refer directly to the DEISs to obtain an understanding of the alternatives as they are being proposed.

The changes in the DEISs from February 1996 to February 1997 primarily clarify or define processes to be implemented, define completion schedules for standards, tie standards more clearly to objectives, or define desired ecological outcomes. For instance, ecological performance measures or quantifiable ecological goals were added to all alternatives. All alternatives continue to describe the analysis required to modify non-process EIS standards, while providing equal or greater assurance of meeting objectives. The purpose of this chapter is to provide a brief description of the evolution in the EIS and some insight into the changes in effects and consequences that have resulted. The organization of the chapter is by SIT staff area.

Within each section, changes to the DEIS are discussed in terms of how they affect outcomes and consequences related to the effects the SIT staff areas reported for the February 1996 preliminary draft EISs. The type of effect is described, but no attempt is made here to describe in complete detail all the associated effects or consequences likely from implementing the revised DEIS alternatives. The SIT worked closely with the EIS team as they documented effects and consequences within the DEIS itself. For an enumeration and discussion of effects refer directly to the revised DEISs.

Landscape Ecology

Wendel J. Hann, Rebecca A. Gravenmier, Jeff Walter, and Thomas Miles

Major changes that occurred in Standards and Objectives

Changes in the evaluation of alternatives are a result of changes in the DEIS objectives and standards. Some changes clarified understanding or improved the methods of modeling and data analysis. There are no substantial changes in the long-term (50 to 100 year) projections and interpretations. The evaluation of effects for the long-term projected outcomes could not be improved given the time available for this evaluation.

- The short- and long-term model projections of landscape processes and functions provide moderate confidence in outcomes because of the scale of mapping. Mapping was accomplished at the management region and forest/range PVG group level with statistical data table relationships to infer trends for finer scale stratifications. There was not adequate time during the previous evaluation or this re-evaluation to map to the scale of Potential Vegetation Groups (PVGs) and develop relationships for effects of the fine-scale standards.

  The projection models cannot be applied at a scale to account for changes, refinements, and

additions of fine-scale standards that are relatively independent from the model simulations. An assumption is made that after the first decade the alternative themes and Desired Future Conditions (DFCs) will predominate and conflicts with fine-scale standards will be resolved through hierarchical landscape assessment and associated decisions. Consequently, the long term relative differences in trends between the alternatives remain the same.

- There has been considerable refinement of standards and improved clarity of the differences between alternatives for the short term (first decade). However, there appears to be increased potential for conflict between standards and estimated activity levels in achieving the action alternative (3 through 7) goals, alternative themes, and desired future conditions (DFCs). This potential for conflict was not as evident in the February 1996 version as it is in the February 1997 version. For the earlier evaluation an assumption was made that a hierarchical landscape assessment, implementation, monitoring, and evaluation process would resolve these conflicts to varying degrees for alternatives 3, 4, 5, 6, and 7 (see table 4-1 in DEIS chapter 4). However, the revised draft EIS alternatives present some conflicts that can result in a variety of outcomes in the first decade. For Alternatives 3 through 7, this resulted in some modification of assumptions to eliminate the conflicts.

However, there are changes in the short-term (first decade) potential outcomes:

- There is a change in the projected rate of transition to the DFCs during the first decade, caused by changes in some standards, improved understanding of the standards, and improved methods of evaluation. This has resulted in changes in some of the original projected effects for Chapter 4 of the DEISs, as well as the addition of new material. The slowdown in transition to the DFCs caused by changes in standards primarily affected Alternatives 3 and 7.

Improved understanding relative to key components of the action alternatives affected Alternatives 3, 4, 5, 6, and 7. This included:

1) A more realistic understanding of the time of transition from the current traditional management to ecological management for the action alternatives. This transition time is a result of the need for technology transfer, multi-scale integrated risk and opportunity analysis, spatial prioritization, subbasin review, ecosystem analysis, collaboration, and design and implementation of ecological conservation, restoration and production activities.

2) The intent in Alternatives 3, 4, 6, and 7 for prioritization of restoration and production activities in the BLM/FS wildland interface with private land urban and rural housing developments.

3) The transition time to develop wilderness prescribed natural fire plans for planned ignitions to achieve the desired futures for Alternatives 3, 4, 6, and 7.

Types of Change in Landscape Dynamics

Minor changes were made in the types of management in Alternatives 1 and 2 (no action alternatives) to correct earlier interpretation of these alternatives. These changes were recognized in the first evaluation of alternatives and accounted for in the qualitative discussion in the Landscape Ecology Chapter's methods section (see Chapter 2 of this document).

For this re-evaluation reliance shifted to different types of data and models for evaluating differences between alternatives. This includes an increased reliance on the type of management prescription model, with its associated long-term effects and assumptions, rather than the modeled projections of amounts of vegetation types and disturbances. The implications of these models retain some level of confidence in detecting differences between alternatives even with substantial conflicts

between goals, themes, DFCs, activity levels and standards. In addition, the models are not as susceptible to differences between alternatives being minimized by the coarse resolution of mapping. Descriptions of these models and how they were mapped are included in Chapter 2 of this report.

This re-evaluation reduces the emphasis on quantitative projections of vegetation types and disturbances, which are much more susceptible to conflicts between the goals, themes, DFCs, activity levels, and standards, as well as loss of resolution due to the coarse scale.

Several generalized quantitative measures (landscape health, soil disturbance, succession/disturbance regimes, landscape patterns, and transition times of the different models) were developed that are less susceptible to loss of confidence due to the conflicts of standards and alternative themes.

From a landscape ecology perspective, the rate of landscape change caused by implementing an alternative can be measured by the similarity to the various landscape patterns of succession/disturbance regimes for the desired management model. When this similarity is measured through time a transition rate can be evaluated.

There are two general types of management responses:

1) the traditional management response — Traditional management focuses on sustained yield, protection, or exploitation of specific elements, such as timber production, livestock grazing, wilderness, and riparian buffers, in a manner relatively independent of the interconnected cause-and-effect relationships across landscapes. Consequently, the interaction of effects between managed elements, other elements, and dynamics of landscape disturbances often conflict. In the long term this type of management can result in disequilibrium of ecological systems and decline in ability to produce expected human resource values (both commodity and amenity). This results in the loss of landscape health.

Landscapes in traditional commodity patterns are predominantly early- or mid-seral, highly fragmented, and lack large overstory and emergent live and dead tree characteristics in the forest landscapes. The range landscapes often have widespread effects of soil erosion and exotic plant invasion. These landscapes require a long period of careful application of conservation, restoration, and production activities to develop the landscape elements and patterns representative of the proper functioning system.

2) the ecological management response — Ecosystem management promotes the transition of current landscape patterns toward healthy (proper functioning) landscape systems by utilizing human technology and energy to mitigate or restore interacting cause-and-effect relationships. These activities are designed to represent the ecological equilibrium interactions, while producing human resource values (both commodity and amenity). In the short term, ecological management is expected to stabilize landscapes that are currently in disequilibrium and slowly increase their predictability of providing for human resource values (both commodity and amenity). In the long term, ecological management is expected to increase a system's ability to produce human resource values at lower cost, while sustaining landscape capability and native biodiversity.

The transition time from the current condition to landscape health for the ecological management response is dependent on the status of the current pattern. Landscapes in traditional reserve patterns that are predominantly mature or late-seral can be transitioned rapidly to healthy landscape (proper functioning) system patterns with conservation, restoration, and production activities. This is because the large overstory and emergent live and dead trees are still present in the forest landscapes, and exotics or soil erosion have not precluded native system potentials in the rangeland landscapes. In contrast, landscapes in traditional reserve patterns that have been cycled by a severe disturbance event have often lost large overstory and emergent live and dead tree characteristics. These landscapes require a long period of careful

application of conservation, restoration, and production activities to develop landscape elements and patterns representative of healthy landscapes.

Alternatives 1 and 2 (the no action alternatives) fit the traditional management response. The desired future for Alternative 1 in roaded, non-wilderness areas would generally fit the traditional commodity pattern for forest landscapes, range landscapes, and forest-range landscapes. In contrast, the desired future for Alternative 1 in wilderness areas would generally fit the traditional reserve pattern for forest landscapes, range landscapes, and forest-range landscapes. Alternative 2 would be similar to Alternative 1 in wilderness, but the non-wilderness would be a fragmented combination of the traditional reserve and results of historic management patterns along stream buffers and in remaining late-seral forest areas, and the traditional commodity management patterns in the upland rangeland and mid-seral forest types.

To varying degrees Alternative 3, 4, 5, 6, and 7 fit the ecological management response. The desired future for Alternatives 4 and 6 would fit the healthy landscape (properly functioning system) pattern for forest landscapes, rangeland landscapes, and forest-range landscapes. While Alternatives 3 and 5 have a DFC for ecosystem management that fits the ecological management response, the emphasis on local priorities for Alternative 3 and production priorities for Alternative 5 would not provide an equal emphasis for conservation, restoration, and production activities based on risks and opportunities across the Basin. Consequently, Alternatives 3 and 5 would result in a mix of ecological and traditional responses. Alternative 3, because of the local emphasis, would have a fine-scale mix caused by local priorities, while Alternative 5, because of the emphasis for activities in more productive areas, would have a coarser scale mix related to potential vegetation and current condition composition.

Alternative 7 has a very conflicting result caused by the mixing of the ecological and traditional responses in the theme and DFCs, as well as in the standards. This would result in traditional reserve patterns clumped in the reserves, and a mix of traditional reserve, commodity, and proper functioning systems patterns on the other lands. While action activities would be the dominant activities causing direct change in Alternatives 3, 4, 5, and 6, other disturbances, such as wildfire, drought, stress mortality, insect/disease mortality, and exotic invasion would predominate in alternative 7.

Areas that currently fit the healthy landscape pattern are relatively easy to maintain through representation of cause-and-effect relationships with application of conservation, restoration, and production activities.

Transition rates from current landscape conditions to the desired future landscape conditions were estimated for each alternative. The estimate considers the likely similarity of the landscape pattern of succession/disturbance regimes to the desired future landscape systems. These transition rates are described in the sections below with reference to short-and long-term trends.

Landscape Health Evaluation

Rangeland landscape patterns — In the next 10 years, none of the alternatives would change to healthy landscapes because landscape patterns of rangeland vegetation composition and structure respond very slowly to changes in management.

In the long term (50- to 100-years), Alternatives 4 and 6 would show a high rate of transition toward healthy landscapes, and Alternative 3 would show a moderate trend toward healthy landscapes. Alternatives 5 and 7 would have a low rate of transition, and Alternatives 1 and 2 would result in no change.

Forest landscape patterns — Alternatives 1, 2, 3, 5, or 7 would show no change in trend toward healthy landscapes in the next 10 years, Alternative 4 would produce a moderate transition in the short term. Alternative 6 would result in low achievement of healthy landscapes in the short term.

Alternative 4 would produce a high transition rate to healthy landscapes in the long term. Alternative 6 would respond at a slower rate in the long term than Alternative 4, because the low rate of activities in the first 10 years would result in substantial differences in disturbance and succession. The long-term trend for forest landscape patterns in Alternatives 1 and 2 would not change, while Alternatives 3, 5, and 7 would result in a low rate of transition to healthy landscapes.

Forest-rangeland landscape mosaics — None of alternatives would result in a transition to healthy landscapes in the short term, because of slow response in forest-rangeland landscape mosaics to changes in management.

In the long term, the response of the forest-rangeland landscape mosaics would differ from either forest or rangeland landscapes. Alternative 4 would produce a high positive trend toward healthy landscapes, and Alternatives 3 and 5 would show a low trend toward healthy landscapes, with Alternative 6 ranking as moderate. Alternatives 1, 2, and 7 would result in continued transition away from healthy landscapes; Alternative 7 would not produce a net transition because the dynamics of fire, fuels, exotic plants, and succession within reserves would not trend toward a healthy balance in the long term.

Dry grass and dry shrub potential vegetation groups — In the short term, Alternatives 3 and 4 would result in a moderate trend toward healthy landscapes, due to the strong emphasis on perennial grass and shrub restoration through control of noxious weeds and management to reduce cheatgrass and other exotic annuals. In contrast, there would be no trend toward healthy landscapes for Alternatives 1 and 2, and only a low rate of transition to healthy landscapes for Alternatives 5, 6, and 7.

In the long term, Alternative 4, with its high restoration emphasis, would result in a high transition toward healthy landscapes. Alternatives 3, 6, and 7 would reach a moderate transition level to healthy landscapes in the long term, and Alternative 5 would remain low in its ability to achieve healthy landscape systems. Alternatives 1 and 2 would continue their trend away from healthy landscapes in the long term.

Cool shrub potential vegetation group — In the short term under Alternatives 3, 4, 5, and 7, there would be a moderate trend toward healthy landscapes due to relatively rapid response of cool shrublands to treatments such as improved grazing management or weed control compared to the dry shrub and dry grass potential vegetation groups. Alternative 6 has a low trend because of a lower level of activities in the next 10 years. In contrast, cool shrublands would not trend toward healthy landscapes under Alternatives 1 and 2, in the short term.

In the long term, Alternatives 4 and 6 would result in a high transition to healthy landscapes due to a high emphasis on restoration, including livestock grazing management. Alternatives 3, 5, and 7 would show a moderate trend toward healthy landscapes. Cool shrublands would not trend toward healthy landscapes under Alternatives 1 and 2 in the long term.

Woodland potential vegetation group — In the short term under Alternatives 3, 4, 5, and 7, there would be a low trend toward healthy landscapes due to limitations in technology. Alternative 6 would result in moderate transition to healthy landscapes due to emphasis on technology development; Alternatives 1 and 2 would show no trend toward healthy landscapes.

In the long term, Alternatives 4 and 6 would produce a high trend toward healthy landscapes; Alternatives 3, 5, and 7 would produce a moderate trend; and Alternatives 1 and 2 show no trend toward healthy landscapes.

Rangeland riparian potential vegetation group — In the short term, the strong emphasis on riparian restoration in Alternatives 3, 4, and 6 is predicted to produce a moderate trend toward healthy landscapes. A moderate transition to healthy landscapes is also predicted for Alternative 7 as a result of the removal of livestock grazing

pressure. Alternatives 2 and 5 would have a low rate of trend, and Alternative 1 would show no transition toward healthy landscapes.

In the long term, Alternatives 1 and 5 would result in a low, Alternative 2 in a moderate, and Alternatives 3, 4, 6, and 7 in a high trend toward healthy landscapes.

Dry forest potential vegetation group — Historically, a mixture of stable and cyclic succession/disturbance regimes were produced with mosaics of open to somewhat closed forests dominated by ponderosa pine or Douglas-fir. Similar disturbance effects need to be restored or imitated for the dry forest potential vegetation group to trend toward healthy landscapes. In the short term, Alternatives 1 and 2 would result in no trend to healthy landscapes. Alternatives 3, 4, and EEIS:7 would produce a moderate trend to healthy landscapes, with Alternative 4 showing a quicker shift toward healthy landscapes because of its emphasis on restoration. Alternatives 5, 6, and UCRB:7 show a low trend due to low rates of restoration.

In the long term, Alternatives 3, 4, and 6 would produce a high trend toward healthy landscapes because of the emphasis on prescribed fire, thinning of dense stands, and promoting early-seral shade-intolerant and large trees. Alternatives 5 and EEIS:7 would show a moderate trend toward healthy landscapes, Alternative UCRB:7 would be low, and Alternatives 1 and 2 would result in no trend to healthy landscapes in the long term.

Moist forest potential vegetation group — This includes some of the most productive land in the project area. In the absence of disturbance, biomass accumulates rapidly and competition for available carbon and water increases. Achieving healthy landscapes would mean increasing the amount of late-seral forest with a corresponding decrease in mid-seral forest, as well as promoting ponderosa pine, western larch and western white pine. In the short term, Alternatives 3, 4, and 5 would result in a moderate trend to healthy landscapes, while Alternative 6 would be low.

In the long term, Alternatives 4 and 6 would have a high transition toward healthy landscapes because of their restoration emphasis. Alternatives 3 and 5 would have a moderate transition rate toward healthy landscapes. In the short and long term, Alternatives 1 and 2 would show no trend toward healthy landscapes and Alternative 7 would show a low trend due to the imbalance of succession and disturbance in reserves and the lack of emphasis on western white pine restoration.

Cold forest potential vegetation group — Unlike the dry and moist forests, the cold forest has less frequent disturbance and slower succession rates; therefore, conditions generally are closer to the historical range of variability. However, traditional fire suppression practices have resulted in simplification of landscape patterns, and whitebark pine is declining rapidly from effects of blister rust and fire exclusion. In the short term, Alternatives 3, 4, and 5 would have a moderate trend and Alternative 6 would have a low trend toward healthy landscapes.

In the long term, Alternatives 4 and 6 would have a high probability of transition to healthy landscapes because of their emphasis on restoration, while Alternative 5 would have a moderate trend. In the short and long term, Alternative 7 would result in a low transition to healthy landscapes because of imbalance between successional conditions and disturbance processes and the lack of emphasis on whitebark pine restoration. Alternatives 1 and 2 would result in no trend toward healthy landscapes.

Alpine potential vegetation group — This is a sensitive ecosystem which has low productivity and slow rates of succession. Because of the slow rates of response to restoration, none of the alternatives would produce a high trend toward healthy landscapes in either the short or the long term. Alternatives 1 and 2 rated low, and Alternatives 3, 4, and 6 rated moderate in trend toward healthy landscapes in the short and long term. Alternatives 5 and 7 rated low in the short term and moderate in the long term.

Forest soil disturbance — Alternatives that would increase the amount and intensity of soil disturbance would be more likely to harm soil stability, function, and productivity. Soil disturbance can come from a number of sources, including timber harvest and thinning, wild and prescribed fires, roads, recreation, and livestock and wildlife grazing. Alternative 1 would have the greatest amount of soil disturbance in the long and short term with no trend toward healthy landscapes. Alternatives 2, 5, and 7 would result in low probability of reducing soil disturbance in the short term. This trend would remain low for Alternative 2 in the long term. Alternatives 3, 4, and 6 would result in a moderate trend to healthy landscapes in the short and long term, because of higher levels of restoration activities or mitigation for best management practices (BMPs) that resemble natural succession/disturbance regimes. Alternatives 5 and 7 would have low rates in the first decade increasing to moderate levels in the long term.

Rangeland soil disturbance — The emphasis on soil protection through improved vegetation management and livestock grazing systems, and the resultant improvements in residual cover, would produce a moderate trend toward reduction in the short and long term under Alternatives 3 and 4. For Alternative 6, this moderate trend would improve to high in the long term. Alternatives 5 and 7 would produce a low trend in the short term because their lack of restoration emphasis would not reduce exotic plant invasion or effects of severe wildfire. In the long term, both alternatives would increase to moderate. Alternatives 1 and 2 show no ability to achieve healthy landscapes in either the short or the long term.

Noxious weed risk reduction — In forest and rangeland systems, Alternatives 3 and 4, with their high emphasis on noxious weed control, would produce a high trend toward noxious weed risk reduction in both the short and long term. Alternatives 6 and 7, with less emphasis on activity levels that would reduce noxious weed spread, would produce a moderate trend toward healthy landscapes in both the short and long term. Alternative 5 would show a low trend and Alternatives 1 and 2 would show no trend toward weed reduction or healthy landscapes in either the short or long term.

Landscape-scale terrestrial habitats — In the short and long term, Alternative 4 would show moderate trends toward improvement due to the emphasis on active restoration of landscape-scale terrestrial habitats. In the short term, Alternatives 2, 3, 6, and 7, which have a lower emphasis on restoration activities, would show a low trend and Alternatives 1 and 5 would show no trend toward improving landscape-scale terrestrial habitats.

In the long term, Alternatives 4, 6, and 7 would produce moderate trends toward improvement, but none of the alternatives would produce high trends. The connectivity of terrestrial species populations has been altered by land uses and land ownership patterns that have fragmented many species habitats. This loss of connectivity prevents these fragmented populations from interbreeding, which puts them at risk. There is little that can be done on BLM- or Forest Service-administered lands alone, relative to landscape-scale conditions, to improve healthy landscapes above moderate levels.

Landscape-scale riparian habitats — Alternative 4 would show a high trend toward improvement in landscape-scale riparian habitats in both the short and long term. Alternative 6 would show a moderate ability to achieve healthy landscapes in the short term and a high rate in the long term. In the short and long term, Alternatives 3 and 7 would show a moderate trend and Alternative 1 would show no trend toward improvement of landscape-scale riparian habitats due to the lack of restoration. Alternative 5 has low and moderate trends for the short and long term, respectively. Although Alternative 2 would provide for more protection of riparian habitats, the lack of active restoration and fragmentation of terrestrial habitats would result in a low transition to healthy landscapes.

Risk reduction to human life and property from wildfire in the urban/wildland interface — This was a key variable for assessing healthy landscapes. Alternative 1 focuses on commodity elements, Alternative 2 on commodity elements with riparian and old forest protection, and Alternative 5 on economic efficiency. This would increase fragmentation of landscape mosaics, and would not focus on fuel conditions in the interface areas or on representation of disturbance regimes appropriate to healthy landscape systems. Therefore, there would be low or no levels of risk reduction under Alternatives 1, 2, and 5, in the short term; and in fact, it is anticipated that long-term risk under these alternatives would actually increase. In direct contrast, Alternative 4 focuses on fuel conditions in the interface areas and on representation of succession/disturbance regimes to reduce vulnerability to wildfire, resulting in high levels of wildfire risk reduction in the short and long term. Alternative 3 would have moderate and high transition levels for the short and long term, respectively. Alternative 6 would show low ability to achieve healthy landscapes in the short term, but would improve to high in the long term. In the short term under Alternative 7, current risk conditions would increase because reduced active wildfire suppression efforts would be coupled with continued increase in high-risk fuel conditions on lands near reserves. Although as wildfires reduce fuels, the long-term risk would decline and the transition to healthy landscapes would increase to a moderate rate. This would occur at a very high cost of wildfire suppression, risk to homeowners, and severity of disturbance effects.

Desired human commodity values (such as timber products and livestock forage) — Healthy landscape system response for desired human commodity values (such as timber products and livestock forage) is a paradox. The short-term transition to healthy landscapes with regard to commodities would be high under Alternative 1 and moderate under Alternatives 2, 3, and 4. However, because landscape relationships would become imbalanced, in the long term the availability of these commodities would decline and the trend toward healthy landscapes would drop to a moderate rate for Alternative 1 and low for Alternative 2. In the short term, Alternatives 4 and 5 would produce a moderate trend toward healthy landscapes, primarily as an offshoot of restoration activities. In the long term, Alternative 4 would transition to a high rate as conditions become balanced and commodity flows are produced with only low to moderate levels of restoration. However, Alternative 5 would decline to moderate as an imbalance develops in areas with low productivity and low restoration emphasis that are adjacent to areas where commodity production is a priority. Alternative 3 is moderate in both short and long term because of moderate levels of restoration and emphasis on connectivity. Alternative 6, with a short-term low trend, would increase to a moderate level in the long term. In the short and long term, Alternative 7 would rank low in its ability to achieve healthy landscapes with regard to commodity production.

Desired human amenity values (such as scenic values, clean air and water, and recovery of rare habitats) — The production of desired human amenity values (such as scenic values, clean air and water, and recovery of rare habitats) in healthy landscape systems is almost directly opposite to the production of commodity values for Alternatives 1 and 2. Alternatives 3 through 7 display varying levels in ability to produce a sustainable flow of amenities. Alternatives 1 and 2 would respond with low ability to achieve healthy landscapes in the short term and would actually result in a long-term decline of amenity values. Alternative 7 would sustain moderate levels of amenity values in the short and long term. Alternatives 3, 4, and 6 would produce only a moderate flow of amenity values in the short term, because many restoration activities (such as prescribed fire, extensive thinning, and road closures) can detract from amenity values. Alternative 3 would remain moderate in the long term because of lower investment in restoration. In the long term under Alternatives 4 and 6, as more landscapes become native in appearance, high lev-

els of amenity values would be available with only low to moderate levels of restoration.

Significance of Changes

The changes in the standards and objectives for the Alternatives will provide some clarity for the short term (first decade), but these changes appear to increase the potential for conflict between standards and estimated activity levels in achieving the action alternative goals, themes and desired future conditions (DFCs).

A combination of changes in some standards, clarification in understanding the standards, and improvement in methods of evaluation, caused a change in the evaluation in the rate of transition to the DFCs during the first decade.

The opportunity to simultaneously achieve the ecosystem management EIS goals using the lowest long-term investment in restoration and mitigation, appears to be highest with alternatives that have landscape patterns that are becoming consistent with:

- their biophysical succession/disturbance regimes,
- reduction of soil disturbance and decrease of exotic species invasion,
- restoration of landscape-scale native terrestrial and riparian habitats and appropriate connectivity,
- reduced fire risk in the urban and rural wildland interface, and
- provision of levels of human commodity and amenity values consistent with the other factors.

Alternatives 1 and 2 would provide no or low ability overall to achieve healthy landscape systems in either the short or the long term.

Alternative 3 would show moderate ability to achieve healthy landscapes in both the short and long term.

Alternative 4 would have a moderate ability to achieve healthy landscapes in the short term and a high ability in the long term.

Alternative 5 would have a low ability to achieve healthy landscapes in the short or long term.

Alternative 6 would have a low ability to achieve healthy landscapes in the short term but a high ability in the long term.

Alternative 7 would have low ability to achieve healthy landscapes in the short term and would show a moderate trend toward healthy landscapes in the long term.

Aquatic Ecology

Bruce E. Rieman, James R. Sedell, and Danny C. Lee

Major changes in Standards and Objectives

The February 1996 evaluation of effects on aquatic habitats and native fishes consisted of three steps. Step one identified the level of protection, maintenance, or restoration of aquatic and riparian habitats offered by each alternative. Step two identified changes in distribution and status of seven widely distributed salmonid species that could be expected under each alternative. Step three involved a similar, though less intensive, effort to identify expected changes in populations of eighteen more narrowly distributed fish species of special concern. This section reexamines the earlier conclusions in light of the most recent changes to the DEISs.

During the February 1996 evaluation, activity tables were "developed for each forest and range cluster by alternative to aid in analysis of effects, to allow projections of outcomes if the various alternatives were to be implemented, and to indicate relative differences among alternatives" (DEIS Chapter 3). The evaluation of aquatic effects used these spatial and temporal allocations of management activities and road densities to project potential management influences on fishes under each alternative. This included the development of four primary pieces of information: 1) a series of classification trees to associate current patterns in fish distributions with landscape characteristic,

which were then used to predict changes in fish distribution that might track changes in landscape characteristics; 2) a summary of anticipated road density changes across the current distribution of fishes; 3) a summary of the current ownership and management emphasis for the current distribution of fishes; and 4) a summary of the anticipated intensity of management activities across the current distribution of fishes. Each of these provided a sense of where and to what extent anticipated levels of management activity for each alternative would likely influence each of the fish species considered.

Because the recent DEIS changes do not require changes to the activity tables used in the February 1996 evaluation, projected trends from the earlier analysis in allocation of roads and other land-disturbing activities, and in landscape-level allocation of restoration activities still apply. These trends were instrumental in the evaluation of differences between alternatives.

In both the February 1996 evaluation and this review, the aquatic and riparian conservation strategies were evaluated based on riparian area interim widths and activities allowed within them, treatment of strongholds and at-risk populations, treatment of priority watersheds or aquatic categories, amount and guidance of watershed and riparian restoration, and other major assumptions. Central to the evaluation is the assumption that Ecosystem Analysis at the Watershed Scale[1] allows landscape, forest, and aquatic/riparian objectives to be met with greater efficiency and effectiveness, given the ecological variability among and within subwatersheds and subbasins. Therefore, the more area which requires ecosystem analysis, the more certainty in the minds of the reviewers that the alternative's objectives will be met for ecological as well as economic and social reasons.

Riparian widths and activities — The area of land within Riparian Conservation Areas (RCAs) (which direct management activities for the purposes of protection and restoration of aquatic and riparian function and structure) among the alternatives did not change significantly with the DEIS changes. Alternatives 6 and 4 still contain the largest RCA areas, followed by Alternatives 7, 3, 2, 5, and 1 in descending order. In earlier preliminary draft EISs, Alternatives 4 and 6 (and 5 outside commodity areas) interim RCA widths and standards could be modified only after ecosystem analysis. In the February 1996 evaluation, it was assumed that modifications would not result in degradation or halt restoration trends in habitats, populations or riparian condition, and therefore received positive evaluations if Ecosystem Analysis at the Watershed Scale were completed. In the revised DEIS, Alternatives 3, 4, 5 (outside commodity emphasis areas), and 7 now allow for modification of standards only after Ecosystem Analysis at the Watershed Scale is conducted. The original assumption applies. Aquatic and riparian protection, then, is strengthened for Alternative 3, and remains much the same as in the earlier evaluation for Alternatives 4, 5, and 7. Alternative 6 now provides a four-year transition period in which changes to EIS standards can be made without ecosystem analysis in areas where Ecosystem Analysis at the Watershed Scale is not required. The change to Alternative 6 is less risky now because of the large area in which Ecosystem Analysis at the Watershed Scale is required, and the requirement that subbasin reviews would be completed in one year. The conclusion is that protection and restoration potential under Alternative 6 improved from the earlier evaluation.

The DEIS changes in Alternative 4 prohibiting site-specific modifications to standards, RCA widths, and Riparian Management Objectives (RMOs) without Ecosystem Analysis at the Watershed Scale create some confusion and uncertainty. For example, there are very few prescriptive standards which a manager would want or need to change in order to manage vegetation within RCAs. Both a project-scale NEPA document or

[1]Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis, version 2.2, revised August 1995. The analysis process includes topic areas to ensure that analyses demonstrate a basic understanding and knowledge of the watershed.

an ecosystem analysis logic trail can be used to describe how timber or vegetative management shall benefit aquatic and riparian processes and function. Standards for Alternatives 4, parts of 5, and 6 clearly outline the primary purpose of RCAs, specifying "vegetation management shall be conducted only to protect, maintain, or restore riparian and instream processes and functions and to meet the intent of zones 1, 2a, and 2b...timely opportunities shall be provided to interagency partners for agreement on vegetation management activities in RCAs."

Uncertainty in Alternative 4 arises because a much smaller area of the landscape triggers Ecosystem Analysis at the Watershed Scale, and implementation of RCA objectives could be achieved project by uncoordinated project. At least three possibilities for interpretation of this alternative exist: 1) it involves greater risk for aquatic and riparian resources than Alternatives 2, 3, 6, and 7 because of aggressive, project-scale implementation of activities and restoration, which make this less of an ecosystem/landscape management alternative without focused restoration priorities; 2) it is a reserve-type system centered around RCAs which would affect between 25 to 50 percent of the landscape (in this case, RCA widths on intermittent streams are not modified and vegetation management is very conservative within the entire RCA; thus landscape restoration and minimizing of landscape disturbance patterns would not be achieved); or 3) the alternative is much like Alternative 6, with managers deciding that landscape management requires the modification of standards, Ecosystem Analysis at the Watershed Scale is conducted, and the information base from which to proceed in a prudent manner is acquired. The first possibility has greater short-term and long-term risks and uncertainty surrounding it. The second possibility has less short-term risk and more long-term risk of not meeting watershed, terrestrial and landscape standards and objectives. The third would afford the least risky ecological solution. Given that activity levels have not changed for Alternative 4, more risk and uncertainty is assumed for it to meet goals and objectives. The positive side of this alternative is that the aggressive activity levels have the potential for accelerated learning under the adaptive management paradigm, if effective monitoring accompanies implementation.

Treatment of Strongholds and At-Risk Populations — The February 1996 alternatives required ecosystem analysis in strongholds of native salmonids in Category 2 and 3 subbasins for Alternatives 3, 4, 5 (outside commodity areas), and 6. The recent DEIS changes in alternatives 3-7 provide specific objectives to protect or restore strongholds in Category 2, and to protect strongholds in Category 3 subbasins. However, there are now no standards coupled with those objectives. Instead, the standards which trigger Ecosystem Analysis at the Watershed Scale are in the Implementing Ecosystem Management section. The standards for Alternatives 3, 6 and 7 are quite similar to those evaluated earlier. In Alternative 4, they are tied only to federally listed and proposed species. Alternative 4 then becomes much more species-centric and less an ecosystem management strategy. This raises further concerns about the ability to achieve the goals and objectives of the alternative. The February 1996 evaluation relied on models which used strong, depressed, and fringe population distributions to examine the overlap with activities, management intensities, and road densities for each alternative. These models did not change for this current review.

Treatment of Priority Watersheds and Category Watersheds — Subbasin reviews are defined as to what they are and where and when they must be completed in the revised DEISs. In both the February 1996 and present evaluations, it was assumed that strongholds can be identified and verified with subbasin analysis. It was further assumed that aquatic categories can be amended and verified through subbasin reviews.

Road Management — The February 1996 evaluation assumed that the requirement for development and implementation of a standardized road condition and risk inventory would be met early in the life of the plan in order to estab-

lish watershed restoration priorities. If it was not, watershed restoration outcomes would be uncertain and the intent of Alternatives 3 through 7 would be more difficult to meet. If an accurate road inventory is not completed, subbasin reviews and Ecosystem Analysis at the Watershed Scale cannot effectively address road-related risks or restoration needs. This assumption still applies, given the required inventory specified by the standards. In addition, specific direction is given for road reduction, net increases of roads to no more than one road-density class for Alternatives 3, 4, and 5, and no net increases in roads in low roaded areas unless Ecosystem Analysis at the Watershed Scale is conducted for Alternatives 6 and 7.

Key Salmonid Species Effects

The following discussion focuses primarily on the key salmonid species and how the February 1996 evaluation might change in response to the changes in alternatives.

Alternatives 1 and 2 — No changes are needed in the evaluation.

Alternative 3 — Ecosystem Analysis at the Watershed Scale will be required in stronghold subwatersheds and across the distributions of wild stream-type chinook, steelhead, and most if not all of that for bull trout. Most species will generally benefit through better planned restoration activities where they occur. The effect of the changes in Alternative 3 for redband and cutthroat trout are ambiguous; each should benefit where they overlap with the trigger species, but substantial portions of the ranges for allopatric redband trout (those outside the range of steelhead) and Yellowstone cutthroat trout fall outside these areas. The distribution of westslope cutthroat trout strongly overlaps the distributions of the anadromous stocks and bull trout, which should benefit westslope cutthroat trout. Overall, changes in the alternative suggest a net improvement over the earlier projections for stream-type chinook salmon, steelhead, bull trout, and probably westslope cutthroat trout, and a positive but marginal improvement for redband trout. No important change in projections for Yellowstone cutthroat trout is anticipated.

Alternative 4 — The requirement for Ecosystem Analysis at the Watershed Scale in subwatersheds that support listed species will extend over much of the stream-type chinook salmon and steelhead distributions in the Snake River Basin and in upper Washington, but not in central Oregon. Restoration activities guided by Ecosystem Analysis at the Watershed Scale may conserve and restore chinook and steelhead habitats in those areas better than previously projected. That positive change is confounded by uncertainty with implementation. Activities within the core of strongholds for stream-type chinook salmon, steelhead, and some redband trout in central Oregon do not require Ecosystem Analysis at the Watershed Scale. The high timber harvest and thinning activity levels expected in central Oregon, and the potential lack of Ecosystem Analysis at the Watershed Scale means that risks are higher and the probability of effectively focusing forest and watershed restoration is lower. The ultimate effect depends heavily on how the alternative is implemented.

Changes in this alternative have mixed implications for other species. Those parts of the distributions of bull trout, westslope cutthroat, and redband trout that overlap with federally listed stocks are likely to benefit. Category 1, FEMAT key watersheds, and wilderness areas cover important strongholds for westslope cutthroat and bull trout, and the additional requirements should increase benefits throughout important parts of their ranges. However, the elimination of the requirement for Ecosystem Analysis at the Watershed Scale in strongholds will result in a net reduction of analysis and thus greater risks in a large part of the distributions and species outside trigger areas. This should be most relevant in the fringe for westslope cutthroat and in much of the range of allopatric redband and Yellowstone cutthroat trout.

If bull trout are listed (currently Category 1 candidates with review pending), Ecosystem Analysis

at the Watershed Scale will be required over a much larger part of the region outside the range of listed and proposed salmon and steelhead, although it still would not cover the core area for stream-type chinook, steelhead, and redband trout in central Oregon. This should lead to better restoration of depressed and fringe populations of bull trout, and a substantial (though incomplete) extension of that action for some strong and many depressed and fringe populations of westslope cutthroat trout and sympatric redband trout. Increased benefits for allopatric and fringe redband populations will be limited, and no change in the projections for Yellowstone cutthroat trout are expected. With listing of bull trout, Alternative 4 will provide more comprehensive coverage of aquatic habitats needing restoration. Listing of bull trout will not influence the uncertainty in the implementation of Alternative 4.

Alternative 5 — The primary changes in Alternative 5 follow from those in Alternative 4. Outside of the timber and livestock emphasis areas, changes in the requirements for Ecosystem Analysis at the Watershed Scale should lead to some benefits with more focused and effective restoration activities across a large part of the distributions of stream-type chinook salmon and steelhead. Because the listed or proposed stocks fall largely outside the timber and livestock emphasis areas, changes in projections should be generally equivalent to those in Alternative 4.

Alternative 6 — The initial (first 4 years) requirement for Ecosystem Analysis at the Watershed Scale across the entire distributions of listed and candidate species and the fringe distributions for all salmonids, substantially expands the area subject to analysis. After four years, Ecosystem Analysis at the Watershed Scale is required in all watersheds. In addition, an Ecosystem Analysis at the Watershed Scale for subwatersheds with less than 0.7 road miles per square mile is required. These changes should improve projections relative to the February 1996 evaluation for all species across important parts of their current distributions. The benefits are most likely in the depressed and fringe portions of these distributions that were not previously addressed in Alternative 6, or in any other alternative. These changes, in concert with the more moderate levels of timber harvest and thinning activities, strengthen this alternative and make it among the most likely to conserve and rebuild depressed and fringe populations. Despite the improvements, the alternative does not ensure that some further declines will not occur. The inability to prevent further declines is an aspect of all alternatives, and is discussed below.

Alternative 7 — Requirements for Ecosystem Analysis at the Watershed Scale are increased under Alternative 7 to include the distribution of listed species not covered by the Northwest Forest Plan, subwatersheds with less than 0.7 road miles per square mile, and to be prior to management activities within RCAs. Although the increased reliance on analysis should more effectively focus restoration and management activities, the relatively limited amount of restoration activity expected under this alternative means that those changes will not produce much different results than originally projected.

Significance of Changes

In general the changes to the alternatives represented by the standards of the Aquatic Strategies strengthened the content or application of riparian conservation measures. This should effectively increase the protection of riparian and watershed processes that influence habitats for fishes across the alternatives. It is most likely to benefit habitats and populations that are currently in good condition, because these areas are less likely to be degraded by future activities given the increased protection. Watersheds, habitats, and aquatic ecosystems that are currently healthy are more likely to remain healthy under the revised standards.

Watersheds and populations that are degraded or depressed will also benefit through long-term recovery of habitats and watershed processes. The legacy of roading, introduced species, and any new pressures associated with increasing land

management demands, however, could make passive recovery very slow or unlikely in many systems. Active restoration of watersheds (such as the obliteration of roads and elimination of channel crossings) will be critical to long-term management and restoration of productive and resilient aquatic ecosystems. For this reason, the interpretation of alternatives is based strongly on the expectation that Ecosystem Analysis at the Watershed Scale would change standards to more closely reflect the forests and landforms to which they apply. It was generally assumed that while effectively managed RCAs are key to conservation and restoration of aquatic habitats, the cumulative effects of land-use management, and the benefits realized from active restoration will be strongly dependent on understanding existing forest and watershed conditions, and the disturbances and processes likely to influence those conditions in the future. Restoration will be of little value if it is in not in the right place and does address the right problems. Even the strictest riparian standards may not mitigate excessive disturbance outside the buffers. Focusing and prioritizing management activities and managing cumulative effects in ways that minimize risks and maximize potential benefits is far more likely through Ecosystem Analysis at the Watershed Scale than not.

These issues represent a basic tension in the original analysis and this review. To conserve and restore healthy fish populations, it is necessary to conserve and restore forest, watershed, and riparian processes and conditions. Restoration activities can provide important benefits, but are often associated with land management activities that carry increased risks. Determining the cumulative outcome of multiple activities that can entail both lower and higher risks is difficult at this scale of analysis.

On the whole, changes in Alternatives 2, 3, 4, 6, and 7 will improve overall conditions for the species evaluated. All were generally strengthened relative to the February 1996 preliminary draft, although the patterns of protection and risks may have changed. The cores/strongholds for most species distributions (that is, the areas where habitats and populations are generally in good shape) are likely to remain that way. Three exceptions are redband trout, steelhead, and stream-type chinook salmon. In central Oregon under Alternative 4, the potential for high land-disturbing activities (timber and thinning), uncertainty in implementation, and no requirement for Ecosystem Analysis at the Watershed Scale make the outcome uncertain.

Outside the core/stronghold habitats, the ecological tradeoffs between riskier management activities and restoration activities are more difficult to interpret, thus increasing uncertainty. Several of the original interpretations regarding the ability of the alternatives to prevent further declines in the status or distribution of the key salmonids have changed. For each species except Yellowstone cutthroat trout, downgrading the projections represents an oversight in original analysis rather than increased skepticism with the current draft. With the exception of bull trout in Alternative 3, and all species in Alternative 6, the concerns regarding restoration of habitats or rebuilding of populations in the more depressed, fragmented or fringe portions of these species' distributions have not changed. The legacy of past land management activities, introduced species, and habitat fragmentation is important. Whether the benefits from restoration can be enough to overcome the negative trends (inertia) from the past simply cannot be determined. For reasons outside the scope of Federal land management, some populations may continue to decline. The population condition, trend, and isolation at the subwatershed scale will not be able to improve rapidly enough to prevent population declines in the short term, given the long time lags required for watershed and forest improvement.

The original analysis was based largely on the anticipated effects of the alternatives on seven key salmonids. Although these fishes are important, they are broad indicators of aquatic ecological conditions. The revision of the EIS has focused the triggers for analysis and some standards more strongly on the distribution of select threatened

and endangered species (that is, listed salmon and steelhead or bull trout) in some alternatives more than before. Some alternatives now seem to be a collection of fine-filter strategies more sensitive to current issues than to broad ecological process, function, and integrity. Although focused strategies and specific standards can have direct benefits for indicator species, a broad, integrated analysis is necessary to recognize and establish priorities which provide for the integrity of whole systems and landscapes. Alternatives that require Ecosystem Analysis at the Watershed Scale in concert with broader scale planning and analysis within subbasin review are more likely to meet the intent of ecosystem management and the integration of objectives across terrestrial, aquatic, and social systems.

Terrestrial Ecology

Richard S. Holthausen, John F. Lehmkuhl, Martin G. Raphael, Randal J. Hickenbottom, Stephen J. Shelly and Lisa Croft

Major Changes that Occurred in Standards and Objectives

Implementing Ecosystem Management — A number of standards were changed to better establish the priorities for accomplishing subbasin reviews and Ecosystem Analysis at the Watershed Scale. These changes are reviewed more thoroughly by the Aquatic Team. Some of these provisions were clearly intended to benefit terrestrial species, such as the requirement that ecosystem analysis under Alternative 6 be completed prior to activities that would affect large blocks of intact native rangeland. Provisions affecting the priority for accomplishing ecosystem analysis will also influence timing of activities within the first decade as discussed by the Landscape Analysis team. However, none of the changes are expected to have a direct effect on long-term outcomes for terrestrial species.

The initial terrestrial analysis assumed that ecosystem analysis would be an integral part of the implementation process and would include consideration of plant and animal species. The new provisions will contribute to the validation of this assumption.

The small changes in rate of implementation resulting from these provisions are unlikely to affect outcomes for terrestrial species which were projected through 100 years. Long term landscape outcomes are not expected to be changed by the new provisions, so habitat outcomes for terrestrial species would only be changed if the modified rate of implementation resulted in habitat bottlenecks in the very near term.

An additional consideration for the terrestrial analysis is the increased clarity of the intent to change standards through the process of ecosystem analysis. This places even more importance on the assumption in the terrestrial analysis that terrestrial plant and animal species be considered in ecosystem analysis. It should be obvious that changes in standards that will affect management of habitats have to be based on consideration of all species that will potentially be influenced. This assumption should be reflected throughout the development and implementation of the ecosystem analysis process.

Physical Environment — No changes affecting the terrestrial analysis have been made in this section. However, the added detail in the terrestrial habitat standards for snags and down wood make it clear that there are differences between the soils, habitat and fire standards for these ecosystem components. Reconciling these differences between draft and final will be essential. For this review, it is assumed that the most stringent of the standards apply (see discussion on terrestrial habitat standards).

Terrestrial Strategy — New objectives and standards place added emphasis on the maintenance of native plant species and will be considered as potentially increasing likelihoods that plant species viability will be maintained. This potential benefit was considered in the Terrestrial Team's review of outcomes for vascular plants. Several other standards in this section direct the management of mature/old trees and forests out-

side of reserves in Alternative 7 and were added after the February 1996 preliminary draft version. Although these standards were under development at the time of the terrestrial analysis, their intent was fully reflected in the Terrestrial Team's evaluation of the February 1996 version. Therefore, the influence of these standards was considered to already be incorporated in the terrestrial analysis.

Aquatic/Riparian Strategy — Several pieces of the aquatic conservation strategy have changed from the information that was used by the terrestrial team in February 1996. These changes, discussed below, are considered in this review of outcomes for plants and vertebrates.

Most significant of these changes is the use of the slope adjustment factor and the resulting addition of riparian management zone 2b to the Riparian Conservation Areas (RCAs). The slope adjustment factor was not considered in the Terrestrial Team's February 1996 analysis. It could provide additional benefit to species associated with riparian habitats in Alternatives 4 and 6, and Alternative 5 outside of timber emphasis areas. The added benefit will be most pronounced along intermittent streams in steeply-sloped drainages. This potential improvement in outcome is considered in this review of habitat outcomes.

For Alternative 7, the terrestrial analysis of February 1996 was based on the assumption of a 100-foot minimum buffer on intermittent streams. However, this minimum buffer width is actually 150 feet. This increased riparian protection is considered in this review.

Another change from the Terrestrial Team's understanding of the aquatic strategy in February 1996 involves the standard for buffers around ponds, lakes, and wetlands less than one acre in size under Alternatives 2, 3, and 7. This was thought to be 100 feet at the time of the terrestrial analysis, but is now understood to be 50 feet, except in key and priority watersheds (as defined by PACFISH/INFISH) where the 100 foot minimum applies. For Alternative 5, the February 1996 evaluation assumed no buffer around forested wetlands and the use of the Proper Functioning Condition[2] (PFC) concept around rangeland wetlands. Alternative 5 has now been clarified to indicate that buffers around all wetlands inside timber and livestock emphasis areas will follow a PFC standard, and wetlands outside of timber and livestock priority areas will follow the standards in Alternative 4. These differences are considered in this review.

Terrestrial and Aquatic Species and Habitats — Substantive changes were made to several standards in this section. The standard for snags was refined from the February 1996 version, and the standard for down wood was added. The current snag standard provides additional detail on requirements for snag management, but actually calls for fewer large snags than were specified in February 1996. This revised standard was not intended to provide a lower probability of achieving objectives. Rather, it was based on a more recent review of studies of snag-associated species. The effect of the new minimum standard is incorporated in this review. As with the previous minimum standard, it does not differ across Alternatives 3 through 7, so it was considered in the context of the landscape team's overall assessment of the emphasis, by alternative, on snag management.

The down wood standard represents an addition from the February 1996 standards. However, the terrestrial team had assumed in its 1996 analysis that an appropriate down wood standard would be developed. The specific provisions of this standard are considered in this review.

The standard for maintenance of mature/old forest in Alternatives 3, 4, 5 and 7 is more specific than the standard it replaced from the Terrestrial Team's evaluation materials. The additional specificity is considered in this review.

[2]The Bureau of Land Management produced two technical references for riparian area management on the process for assessing proper functioning condition. These are Technical Report #1737-9 (1993) and #1737-11 (1994).

The standard requiring implementation of recovery plans is stronger than what was in the February 1996 version. However, the terrestrial analysis assumed that recovery plans would be implemented, so this does not result in changed outcomes for terrestrial species.

A variety of other standards were strengthened in this section, including those for management of firewood programs and for maintenance of viable populations. However, these changes have the effect of validating provisions and assumptions that were evaluated by the Terrestrial Team during 1996 and are not considered to affect outcomes in this review.

Human Uses and Values and Tribal Interest — Changes in these areas were judged not to affect habitat outcomes for terrestrial species.

Road Management — Over a dozen objectives and standards for road management changed from the February 1996 evaluation to the current DEIS objectives and standards. These are substantive changes and provide additional guidance on the intent for road management. All changes are, however, consistent with assumptions made by the landscape team in its original projections of road densities under the alternatives. Those projections of road density were the primary basis for the Terrestrial Team's understanding of road effects under each of the alternatives. The new and revised road standards and objectives were considered as part of this review, but their effects were generally similar to original projections.

Adaptive Management/Monitoring and Accountability — Changes in these sections do not result in any changed outcomes for terrestrial plant and animal species.

Allocations from Northwest Forest Plan — At the time of the evaluation in February 1996 there was significant discussion of the likelihood of changing Late-Successional Reserves in the area of overlap between the Columbia River Basin and the Northwest Forest Plan. The understanding now is that standards for management of these reserves might be changed through ecosystem analysis, but that the likelihood of eliminating the reserve designation is very remote. This revised understanding was considered as part of this review.

Effects on Plant and Animal Species

In this section likely changes in species outcomes that result from this more complete understanding of DEIS objectives or standards are discussed. Only those species where some change in outcome is likely will be addressed.

Plants — The number of plants of rangewide conservation concern in the EIS areas is now 173. This slight increase from 164 during the February 1996 evaluation is due to reconciliation of earlier lists of such species and to availability of new field information. Of special note is the discovery of *Spiranthes diluvialis*, a federally listed threatened species, along the Snake River in Idaho in August 1996 (UCRB EIS area). These recently discovered occurrences represent a northwestward range extension for this plant. Since all listed species were analyzed in the initial review, a qualitative analysis of *Spiranthes* is included in this document. The other eight species that surfaced since the 1996 evaluation would all require fine-scale analysis (e.g., they are geographically or ecologically restricted, and can not be evaluated at the broad scale of the analysis).

As in the initial analysis, this evaluation does not include nonvascular plants (lichens, bryophytes and fungi). In addition, it is important to note that this and the previous analysis do not address aquatic vascular plants.

The analysis of effects of the revised alternatives on the continued viability of *Spiranthes diluvialis* applies only to the portion of the plant's range that occurs within the EIS areas. Under Alternatives 3 through 7 the outcome ranking for this plant is 4; habitat in the EIS areas is distributed as isolated patches, with limited dispersal opportunities between patches. The two occurrences of this

plant in the UCRB EIS area are on Federal lands. As there are standards under all of the alternatives that require continued protection of federally listed species and the implementation of recovery plans, this species is not expected to decrease from current levels. This evaluation is not based on the amount of unoccupied suitable habitat available, and the management emphasis for those areas, but rather on the protection afforded to federally listed species by these standards.

The general effect of the majority of the new and revised objectives and standards, as well as a closer consideration of those which were only cursorily examined during the 1996 evaluation, is that they will provide a greater level of protection for all rare plants across the EIS analysis areas. The initial analysis was restricted to those taxa that had a broad geographic distribution pattern, or that occurred in two or more of the broad community groups.

The most significant changes since the review of the alternatives in February 1996 is the strengthening of objectives and standards that apply directly to rare plants and rare plant communities. These additions have significantly strengthened the protection for these elements, especially at the edges of their geographic ranges. Several of these standards may have existed during the review of alternatives in 1996, but were not fully considered during that initial review.

Only one nonvascular plant currently has agency special status within the EIS analysis areas. Since March 1996, a more complete list of rare bryophytes, lichens and fungi in the analysis area has been compiled; these have not yet been reviewed for possible agency special status designation. Furthermore, it is possible that between the release of the draft and final EISs there could be a review of the effects of the alternatives, and specific objectives and standards, on nonvascular plants and aquatic macrophytic vascular plants. There are several standards (such as those for snags, down woody debris in riparian areas, and the aquatic standards for timber and grazing) that could affect the viability of these species. Effects of the objectives and standards on rare plants and rare plant communities are summarized below.

All Rare Plant Species/Communities —

Ecosystem Analysis at the Watershed Scale — In Alternative 6, Ecosystem Analysis at the Watershed Scale is triggered in part by the presence of federal candidate species. Recent changes (Federal Register, Vol. 61, No. 40, p. 7596) were made to the list of species of plants and animals that are regarded as candidates for listing. These changes dropped the earlier classifications of Category 1 (C1) and Category 2 (C2) candidates. For plants in the EIS analysis areas, the changes caused by the reclassification were significant; there was a decrease from 31 C1 and 107 C2 (138 total) to 4 candidate plants. Thus, the number of cases where a rare plant would trigger Ecosystem Analysis at the Watershed Scale would be much lower. There are still 173 plant taxa of rangewide conservation concern which may trigger Ecosystem Analysis at the Watershed Scale in a "may affect" situation. Currently there are five federally listed plants that would trigger Ecosystem Analysis at the Watershed Scale under Alternatives 4 and 6, and Alternative 5 outside timber and livestock priority areas.

Terrestrial Strategies — Though this standard is vague with regard to how it would be implemented, it could be beneficial for habitat restoration and enhancement for rare plants and plant communities under Alternatives 3 through 7.

Aquatic/Riparian Strategies — It is unknown which plant species may be affected by this standard for sand and gravel mining within RCAs, although attainment of RMOs would likely ameliorate any potentially adverse effects.

Terrestrial and Aquatic Species and Habitats/Viable Populations — Regarding rare plant conservation, the most significant objectives and standards that have been strengthened since the initial plant analysis are those in this section. The effect of the implementation of these objectives and standards would be to increase the positive outcomes for all 173 rare plants of rangewide

conservation concern under Alternatives 3 through 6, and for any such species that occur outside of reserves in Alternative 7. Especially important to the conservation of these plants is a standard under Alternatives 3 through 6, and Alternative 7 outside of reserves, which emphasizes the management of those occurrences at the edges of species' ranges. Of the 173 plant taxa of rangewide conservation concern, there are 10 that are considered disjunct or peripheral in the EIS analysis areas, and for these taxa this standard is particularly important. This standard will also provide much needed emphasis on the conservation of peripheral populations of numerous FS and BLM sensitive species that, while they may be secure on a rangewide basis, are rare in certain states or Forest Service Regions.

Standards under Alternatives 3 through 7 would provide critical protection for the continued viability and genetic integrity of rare plants.

Standards for Alternatives 3 through 7 may increase the general level of protection of rare plant communities across the landscape that are dominated by mountain mahogany, bitterbrush or quaking aspen, and for any rare plants occurring in these communities.

Protection/Restoration of Listed Species Habitats — Objectives and standards provide the critical language from BLM and Forest Service manual direction. This direction requires that habitats be managed to prevent the need for listing, to recover special status and sensitive species, and to contribute to the recovery of federally listed species in strict compliance with recovery plans. When implemented, these standards would substantially reduce the difference in effects between the alternatives, as the level of protection is now more clearly stated across the alternatives for all rare plants of conservation concern than it was in the alternatives evaluated in February 1996.

Tribal Interests/Habitat Conditions — Objectives and standards for Alternatives 3 through 7 on tribal plant species of concern were not included in any of the reviews of the alternatives. The vascular plant task group did provide a summary, by vegetation type and seral stage, of the plant taxa of cultural importance that was provided by the SIT liaison working with the Tribes. This objective would raise the level of protection for communities containing these plants during project planning and implementation.

Upland Shrub Species — A spatial analysis has not been conducted to determine which taxa of conservation concern may be affected by restoration and management activities in the range clusters identified as a high priority for livestock forage production under Alternative 5. However, implementing the standards regarding viable populations should result in no decrease in outcomes for plants located in these clusters.

Astragalus mulfordiae, Astragalus oniciformis, Astragalus solitarius, Astragalus yoder-williamsii, Hackelia cronquistii. Under Alternative 6, the requirement for Ecosystem Analysis at the Watershed Scale prior to modification of large blocks of existing native rangelands would potentially provide increased protection of habitat for rare plants and rare plant communities present in these habitats, provided that during the Ecosystem Analysis at the Watershed Scale, rare plants and communities are adequately addressed.

Objectives apply to the management of rangelands under Alternatives 3 through 7, and may afford a greater level of protection for those rare plants associated with range habitats. For the specific locations mentioned a spatial analysis was not completed to determine the specific taxa affected.

Astragalus mulfordiae, Astragalus oniciformis, Astragalus solitarius, Astragalus yoder-williamsii and Penstemon lemhiensis. Given the crucial role of fire in the life cycle of certain rare plants, the restoration of fire as a natural disturbance process under Alternatives 3 through 7 could be beneficial to these species associated with upland shrub communities.

Noxious weeds have been identified as a major threat to rare plants and communities in several

parts of the EIS analysis areas, and implementation of standards potentially increases beneficial outcomes for rare plants threatened by weed invasion, especially for these species associated with upland shrub communities. These potential benefits could result under Alternatives 3 through 6, and under Alternative 7 outside of reserves.

The inclusion of language under Alternatives 3 through 7 that requires the maintenance and restoration of habitat for special status species, in addition to listed, proposed and federal candidate species, greatly increases the potential for positive outcomes for rare plants located in rangeland habitats, especially for these species associated with upland shrub communities.

Forest Species —

Collomia mazama, Cypripedium fasciculatum, Astragalus paysonii, Grindelia howellii, and Penstemon glaucinus. Given the crucial role of fire in the life cycle of certain rare plants, the restoration of fire as a natural disturbance process under Alternatives 3 through 7 could be beneficial to these early and mid-seral forest (or forest opening) species.

Astragalus paysonii, Botrychium ascendens, Botrychium crenulatum, Botrychium paradoxum, Calochortus longebarbatus var. ***longebarbatus, Calochortus longebarbatus*** var. ***peckii, Calochortus nitidus, Castelleja chlorotica, Collomia mazama, Cypripedium fasciculatum, Grindelia howellii, Mimulus washingtonensis*** var. ***washingtonensis, Penstemon glaucinus,*** and ***Penstemon lemhiensis.*** For these rare plants that occur in forests, or openings in forests, and are potentially threatened by noxious weeds (usually following habitat disturbance), the benefits under Alternatives 3, 5, and 7 (outside of reserves) may not be as great as those under Alternatives 4 and 6, since the last three steps of Integrated Weed Management (IWM) are not required in the case of Alternatives 3, 5, and 7.

Riparian Species — Additional opportunities exist for spatial analysis to determine which of the 173 plants of rangewide conservation concern occur in riparian zones 1, 2a or 2b, and how these would be effected by the types of activities permitted under each alternative in these zones.

Botrychium crenulatum, Calochortus longebarbatus var. ***longebarbatus, and Calochortus longebarbatus var. peckii.*** In the initial analysis, these three plant species associated with moist forests (or wet meadow openings within forests) were identified as potentially benefitting from the aquatic standards under Alternatives 2, 3, and 7. The adverse effects of Alternatives 4 and 6 on these species may have been slightly overestimated as a result of not fully considering the types and intensities of activities permitted in the buffer zones in these cases.

Amphibians and Reptiles — Some adjustment in outcomes may result for those amphibian and reptilian species associated with riparian ecosystems, because several parts of the aquatic/riparian strategies have been clarified or changed. One potentially positive effect is the use of the slope adjustment factor to delineate RCA zone 2b, managed according to standards for Alternatives 4, 5 (outside timber and livestock emphasis areas) and 6. The change from 100 to 150 foot minimum buffer on intermittent streams for Alternative 7, and the decrease from 100 to 50 foot minimum buffer on ponds and wetlands less than one acre (Alternatives 2, 3, and 7) are the other major differences considered. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes are considered to nearly balance each other for species that use both habitats, and result in little or no change under this alternative. Overall, these changes should not result in significant (>0.5 mean outcome units) shifts in species outcomes for amphibians or reptiles.

Coeur d'Alene salamander — The Coeur d'Alene salamander is found in springs, seeps, spray zones and wet talus slopes in forested areas, and does not generally move far from the riparian zones. All of the salamander's range is contained

within the UCRB and about 80 percent of the species' range is on Forest Service land. The riparian zone width around intermittent streams and small wetlands, and the levels of harvest in currently undisturbed forestland were considered the most important attributes of the alternatives on BLM- and FS-administered land. As a result of the fuller understanding of the alternatives, the Coeur d'Alene salamander could have a slightly higher likelihood of Outcome 3 (habitat primarily as patches, limited species interactions, subpopulations interact as a metapopulation) in Alternatives 4 and 6, but would be unlikely to result in a shift of one-half of a mean outcome score. This species' range is primarily (80+ percent) in a timber emphasis area in Alternative 5, so use of the slope adjustment factor to delineate zone 2b will not benefit this species in this alternative. The decrease in buffer on wetlands less than one acre could slightly reduce the outcomes in Alternatives 2 and 3, but again would not result in a change from one outcome level to another. There is no shift in outcomes under Alternatives 1 and 7.

Western toad — Because the riparian buffers were considered important for the western toad, which breeds in spring pools, ponds, lake shallows and slow moving portions of streams, only the decrease in buffer width on small ponds and wetlands (less than one acre) in Alternatives 2 and 3 was evaluated as being germane to this species. The habitat affected by using the slope adjustment factor to define zone 2b would likely be too steep and fast moving to be suitable for this species. The decrease in buffer on wetlands less than one acre could slightly reduce the outcomes in Alternatives 2 and 3, but would not result in a change as large as one-half of a mean outcome score.

Woodhouse's toad — The adjustments in alternatives for Woodhouse's toad would be similar to those for the western toad.

Tailed frog — Tailed frogs occur in isolated populations in and along streams in the Pacific Northwest and are highly specialized for life in cold, clear, fast-flowing mountain streams. Tailed frogs inhabit streams with continuous flow and cold, well-aerated waters and are not found in intermittent streams. Riparian buffers were an important factor in evaluating this species and the use of the slope adjustment factor to define zone 2b would provide some benefit to this species. As a result of the fuller understanding of the alternatives, we believe the tailed frog could have a slightly higher likelihood of Outcome 2 (habitat broadly distributed with gaps with nearly continuous occupation by the species, allowing for the species to interact as a metapopulation) in Alternatives 4 and 6, but would be unlikely to result in a significant change in mean outcome score (a change of at least 0.5 outcome units).

Spotted frogs — The adjustments in alternatives for the "Columbian" spotted frog would be similar to those for the western toad. The adjustments in alternatives for the "Oregon" spotted frog would be similar to those for the western toad.

Northern leopard frog — The adjustment in alternatives for the northern leopard frog would be similar to that for the western toad. It should be noted that any decrease in outcome level for this species in Alternatives 2 and 3 results in higher levels of Outcome 5 (scarce habitat, little or no population interactions, strong potential for extirpations and little likelihood of recolonization).

Painted turtle — The decrease in buffer width on small ponds and wetlands (<1 acre) in Alternatives 2 and 3 was evaluated as being germane to this species, because the riparian buffers were considered important for the painted turtle and because it uses wetlands, ponds and slow moving streams at lower elevations. The habitat affected by using the slope adjustment factor to define zone 2b would likely be too steep and fast moving to be suitable for this species. The decrease in buffer on wetlands less than 1 acre could slightly reduce the outcomes in Alternatives 2 and 3, but would not result in a significant change in outcome score.

Western pond turtle — The adjustments in alternatives for the western pond turtle would be similar to those for the painted turtle.

Rubber boa — Similar adjustment to painted turtle.

Common garter snake — Similar adjustment to painted turtle.

Waterbirds and Shorebirds — Changes in the aquatic standards from the February 1996 version are the only changes that potentially will affect viability outcomes for waterbirds and shorebirds.

Reduction in the buffer zone for small (<1 ac) wetlands likely would lower the outcome scores for some species groups under Alternatives 2, 3, and 7. The reduction in outcome, however, would probably not be significant. The effect of reducing this buffer likely will reduce the amount and quality of riparian and adjacent upland vegetation and water quality in small wetlands. Implementation of a 100 foot buffer zone (previously PFC was the standard) in emphasis areas other than timber and livestock under Alternative 5 likely would have a positive effect on outcomes scores for some species groups. Increasing the RCA on intermittent streams (from 100' to 150') under Alt. 7 will have a minor positive effect on some species viability outcomes through increased water quality in the larger perennial streams.

The addition of a slope adjustment factor, potentially increasing the width of forest riparian conservation areas in Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 will have a positive effect on viability outcomes for some species groups of waterbirds and shorebirds. The effect on viability outcomes likely would be small, and probably not significant, for most species because the slope adjustment would occur on small perennial or intermittent streams that are secondary habitats for stream or riparian associated species. However, the greater protection for those lower order streams will have a positive influence in downstream water quality in the larger higher-order streams. The effect would be relatively smaller under Alternative 5 than under Alternatives 4 or 6, because the standards would not affect timber or livestock emphasis areas in Alternative 5.

Group 1: Open water species — Lower outcomes from reduction in small wetland buffers that would affect adjacent vegetation and water quality under Alternatives 2, 3, and 7.

Group 3: Wood duck, common and hooded mergansers — Higher outcomes by increasing forest RCA width and resulting increase in water quality under Alternatives 4, 5, and 6. However, reducing small wetland buffers might reduce nesting snag availability and result in a slight reduction outcome under Alternatives 2, 3, and 7.

Group 4: Common and barrow's goldeneye, bufflehead — Lower outcome scores from reduction in small wetland buffers that might lower availability of nesting snags under Alternatives 2, 3, and 7.

Group 6: Harlequin duck — Higher outcome scores from increasing forest RCA widths and resulting increases in water quality, lower disturbance near streams under Alternatives 4, 5, and 6. Changes would likely have little affect on streamside habitat.

Group 7: Herons and egrets — Lower outcome scores from reduction in small wetland buffers and consequent effects on adjacent vegetation and water quality, and reduction in availability of nesting trees near wetlands under Alternatives 2, 3, and 7.

Group 8: Dabbling ducks — Lower outcome scores from reduction in small wetland buffers and consequent effects on water quality and adjacent vegetation used for nesting under Alternatives 2, 3, and 7.

Raptors and Gamebirds — The raptors and gamebirds reviewed by the Terrestrial Team use essentially all habitats in the assessment area. For most of these habitats, little change in outcome is projected to result from changes to alternatives or changes in understanding of the alternatives made between February 1996 and February 1997. The

habitats for which different projections might actually be made are those associated with riparian and wetland areas. Several of the raptor and gamebird species are associated with these habitats. These include blue grouse, mountain quail, bald eagle, Swainson's hawk, merlin, long-eared owl, northern pygmy-owl, northern saw-whet owl, and western screech owl.

Of the raptors and gamebirds associated with riparian habitats, 6 are associated with riparian shrub or herb vegetation. These habitats are not strongly influenced by the refined understanding of the aquatic/riparian strategies, so outcomes for the 6 species (mountain quail, Swainson' hawk, merlin, northern pygmy-owl, and northern saw-whet owl) are not expected to be influenced by refined understanding of the alternatives.

Long-eared & western screech owls — Two species, long-eared owl and western screech owl, are associated with riparian willow and cottonwood. This habitat would probably be somewhat benefited by the 150 foot buffers on intermittent streams that we now understand to be the standard for Alternative 7. Outcomes for these species under Alternative 7 would likely be somewhat better than projected in February 1996, but not significantly so. The slope adjustment factor applied to Alternatives 4, 5, and 6 to delineate zone 2b is less likely to include these riparian types, so no improvement for these species is projected under Alternatives 4, 5 and 6.

Bald eagle — One species, bald eagle, is associated with large conifer trees near water. This habitat is likely to receive some greater protection within zone 2b of Alternatives 4, 5, and 6 than was projected in February 1996. This difference is not expected to be significant, and would be less in Alternative 5 than in Alternatives 4 and 6 since this riparian standard does not apply within the Timber Emphasis Areas. Since Alternatives 4 and 6 were previously judged to have the best outcomes for bald eagles, these changes do not have a strong effect.

Blue grouse — Blue grouse are associated with riparian woodland which is likely also represented within zone 2b. Outcomes for blue grouse would likely be somewhat better under Alternatives 4, 5, and 6 than was projected in February, 1996. Again, this change would not be significantly large, and the change would be less under Alternative 5 than Alternatives 4 and 6. Since these alternatives were already projected to improve blue grouse habitat, these small changes would do little to influence effects associated with the alternatives.

Woodpeckers, Nuthatches and Swifts — Cavity-nesting birds are influenced by fine-scale features of the environment, especially numbers of snags. Revised guidelines may lead to a short-term decline in numbers of large snags relative to the understanding at the time the expert panels were convened. However, new research suggests the original understandings of snag requirements were higher than necessary. In the long term, no significant changes in outcome scores are expected for cavity-nesting species.

Pileated Woodpecker — Revised snag guidelines call for interim standards that would remain in place until locally developed standards are adopted. The revised standard for large (> 20 inch dbh) snags is lower than considered in the previous analysis. These revised guidelines resulted from a new literature review and summary of snag requirements of cavity-nesting species, and these standards provide for 6 to 10 times the density of large snags than existing direction (Thomas and others 1979[3]) so the new guidelines are presumed to be sufficient to meet the needs of these species. In addition, the expert panel was primarily influenced by the long term projection of snag emphasis under each alternative rather than the interim guidance. Any influence of these new guidelines

[3]Thomas, Jack W. ed. 1979. Wildlife habitats in managed forests. The Blue Mountains of Oregon and Washington. Forest Service Agric. Handbook. 553. U.S. Department of Agriculture, Forest Service. 512 p.

would probably be most important over the shorter term, say the next few decades until local standards are developed. Over the long run, the outcome scores would not change for this species. If one accepts that the original interim guidelines were more appropriate to meet nesting requirements for the species, the result would be a slight decline in outcome scores under Alternatives 3 through 7 (certainly less than one-half of a full outcome level).

White-headed Woodpecker — Same as pileated woodpecker.

Vaux's Swift — Same as pileated woodpecker.

Note: For each of these species, the new guidelines call for retention of large patches and connectivity of mature forest under Alternatives 3, 4, 5, and 7 (outside reserves). This could lead to greater numbers of large snags. However, the landscape team did not project greater expression of late-seral conditions over the long term, so it is difficult to determine whether changes in habitat outcome would be realized.

Lewis' Woodpecker — The February 1997 riparian standards indicate that riparian buffer widths in Alternatives 4, 6, and 5 (in areas outside of timber or livestock emphasis) are larger than originally evaluated. Lewis' woodpeckers nest primarily in cottonwoods along permanently flowing streams at lower elevations. Because the effects of the revised aquatic standards would be most pronounced for higher elevation intermittent streams, the outcome scores for this species would slightly increase, but not to more than one-half of an outcome level. The only significant increase in RCA would be in areas outside of timber and livestock emphasis under Alternative 5 and these areas represent a small proportion of the species' range in the EIS areas. Therefore, the outcome score for Alternative 5 would not be raised.

Other cavity-nesting species — Other species of cavity-nesting birds are associated with smaller diameter snags. Guidelines for retention of smaller snags are similar to those presented during the panel deliberations and do not warrant changes in outcome scores for any of these other species.

Cuckoos, Hummingbirds, and Passerines — Based on the analysis of the implications of new or revised standards under the planning alternatives, no changes in outcome scores are warranted for cuckoos, hummingbirds, and passerines. Reasons for these findings are discussed below.

Riparian species — The species associated with riparian habitats would benefit from somewhat larger riparian buffers based on the guidelines due to the slope adjustment factor applied to Alternatives 4, 5 (outside of timber and livestock emphasis areas), and 6. The effect would be greatest on intermittent streams on steeper slopes that occur in higher elevation landscapes. Therefore, species that occur in riparian habitats associated with higher elevation coniferous forest would probably benefit most from this change. The species classified as riparian associates in this analysis are more typically in lower elevation hardwood and shrub habitats, so the benefit from the revised guidelines would be very slight.

Forest species —

Hammond's Flycatcher. This species is associated with late-seral coniferous forest. The revised standards call for retention of large connected blocks of late-seral forest under Alternatives 3, 4, 5 and 7 (outside of reserves), which could create better habitat conditions for this species. However, the Landscape Team did not project increased expression of late-seral forest over the long run as a result. Therefore, although one might expect a slightly increased habitat outcome under these alternatives, this was not reflected in the landscape projections. Given the long-term landscape projections, there is not sufficient evidence to support revising the outcome scores for this species.

Winter Wren. See narrative for Hammond's flycatcher. In addition, this species is associated with down wood. The revised standards provide more specific down wood guidelines than were available at the time of the panel deliberations. These standards would provide for slightly greater retention of down wood under Alternatives 4 and 6 than

under other alternatives until local guidelines are developed. This is consistent with the original interpretations, and consistent with the level of emphasis on down wood as provided by the Landscape Team. Therefore, no change is expected in habitat outcome scores for this species.

Grassland species — No expected changes.

Woodland species — No expected changes.

Bats and Small Mammals — Some adjustment in outcomes may result for those bats and small mammals associated with riparian ecosystems and snag habitat, because some aquatic/riparian strategies and snag requirements have been clarified or changed. The use of the slope adjustment factor (riparian zone 2b) in standards for Alternatives 4, 5 (outside timber and livestock emphasis areas) and 6, the change from 100- to 150-foot minimum buffer on intermittent streams for Alternative 7, and the decrease from a 100- to a 50-foot minimum buffer on ponds and wetlands less than 1 acre (Alternatives 2, 3, and 7) are the major riparian differences considered. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes were considered to balance or nearly balance each other for species that use both habitats, and result in little or no change under this Alternative.

Cavity-roosting bats and small mammals are influenced by the numbers of snags available. The revised guidelines may result in fewer large snags than understood at the time the expert panels were convened. New research summaries suggest the current snag requirements are adequate to meet species needs for this habitat component. In the long term, no significant changes in outcome scores are expected for these cavity-roosting bats and small mammals.

A new standard calls for retention of large patches and connectivity of late-seral forest under Alternatives 3, 4, 5 and 7 (outside reserves). This could lead to greater numbers of large snags and green trees and more contiguous, sizeable patches of late-seral forest. Because the landscape team did not project more late-seral conditions over the long term it is difficult to assess whether changes in habitat outcomes would occur.

Bats — The fringed myotis, hoary bat, long-eared bat, long-legged bat, silver-haired bat, and spotted bat all use snags and live tree roosts, late-seral habitat, and riparian habitat. They are also sensitive to human disturbance. The initial panel judgments were, therefore, based on projected large snag numbers, amounts of late-seral habitat, timber harvest levels, levels of human disturbance, and riparian buffers. Because of the clarification of the aquatic/riparian standards, Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 should result in wider riparian buffers on intermittent streams in steep landscapes than understood in the initial panels. Alternative 7 has wider buffers on all intermittent streams. Alternatives 2, 3, and 7 should result in smaller riparian buffers on ponds and wetlands smaller than 1 acre. Because there is no way to quantify the amount of intermittent stream affected by the increase in buffer width in Alternative 7, versus the decrease in small pond and wetland buffer in Alternative 7, these changes were considered to generally balance each other for species that use both habitats, and result in little or no change under this Alternative. Alternatives 4 and 6 could have slightly better outcomes than earlier projected for these species, while Alternatives 2 and 3 could have slightly lower outcomes. Overall these changes should not result in significant shifts in species outcomes (such as a shift in one-half a species mean likelihood outcome) for any bats or small mammals assessed.

Similarly, the adjustment in large snag guidelines and clarification of standards for retention of large patches and connectivity of late-seral forest [Alternatives 3, 4, 5 and 7 (outside reserves)] should not result in significant shifts in species outcomes (such as a shift in one-half a species mean likelihood outcome) for any bats or small mammals assessed.

For pale western big-eared bat the number of large diameter snags, riparian condition, and intermittent stream protections, and the reduction of road densities were important features of the alternatives. Expected results of clarifications or changes in Alternatives are similar to those described for other bats, above.

Small mammals — Important components of northern flying squirrel habitat include large trees and snags. Improving riparian conditions and decreasing forest fragmentation are also important. Expected results of clarifications or changes in Alternatives are similar to those described for the bats, above.

Carnivores — In general the revised objectives and standards, as they relate to the carnivores considered for analysis, have positive implications for the group. Although numerous changes have been made to the standards and objectives, 15 of the changes were considered to be of importance to the carnivore species group. Each of the selected changes to the objectives and standards were rated as positive (+), neutral (/), or negative (-) for each species in the group. Overall trends were then determined from the change for each alternative, for each species and the group as a whole.

The triggers for ecosystem analysis at the watershed scale are positive for carnivores, in that several species are federally listed, all of the species considered persist in areas of low road densities and several species prey on range associated species. An additional standard for Alternatives 3 through 7 is considered to be positive for grizzly bears. This standard affords additional protection for whitebark pine.

Two changes in aquatic and riparian standards have implications for this group. First, for Alternative 7 the panelists originally evaluated buffer widths of 100 feet for intermittent streams, the current standard reads 150 feet. For the species in this group this can be considered a positive change. Second, however is the decrease in the buffer width from 100 feet to 50 feet around small wetlands (less than 1 acre in size) under Alternatives 2, 3, and 7, for watersheds not identified as key or priority. This change is considered to have a negative effect on the habitat of most carnivore species and their prey. The addition of the slope adjustment factor for Alternatives 4, 5 (outside timber priority areas) and 6 are considered positive for carnivores. This change allows for improved prey habitat and improved dispersal habitat.

The changes involving the standards for coarse woody debris, large standing trees (live or dead), snags and down wood for Alternatives 3 through 7 are considered to be neutral for forest carnivores at this time, with the understanding that the prescribed levels meet the habitat requirements of these species and their prey.

Projected road densities were considered a very important aspect in rating the viability outcomes for the alternatives. The current road density reduction standard in Alternatives 3 through 7 and the standard that limits increasing road densities in areas that currently have no roads to a low road density, for Alternatives 3 through 7, are consistent with the maps the panelists were given during the alternative evaluation process. Therefore this is considered to be a clarification of intent and not a change in content.

Forest carnivores: pine marten, fisher, lynx and wolverine — Of all the changes to the objectives and standards of greatest concern for pine marten and fisher are the standards for coarse woody debris, large standing trees, snags and down wood. Specifically the changes to the snag standards require fewer large snags and an increased number of total snags. The assumption is that these changes will meet the habitat requirements of forest carnivores and their prey. The change to aquatic and riparian direction for Alternative 7 which increased the buffer width on intermittent streams and the slope adjustment factor, should be positive for forest carnivores. The last change potentially affecting habitat for this group, involves the standards for road densities. One standard which requires ecosystem analysis at the watershed scale (in areas of no or low road density), can be considered positive for forest carnivores. The standard which requires decreasing

road densities in areas of high or extreme road density is also considered to be positive for forest carnivores.

Alternative	Expected Change in Outcomes
1,2,3,4,5	No change
6	Slight improvement
7	More improvement

Gray Wolf — The implications for the gray wolf as a result of the changes to the objectives and standards are fairly limited. The requirements for ecosystem analysis at the watershed scale for Alternatives 4, 6 and parts of 5, will be positive for gray wolf. The only other change expected to affect gray wolf habitat is one which prescribes reducing road densities in areas of high or extreme road densities.

Alternative	Expected Change in Outcomes
1,2,3,4,5	No change
6,7	Slight improvement

Grizzly bear — The changes to the Aquatic Conservation Strategy previously described have mixed results for grizzly bears. Increasing the buffer widths on intermittent streams (Alternative 7) and the slope adjustment factor for Zone 2B (Alternatives 4, 6 and parts of 5), will have a beneficial effect on grizzly bear habitat. Potentially these changes could benefit movement corridors and prey habitat. The decrease in the size of the buffers for wetlands less than 1 acre would have a negative effect on grizzly bear habitat. Both standards were rated positive for grizzly bears. The standard which calls for increasing the distribution and frequency of whitebark pine for Alternatives 3 through 7 could be very positive for grizzly bears. The standard which prescribes road density reductions in areas of high to extreme road densities may have some potential benefit for grizzly bear habitat.

Alternative	Expected Change in Outcomes
1,2,3,5	No change
4, 6	Slight improvement
7	More improvement

Ungulates — Since the woodland caribou uses habitats quite different from the pronghorn antelope and the California bighorn sheep it is impossible to determine trends in expected effects as a result of the changed objective and standards for the ungulates as a group. However expected effects for pronghorn antelope and California bighorn sheep are similar.

Woodland caribou — Generally the changes to the objectives and standards are expected to be positive for the woodland caribou. The only negative effect expected involves the Aquatic Conservation Strategy where the buffer widths on wetlands less than 1 acre in size are understood to have decreased from 100-foot to 50-foot (Alternatives 2, 3 and 7). However, the increase in buffer widths along intermittent streams (Alternative 7) and the slope adjustment factor (Alternatives 4, 6 and parts of 5) are considered a positive change for caribou habitats. Requirements for ecosystem analysis at the watershed scale (listed species, Alternatives 4 through 7) and areas of no or low road density (Alternatives 6 and 7), are considered to be positive for woodland caribou habitats. Standards calling for large standing trees (Alternatives 3 through 7) and restricting the harvest of large trees (Alternative 7), are considered favorable for woodland caribou. Finally, the standard which prescribes reducing road densities in area of high and extreme road density (Alternatives 3 through 7) is considered positive for woodland caribou.

Alternative	Expected Change in Outcomes
1,2,3,4,5,6	No change
7	More improvement

Pronghorn antelope and California bighorn sheep — The expected overall effects of the changes to the objectives and standards for pronghorn antelope and California bighorn sheep are minimal. Potentially three standards are considered to be positive for these two species. These standards prescribe ecosystem analysis at the watershed scale for areas of no to low road densities and areas which contain large block of native rangelands, and will be positive for both species.

Finally the standard which prescribes a decrease in road densities in areas that currently have high to extreme road densities, is considered to be positive for these 2 species (Alternatives 3 through 7).

Alternative	Expected Change in Outcomes
1,2,3,4,5,6	No change
7	Slight improvement

Significance of Changes

Standards to better establish the priorities for accomplishing subbasin reviews and Ecosystem Analysis at the Watershed Scale would provide for better protection of some rare plants and some carnivores. Outcomes for plants of special or sensitive status would be more positive because of the improved emphasis on protection and restoration of habitats. These changes have significantly strengthened the protection for plants at the edges of their geographic ranges.

Changes primarily in the delineation of RCAs and the snag and down wood standards most affected vertebrate species outcomes initially determined during February 1996. Increasing the RCA width by addition of the slope adjustment factor in Alternatives 4, 5 (outside timber and livestock emphasis areas), and 6 would have beneficial effects on some riparian-associated species. However, the revised standard would primarily affect intermittent streams and would have less direct impact than with perennial streams, which provide more primary riparian habitat than intermittent streams. The effects on downstream water quality in the higher order perennial streams would have a positive impact on species associated with aquatic habitats. These positive effects on riparian species would be much smaller under Alternative 5, where they would occur only in emphasis areas other than timber and livestock, than under Alternatives 4 and 6. Increasing the buffer zone in intermittent streams under Alternative 7 would have indirect effects similar to increasing RCA widths under Alternatives 4 and 6.

Decreasing the buffer zones in small wetlands (<1 acre) under Alternatives 2, 3 and 7 from 100 feet to 50 feet would have some negative effects on species associated with those habitats. In some cases, such as with amphibians, the effects of wider RCAs in intermittent streams, as described above, might be offset by decreases in small wetland protection. However, protection of small wetlands in priority areas other than timber or livestock would result in better habitat outcomes for species in those habitats under Alternative 5.

Changes in the snag and down wood retention levels would likely not change the outcomes determined during February 1996 for species associated with those habitat elements. Although the current standards call for lower retention of large snags than the February 1996 evaluation, new research suggests the original understandings of snag requirements were higher than necessary. In the long term, no significant changes in outcome scores are expected for species associated with snag or down wood habitats.

Overall, changes in the alternatives from 1996 to 1997 will not result in significant changes in mean viability outcome scores (that is, changes would be less than 0.5 outcome units) for species affected by changes.

Social-Economic

Richard W. Haynes, Amy L. Horne, James A. Burchfield, and Steve F. McCool[4]

Major Changes that Occurred in Standards and Objectives

The primary changes in the DEIS alternatives that will affect the evaluation are those changes that increase the likelihood of protracted planning activities in the first decade. This includes ecosystem analysis at the watershed scale and subbasin reviews. Such activities reduce the likelihood of attaining the first decade activity levels until later in the decade. This could especially be a problem

[4]The authors benefited from discussions with Nick Reyna and Stewart Allen.

for the timber activity levels where timber sale activity is expected to drop while watershed analysis is undertaken.

Types of Changes

The alternatives differ only in the extent of the potential drop in timber sale activity. Those delays in the sales program on top of the changes in, for example, the timber sale program since 1990, will impose further economic impacts over the next five years. For example, in the Eastside EIS area the timber sale program fell from 1.6 billion board feet in 1990 to 316 million board feet in 1995 largely as the result of the Eastside Screens and changes in the FS timber sale program. For the Eastside DEIS, average first decade harvests in Alternatives 2 through 6 average 767 million board feet — more than two times current sales level. Assuming that during the period when watershed analyses are conducted the timber sales program remains at current levels and that only one tenth[5] of the harvest reduction can be offset by increases on private timber lands, then job reductions will be increased by 3,100 jobs during that period. This timber is sufficient to supply 12 mills. While it is difficult to predict specific mill closures, mill closures will be inevitable during this period. The problem is not as severe in the UCRB where Federal timber sales have fallen by a smaller percentage only in the last three years.

While these changes are framed in just economic terms, the social changes that accompany these economic transitions are very real in those communities experiencing mill closures. Communities and economies characterized by low social/economic resiliency will be challenged during this transition period from existing FS practices to the new practices reflecting ecosystem management. Various institutions such as local governments will attempt to prevent or mitigate these changes, possibly threatening achievement of the long-term management changes.

Not addressed are the substantial costs to the various agencies for additional planning activities. In an era of downsizing and reduced federal budgets, such an approach seems regressive. Management delays in accomplishing watershed analysis (up to four years in some alternatives) may diminish public confidence in the agencies responsible for the stewardship of Federal lands. It may betray the presumed promises offered by the EISs as a more efficient planning model to guide actions on Federal lands and would likely engender a negative political response. Finally, there is the likely decrease in trust in Federal land management agencies as effective institutions capable of coordinated action.

The potential decrease in federal payments to counties coupled with decreases in federal dollars to support road systems on Federal lands will impact both social resiliency and recreation opportunities that contribute to local quality of life. These decreases are relatively certain compared to the relatively uncertain and longer-term projections of positive effects on fish and environmental quality. It is difficult to speculate on the effect of other social variables such as quality of life or community well-being.

Significance of Changes

The primary changes in the DEIS alternatives, standards and guidelines that affected the evaluation are those changes that increase the likelihood of protracted planning activities in the first decade. This conclusion is reached by looking at the extent of the reliance in the various DEIS alternatives on new planning activities prior to the implementation of land management activities such as timber sales. This is seen as having the largest impact on the timber sales program and payments to counties while only minimal impacts on recreation or range activities.

[5]Past studies have used a higher fraction but the length of the current federal harvest reduction (now six years) has reduced the available private timber inventories.

Conclusions

Thomas M. Quigley

The concurrent scientific assessment and EIS development complicated the evaluation of the DEIS alternative effects. The SIT retained the February 1996 version as the primary product to analyze so that analysis could be concluded. The primary overarching elements of the alternatives (purpose and need, goals, themes, activity levels, desired range of future conditions, and the affected environment) changed very little between February 1996 and February 1997. Those elements that changed the most were the objectives and standards. For the most part changes were to improve understanding, provide clarity, and further flesh out details associated with process-oriented standards. These were generally adopted in a manner consistent with the SIT assumptions required to resolve unknowns in the February 1996 EISs.

Given this background one would not expect dramatic differences in effects and consequences, nor to see rankings among the alternatives shift substantially. This is essentially the outcome of the revaluation of the February 1997 version of the DEISs. Many of the objectives and standards were at scales and resolutions that could not be modeled directly across the EIS areas. This resulted in interpretations of likely effects for many of the new standards and objectives.

On the whole, changes to the alternatives will improve overall conditions for riparian and aquatic related species. Projecting future effects to 100 years results in few substantive differences. From a landscape ecology perspective, the changes in the alternatives are likely to delay the transition to the desired future conditions during the first decade. In addition the single size/state standards will likely increase disruption of ecological processes if they are not revised to fit the ground during implementation within the first decade.

Alternatives 3 through 7 provide varying rates in achieving healthy landscapes, but each has some potential. The requirements for subbasin review and ecosystem analysis at the watershed scale are likely to cause a slowdown in the production of timber during the first few years. The social and political acceptability for the required analysis and its potential impact on commodity flows are first decade concerns for managers. Terrestrial species are expected to have slightly better outcomes associated with the revised alternatives, but few changes would be significant (that is, changes would be less than 0.5 outcome units).

The SIT has worked with the EIS teams as the assessment and EISs were developed. The EIS teams relied heavily on the Evaluation of EIS Alternatives by the SIT. Rather than continue to modify the science publication to remain completely consistent with the evolving EISs, chapters 2 through 7 of this publication are based on the February 1996 version. This chapter provides a brief overview of the changes in the evaluation of alternatives that are reflected in the February 1997 DEISs. To understand the specific management directions being considered within the EIS process and the associated effects and consequences, refer directly to the official NEPA documents.

Continue

Previous

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Mis-scans identified by the software have been corrected;
however, some errors may remain.

Acknowledgments

The re-evaluation of the EIS alternatives was accomplished in a short period of time to accommodate continued progress of the EIS process. Many individuals contributed to the re-evaluation and its documentation. Cindy Dean has been largely responsible for the synthesis and final collating of the information. Rebecca Gravenmier assisted in organizing and interpreting the voluminous information. Jodi Clifford has assisted in editing and general document coordination. Cathy Humphrey and Shari Whitwell provided valuable summaries and comparisons of standards and objectives between EIS versions. The Project administrative staff and communications teams aided in many ways during periods of quick turnaround requirements and under high pressure. Ralph Perkins and Richard Hanes provided valuable insights into tribal concerns.

Appendix I

The science team received the Preliminary Draft EIS standards and objectives in February 1996. This appendix is provided as a reference listing of those standards and objectives. They represent the set for which the science team analyzed and documented the outcomes and effects. As the analysis proceeded and interaction occurred with managers, the public, and the Science Team, these original standards and objectives began to evolve. For a listing of the specific objectives and standards in which this process finally resulted, please refer to the EIS documents directly.

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Direction for Alternative 1

Objectives and Standards

Implementation and Adaptive Management

1I-O1. For riparian areas, measurable objectives and monitoring will be set for key parameters such as stream surface shading, streambank stability and shrub cover.

Monitoring and Evaluation

1M-S1. Ensure operations are in compliance with appropriate regulations. Conduct inspections in accordance with agency policies and procedures.

Physical Environment

1P-O2. Meet state air quality requirements.

1P-S2. Plan and conduct prescribed burning in accordance with State Smoke Management Plans and State Implementation Plans of the Clean Air Act.

Suggested Technique
Employ smoke management mitigation measures to reduce emissions from prescribed burning.

1P-S3. Reduce total emissions from prescribed burns to prevent significant deterioration (PSD).

Suggested Technique
Reduce the potential for wildfire emissions through use of prescribed fire and other fuels management.

1F-O3. Plan and conduct land uses and management activities to minimize loss of site potential caused by detrimental erosion, compaction, displacement, puddling and severe burning.

1F-O4. Maintain at least 80% of each activity area in condition of acceptable productivity potential.

1F-O5. Use management practices that ensure:

- Adequate amounts of ground cover to support infiltration, maintain soil moisture storage and stabilize soils.
- Permeability rates appropriate to climate and soils.
- Adequate nutrient capital and functioning cycles on all lands.

1F-O6. Where detrimental effects have occurred, plan and implement rehabilitation to meet soil and water objectives and standards.

1F-O7. Stabilize lands disturbed as a result of activities to control soil erosion.

1P-O8. Maintain or enhance water quality and quantity and protect existing beneficial uses of water.

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1P-S4. Meet or exceed applicable state and federal water quality standards.

Human Uses and Values

1H-O4. Provide a broad spectrum of developed and dispersed recreation opportunities and activities in a range of settings.

1H-S4. Use the recreation opportunity spectrum (ROS) or appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences.

1H-S5. Manage recreation settings and facilities to provide safe and sanitary recreation experiences, protect facilities, sites and resources, and meet user needs.

1H-S6. Protect and manage established dispersed recreation sties and special place.

1H-O5. Maintain and enhance the visual character of the landscape.

1H-S7. Meet established visual quality objectives (or "higher"), using management principles and techniques from the appropriate agency Landscape Management Systems.

Suggested Technique
Rehabilitate landscapes containing negative visual elements.

1H-O6. Coordinate management of Federal lands, resources and activities with local, state and Federal agencies, private landowners, Native American Tribes, and interest and user groups. [from 3-7?]

Suggested Techniques
Emphasize strengthening and developing partnerships in managing and enhancing Forest resources (fish, wildlife, recreation, others).

Coordinate fire management activities in rural interface areas with local governments, agencies, and landowners.

1H-O7. Improve public awareness of, involvement in, and support for Forest and District land management objectives and programs.

1H-O8. Support strategies that enhance rural community economic advancement; define complimentary roles and implement programs that best serve the public. Assist in providing developmental, tourism, and recreational activities that help diversify rural economies, improve quality of life that attracts amenity related in-migration.

1H-S8. Provide a predictable supply of timber and other forest products within sustainable limits of the ecosystem(s).

1H-S9. Provide a predictable supply of livestock and wild horse forage within sustainable limits of the ecosystem.

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1H-O9. Provide for ceded land rights and treaty privileges of native peoples. [should we have items from 3-7 here also?]

1H-O10. Consult and coordinate planning and management activities with the tribes.

1H- O11. Maintain pubic lands open to and available for mineral and energy exploration and development except where legally unavailable (withdrawn) or necessary to protect special values.

Locatable Minerals

Objective. Provide opportunity for the orderly exploration and development of mineral resources in area identified as open to operations and subject to appropriate regulations.

1H-S10. As required by applicable mining laws, provide access for exploration and development of locatable mineral resources. A decision on approval of access will be made as a result of appropriate environmental analysis, conducted in response to proposed operating plans.

1H-S11. Where necessary to protect important lands and resources, mineral exploration and development would be subject to additional restrictions or stipulations. The least restrictive limitations necessary for resource protection would be used.

1H-S12. All surface disturbance from operations would be reclaimed to a productive condition to the extent reasonable and practicable.

Leasable Minerals

Objective. Provide leasing opportunities for oil, gas and geothermal exploration and development subject to appropriate regulations and requirements in areas identified as open to operations.

Standard. Subject to applicable laws and regulations, provide access for exploration and development of leasable mineral resources.

Standard. All exploration applications will receive appropriate environmental review and NEPA documentation prior to authorization.

Standard. In order to protect special resource values and investments, leasing would be subject to appropriate lease notices and lease stipulations.

Standard. Ensure that operations are in compliance with appropriate regulations conducted inspections in accordance with agency policies and procedures.

Standard. All surface disturbance from operations would be reclaimed to a productive condition to the extent reasonable and practicable.

Objective. Provide and manage a safe and economical transportation system to provide public access and meet resource and protection objectives.

Standard. Plan, develop, operate, and maintain according to agency standards and objectives for planned uses and activities, safety, economies, and impacts on lands and resources.

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Terrestrial Ecosystems

1T-O12. Make suitable rangelands available for grazing and browse use in coordination with other uses and protecting productivity.

1T-S13. Allocate forage on allotment or management area to meet basic plant, plant vigor, and soil needs as first priority.

1T-S13a. Use the forage utilization standards defined in agency guides; use levels should be consistent with objectives established by management plans.

Suggested Technique
Set forage utilization standards (stocking rates) for livestock, wild horses and burros, and big game for riparian and upland areas based on species type, current allotment condition and range management strategy.

Design grazing systems to maintain or improve plant vigor.

1T-S14. Range project plans or AMPs and, where applicable, wild horse and burro herd management plans (WHHMPs) will be developed, revised and maintained which establish objectives for managing vegetation resources (including activities needed to achieve the objectives) for achieving desirable riparian conditions (and improvement schedule if needed, grazing system, season of use, class of livestock, stocking levels, forage products and utilization rates, improvements needed to achieve objectives, economic efficiency analysis and coordinating requirements).

Suggested Technique
Intensive range management practices including rest may be used to protect and improve riparian vegetation and fish and wildlife habitats.

To stabilize soils, improve livestock forage conditions and wildlife habitat, seed poor condition rangelands to a site specific mixture of native or desirable exotic grasses, fobs and shrubs. Use seedings to release grazing pressure form native range to improve their condition.

To stabilize soils after wildfire, seed rangelands that have a low potential for natural recovery with a site specific mixture of native or desirable exotic grasses, forbs and shrubs.

Provide periods of rest from disturbance or livestock use during times of critical plant growth to maintain or improve vegetation condition.

1T-O13. Use integrated pest management detection, prevention, and suppression strategies to manage pests including biological, manual, mechanical, cultural, prescribed fire, chemical and regulatory methods.

1T-S15. Plans and actions for control of competing and unwanted vegetation (including noxious weeds) will be in keeping with "Managing Competing and Unwanted Vegetation" (FEDS) USDA, Forest Service, 1988, "Vegetation Treatment on BLM Lands in Thirteen Western States" (ROD) USDA, BLM 1991., "Northwest Area Noxious Weed Control Program" (ROD) USDI BLM 1987, or similar agency direction.

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1T-S16. All wild fires shall receive a prompt and appropriate suppression response. Appropriate suppression strategies are defined by the agency.

1T-S17. Priorities for fire suppression shall be the protection of human life, public safety, private property, and improvements or investments.

Suggested Techniques
Use minimum impact suppression methods.

Use prescribed fire to meet vegetation management objectives and to reduce and maintain appropriate fuel profiles. Unplanned ignition may be used if a prescribed fire plan has been developed and the fire is within prescription.

Manage residue profiles at a level to minimize the potential of high intensity catastrophic wildfire and provide for other resource objectives.

1T- O14. [need an obj related to suitable lands: see 1T-O12 for example.]

1F-S18. Allow regulated timber harvest only on lands classified as suitable for timber management. Prohibited timber harvest on lands unsuitable for timber management, except where needed to accomplish other multiple use objectives.

1F-S19. Selection of appropriate silvicultural systems should be guided by:

- Meets the management objectives and management area or resource emphasis.
- Permits the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards defined in agency guidelines and are designated for harvest.
- Permits the use of acceptable logging methods that can remove logs and other products without excessive damage to the identified desirable retained vegetation.
- Be capable of meeting or providing special management conditions and achieve particular multiple use management objectives (such as streamside protection, wildlife needs, and visual enhancement).
- Permits control vegetation and use appropriate practices to establish desired species, composition, density and rates of growth of trees and other vegetation needed to achieve objectives.
- Promote stand structures and species composition that minimizes serious risk of damage caused by mammals, insects, disease, or wildfire, and allows treatment of existing insect, disease, or fuel conditions.
- Assure that lands can be adequately restocked within time frames.
- Practical and economic in terms of transportation, harvesting, preparation and administration of timber sales.

1F-S19a. Clearcutting should only be allowed when it is found to be the optimum harvest methods.

Suggested Technique
The variety of management intensities and silvicultural practices can be used, singly or in combination, and will vary by site conditions and productivity, timber species, resource management objectives and timing of implementation.

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Appropriate silvicultural practices including site preparation, tree improvement, reforestation, release and weeding, thinning, fertilizing, pruning, sanitation harvest, salvage harvest, even aged harvests (shelter woods, seed tree, clearcuts) and uneven aged harvest (individual tree and group selection. Regeneration and tree stocking standards are defined at the local area.

1F-S20. Lands scheduled for timber harvest using even-aged practices should be managed on rotation(s) equal to or greater than 95 percent of culmination of mean annual increment of growth (based on cf measure).

1F-O15. Use timber management activities to promote horizontal and vertical vegetative diversity to help meet wildlife, aesthetic, recreational, and other objectives.

1F-S21. Where appropriate, stagger regeneration in space and time for even aged areas. Created openings should be separated by blocks of land or areas not classed as created opening. Harvested areas are not considered a created opening for timber management when tree stocking is above minimum levels, trees are 4' in height and free to grow.

1F-S22. Openings created by even aged harvesting should not exceed 40 acres; exceptions permitted under catastrophic conditions.

1F-O16. Provide for salvage harvest of timber killed or damaged by events such as wildfire, wind storms, insect and diseases, consistent with management objectives for other resources.

Objective. Provide habitat for viable populations of existing natives and desirable non-natives vertebrate wildlife species.

1T-S23. Old growth tree (reserve where appropriate) habitat (or develop replacement habitat where presently unavailable) should be maintained and well distributed across the landscape for indicator species dependent on old growth. Meet key species requirements by managing (reserve) areas of appropriate size and arrangement with adequate larger, older trees; proper stand structures and densities (usually multi-storied), snags and down logs; associated feeding habitat and other criteria.

1T-S24. Should manage dead trees (snags) to provide the required numbers and size of snags throughout the Forest to maintain primary cavity excavators at 40 to 60 percent of their potential population in timber production areas and appropriate levels in other areas; leave appropriate levels of green trees to serve as a source of future snags.

1T-S25. Should provide dead and down logs in appropriate numbers by size classes to support species that utilize this resource.

1T-S26. Should manage forest stands and shrub and grassland communities and successional stages to provide suitable big game habitat(s); cover quality, cover size and spacing, open road densities, and forage quality to meet species needs as defined in a Habitat Effectiveness Index.

1T-S27. Should protect big game habitats at key times including winter ranges, calving/ fawning areas, wallows, and migration areas by maintaining desired vegetative structure and characteristics.

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1T-S28. Should manage unique or featured wildlife habitats including cliffs, talus, caves; seeps-springs; bogs, wallows and other wet areas (generally under 10 acres) to protect their primary values.

1T-S29. For Federal Threatened, Endangered, proposed, and special status species, shall use required biological assessment/evaluation procedures and meet consultation requirements. Promote preservation, restoration and/or maintenance of their habitats.

Wilderness and Reserves

1?-O21. Manage for natural ecological processes with minimal human interference; preserve and protect natural conditions, processes, and wilderness character.

Suggested Techniques
Replicate natural processes, disturbance events and cycles with prescribed fire(s). (Naturally occurring fires are considered prescribed fires until declared a wildfire (outside of prescription). Wildfires will be suppressed using appropriate agency suppression strategies.)

1?-S30. Recreation, range and other permitted activity use and facilities shall be managed to meet wilderness objectives and preserve wilderness character and values.

Suggested Technique
Use the Limits of Acceptable Change (LAC) process to determine management actions to preserve natural environments and provide for wilderness experiences.

1?-S31. Timber harvest and motorized vehicle access shall be prohibited (except emergencies or other authorized exceptions).

1?-S32. Manage Wilderness Study Areas (WSA) to protect and preserve their wilderness character. Protect and preserve Areas of Critical Environmental Concern (ACEC) special resource values.

Aquatic Ecosystems

Ecosystem Analysis

Not applicable except for NWFP

1A-O22. Objective: Inventory, treat and improve conditions in watersheds in need of restoration to reverse and arrest adverse impacts to water quality and fish habitat. Areas where fish habitat(s) or water quality have been adversely affected shall be given high priority for corrective treatments that mitigate impacts or rehabilitate these areas.

1A-S33. Meet or exceed state water quality protection and restoration requirements through planning, application and monitoring of Best Management Practices (BMPs).

1A-S34. Protect beneficial uses by implementing water quality practices, plans, and policies in current memorandums of understanding with the states.
1A-S35. Evaluate proposed projects or management actions for cumulative effects on water quality, quantity or stream channels.

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Suggested Techniques
Disperse activities in time and space, where practicable, to the extent needed to meet management requirements.

1A-O23. Provide and maintain a diverse, well distributed pattern of fish habitat to aid in increasing anadromous fish runs.
- Meeting criteria in state water quality standards for stream temperature and providing stream side vegetation to shade at least 60 percent of stream surface from June through September between hours 10 am and 4 pm.
- Maintaining sufficient large woody debris to provide for continuous long-term supply in all stream classes.
- Retaining 80 percent or more of the total lineal distance of stream banks in stable condition.
- Promoting bank, floodplain, and channel stability to provide resiliency to disturbance and foster aquatic diversity.
- Ensuring that 15 percent or less of stream substrate is covered by inorganic sediment.
- Providing pools that are adequately large, well distributed, and persistent during low flows and to conserve or restore channel morphology appropriate to the climate and landform.
- Providing at least 80 percent of site enhancement potential for cover for grass-forb, shrub and tree dominated sites in riparian areas.

Suggested Techniques
Use practices that maintain or promote sufficient residual vegetation to maintain, improve or restore riparian and wetland functions. Use practices that maintain or promote appropriate channel morphology and functions.

1A-O24. Achieve riparian and wetland area improvement and maintenance through management of existing uses, wherever feasible.

1A-O25. Maintain or improve riparian and wetlands to properly functioning condition.

1F-O26. Limit or mitigate ground disturbance in floodplains, riparian areas, and aquatic habitats to prevent soil movement, loss and sedimentation.

Direction Unique to Alternative 1
[Level 2]
Objectives and standards applicable to areas covered by the Northwest Forest Plan.

Social

Same as Alternative 1 level 1 direction

Economics

Same as Alternative 1 level 1 direction

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Tribal Trust Responsibilities

Northwest Forest Plan standards and guidelines see pages C-31 to C-38

Aquatics

1A-O1(2). General Aquatic Conservation:

- Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems.
- Maintain and restore spatial and temporal connectivity within and between watersheds.
- Maintain and restore the physical integrity of the aquatic system.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved.
- Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing.
- Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

1A-O2(2). Emphasize riparian dependent resources by maintain and restoring riparian structure and function, conferring benefits to riparian dependent and associated species, enhancing habitat conservation for organisms that are dependent on transition zones between upslopes and riparian areas, improving travel and dispersal corridors for terrestrial animals and plants and providing greater connectivity of the watershed. Riparian Reserves serve as connectivity corridors among Late Successional Reserves.

1A-S1(2). Delineate and manage riparian reserves in all watersheds to protect and restore riparian and aquatic integrity and function according to prescribed widths for defined categories of streams or water bodies (see Alt. 2, standard 5-11.6).

1A-S/G(2). Standards and Guidelines: Apply special standards and guidelines that prohibit and regulate activities to lands along streams and unstable or potentially unstable areas where attainment of aquatic conservation objectives may be retarded or prevented. See Northwest Forest Plan standards and guidelines pages C-31 to C-38

1A-S2(2). To promote efficient and effective protection and restoration of aquatic/riparian resources in riparian areas, restoration and vegetation manipulation actions in RMAs should facilitate ecosystem function, reconnect linkages between aquatic, riparian, and upland environments, and focus on the causes of degradation. Note that some of these guidelines do not apply unless site-specific or ecosystem analysis is performed.

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1A-G1(2). To avoid artificial habitat edges at RMA boundaries in areas of timber harvest, livestock grazing, or vegetation manipulation, consider feathering vegetation structure between RMAs and adjacent lands. Implement feathering strategies so as to have negligible effect on bank stability, streamside shading, channel/floodplain interactions, and wood inputs to the aquatic/riparian system.

1A-G2(2). Design and implement treatments that affect riparian vegetation pattern, composition, or structure in a manner that reflects natural disturbance processes (e.g. flood, fire).

1A-G3(2). On rangelands, consider regulating domestic grazing intensity and season of use to limit bank trampling, restore plant vigor, promote vegetation cover, and increase energy storage.

1A-G4(2). On rangelands, consider regulating spring and seep development so as to protect ecological processes, functions, and states at these sites.

1A-G5(2). Consider locating water development, fencing, salt, and supplements on upland areas to keep domestic livestock from congregating in riparian areas.

1A-G6(2). Because fencing commonly fails at successfully excluding livestock, consider other management options prior to implementing permanent enclosures around riparian areas.

1A-G7(2). To reduce adverse consequences to aquatic/riparian resources due to roads, road obliteration and rehabilitation should be a high priority within RMAs.

1A-G8(2). Design of necessary new roads in RMAs should be done in a manner that does not disrupt natural hydrological flow paths, including diversion of streamflow and interception of surface and subsurface flow.

1A-G9(2). Construct necessary new roads and maintain existing roads in such a manner to minimize sediment introduction into aquatic environments and disruption of hydrologic regime.

1A-G10(2). Where appropriate, control road access, with the intent to limit introductions of exotic aquatic biota.

1A-G11(2). Construct all new road stream crossings within RMAs currently supporting fish species, or streams which historically supported native fish species, in such a manner to maintain fish passage.

1A-G12(2). All new road stream crossings shall be constructed to accommodate at least the 100-year flood event. Design criteria should be on the basis of standard engineering practices.

- fish and wildlife (?)
- research (?)
- watershed and habitat restoration. (?)

1A-O3(2). Key watersheds will be identified and managed to maintain and recover at risk stocks of fish through a system of large refugia (designated areas that provide or are expected to provide, high quality habitat). Two designations of key watersheds has been identified:

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Key Watersheds (Tier 1 - Aquatic Conservation Emphasis) have been selected for directly contributing to conservation of at-risk anadromous salmonids, bull trout and resident fish species. Key watersheds (Tier 2 (other)) were selected as sources of high quality water and may not contain at-risk fish stocks.

1A-S2(2). In key watersheds, no new roads will be built in unroaded portions of inventoried roadless areas. Reduce road mileage outside roadless areas. Permit no net increase in the amount of roads, if funds are insufficient to implement reductions.

1A-G13(2). Key watersheds are the highest priority for watershed restoration.

1A-O4(2). Conduct ecosystem analysis within a watershed using the watershed analysis Procedures to help implement management objectives. Use information from watershed analysis to guide management prescriptions and monitoring strategies.

1A-S3(2). Watershed Analysis is required for (a) all key watershed and all roadless areas prior to resource management activities. Exceptions are minor activities categorically excluded under NEPA, (b) analysis of earthflows for inclusion with riparian reserve, and (c) modifications of riparian reserve boundaries.

1A-G14(2). Watershed Analysis is recommended for all other watersheds.

1A-O5(2). Design and implement watershed restoration activities to restore watershed processes, recover fish and riparian habitat and improve water quality.

1A-G15(2). Focus watershed restoration on removing roads and upgrading those that remain in the system. Apply silvicultural systems to restore and retain large conifers in Riparian Reserves.

Northwest Forest Plan Standards and Guidelines Common to All Land Allocations

Standards:

Standards and Guidelines from current plans apply where they are more restrictive or provide greater benefits to late-successional forest related species than other provisions of the (NW Forest Plan) Standards and Guidelines.

Exceptions consist of provisions in the NW Forest Plan that are specifically designed to replace direction in current plans including:

—Direction specific to management for the Northern Spotted Owl and its habitat.
—Administratively Withdrawn Areas that are specified in current plans to benefit certain late successional species are returned to the matrix unless local knowledge indicates the NW Forest Plan and direction will not meet management objectives for these species.
—Green tree retention standards for the matrix exceeding 15 percent in current plans are superseded by 15 percent retention direction in the Standards and Guidelines.
—For Adaptive Management Areas, direction in current plans needs to be considered during planning and implementation activities and may be modified in Adaptive Management Areas plans based on site specific analysis.

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Standard: Unmapped Late-Successional Reserves (See direction page C-3, NW Forest Plan Standards and Guidelines)

Standard: Watershed Analysis - see Watershed Analysis direction.

Standard: Research (See direction page C-4, NW Forest Plan Standards and Guidelines.

1M-O1. Survey and manage to provide benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens and arthropods.

1M-S1. Acquire and use information of known species sites in management of activities.

1M-G1. The appropriate action is generally protection of relatively small sites; for some species, the appropriate action includes use of specific management treatments.

1M-S2. Develop survey protocols for identified species (as scheduled) and complete prior to ground disturbing activities.

1M-S3. Conduct extensive surveys for species to find high-priority sites for species management (as scheduled).

1M-S4. Survey for and acquire additional information about certain species (arthropods, fungi species (not rate and endemic), bryophytes and lichens) to determine necessary levels of protection.

1M-S5. Known and newly discovered sites of certain identified mollusca and vascular plan species will be protected from grazing by all practicable steps.

Rangeland

Same as Alt 1 general

Forestland

Congressional Designations

1C-O1. Manage all lands with congressional designations, reserved for specific purposes, by following direction written in applicable legislation or plans.

1C-S1. In Congressionally Reserved Areas, the direction from standards and guidelines (from Northwest Forest Plan) also applies where it is more restrictive or provides greater benefits to late-successional forest related species, unless the application of standards and guidelines would be contrary to legislative or regulatory language or intent.

Late-Successional Reserves

1L-O1. Manage to protect and enhance conditions of Late-Successional and Old Growth forest ecosystems, which serve as habitat for late successional and old growth related species including the Northern Spotted Owl. Reserves are designed to maintain a functional interacting, later suc-

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cessional and old growth forest system. Late successional reserve areas have been designated including: mapped late-successional reserves, known spotted owl activity centers (in matrix and adaptive management areas) and protection buffers.

1L-S1. A management assessment should be prepared for each large Late Successional Reserve (or group of smaller LSRs) before habitat manipulation activities are designed and implemented. Late-successional assessments are subject to review by the Regional Ecosystem Office.

Managed Late-Successional Reserves

1G-O1. Manage to produce and maintain an optimal level of Late-Successional and Old Growth forest ecosystems on a landscape scale as identified for certain owl activity centers on the eastside where regular and frequent fire is a natural part of the ecosystem. Managed Late-Successional Areas have been designated for: Managed pair areas for known owl pairs and resident singles (in Washington Eastern Cascades) and Protection Buffers for specific endemic species.

1G-S1. Each managed late-successional area or group of smaller managed late-successional areas should have a management assessment, as described for late-successional reserves.

Standard: Late Successional Reserves - Silviculture
Stand and vegetation management of any type is considered a silvicultural treatment.

Guideline: Reduce Risk of Large-scale Disturbance
Risk reduction efforts to reduce the probability of major stand replacing events are encouraged consistent with the Late Successional Reserve direction.

Guideline: LSR - Silviculture
Silvicultural activities aimed at reducing risk shall focus on younger stands in Late Successional Reserves to accelerate development of late-successional conditions while making future stands less susceptible to natural disturbance.

Guideline: Late Sucessional Reserves - Silviculture
Treatments including salvage should not generally result in a degeneration of currently suitable owl habitat or other late successional conditions.

In LSRs where levels of risk are particularly high and additional measures are required, management activities designed to reduce risks are encouraged. Activities in older stands may be appropriate if: (1) proposed management activities will clearly result in greater assurance of long-term maintenance of habitat, (2) the activities are clearly needed to reduce risk, and (3) the activities will not prevent the LSR from playing an effective role in the objectives for which they were established.

Guideline: Late Successional Reserve - Salvage
Management following stand replacing event should be designed to accelerate the high quality habitat for species associated with late-successional conditions. Salvage activities should focus on long range conditions based on the desired future condition of the Forest.

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Guideline:
Specific salvage guides should be developed for each physiographic province and possibly different forest types within the province. Use the guidelines in the NW Forest Plan (p. C-14 to C-16) for salvage until province direction is provided.

Standards (and Guidelines): Late Successional Reserves - for Multiple Use Activities other than silviculture.
Most nonsilvicultural activities located inside late-successional reserves that are neutral or beneficial to the creation and maintenance of late successional habitat are allowed. Some existing uses and current development activities may be modified or eliminated that pose adverse impacts and changes made to current direction governing these activities (see NW Forest Plan, Standards and Guidelines, p. C-16 to C-19).

Road Construction and Maintenance	Research
Fuelwood Gathering	Right-of-way
American Indian Use	Contracted Rights
Developments	Easements
Land Exchanges	Special Use Permits
Habitat Improvement Projects	Nonnative Species
Range Management	Fire Suppression and Prevention
Special Forest Products	Recreational Use
Other	

1G-O2. Maintain suitable northern spotted owl habitat through time using various management techniques. Permit certain silvicultural and fire hazard reduction treatments to prevent complete stand destruction from large catastrophic events (such as high intensity, high severity fires or disease or insect epidemics).

1G-O3. Maintain an amount of suitable habitat equal to median amounts observed in pair home ranges in the Province. The location of this acreage may change through time as management is rotated through the area. Some uncertainty will be accepted in management to provide habitat in these areas and accommodation of risk should be considered in any Section 7 consultations in these areas.

Adaptive Management Areas
Objectives:
Learn how to manage on an ecosystem basis in terms of both technical and sound challenges and in a manner consistent with applicable laws.

Encourage the development and testing of technical and social approaches to achieving desired ecological, economic and other social objectives.

(See NW Forest Plan Standards and Guidelines, pages D-1 to D-12, for discussion of implementation and applicable Standards and Guidelines. One area - Snoqualmie Pass AMA, Washington, has been designated within the Eastside EIS area).

1D-S1. Silviculture, salvage and multiple use activities for these areas should always be guided by the objective of maintaining adequate amounts of suitable habitat.

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1D-S2. Standards and guidelines applicable for late-successional reserves for multiple use activities (other than silviculture) also apply to managed late successional areas. Protection buffers for certain rare and locally endemic species - assure viability.

Matrix Lands

1X-O1. On lands outside six categories of designated area, conduct most of the timber harvest and silvicultural activities on suitable forest lands, according to standards and guidelines. Most scheduled timber harvest contributing to probable sale quantities (PSQ) takes place in the matrix.

1X-O2. Provide a renewable supply of well distributed coarse woody debris in matrix management to maintain populations of various organisms that use this habitat structure.
2.1 Standard: Matrix - Course woody debris
Develop models for groups of plant associations and stand types that can be used as a baseline for developing prescriptions and local standards. Until local standards are developed, the following guidelines apply: A minimum of 120 linear feet of logs per acre greater than or equal to 16" in diameter and 16 feet long should be retained. Decay class 1 and 2 logs can be counted towards these totals. (See Matrix Standards and Guidelines, p. C-40 and C-41 for additional requirement).

2.2 Standard: Matrix - Course woody debris
Course woody debris already on the ground should be retained and protected to the greatest extent possible from disturbance during treatment. Down logs should be left within forest patches that are retained under green-tree retention guidelines.

1X-O3. Emphasize green tree and snag retention in Matrix management.
3.1 Standard: Matrix - Snag and green tree retention.
Retain at least 15 percent of the area associated with each cutting unit in the matrix lands. The limitation does not apply to intermediate harvest (thinnings) in evenaged young stands.

3.1 Guideline: Matrix - Snag and green tree retention.
As a general guide, 70 percent of the total area to be retained should be aggregates of moderate to larger size (0.2 to 1 hectare or more) with the remainder as dispersed structures (individual trees, possible including smaller clumps less than 0.2 hectare). Retention of large aggregates may be particularly important where adjacent areas have little late successional habitat. To the extent possible, patches and dispersed retention should include the largest, oldest live trees, decadent or leaning trees, and hard snags occurring in the unit. Patches should be retained indefinitely.

3.2 Standard: Matrix - Snag retention
As a minimum, snags should be retained with the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population level based on published guidelines or models. The per acre requirement should be met on average areas no larger than 40 acres.

3.2 Guideline: Matrix - Snag retention
To the extent possible, snag management within the harvest units should occur within the areas of green tree retention (See also NW Forest Plan, Standards and Guidelines, page C-42 for additional direction).

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L3.3 Standard: Matrix - Lands - specific BLM direction
For lands administered by the BLM in Oregon, south of Grants Pass, retain 16 to 25 large green trees per acre in harvest units where available.

1X-O4. Provide additional protection for caves, mines, and abandoned wooden bridges and buildings that are used as roost and hibernation sites for bats.
4.1 Standard: Matrix - Bats
Conduct surveys of crevices in caves, mines and abandoned wooden bridges and buildings for presence of roosting bats.

4.2 Standard: Matrix - Bats
As an interim measure, timber harvest is prohibited within 250 feet of sites containing bats. Management standards and guidelines that may be included as mitigation measures in project or activity plans will be developed for the site. (See also Matrix. Standards and Guidelines, p. C-43 and C-44 for additional direction and discussion.)

1X-O5. Minimize soil and litter disturbance by modifying site treatment practices, particularly use of fire and herbicides, and modifying harvest methods.
5.1 Standard: Matrix - Modify site treatments
Site treatments should be prescribed which minimizes intensive burning, unless appropriate for certain specific habitats, communities or stand conditions. Prescribed fire should be planned to minimize the consumption of litter and coarse woody debris.

5.2 Standard: Matrix - Modify site treatments
Minimize soil and litter disturbance that may occur as a result of yarding and operation of heavy equipment and minimize the intensity and frequency of site treatments.

1X-O6. Provide for retention of old growth fragments in watersheds where little remains to support biological and structural diversity (refugia) across the landscape.

1X-S1. On fifth field watersheds (20-200 sq. miles), where federal lands currently comprised 15% or less of late successional forest should be managed to retain and protect all late successional stands.
8. Objective: Current Plans/Draft Plans Preferred Alternative
See NW Forest Plan, Standards and Guidelines, page C-45.

1X-O7. Management of stands in the matrix surrounding known Northern Spotted Owl Activity Centers will be designed to reduce risks of natural disturbance to protect owl habitat.

1X-O8. White-headed Woodpecker, Black backed woodpecker, Pygmy nuthatch, flammulated owl, and lynx should have protection buffers in the matrix. (See pages C-45 to C-48, NW Forest Plan Standards and Guidelines)

10. Objective: Matrix - Fire fuels
(See page C-48, NW Forest Plan Standards and Guidelines)

Minerals
Same as Alternative 1 level 1

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Wildlife
Same as Alternative 1 level 1

Direction for Alternative 2
Level 1
Objectives and Standards

Human Uses and Values

Same direction as Alternative 1.

Physical Environment

Terrestrial Ecosystems

Rangeland

Same direction as Alternative 1.

Disturbances

Same direction as Alternative 1.

Air Quality

Same direction as Alternative 1.

Forestland

Same direction as Alternative 1.

Objectives and Standards from Eastside Screens: RF Forest Plan Amendment #1, 5/20/94, and RF Forest Plan Amendment #2, 6/5/95.

2F-O14. All timber sales will be designated to incorporate interim standards for ecosystem analysis and management (six types of timber sales are exempt from consideration under this standard).

2F-S2.
- Characterize the proposed timber sale and its associated watershed for patterns of stand structure by biophysical environment and compare to the Historic Range of Variability (HRV).
- Use the processes and ecosystem characterization steps defined in Regional Forester's Forest Plan Amendment #2 (6/5/95).
- Identify structural components and biophysical environment combinations that are outside HRV conditions to determine potential treatment areas. Structural stages include: stand initiation, stem exclusion - open canopy, stem exclusion - closed canopy, understory reinitiation, multi-stratum without large trees; multi-stratum with large trees, and single stratum with large trees. (Structural stages definitions for use in HRV analysis can be found in the glossary.)

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Wilderness and Reserves

Same direction as Alternative 1.

Minerals

Same direction as Alternative 1.

Wildlife Habitat (objectives and standards from Eastside screens)

2W-O1. Maintain old growth tree (reserve where appropriate) habitat (or develop replacement habitat where presently unavailable) well distributed across the landscape for indicator species dependent on old growth. Meet key species requirements by managing (reserve) areas of appropriate size and arrangement with adequate larger, older trees; proper stand structures and densities (usually multi-storied), snags and down logs; associated feeding habitat and other criteria.

For Timber Sales use the following:

Use Scenario A whenever any one type of LOS in a particular biophysical environment is below HRV (9.1b).

Use Scenario B when both LOS stages within a particular biophysical environment are at or above HRV (9.1e).

LOS can be either "multi-strata with large trees" or single strata with large trees).

LOS stages are calculated separately.

2W-O2 (Scenario A). If either one or both of the Late and Old Structural stages fall below HRV in a particular biophysical environment within a watershed, then there should be no net loss of LOS from that biophysical environment.

2W-S1 (Scenario A). Do not allow timber sale harvest activities to occur within LOS stages that are below HRV. Harvest of dead trees may be permitted when standards for snags and down logs are met.

2W-G1 (Scenario A). Some timber sale activities can occur within LOS stages that are within or above HRV in a manner to maintain or enhance LOS within that biophysical environment. One type of LOS may be manipulated to move stands into the LOS stage that is deficit if this meets historical conditions.

2W-O3 (Scenario A). Outside of LOS, maintain and/or enhance LOS components in stands subject to timber harvest activities.

2W-S2 (Scenario A).

Maintain all remnant late and old seral and/or structural live trees >21" dbh that currently exist within stands proposed for harvest activities.

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Manipulate vegetative structure that does not meet late and old structural LOS) conditions using treatments that move stands toward appropriate LOS conditions to meet HRV.

Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure. (While understory removal is allowed, some amount of seedlings, saplings, and poles need to be maintained for the development of future stands).

2W-O4 (Both Scenarios). Maintain connectivity and reduce fragmentation of LOS stands.

2W-S3. Maintain or enhance the current level of connectivity between LOS stands and Forest Plan designated "old growth" habitats by maintaining stands between them that serve the purpose of connections, using criteria for network pattern, connectivity corridor description, length of connection corridors and timber harvest and silvicultural criteria (RF Forest Plan Amendment #2, 6/5/95).

2W-O5 (Scenario B). Maintain wildlife habitat management options by impacting large and/or contiguous stands of LOS as little as possible, while meeting other multiple use objectives.

2W-S4 (Scenario B). Within a particular biophysical environment within a watershed, if the single, existing late and old structural (LOS) stage is WITHIN OR ABOVE HRV, OR if both types of LOS stages occur and BOTH are WITHIN OR ABOVE HRV, then timber harvest can occur within these stages as long as LOS conditions do not fall below HRV. Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

Harvest activities, (any and all types being considered, can occur in the following stand types in order of priority:

First priority is within stands other than LOS.

Second priority is within smaller, isolated LOS stands <100 acres in size and/or at the edges (first 300 ft.) of large blocks of LOS stands (> 100 acres).

As a last priority some harvesting can occur within the interior of large LOS stands (>100 acres) (beyond 300 ft. from edge), but is limited to non-fragmenting prescriptions such as thinning, single-tree selection (UEAM), salvage, understory removal, and other non-regeneration activities. Group selection (UEAM) is only allowed when openings created either mimic the natural forest pattern, and/or do not exceed 1/2 acre in size; REGENERATION and GROUP SELECTION ACTIVITIES ARE NOT ALLOWED.

2W-O6. Manage dead trees (snags) to provide the required numbers and size of snags throughout the Forest to maintain primary cavity excavators at 40 to 60 percent of their potential population in timber production areas and appropriate levels in other areas; leave appropriate levels of green trees to serve as a source of future snags.

2W-S5 (timber sales). For snags, down logs and green tree replacement habitats (RF Forest Plan Amendment #2):

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Maintain snags and green tree replacement trees of >21 inches DBH (or whatever is the representative DBH of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators.

For lodgepole pine stands, all sale activities will maintain snags and green replacement/roost trees of $\geq$ 10 inches dbh at 100 percent potential population levels of cavity excavators. The largest available trees should be left to meet this requirement.

Retain down logs at appropriate quantities while permitting accomplishment of fire protection needs for life and property and prescribed burning and without extraordinary measures to meet requirements.

Leave pre-activity (currently existing) levels down logs, unless they exceed the quantities listed below. Harvest activities should supplement pre-activity levels of down logs up to the maximum level shown below. Exceptions can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

Species	Piece Length Pieces Per Acre	Diameter Small End	Total Lineal Length
Ponderosa Pine	2-6	12"	>6 ft. 20-45 ft.
Mixed Conifer	15-20	12"	>6 ft. 100-140 ft.
Lodgepole Pine	15-20	8"	>8 ft. 120-160 ft.

2W-O7. Provide dead and down logs in appropriate numbers by size classes to support species that utilize this resource.

2W-S6 (timber sales). For snags, down logs and green tree replacement habitats (RF Forest Plan Amendment #2):

Maintain snags and green tree replacement trees of >21 inches DBH (or whatever is the representative DBH of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators.

For lodgepole pine stands, all sale activities will maintain snags and green replacement/roost trees of $\geq$ 10 inches dbh at 100 percent potential population levels of cavity excavators. The largest available trees should be left to meet this requirement.

Retain down logs at appropriate quantities while permitting accomplishment of fire protection needs for life and property and prescribed burning and without extraordinary measures to meet requirements.

Leave pre-activity (currently existing) levels down logs, unless they exceed the quantities listed below. Harvest activities should supplement pre-activity levels of down logs up to the maximum level shown below. Exceptions can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

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Species	Piece Length Pieces Per Acre	Diameter Small End	Total Lineal Length
Ponderosa Pine	2-6	12"	>6 ft. 20-45 ft.
Mixed Conifer	15-20	12"	>6 ft. 100-140 ft.
Lodgepole Pine	15-20	8"	>8 ft. 120-160 ft.

2W-O8. Manage forest stands and shrub and grassland communities and successional stages to provide suitable big game habitat(s); cover quality, cover size and spacing, open road densities, and forage quality to meet species needs as defined in a Habitat Effectiveness Index.

2W-O9. Protect big game habitats at key times including winter ranges, calving/fawning areas, wallows, and migration areas by maintaining desired vegetative structure and characteristics.

2W-O10. Manage unique or featured wildlife habitats including cliffs, talus, caves; seeps-springs; bogs, wallows and other wet areas (generally under 10 acres) to protect their primary values.

2W-O11. (Both Scenarios): As a minimum, manage to insure goshawk species viability by meeting the following standard; Forest Plan standards and guidelines that exceed the standards should be used instead of or in addition to.

2W-S7. Protect every known active and known nesting site used in the last 5 years.

Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting.

30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) will be deferred from harvest. A 400-acre "Post Fledging Area" (PFA) will be established around every known active nest site. While some harvest activities can occur within this area, retain at least 60 percent of the area in LOS condition or all the LOS stands if less than 60 percent. Enhance younger stands towards LOS condition, as possible.

Aquatic Ecosystems

2A-O1. Meet or exceed state water quality protection and restoration requirements through planning, application and monitoring of Best Management Practices (BMPs).

2A-O2. Protect beneficial uses by implementing water quality practices, plans, and policies in current memorandums of understanding with the states.

2A-O3. Evaluate proposed projects or management actions for cumulative effects on water quality, quantity or stream channels.

2A-O4. Disperse activities in time and space, where practicable, to the extent needed to meet management requirements.

2A-O5. Inventory, treat and improve conditions in watersheds in need of restoration to reverse and arrest adverse impacts to water quality and fish habitat.

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Objectives and Standards from Pacfish, Except Infish, as Noted.

2A-O6. For streams of moderate to large size (3rd to 7th order), within watersheds with anadromous fish the following (Interim) Riparian Management Objectives apply.

- No measurable increase in maximum water temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period. Maintain maximum water temperatures below 64°F within migration and rearing habitats and below 60°F within spawning habitats. INFISH - Maximum temperature below 59°F with adult holding habitat below 48°F within spawning and rearing habitat.
- In forested systems, provide large woody debris >20 pieces per mile; >12-inch diameter; >35 feet in length (for Oregon, Washington, and Idaho).
- In non-forested systems, maintain >80 percent bank stability and >75% of banks with <90 degree angle (i.e., undercut).
- Achieve a pool frequency for all systems: *Wetted width in feet:* 10, 20, 25, 50, 75, 100, 125, 150, 200; *Number pools per mile:* 96, 56, 47, 26, 23, 18, 14, 12, 9;
- [Pools per mile applies to Rosgen "C" channels within each system (Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia Basin, June 1994). National Forests and BLM Districts are to develop pools/mile objectives for other appropriate stream channels.]
- Same as Alternative 1 for items c, e, and g.
- Maintain a width/depth ratio of all stream systems <10 mean wetted width divided by mean depth.

2A-S1. Delineate and manage (Interim) Riparian Habitat Conservation Areas (RHCAs) in every anadromous watershed to help maintain integrity of aquatic ecosystems. Standard widths are defined for:

- fish bearing streams; 300 ft;
- permanently flowing non-fish bearing streams, 150 ft.;
- ponds, lakes, reservoirs and wetlands greater than 1 acre, 150 ft.;
- seasonally flowing or intermittent streams, wetlands less than 1 acres, landslides and landslide prone areas;
- Key watersheds, 100 ft.;
- Non-key watersheds, 50 ft.;
- non-forested rangeland ecosystems - permanently flowing streams (100-year flood plain).

(See standard widths for defined categories of streams or water bodies for forested and rangeland systems in glossary OR could add widths definitions here.)

2A-S2. Project and site specific standards and guidelines apply to RHCAs and to projects and activities in areas outside RHCAs that would degrade them (See pages _____, PACFISH RHCA S&G's related to management activities): 1) Timber, 2) Roads, 3) Grazing, 4) Recreation, 5) Minerals, 6) Fire/Fuels, 7) Lands, 8) General Riparian, 9) Fish and Wildlife, 10) Research, and 11)Watershed and Habitat Restoration.

2A-O7. During the period of interim direction, all watersheds that contain designated critical habitat for listed anadromous fish will be treated as key watersheds to provide protection across the landscape where habitat for anadromous fish receive special attention and treatment.

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2A-S3. (For Key Watersheds to be developed at this stage, no direction found similar to Northwest Forest Plan.)

2A-O8. [INFISH Priority Watershed] Designated priority watersheds contain watersheds with excellent habitat or strong assemblages of inland native fish, with a priority on bull trout populations; watersheds that provide for meta-population objectives; and degraded watersheds with a high restoration potential to provide a pattern of protection across the landscape where habitat for inland native fish would receive special attention and treatment.

2A-S4. [INFISH Priority Watershed] Within priority watersheds, ongoing activities have been screened to categorize the extent of risk they represent to bull trout habitat or populations. Projects determined to be a high or medium risk must be reviewed by Forest Supervisors and, subject to valid existing rights, they have three options to pursue: Modify the action to reduce the risk; postpone the action until the final direction is issued; or within one month, Forest Supervisors will submit to their respective Regional Foresters an action plan for how high and moderate risk projects will be modified to avoid an unacceptable risk. Modifications for moderate and high risk projects should be initiated within 2 months with high risk projects having the highest priority. If there are compelling reasons why a project can not be modified delayed, or canceled, the Forest Supervisor will include in the action plan written documentation of the rationale for such action and what other mitigating measures will be implemented to assure there is not an unacceptable risk. For low risk projects, Forest Supervisors must provide an action plan by March 1, 1996, for means to assure there is not an unacceptable risk.

2A-O9. Use the Ecosystem Analysis at a Watershed Scale or other appropriate procedures to conduct Watershed Analysis to provide information to management in implementing management objectives.

2A-S5. Completion of a Watershed Analysis is required for the following:

I. Modifications of (Interim) RMO's which better reflect conditions attainable in a specific watershed or stream reaches.
II. Generally, modification of (interim) RHCAs boundaries (widths) in all watersheds or documented stream reach or site specific data with supporting rationale and effects of the change.
III. Prior to salvage cutting in RHCA's for watersheds with listed salmon or designated critical habitat.
IV. Prior to construction of new roads or landings in RHCA's for watersheds with listed salmon or designated critical habitat.
V. Prior to construction of new recreation facilities in RHCAs for watersheds with listed salmon or designated critical habitat.

2A-G1. Use Watershed Analysis as a basis for evaluating cumulative effects; defining restoration needs, goals, and objectives; implementing restoration strategies and monitoring effectiveness of watershed protection measures.

2A-O10. Use watershed restoration actions to improve the current conditions of watersheds to restore degraded habitat and to provide long-term protection to natural resources, including riparian and aquatic resources.

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2A-G2. Use information from Watershed Analysis (and project development) to initiate restoration strategies and projects where appropriate and funds are available. Key and priority watersheds have priority for conducting watershed restoration.

Ecosystem Analysis

See Objective 2A-09 and Standard 2A-S5.

Objectives and standards applicable to areas covered by the Northwest Forest Plan is the same as Alternative 1.

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Table 3-11. Objectives and Standards for Alternatives 1 - 7

Definitions

Objectives – measureable, **time-specific** indicators used to measure progress toward attainment of goals. They address short- and long-term actions taken to meet goals.
Standards – **Required** management actions addressing how to achieve objectives. Standards can include requirements to refrain from taking action in certain situations.
Guidelines – **Suggested** actions, priorities, processes, or prescriptions that are useful in meeting objectives; not required. Common terminology will be used prior to publication of the DEISs.

For these EISs, the following terminology has been used to distinguish standards from guidelines (source: FS Directive 1110.8, Degree of Compliance or Restriction in Directives):

Verb	Degree of Compliance/Restriction	In the DEISs, Applies to
Must, shall	Action is mandatory.	Standards
Should, ought	Action is required unless justifiable reason exists for not taking action.	Standards
May, can, could	Action is optional.	Guidelines
Will	Verb does not convey a degree of restriction. Applies only to a statement of future condition or an expression of time. Not to be used in place of shall or must.	DRFC

*** NOTE: The objectives that follow are intended to move conditions TOWARD the DRFC. ***

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Table 3-11. EASTSIDE and UCRB Description of Alternatives: Objectives and Standards; S=Substance, P=Process
For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
ECOSYSTEM MANAGEMENT (EM)						
Not Applicable	Not Applicable	**EM-O1. Objective[P]:** Analyze ecosystems and components of ecosystems through multiple scales to identify patterns, processe, and disturbance mechanisms at scales consistent with causes and interactions at which they function. *See Standards EM-S1-7. See Guidelines EM-G1-7.*				
Not Applicable	Not Applicable	**EM-O2. Objective[P]:** Identify opportunities and establish priorities for vegetation, prescribed fire, aquatic, riparian, terrestrial, recreation, and watershed management at the 4th code HUC scale (subbasin and subsection scale) that combines information from the science assessment with finer scale data to tier to goals and objectives of the ICBEMP. *See Standards EM-S1-7. See Guidelines EM-G1-7.*				
Not Applicable	Not Applicable	**EM-O3. Objective[P]:** Move away from project driven watershed scale analysis and move towards watershed scale anaysis that support ecosystem planning.				
Not Applicable	Not Applicable	**EM-O4. Objective[P]:** Analyze ecosystems at the watershed scale using the federal interagency guide (version 2.2) and R1/R4/R6 policy implementation guide prior to management actions that have issues or effects at that scale.				
Not Applicable	Not Applicable	**EM-S1. Standard[P]:** Forest Service and Bureau of Land Management units shall conduct and complete a subbasin (4th HUC or groups of 4th HUC) analysis at a coarse scale using the science assessment and local information.				
Not Applicable	Not Applicable	**EM-S2. Standard[P]:** Ecosystem analysis at the watershed scale (20-200 square miles) should be completed that incorporates subbasin analysis results to support management prescriptions and recommendations.				
Not Applicable	Not Applicable	**EM-S3. Standard[P]:** Line officers should be involved to determine the level of analysis based on the issues and commitment of personnel, time, and funds for successful completion of the analysis.				
Not Applicable	Not Applicable	**EM-S4. Standard[P]:** Interim RMOs, RMAs, and standards and guidelines shall provide points of reference when conducting Ecosystem Analysis. The rationale and logic for deviation from these interim provisions shall be documented during the NEPA decision process.				
Not Applicable	Not Applicable	**EM-S5. Standard[P]:** If Ecosystem Analysis is completed for a watershed, Forest Service and BLM units should review the analysis for information to facilitate new project analysis. If information supports project issues, then incorporate the previous analysis in the NEPA decision process. If information does not support project issues, then further analysis which tiers to and supplements the previous analysis should be completed.				
Not Applicable	Not Applicable	**EM-S6. Standard[P]:** During the NEPA decision process for management actions that require an EA or EIS, Watershed Management Objectives should be developed that incorporate information and recommendations from Ecosystem Analysis. If a previous EA or EIS established Watershed Management Objectives, they should be reviewed to ensure applicability and modified if new information indicates they are inconsistent with management intent.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**EM-S7. Standard[P]:** Regional and State Offices should develop and coordinate an advisory and review process to ensure the intent of Ecosystem analysis is consistently applied within the Eastside and Upper Columbia River Basin EIS area.				
		EM-O5. Objective[S]: Eliminate/reduce the potential for disease transmission between domestic sheep and bighorn sheep.				
SOIL PRODUCTIVITY						
Current *direction in* handbook for FS lands	Current *direction in* handbook for FS lands	**EM-O6. Objective[S]:** Prevent degradation of soil quality and loss of soil productivity. *See Guidelines EM-G10-14.*				
		EM-O7. Objective[S]: Protect soil hydrologic function and productivity in riparian areas to preserve water quality buffering and regulation of nutrient cycling.				
		EM-O8. Objective[S]: Restore soil productivity, quality, and function in areas where loss has likely occurred.				
		EM-S8. Standard[P]: The Forest Service and BLM shall develop soil productivity protection and restoration programs based on inventories and existing information.				
		EM-O9. Objective[P]: Restore nutrient cycling and decomposition processes to provide for sustainable nutrient supply in forest and rangeland ecosystems by providing for natural levels of vegetation composition, density, size class, and distribution, both in standing and downed biomass, in a manner that allows for recruitment over time.				
		EM-S9. Standard[S]: Large diameter standing and downed wood should be retained on site, over time, to provide for carbon and nutrient stores.				
		EM-S10. Standard[P]: Recommendations for managing coarse woody debris shall be developed for local geoclimatic and vegetation type.				
		EM-S11. Default Standard[S]: In the absence of local data, the following amounts of coarse woody material will be minimums left on site. Unburned/low intensity burn sites: 10-15 tons/acre. Moderate intensity burn sites: 15-20 tons/acre. High intensity burn sites: 20-30 tons/acre.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
ROADS						
Not Applicable	PACFISH, INFISH and access strategies needed for wildlife management	**EM-O10. Objective[S]:** Reduce road-related effects and potential effects on watersheds, soils, aquatic/riparian, and terrestrial resources at levels specified in tables 3-12 and 3-13 while providing for resource management activities and other anticipated human access needs such as recreation and tribal activities, etc. *See Standards EM-S12-17. See Guidelines EM-G15-40.*				
Not Applicable	Not Applicable	**EM-S12. Standard[P]:** Develop and implement a standardized road condition and risk inventory, in a consistent and systematic manner that addresses multiple scales, temporally and spatially.				
Not Applicable	Not Applicable	**EM-S13. Standard[S]:** Construct all new road crossings of streams and rivers that currently support fish species, or that historically supported native fish species, in such a manner as to maintain fish passage.				
Not Applicable	Not Applicable	**EM-S14. Standard[P]:** Transportation plans, including Access and Travel management plans, should be developed in an integrated resource manner. These plans should be used to support Ecosystem analysis at the watershed scale and to identify long-term transportation needs and road maintenance practices. These plans also should be used to identify and prioritize roads for rehabilitation, closure, or obliteration to reduce road-related effects to watershed, soil, terrestrial, and aquatic resources.				
Not Applicable	Not Applicable	**EM-S15. Standard[S]:** There shall be no net increase in road density in any clusters. Road mileage increases will be off set by a equal or greater mileage decrease on a per cluster basis.				
Not Applicable	Not Applicable	**EM-S16. Standard[S]:** Reduce the risk of wildlife mortality or displacement/avoidance caused by human access. Emphasize all forest clusters with the presence or potential of large carnivores.				
Not Applicable	Not Applicable	**EM-S17. Standard:** Not applicable.				**EM-S17. Standard[S] :** There shall be no road construction in reserves or unroaded areas larger than 1,000 acres.
NOXIOUS WEEDS						
Not Applicable	Not Applicable	**EM-O11. Objective[S]:** To maintain biodiversity and productivity of native rangeland plant communities.				

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Continue

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**EM-S18. Standard[P]:** An integrated weed management (IWM) strategy for noxious weeds should be implemented. See Appendix H for a more complete discussion of the 7 basic steps of the IWM strategy. The 7 steps of the IWM strategy are common to all alternatives and are presented below: 1) Inventorying and mapping of noxious weed presence, distribution, and density. 2) Preventing weed encroachment. 3) Detecting and eradicating new introductions of noxious weeds. 4) Containing large-scale infestations of noxious weeds. 5) Controlling-suppressing large-scale infestations of noxious weeds. 6) Revegetating sites that are characterized by existing noxious weed infestations and a lack of understory of native species or exotic perennial seeded species. 7) Implementing proper range management practices during the management phase after noxious weed control.					
		EM-O12. Objective[S]: To ensure that management for noxious weeds is carried out efficiently and consistently across jurisdictional and political boundaries.				
		EM-O13. Objective[P]: To conserve biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2.	**EM-O17. Objective[P]:** To conserve and restore biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2.	**EM-O19. Objective[P]:** To conserve biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 2 and 4.	**EM-O22. Objective[P]:** To conserve and restore biodiversity and productivity of native rangeland plant communities. Priority areas for this objective are range clusters 2, 3, and 5.	**EM-O24. Objective[P]:** within reserves To conserve biodiversity and productivity of native rangeland plant communities. Priority areas for this objective are range clusters 1-6. **outside reserves** Same as EM-O13, EM-O14, EM-O18, and EM-O21.

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Previous

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		EM-S19. Standard[P]: Unless the intent of Objective EM-O13 can be achieved with an *alternative method*, steps 1-4 of IWM should be implemented. Implement the steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S20. Standard[P]:** Unless the intent of Objective EM-O17 can be achieved with an *alternative method*, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds; implement steps 1-7 of IWM, and especially steps 5-7, on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**EM-S21. Standard[P]:** Unless the intent of Objective EM-O19 can be achieved with an *alternative method*, steps 1-4 of IWM should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S22. Standard[P]:** Unless the intent of Objective EM-O22 can be achieved with an *alternative method*, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds; implement steps 1-7 of IWM, and especially steps 5-7, on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**EM-S23. Standard[P]:** within reserves Unless the intent of Objective EM-O24 can be achieved with an alternative method, steps 1-4 of IWM should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds. **outside reserves** Same EM-S19, EM-S24, EM-S27, and EM-S29.
		EM-O14. Objective[S]: To conserve and restore biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 3.	**EM-O15. Objective[S]:** To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. Priority areas for this objective are range clusters 1, 3, 4, 5, and 6.	**Same as EM-O14.**	**EM-O16 Objective: To** restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. Priority areas for this objective are range clusters 1, 4, and 6.	

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		EM-S24. Standard[P]: Unless the intent of Objective EM-O14 can be achieved with an alternative method, steps 1-4 of IWM should be implemented on high disturbance areas, and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds; steps 1-7 of IWM, and especially steps 5-7, should be implemented on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.	**EM-S25. Standard[P]:** Unless the intent of Objective EM-O15 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	**Same as EM-S24.**	**EM-S26. Standard:** Unless the intent of Objective EM-O16 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high or moderate susceptibility to invasion by noxious weeds.	
		EM-O18. Objective[S]: To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species. The priority area for this objective is range cluster 5.		**EM-O20. Objective[S]:** Provide forage for livestock production, while conserving biodiversity and productivity of native rangeland plant communities. The priority area for this objective is range cluster 5.		

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		EM-S27. Standard[P]: Unless the intent of Objective EM-O18 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S28. Standard[P]:** Unless the intent of Objective EM-O20 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds; implement steps 1-4 of IWM on high disturbance areas and rangeland plant communities that are not infested currently with noxious weeds and are of high susceptibility to invasion by noxious weeds.		
		EM-O21. Objective[S]: To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species, while providing forage for livestock production. Priority areas for this objective are range clusters1, 4, and 6.		**EM-O23. Objective[S]:** To restore biodiversity and productivity of native rangeland plant communities, primarily through the use of native plant species, while providing forage for livestock production. Priority areas for this objective are range clusters 1 and 6.		

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For specific levels of activity by alternative and cluster, see tables 3-12 and 3-13. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		EM-S29. Standard[P]: Unless the intent of Objective EM-O21 can be achieved alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S30. Standard[P]:** Unless the intent of Objective EM-O23 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		
		EM-S29. Standard[P]: Unless the intent of Objective EM-O21 can be achieved with an alternative method, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		**EM-S30. Standard[P]:** Unless the intent of Objective EM-O23 can be achieved with an alternative weed control strategy, steps 1-7 of IWM, and especially steps 5-7, should be implemented. Implement these steps on high disturbance areas, and rangeland plant communities that contain noxious weeds and are of high susceptibility to invasion by noxious weeds.		

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
SOCIAL AND ECONOMIC (SE)						
Provide a sustained yield of commodities (timber, other forest products, and forage for livestock and wild horses).		**SE-O1 Objective[S]:** Provide a sustainable and predictable level of goods and services from Forest Service- or BLM-administered lands, consistent with legal requirements and ecosystem capabilities. Generate economic activity in rural communities, including private sector employment, agency employment, income, number of recreation visits, and revenues shared with local governments.				
Tables 3-12 and 3-13 displayed for comparison	Tables 3-12 and 3-13 displayed for comparison	**SE-O2 Objective[S]:** Derive social and economic benefits, promote new commercial activity, reduce future agency land management costs including but not limited to wildfire suppression costs, and increase demand for labor and capital formation through activities which restore ecosystem functions and processes at the levels described in tables 3-12 and 3-13.				
Table 3-12 displayed for comparison	Table 3-12 displayed for comparison	**SE-O3 Objective[S]:** Avoid future large shifts in commercial activity that cause rapid changes in demand for labor (gain or loss of jobs) and capital (investments in plant and equipment) by offering commercial timber for sale at an amount consistent with the volume available from the acreage of timber harvest planned in tables 3-12. *(See Guideline SE-G1)* Limit annual variation in timber production by no more than . . .				
		. . . plus or minus 15 percent.	. . . plus or minus 25 percent.	. . . plus or minus 15 percent.	. . . plus 10 or minus 20 percent.	. . . plus or minus 50 percent.
Not Applicable	Not Applicable	**SE-S1 Standard[P]:** Individual units shall achieve Objective S-O3 unless an exemption is granted from the Regional Forester or BLM State Director based on circumstances which make the objective unattainable.				
See table 3-13	See table 3-13	**SE-O4 Objective[S]:** Offer forage for livestock grazing consistent with the levels in tables 3-13.				
Not Applicable	Not Applicable	**SE-O5 Objective[S]:** Emphasize customary economic uses in rural communities or geographic areas identified as less economically diverse and more dependent on outputs of goods and services from Forest Service and BLM administered lands based on: (1) where these uses generate a substantial percent of local employment; (2) that are geographically isolated; and (3) that are not gaining substantial employment opportunities in other industries. These areas are henceforth referred to as "priority areas." Prioritize activities on tables 3-12 and 3-13 in these areas to promote such customary uses as well as new activities in these priority areas.				
Not Applicable	Not Applicable	**SE-S2 Standard[P]:** Priority areas shall be established in the Record of Decision. Changes to priority areas shall occur by amendments to land use plans. Priority areas shall be reassessed every five years to determine if conditions warrant a change in priority area designation.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
COMMUNITY RESILIENCY						
Not Applicable	Not Applicable	**SE-O6 Objective[S]:** Within three years support rural communities in their efforts to become more resilient by implementing policies which favor local labor, resources and knowledge and local use of resources from Forest Service and BLM-administered lands in the implementation of objectives SE-O1, SE-O2, SE-O3, SE-O8, and SE-O18.				
Not Applicable	Not Applicable	**SE-O7 Objective[P]:** Within three years support local strategies that enhance social and economic conditions in rural communities. Define a federal agency role which assists in providing developmental, tourism, and recreational activities that help diversity rural economies and improve quality of life. *(See Guidelines SE-G4 through SE-G13).*				
Not Applicable	Not Applicable	**SE-O8 Objective[S]:** Reduce the risk of life and property loss due to wildfire and decrease future wildfire suppression costs by actively managing wildland fuels on areas of Forest Service and BLM administered lands within or adjacent to wildland-urban interface areas. *(See Standard SE-S3. See Guidelines SE-G14–15)*				
Not Applicable	Not Applicable	**SE-S3 Standard[P]:** Involve local governments plus other landowners' organizations as appropriate in development of coordinated fuel management plans and priorities.				
INTERGOVERNMENTAL AND INTERAGENCY COORDINATION						
Not Applicable	Not Applicable	**SE-O9 Objective[P]:** To increase public ownership of decisions, begin greater collaboration through increased intergovernmental coordination with State, local and tribal governments, and interagency coordination with other Federal agencies in planning, implementation, and monitoring efforts in order to seek the knowledge and opinions from governmental agencies.				
Not Applicable	Not Applicable	**SE-S4 Standard[P]:** Within 2 years, each National Forest and BLM District shall sign a memorandum of understanding or equivalent document with appropriate State, county and tribal elected officials to detail, among other things, how to use the exemption from the Federal Advisory Committee Act in P.L. 104-1, for elected officials to offer advice and recommendations to Federal land managers.				
Not Applicable	Not Applicable	**SE-O10 Objective[S]:** Improve stability of Federal payments to local governments to contribute to long-term budget consistency and planning of local government revenues through increased predictability (S-O1) of goods and services from Federal lands.				
ROLE OF THE PUBLIC						
Not Applicable	Not Applicable	**SE-O11 Objective[P]:** To help achieve greater predictability for outcomes from lands managed by the Forest Service or BLM and better public ownership of decisions, by providing increased levels and types of opportunities for involvement of the public. Within 1 year develop and implement a systematic approach to seeking the knowledge and opinions of a broad range of stakeholders through methods that encourage discussion, understanding, and resolution of issues. *See Guidelines SE-G16 through SE-G26).*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
RECREATION OPPORTUNITIES						
SE-O12 Objective[S]: Manage for a broad range of resource- dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes.			**SE-O12 Objective[P]:** Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism.	**SE-O12 Objective[P]:** In areas where recreation is the primary emphasis (Forest Cluster 1; Range Clusters 2,3) and secondary (Forest Clusters 2,6; and Range Cluster 5), emphasize the most appropriate recreation and tourism opportunities that reflect current and projected demand and for which public lands are best suited.	**SE-O12 Objective[P]:** Manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. In addition, identify opportunities to capitalize on restoration efforts by creating new opportunities for low-impact, nature-appreciative recreation and tourism	**SE-O12 Objective[P]:** In areas outside reserves, manage for a broad range of resource-dependent, land and water-based recreation opportunities to provide a variety of recreation experiences and outcomes. Within reserves, maintain or achieve primitive and semi-primitive settings that provide opportunities for solitude and other benefits associated with these settings.
SE-S5 Standard[P]: Use the recreation opportunity spectrum (ROS) or other appropriate agency direction to guide inventory and management to meet goals for recreation settings and experiences.				Not applicable	**SE-S5 StandardP]:** Same as Alternatives 1, 2, 3, and 4.	**SE-S5 Standard[S]:** Outside reserves, same as Alternatives 1, 2, 3, 4, and 6. Manage reserves for primitive and semi-primitive settings.
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O13 Objective[P]:** Identify opportunities to provide public access for land and water-based recreation purposes.				
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O14 Objective[P]:** Foster and strengthen partnerships between public and private sectors to raise the quality and quantity of recreation and tourism facilities and services, to avoid duplication, and to share resources.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Varies by BLM and Forest Service land use plan.	Varies by BLM and Forest Service land use plan.	**SE-O15 Objective[S]:** Take actions that will lead to recreation programs operating in a financially self-supporting manner.				
QUALITY OF LIFE						
Not Applicable	Not Applicable	**SE-O16 Objective[S]:** Enhance scenic integrity in areas currently rated as low or moderately low by implementing management activities for forest and range vegetation and road densities at the levels described in tables 3-12 and 3-13. *(See Guidelines SE-G83 through SE-G84).*				
Meet established visual quality objectives based on management principles and techniques from the applicable agency visual landscape management system.		**SE-O17 Objective[S]:** Maintain the highest level of scenic integrity and decrease short- and long-term risks from wildfire by implementing activities for forest and range vegetation and road densities at the levels described in tables 3-12 and 3-13. *(See Guidelines SE-G85–87).*				
						Not applicable in reserves.
Not Applicable	Not Applicable	**SE-O18 Objective[S]:** Protect human health and decrease short- and long-term risks of degraded air quality from wildfire by implementing vegetation management activities at the levels in tables 3-12 and 3-13.				
TRANSPORTATION AND UTILITY CORRIDORS						
Not Applicable	Not Applicable	**SE-O19 Objective[S]:** Ensure that reliable and buildable utility corridors are available to serve regional and local energy, communication and transportation needs, and that essential access for energy repairs and maintenance is available.				
Not Applicable	Not Applicable	**SE-S6 Standard[S]:** *Maintain access to existing corridor right-of-ways, special use permits and easements for infrastructure* maintenance.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
TRIBAL INTERESTS (T)						
Varies by BLM or forest service land use plan.		**T-O1. Objective[P]:** To help meet the Federal government's responsibility maintain a government to government relationship with affected federally recognized tribes. Develop meaningful relationships to understand and incorporate tribal needs, interests, and expectations in Federal land management; allow cooperative activities where there are shared goals.				
Varies by BLM or forest service land use plan.		**T-S1. Standard[P]:** (1) Agencies shall consult with all affected federally recognized tribes on projects at the proposal stages, and at other stages as appropriate. (2) Agencies should consult with all affected Indian tribes/ communities on project at proposal stages, and at other stages as appropriate.				
Table 3-12 displayed for comparison	Table 3-12 displayed for comparison	**T-O2. Objective[S]:** To help meet the Federal government's responsibility toward tribes, maintain and/or restore habitat conditions at or above a level capable of supporting healthy, sustainable, and usable quantities of species/resources by implementing activities in Tables 3-12 and 3-13.				
Varies by BLM or forest service land use plan.		**T-S2. Standard[P]:** (1) Agencies shall assess habitat conditions (using biological evaluations or other means) and discuss assessments with affected tribes at the earliest practical stage in planning a project. (2) Agencies shall assess habitat conditions (using biological evaluations or other means) where a habitat has an identified social or traditional importance to an affected tribe or American Indian community, such as root fields or fishing grounds.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
TERRESTRIAL ECOSYSTEMS						
DISTURBANCE PROCESSES ON FORESTLANDS AND RANGELANDS: FIRE (F)						
F-O1. Objective[P]: Use prescribed fires from either management ignitions or natural ignitions as a means of achieving management objectives defined in land use plans. Allow lightning-caused fires to play, as nearly as possible, their natural ecological role in Wilderness by developing prescribed fire plans.		**F-O1. Objective[P]:** Restore fire as a natural disturbance process by developing and implementing prescribed fire plans on a landscape scale. Acres to be included in prescribed fire plans approximate the levels described in table 3-2a and 3.3. *See Standard F-S1. See Guidelines F-G1–12, F-G66-70, F-G73- 74, F-G76-98.*				**F-O1. Objective[P]:** Restore fire as a natural disturbance process by developing and implementing prescribed fire plans on a landscape scale, including all reserves. Acres to be included in prescribed fire plans approximate the levels described in table 3-2a and 3.3. *See Standard F-S1. See Guidelines F-G1–12, F-G66-70, F-G73-74, F-G76-98.*
Not Applicable	Not Applicable	**F-O2. Objective[S]:** Rehabilitate and/or reforest burned and/or harvested areas with ecologically appropriate species and strategies tailored to the fire regime inherent to the site, wherever it is determined that the density, structure, and composition of the vegetation will not resemble desired conditions within ten years. *See Standard F-S1.*				
Not Applicable	Not applicable	**F-S1. Standard[S].** (applies to F-O1, F-O2): Rest areas burned by wildfire or prescribed fire from livestock grazing until monitoring data indicate that desired vegetation and litter have recovered to levels that are adequate to protect the soil.				
Not Applicable	Not Applicable	**F-O3. Objective[P]:** When conducting Escaped Fire Situation Analyses for wildfires, recognize and evaluate the long-term effects of fire and alternative suppression strategies on the ecosystem in which fire occurs. *See Guidelines F-G13-16, F-G66-70, F-G73-74, F-G76-98.*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
FORESTLANDS						
ALL FORESTED POTENTIAL VEGETATION GROUPS						
		F-O4. Objective[P]: Maintain biodiversity and productivity of native forested plant communities through the management of noxious weeds.	**F-O4. Objective[P]:** Maintain and/or restore biodiversity and productivity of native forest communities through management of noxious weeds.	**F-O4. Objective[P]:** Maintain biodiversity and productivity of native forested plant communities through the management of noxious weeds.	**F-O4. Objective[P]:** Maintain and/or restore biodiversity and productivity of native forest communities through management of noxious weeds.	**F-O4. Objective: within** reserves Not applicable **outside reserves** Same as alternative 3-6.
		Rationale *– Although departures of forest ecosystem from historical conditions were found through the landscape ecology assessment (CH. 2 STARS) to be mostly attributed to road and harvest systems, changes in landscape vegetation composition and structure, and changes in fire regime, they were also related to a lesser degree to the invasion of exotics.*				
		F-S2. Standard[P]: An integrated weed management (IWM) strategy for noxious weeds should be implemented. In lieu of a more effective strategy, the default standard should be to use the IWM Strategy described in Appendix H. The 7 steps of the IWM Strategy are common to all alternatives, but alternatives differ in the extent of completion of all 7 steps. See Standard EM-S18 in the Ecosystem Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."				**F-S2. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3 & 5.
		F-O5. Objective[S]: Maintain viability and ensure long term evolutionary potential of native terrestrial plant and animal species.				
		F-O6. Objective[S]: Provide for range-wide recovery of federally listed species, federal candidate species and prevent listing of species given special management consideration by the BLM and Forest Service, for example, USFS Forest Service Sensitive Species and USDI Bureau of Land Management Species of Special Concern.				
		F-07. Objective[S]: Manage habitats to ensure long term viability, in full recognition of the ecological importance of special assemblages of species, endemic vertebrates, disjunct vertebrates and vertebrate carnivores, rare plants and amphibians. (See map x)				
		F-O8. Objective[S]: Manage identified important habitats which contain centers of biodiversity, rarity and endemism as well as disjunct vertebrate carnivores to maintain long term ecological integrity. (refer to map xx)				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		[1]**F-O9. Objective[S]:** Manage all Forested PVGs to ensure retention/recruitment of snags and downed logs to maintain viability of associated species and ecological integrity on lands subject to management activities.				
		F-O10. Objective[S]: Reduce the risk of direct mortality caused by human access, with emphasis on large carnivores/ omnivores.				
		F-O11. Objective[S]: Wintering wildlife should be given management priority.				
		F-O12. Objective[P]: Maintain options for evolutionary processes by reference to multiple ecological domains such as peripheral ERUs to maintain long term habitat integrity and to provide for unique species, species assemblages and ecosystems (refer to maps XXX).				
		F-O13. Objective[S]: Maintain habitat and habitat components for species associated with late/old seral structure and occurrence.				
[1]**Default Standard (F-O9):** For administrative units that have not conducted a local analysis of snag habitat retention needs provide the following; Dry Forest PVG (2 snags/acre, >21" DBH), Moist Forest PVG (6 snags/acre >21" DBH) and in the Cold Forest PVG (8 snags/acre >12" DBH). Applies to lands where forest management activities occur.						
			F-S3. Standard[P]: In lieu of a more effective strategy, use the IWM Strategy described in Appendix H. Implement the 7 steps of the IWM Strategy. See Standard EM-S18_ in the Ecosystem Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."		**F-S3. Standard[P]:** In lieu of a more effective strategy, use the IWM Strategy described in Appendix H. Implement the 7 steps of the IWM Strategy. See Standard EM-S18 in the Ecosystem Management/Noxious Weed section for a list of the IWM steps. For forest ecosystems, step 7 should read: "Implementing *vegetation management* activities in such a manner as to prevent the invasion of noxious weeds after noxious weed control."	

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					F-O14. Objective[P]: Determine the ability of mechanical vegetation and fuel management methods (for example, harvest, thinning, chipping) to mimic the effects of natural disturbance regimes on ecosystem processes and functions.	
					F-O15. Objective[P]: Determine the relative importance of various conduits of noxious weed or exotic plant species introduction to improve the effectiveness of noxious weed control.	
					F-O16. Objective[P]: Emphasize restoration that supports learning about management of forested systems over all Forest Clusters. Activity methods used for restoration will vary across the Forest Clusters.	

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					Rationale *– The landscape ecology assessment (STAR) identified the dry forest potential from historical conditions. These changes include a loss of scattered overstory ponderosa pine, western larch and Douglas fir, a loss of single-layer late-seral structural stages, and increase in mid-seral multi-story stands, a general trend towards increased tree densities, a shift of species dominance from shade-intolerant to shade-tolerant, and a shift from a dominance of low intensity/high frequency fire regimes toward higher intensity/lower frequency regimes. These changes have predisposed forest landscapes to larger scale disturbances than would have naturally occurred with endemic fire, insect and disease disturbances. Consequently, wildlife habitat characterized by large trees and single storied late seral stands has declined.*	

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		F-S4. Standard[S]: Decrease total patch number, and increase mean patch size, overall amount, and connectivity of late seral/old forest ecosystems over the long-term at the 4th code HUC scale in PVGs demonstrated to be deficient in late seral structure. Plan for replacement of areas meeting late seral/old forest structural attributes for habitat needs of late seral/old forest dependent species, and ensure consistency with desired disturbance regimes. *See Objectives F-O17, F-O20, F-O23.*				**F-S4. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
		***Rationale** – The landscape ecology assessment (STAR) found that in most cases the current amount of late-seral forest ecosystems is below the historic range of variability. As a whole, the landscape characterization area appears to be more fragmented than the historical landscape, with indices for large patches, and mean patch size decreasing.*				
		F-S5. Standard[P]: Develop late successional/old forest structural definitions for all PVTs, taking into account local site conditions, using at a minimum ranges for the following attributes: a) number of large trees (including those necessary for future snag recruitment), b) number of snags, c) amount of downed woody material, d) amount and size of gaps/openings, e) number of canopy layers, f) native shrub/herb components.				
		F-S6. Standard[S]: When managing vegetation to increase the amount of late-seral structure, use silvicultural and prescribed fire methods which create/enhance late-seral/old forest components.				**F-S6. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
		F-S7. Standard: Not applicable				**F-S7. Standard[S]:** There shall be no commercial harvest in reserves. Limited silvicultural activities shall be allowed to enhance species viability.
DRY FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O17. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, pattern, and fuel loading and distribution to a condition where the ecosystem sustains and is resilient to endemic levels of fire, insects, and disease. Implement management activities at a rate that approximates the levels described in table 3-12. *See Standard F-S8. See Guidelines F-G30-46, F-G66-104.*				

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		F-S8. Standard[S]: Increase the dominance of ponderosa pine in late-seral single strata, and the amount of western larch in late-seral single and late-seral multi-strata structural stages to approach the desired range. Decrease the amount of Douglas-fir, grand fir, and white fir in all structural stages.				**F-S8. Standard: within reserves** Not applicable **outside reserves** Same as alternative 3-6.
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O18. Objective[S]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G30-46, F-G66-104.*				
		F-O19. Objective[P]: Prioritize vegetation management within Forest Clusters as follows: **Forest Cluster 1** – Prioritize areas where late seral structure has declined, where roading has already occurred and there is low risk to aquatic integrity. **Forest Cluster 2** – Prioritize areas where fire risk has increased, roading has already occurred and there is low risk to aquatic integrity. Where early and late seral forests have decreased, and mid seral forests have increased, focus on moving mid-seral shade tolerant forests toward shade-intolerant old forest or regeneration. **Forest Cluster 3** – Areas where restoration or production activities might degrade watersheds are a low priority; prioritize watersheds in poorest overall condition. Prioritize that are already roaded, and show a high departure in fire severity and frequency for any restoration or production activity. **Forest Cluster 4** – Roaded areas and areas that could be restored in combination with watershed restoration would be high priority. **Forest Cluster 5** – Focus on moving mid-seral structure toward late (preferred) or early seral shade-intolerant structure. Focus on areas that are highly roaded, where some road closures or production activity which may degrade watersheds with sensitive anadromous fish or narrowly distributed endemic species would be a low priority. **Forest Cluster 6** – Activity in subwatersheds that support strongholds of native fish, and where restoration and production activities may degrade watershed health is a low priority.				
		***Rationale** – The Science Integration Team (SIT) classified forestland conditions, integrating vegetative, aquatic and hydrologic integrity and resiliency, into 6 forest clusters. These clusters provide the best foundation available to establish vegetation management priorities due to their integration of a variety of ecological parameters (see"Recent changes in terrestrial and aquatic ecosystem conditions of subbasins within the Interior Columbia River Basin and implications for management," draft 1/30/96).*				
		***Rationale** – This cluster is dominated by moist and more production forest types. Subbasins exhibit low forest integrity, they are highly departed from historic conditions, they contain little wilderness and unroaded areas, and are likely to be heavily roaded. Forest structure and composition have been altered by past management. Forest structure is currently more homogeneous than historically. Late-seral structural stages have all but disappeared, with large increases in mid-seral structure.*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
MOIST FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O20. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, patch distribution, and fuel loading and distribution to a condition where ecosystems sustain, and are resilient to endemic levels of fire, insects and disease. Focus restoration on areas which have the highest potential to maintain viability of and/or attain an increase of western white pine. Implement management activities at a rate that approximates the levels described in table 3-12. *See StandardF-S9. See Guidelines F-G48-59, F-G31-39, F-G66-104.*				
		***Rationale** –The landscape ecology assessment (STAR) identified moist forest as exhibiting significant change, although less than dry forest. Much the same as dry forest, these changes include a loss of scattered overstory ponderosa pine, western larch and western white pine, loss of single-story ponderosa pine and codominant seral species, an increase in multi-story stands and a general trend towards overstocking and change of species from shade-intolerant to shade-tolerant. These changes, together with the introduction of white pine blister rust have predisposed forest landscapes to larger scale disturbances than would have naturally occurred with frequent low intensity fires and endemic levels of insects and diseases. Late- and early-seral structures have significantly declined, with compensating increases in mid-seral structure across most subbasins. Consequently, forest structure is more homogeneous than it was historically. The result has been a reduction of wildlife habitat, especially large trees, and single-storied old growth stands.*				
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O21. Objective[S]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G48-59, F-G31-39, F-G41-45, F- G66-104.*				
		F-O22. Objective[P]: Prioritize vegetation management within Forest Clusters as follows (same as Objective F-O19 for Dry Forest): **Forest Cluster 1** – Prioritize areas where late seral structure has declined, where roading has already occurred and there is low risk to aquatic integrity. **Forest Cluster 2** – Prioritize areas where fire risk has increased, roading has already occurred and there is low risk to aquatic integrity. Where early and late seral forests have decreased, and mid seral forests have increased, focus on moving mid-seral shade tolerant forests toward shade-intolerant old forest or regeneration. **Forest Cluster 3** – Areas where restoration or production activities might degrade watersheds are a low priority; prioritize watersheds in poorest overall condition. Prioritize that are already roaded, and show a high departure in fire severity and frequency for any restoration or production activity. **Forest Cluster 4** – Roaded areas and areas that could be restored in combination with watershed restoration would be high priority. **Forest Cluster 5** – Focus on moving mid-seral structure toward late (preferred) or early seral shade-intolerant structure. Focus on areas that are highly roaded, where some road closures could also be accomplished, and where fuel loads have increased significantly. Restoration or production activity which may degrade watersheds with sensitive anadromous fish or narrowly distributed endemic species would be a low priority. **Forest Cluster 6** – Activity in subwatersheds that support strongholds of native fish, and where restoration and production activities may degrade watershed health is a low priority.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		F-S9. Standard[S]: Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of western white pine where it occurred naturally.				**F-S9. Standard[S]: within and outside reserves** Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of western white pine where it occurred naturally.
		Rationale *–There has been extensive loss and poor regeneration of western white pine in the moist forest PVG as a result of blister rust infestations (landscape ecology STAR).*				
COLD FOREST						
Not Applicable except for table _ displayed for comparison	Not Applicable except for table _ displayed for comparison	**F-O23. Objective[S]:** In order to restore ecosystem processes, manage vegetative structure, stand density, species composition, patch size, patch distribution, and fuel loading and distribution to a condition where ecosystems sustain, and are resilient to endemic levels of fire, insects and disease. Focus restoration on areas which have the highest potential to maintain viability of and/or attain an increase of whitebark pine. Implement management activities at a rate that approximates the levels described in table 3-12. *See Guidelines F-G32, F-G35-37, F-G39, F-G41-42.*				
		Rationale *– The cold forest PVG exhibits the least amount of departure form historic conditions within the basin, although it does exhibit significant changes in forest structure and composition in some forest clusters. Because of the naturally longer time intervals between fire disturbance events, this PVG has not been as impacted by fire suppression. Primary concern at this time is the loss of whitebark pine and subalpine larch across the cold forest landscape. Forests of most subbasins are only modestly productive.*				
N/A except for table _ displayed for comparison	N/A except for table _ displayed for comparison	**F-O24. Objective[P]:** In areas that are currently within, or have been restored to the DRFC, manage production activities and levels on lands available and suitable for commodity production consistent with maintaining ecosystem processes, including disturbance intensities and frequencies, within the desired range of variability. *See Guidelines F-G32, F-G35-37, F-G39, F-G41-42..*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
						F-S10. Standard[S]: Within and outside reserves: Plant blister rust resistant stock, and reduce competition to increase the abundance, diversity, and distribution of whitebark pine & subalpine larch where it occurred naturally.
		Rationale *– The landscape ecology assessment (Ch. 2, STARS) found that the primary concern at this time in the cold forest PVG is the loss of whitebark pine and subalpine larch landscape-wide due to the introductions of white pine blister rust.*				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
RANGELANDS (R)						
Not Applicable	Not Applicable	**R-O1. Objective[ ]:** Restore or maintain distribution, frequency, native biodiversity, connectivity and productivity of native rangeland plant communities within the dry shrub, cool shrub and dry grassland PVGs consistent with the disturbance process for that site. Implement management activities at a rate that approximates the levels described in table 3-13.				
Not Applicable	Not Applicable	**R-S1.** Not Applicable				**R-S1. Standard[ ]:** Livestock grazing shall not be allowed in reserves unless livestock grazing use is needed to achieve the intent of the reserve, such as controlling noxious weeds or reducing fine fuels in altered sagebrush steppe. *This standard also applies to all other rangeland objectives.*
Not Applicable	Not Applicable	**R-S2.** Not Applicable				**R-S2. Standard[ ]:** Range improvement projects - such as water developments, fencing, brush control by mechanical means (except prescribed burning), or seeding - shall not be allowed in reserves unless it is needed to achieve the intent of the reserve. *This standard also applies to all other rangeland objectives.*

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O2. Objective[S]:** Minimize conflicts between carnivores (applies to those species whose viability is an issue), and livestock management practices.				Applies outside reserves.
Not Applicable	Not Applicable	**R-O3. Objective[S]:** Reduce the potential for disease transmission between domestic sheep and bighorn sheep.				Applies outside reserves.
Not Applicable	Not Applicable	**R-O4. Objective[S]:** Restore frequency of distribution and ecological integrity of native stands of mountain mahogany, bitterbrush and quaking aspen. Implement management activities at a rate that approximates the levels described in table 3-13				Applies outside reserves.
Not Applicable	Not Applicable	**R-O5. Objective:** Restore native plant community composition, vigor, productivity and ecological integrity of important wild ungulate winter ranges. Implement management activities a rate that approximates the levels described in table 3-13				Applies outside reserves.
Not Applicable	Not Applicable	**R-O6.** Objective: Maintain viability and promote long-term evolutionary process of native terrestrial plant and animal species.				Applies outside reserves.
		R-O7. Objective[ ]: Provide for range wide recovery of federally listed species, federal candidate species and prevent listing of species given special management consideration by land management agencies (that is, USDA Forest Service Sensitive Species and USDI Bureau of Land Management Species of Special Concern).				Applies outside reserves.
		R-O8. Objective[ ]: Manage habitats to ensure long term viability, in full recognition of the ecological importance of special assemblages of species, endemic vertebrates, disjunct vertebrates and vertebrate carnivores, and rare plants. (Refer to Maps XXX)				Applies outside reserves.
		R-O9. Objective[ ]: Manage identified important habitats which contain centers of biodiversity, rarity and endemism as well as disjunct vertebrate carnivores to maintain long term integrity. Refer to map XX.				Applies outside reserves.
		R-O10. Objective[ ]: Maintain multiple ecological domains and options for evolutionary processes by managing peripheral ERUs to maintain habitat integrity to provide for unique species, species assemblages, and ecosystems. (Refer to Maps XXX)				Applies outside reserves.
		R-O11. Objective[ ]: Provide for the continued existence and/or long term viability of local and rare endemics (plants and vertebrates) and disjunct vertebrate species. (Refer to Maps XXX)				Applies outside reserves.
		R-O12. Objective[ ]: Provide for the continued existence and/or long term conservation of; species, species assemblages, and unique ecosystems found in the; Upper Klamath Basin, Owyhee Uplands, and Northern Great Basin. (Refer to Maps XXX)				Applies outside reserves.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
		R-S3. Standard: As locations of occurrence become specifically known Administrative Units involved should develop ecologically integrated management strategies to conserve species closely associated with one ERU.				
Not Applicable	Not Applicable	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1,5, and 6, while emphasizing livestock forage in range clusters 1 and 6, Implement management activities at a rate that approximate the levels described in table 3-13. Priority areas for restoration are range-land clusters 1 and 5.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1,5, and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1 and 6, while emphasizing forage for livestock production. Priority areas for restoration are rangeland clusters 1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13. Objective[ ]:** Restore cool shrublands, dry shrublands and dry grasslands in range clusters 1, 5, and 6. Dry shrublands are the highest priority for initial treatment and establishment of experimental studies. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O13a. Objective[ ]:** within reserves Conserve cool shrublands, dry shrublands, and dry grasslands in range clusters 1, 5, and 6 by primarily emphasizing natural disturbance processes. **R-O13b. Objective[ ]:** outside reserves **Same** as alternative 3.
Not Applicable	Not Applicable	Not Applicable	Not Applicable	**R-O14. Objective[ ]:** Produce livestock forage and conserve cool shrublands, dry shrublands and dry grasslands in rangeland cluster 5. Implement management activities at a rate that approximate the levels described in table 3-13.	Not Applicable	**R-O14. Objective: within reserves** Not applicable **R-O14. Objective: outside reserves** Not applicable

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O15. Objective[ ]:** Produce livestock forage while restoring ground cover, productivity of perennial vegetation and communities that have converted to annual grass-dominated communities within rangeland clusters1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** To restore ground cover and productivity of perennial vegetation and converted communities dominated by annuals. Rangeland clusters 1, 5, and 6 have equal priority for treatment. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** Produce livestock forage while restoring ground cover and productivity of perennial vegetation communities that have converted to annual dominated communities, within rangeland clusters 1 and 6. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective[ ]:** To restore ground cover and productivity of perennial vegetation and communities that have converted to domination by annuals. Rangeland clusters 1 and 5 are the highest priority for treatment. Implement management activities at a rate that approximate the levels described in table 3-13.	**R-O15. Objective: within reserves** Not applicable **R-O15. Objective: outside reserves** Not applicable
JUNIPER AND CONIFER ENCROACHMENT						
Not Applicable	Not Applicable	**R-016. Objective[ ]:** To restore rangeland productivity and native biodiversity in areas where juniper and conifer encroachment is reducing rangeland productivity and biodiversity, implement management strategies that manage juniper and conifer population densities on dry and cool shrublands, dry grasslands, riparian and wetland areas. Priority areas are the above vegetation types in range clusters 3, 5, and 6 for the UCRB. Emphasis is on cool shrublands in Rangeland Cluster 1 for the EEIS. Implement management activities at a rate that approximate the levels described in table 3-13.				
Not Applicable	Not Applicable	**R-S4**. Not Applicable				**R-S4. Standard[S]:** There shall be no harvesting of junipers or conifers inside of reserve areas, unless needed to meet the intent of the reserve.
SOIL AND VEGETATION PRODUCTIVITY						
Not Applicable	Not Applicable	**R-017. Objective[S]:** To manage sagebrush densities on dry and cool shrublands so native biodiversity, soil stability and soil productivity are maintained or improved. Priority areas are range clusters 5 & 6 in the UCRB planning area. Implement management activities at a rate that approximate the levels described in Table 3-13.				

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Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable	Not Applicable	**R-O18. Objective[ ]:** Implement management strategies that promote native biodiversity, soil stability and productivity, and vegetative health and productivity on rangelands with special emphasis during drought years by providing for the following ecosystem functions (1) permit sites to capture water, (2) permit effective water storage, (3) permit release of water such that there is low sediment transport, (4) permit subsurface flow and soil stability, moisture storage, nutrient cycling, and energy flow, (5) permit plants to capture sufficient resources, (6) permit plants to store sufficient resources, and (7) permit plants to retain sufficient cover and litter. Priority areas are dry shrublands and juniper dominated areas in range clusters 5 and 6. Priority areas for the EEIS planning area are dry shrublands and western juniper dominated areas in range cluster 1, 5 & 6. Implement management activities at a rate that approximate the levels described in table 3-13.					
Not Applicable	Not Applicable	**R-S5. Standard[S]:** *Applies to Objective R-O18.* On dry shrublands, there shall be no livestock grazing in a manner that normally would lead to a decrease in soil and vegetative health and productivity during and directly after drought years (about 75% of normal precipitation and below).				
Not Applicable	Not Applicable	**R-O19. Objective[ ]:** Actively manage to restore vegetation structure and species composition to reduce fragmentation and restore linkage zones and increase patch size within and between similar habitats. Reduce fragmentation within shrubland and grass potential vegetation types where special status species occur.				

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<table>
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<tr><td colspan="7">VIABILITY AND FEDERALLY LISTED SPECIES (V)</td></tr>
<tr><td colspan="7">V-O1. Objective[S]: Contribute to the rangewide recovery of federally listed or proposed species (or subspecies or populations) by restoring habitat quality, quantity, and effectiveness. Continue Idaho conservation effort for development of habitat assessments and strategies.</td></tr>
<tr><td colspan="2">V-S1. Standard[P]. Evaluate and implement as appropriate recovery actions according to FS or BLM land-use plans following approved recovery plans. Departure from recovery plans shall be documented in appropriate NEPA analysis and decision notices and records of decision. Develop annual reports on progress and achievements.</td><td colspan="5">V-S1. Standard[P]. Evaluate and implement as appropriate recovery actions according to FS or BLM land-use plans following approved recovery plans and conservation strategies. Departure from approved recovery plans and conservation strategies shall be documented in appropriate NEPA analysis and decision notices and records of decision. Develop annual reports on progress and achievements.</td></tr>
<tr><td colspan="2">V-S2. Standard[S]. In the context of Standard V-S1 for raptor species, subspecies, and populations that are recovering within the ICBEMP project area, apply standards and guidelines from finalized agency documents that have been contributing to recovery.</td><td colspan="5">V-S2. Standard[S]. In the context of Standard V-S1 for raptor species, subspecies, and populations that are recovering within the ICBEMP project area, apply standards and guidelines from finalized agency documents that have been contributing to recovery, and incorporate new scientific information into adaptive management strategies.</td></tr>
<tr><td colspan="7">V-S3. Standard[P]. Implement uniform planning and management procedures by adopting the resource management guidelines and grizzly bear management situations as established in the Interagency Grizzly Bear management (IGBC) Guidelines, 1986. This standard applies to the UCRB EIS area only.</td></tr>
<tr><td>Not Applicable</td><td>Not Applicable</td><td colspan="5">V-S4. Standard[P]. Within established grizzly bear recovery zones, NEPA analysis for proposed land-disturbing activities should evaluate the conclusions of the IGBC task force report, Interagency Grizzly Bear/Motorized Access Management, July 1994. This standard applies to the UCRB EIS area only.</td></tr>
<tr><td>Not Applicable</td><td>Not Applicable</td><td colspan="5">V-S5. Standard[P]. In any recovery area where road densities are higher than thresholds in the IGBC task force report (see V-S7), NEPA analysis for additional proposed land-modifying activities should include complete habitat mapping and cumulative effects analysis. This standard applies to the UCRB EIS area only.</td></tr>
</table>

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Not Applicable	Not Applicable	**V-S6. Standard[P].** NEPA analysis for proposed land-disturbing activities in the Selkirk and Cabinet/Yaak Grizzly Bear ecosystems should evaluate the IGBC strategy for reducing grizzly bear mortalities. ***This standard applies to the UCRB EIS area only.***				
V-S7. Standard[P]. Coordinate annually with States and tribes to provide habitat for big game populations. ***This standard applies to the UCRB EIS area only.***		**V-S7. Standard[P].** Coordinate annually with States and tribes to provide for management of habitat for prey base necessary to support gray wolf recovery. ***This standard applies to the UCRB EIS area only.***				
V-S8. Standard[P]. Implement long-term monitoring protocols that will facilitate use of the Breeding Bird Survey data for management of neotropical migratory birds. Report annually on progress and results.						

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
AQUATIC STRATEGIES Features of Key Components					
BASIC CONCEPT	No region-wide Aquatic Conservation Strategy. Relies on forest and BLM land use plans.	Strategy Incorporates PACFISH/INFISH interim requirements as reflected in Decision Notices[1] and makes them permanent in Alternative 2. Same for Alternative 3, except Standards and Guidelines can also be changed through Watershed Analysis.[2] Activities requiring an EA or EIS will incorporate PACFISH (pages C-3 - C-22) and INFISH (pages E-3 - E-15) interim requirements as the first step. Any changes to those requirements will result from completed watershed analysis.	Strategy represents "refinements" of PACFISH/INFISH made possible by PACFISH/INFISH implementation monitoring and information from the Project's Science Integration Team. Activities requiring an EA or EIS will include watershed-specific RMOs, RMAs and standards and guidelines reflecting completed watershed analysis as the first step. PACFISH/INFISH refined interim standards will be in place and used until watershed analyses are completed. The goal for completion of watershed analyses is three years, but interim standards will not lapse in the event that watershed analyses are not completed.	For forested areas emphasizing timber production the concept reflects "Fish 2000."[3] Rangelands emphasizing livestock production use the concept of Proper Functioning Condition (PFC).[4] Other emphasis areas are the same as Alternatives 4 and 6. - In timber production emphasis areas, project standards are the minimum consistent with state law, to be expanded as indicated by site-specific analysis. - In livestock production emphasis areas, PFC assessment process used to establish objectives. - All other emphasis areas are the same as Alternatives 4 and 6.	Interagency (FWS, NMFS, EPA) Aquatic Conservation Strategy.[5] Same as Alternatives 2 & 3 with additional requirements including allocation of all unroaded areas greater than 1,000 acres as Strongholds for the production of clean water, aquatic and riparian-dependent species.[6]

[1] *Decision Notice and Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH).* USFS and BLM, Wash., D.C., 1995, and *Decision Notice and Environmental Assessment for the Inland Native Fish Strategy: Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada.* USFS, Northern, Intermountain and Pacific Northwest Regions, 1995.Incorporated herein by reference.

[2] *Ecosystem Analysis at the Watershed Scale: The Federal Interagency Guide to Watershed Analysis, Version 2.2.* Incorporated herein by reference.

[3] *National Forest Riparian and Aquatic Habitat Management Strategy (Fish 2000): An Alternative for the Protection and Restoration of Anadromous Fish Habitat in Eastern Oregon and Washington.* Developed by the Northwest Forest Resource Council. Incorporated by reference.

[4] USDI Bureau of Land Management, *Riparian Area Management: Process for Assessing Proper Functioning Condition,* 1993.

[5] Interagency *Aquatic Conservation Strategy.* National Marine Fisheries Service, U.S. Fish and Wildlife Service, Environmental Protection Agency, 1995. Incorporated herein by reference.

[6] "A comprehensive inventory of these areas and their spatial and ecological relationship to the delivery of clean water, aquatic and riparian dependent species is unavailable but is necessary to determine which of the unroaded areas deserve permanent allocation as Strongholds." - Interagency *Aquatic Conservation Strategy.*

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
GOALS (Displayed in the "Desired Range of Future Conditions" for each alternative)	Varies by forest and BLM land use plan.	PACFISH (page C-4) and INFISH (page E-2).	Modified goals from PACFISH, INFISH and Northwest Forest Plan.[7]	PACFISH (C-4) and INFISH (page E-2).	*Interagency ACS* (pages 6-7); follows Northwest Forest Plan.
WATERSHED RESTORATION	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (page C- 21, C-22) INFISH (page E-2). **Alternative 3:** Objectives and activity tables contain specific restoration levels and rates	Objectives and activity tables contain specific restoration levels and rates	Objectives and activity tables contain specific restoration levels and rates	*Interagency ACS* (pages 12 - 13). No specific direction included. However, objectives and activity tables contain specific restoration levels and rates.
WATER QUALITY	Varies by forest and BLM land use plan.	New objectives and standards to provide direction on implementation of the Clean Water Act.			
MONITORING	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (page C- 22 - C-23) and INFISH (pages E- 15) become permanent. **Alternative 3:** Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.	Region and state offices directed to develop implementation, effectiveness and validation monitoring frameworks. Field units directed to monitor RMOs and restoration projects.
KEY/ PRIORITY WATERSHEDS	None	**Alternative 2:** PACFISH (page C- 19) INFISH (page E-13 & 14). **Alternative 3:** Watershed Categories replace Key/Priority Watersheds.	Watershed Categories replace Key/Priority Watersheds.	Watershed Categories replace Key/Priority Watersheds, but are subject to Emphasis Area direction.	None, but concept of "Strongholds" allocated to riparian and aquatic recovery and restoration *Interagency ACS* (page 9).

[7]USFS and BLM, 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl/Standards and Guidelines for Management of Habitat for Late Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. Interagency Supplemental EIS Team Portland, Or.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
WATERSHED ANALYSIS (Separate from the multi-scale ecosystem analysis applicable in Alternatives 3-7).	None	**Alternative 2:** PACFISH (page C- 19 and C-21) INFISH (page E-14 and E-15). Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths and RMOs. **Alternative 3:** Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths, RMOs and standards and guidelines.	Watershed Analysis is a primary emphasis to determine watershed-specific RMA widths, RMOs and standards and guidelines.	In timber emphasis areas, Conduct a watershed-scale riparian function and project-specific assessment, to be expanded as indicated by site-specific analysis. In livestock emphasis areas, Watershed Analysis procedures incorporate PFC as an important consideration, and objectives are established to achieve PFC. For all other emphasis areas, same as Alternatives 4 and 6.	Same as Alternative 2: Intent of Watershed Analysis is a secondary emphasis, and is to refine RHCA widths and RMOs.
INTERIM RMOs	None	PACFISH (page C-6) INFISH (page E-4). Instream attributes expressed as single values.[8]	Appendix G, Pages ____. Instream and riparian attributes expressed in ranges of values stratified by slope class and ERU.[9]	None in timber or livestock emphasis areas (See Page 23 of Fish 2000).	*Interagency ACS* (pages 8-9)[10]
INTERIM RHCAs	Varies by forest and BLM land use plan.	PACFISH (page C-8) INFISH (pages E-5 & 6). Fixed minimum widths based on fish and water presence. For rangelands, fixed on width of 100-year floodplains.	Appendix G, Pages ____. In forested environments, widths vary based on inner and outer riparian zones which reflect instream and riparian functions and processes. In rangelands, widths vary by floodprone area and stream type.	In timber emphasis areas see page 18 of Fish 2000. None in livestock emphasis areas. In all other emphasis areas, same as Alternatives 4 & 6.	Same as Alternatives 2 & 3. *Interagency ACS* (pages 9-10). Adds concept of "Strongholds" to RHCAs, and allocates both to riparian and aquatic recovery and restoration.

[8] The data set from which the PACFISH/INFISH RMOs were developed was limited to 200 streams, and included streams outside the Interior Columbia River Basin.

[9] The data set (2000 streams) was much larger than that for PACFISH/INFISH, and was rigorously analyzed.

[10] RMOs were "developed based on those from PACFISH, the NMFS PACFISH Biological Opinion (BiOp) and the NMFS LRMP BiOp. These in turn were based on the biological habitat requirements of fish and aquatic resources (Rhodes et al., 1994) or based on conditions in undeveloped watersheds as a benchmark (Peterson et al., 1993)."

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Continue

UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
INTERIM PROJECT STANDARDS AND GUIDELINES	Varies by forest and BLM land use plan.	**Alternative 2:** PACFISH (pages C- 9 - C-18) and INFISH (pages E-6 - E-13) become permanent. **Alternative 3:** PACFISH (pages C- 9 - C-18) and INFISH (pages E-6 - E-13) are interim until watershed analysis completed.	Same as Alternative 3, except for changes in timber, fire, roads and recreation management where different standards apply in zones One and Two.	In timber emphasis areas see page 18 of Fish 2000. In livestock emphasis areas, attain PFC. In all other emphasis areas, same as Alternatives 4 & 6.	*Interagency ACS* (pages 14 - 23).

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 5	Alternative 5	Alternative 7
AQUATIC STRATEGIES (A)					
Goals					
Varies by forest and BLM land management plan.	See Desired Range of Future Conditions for each alternative.				
Watershed and Riparian Restoration Management					
Varies by forest and BLM land management plan. Ranges in Tables 3-12 and 3-13 are displayed for comparison.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH. Ranges in Tables 3-12 and 3-13 are displayed for comparison.	**A-O1. Objective:** Restore watershed, soil productivity, stream channel, riparian, and soil integrity where functions are at levels that do not allow ecosystem sustainability and resiliency. Implement watershed restoration activities at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G___.*			
		A-O2. Objective: Maintain or improve forest and rangeland riparian health and integrity, including appropriate conditions for microclimate, streamflow, groundwater flow, channel morphology, floodplain function, and vegetation (composition, pattern, and structure) to achieve conditions that support federally listed species, species of special concern, other aquatic and riparian dependent species, and designated beneficial uses at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G__.*			
		A-O3. Objective: Manage rangeland riparian areas to maintain or improve conditions towards vegetation structure, age, and composition consistent with the potential for that site at the levels described in Tables 3-12 and 3-13. *See Standards A-S1-S3. See Guidelines A-G___.*			
		A-S1. Standard: Grazing intensity and season of use shall be managed to allow vegetation to recover before being regrazed to encourage plant vigor, regrowth, and energy storage.			
		A-S2. Standard: Monitoring plans shall be integrated with grazing management strategies for riparian areas within 10 years.			
		A-S3. Standard: Attainment of Proper Functioning Condition (Riparian Area Management, Process for Assessing Proper Functioning Condition, Technical Report 1737-9, 1993) should be required as a minimum channel and riparian condition for all stream systems. Where stream systems are not meeting Proper Functioning Condition, management activities should be modified to attain Proper Functioning Condition.			
Water Quality					
A-O4. Objective: Maintain water quality where it is presently high, and improve water quality where it does not meet State water quality standards due to influences from Forest Service- or BLM-administered lands. *See Standards A-S4-S6. See Guideline A-G___.*					

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Not Applicable	Not Applicable	**A-S4. Standard:** No objective, standard, or guideline in a Forest Service Land & Resource Mgt. Plan or a BLM Resource Mgt. Plan shall be considered equivalent to a State Water Quality Standard unless said objective, standard, or guideline has been specifically incorporated by the State into its applicable water quality laws, regulations, or standards in which the Forest or BLM plan is in effect.			
A-S5. Standard. Within watersheds where there are water quality limited segments or water bodies as defined by the Clean Water Act (Section 303(d)), management actions shall be implemented in compliance with State-developed water quality programs and strategies with the intent to restore water quality to levels which meet State Water Quality Standards.					
A-S6. Standard. Within watersheds that are identified as High Quality Waters or Outstanding Resource Waters (waters which exceed water quality standards), comply with applicable State anti-degradation requirements.					
Monitoring and Inventory					
Varies by forest and BLM land management plan.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH.	**A-O5. Objective:** Monitor progress toward attainment of long-term health and integrity of watershed, aquatic, riparian, and soil resources. *See Standards A-S7-S10. See Guidelines A-G___.*			
		A-O6. Objective: Collect and inventory data in a consistent, retrievable, and updateable format to acquire essential information about ecological processes and conditions, causal mechanisms, and inherent capabilities and limitations, that are linked across different scales of time and space, and are used to address issues identified by watershed and other scale analyses. *See Standards A-S7-S10. See Guidelines A-G___.*			
		A-S7. Standard: Regional and State Offices shall develop implementation, effectiveness, and validation monitoring frameworks for the Upper Columbia River Basin and Eastside EIS areas.			
		A-S8. Standard: Regional and State Offices should oversee and ensure monitoring programs at various scales and report results on an annual basis. At a minimum, key habitat and watershed processes identified in Watershed Management Objectives and Riparian Management Objectives and implementation and effectiveness of watershed restoration should be reported and assessed to determine progress in meeting objectives.			
		A-S9. Standard: Regional and State Offices shall cooperate with Federal agencies and State, and tribal governments which have Clean Water Act authority to develop consistent protocols for methodologies in collection, transmission, and sharing of monitoring data.			
		A-S10. Standard: Monitoring shall be conducted by field units to determine if Watershed or Riparian Management Objectives are being met. If it is determined that objectives are not being met due to management actions, then management actions should be modified to those more likely to achieve objectives. If analysis indicates that Watershed or Riparian Management Objectives are not being met due to natural conditions or to processes or actions outside of management control, then new objectives should be developed on the basis of new information.			

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Key Watersheds, Watershed Categories, and Emphasis Areas – Use of Watershed Analysis					
Varies by forest and BLM land management plan.	Varies by forest and BLM land management plan and as amended by the Decision Notices for PACFISH and INFISH. See Appendix ___ for description.	Watershed Categories 1, 2, 3 as defined in the Scientific Assessment and discussed in Chapter Two of this EIS apply. See Appendix ___ for description.		Emphasis areas as defined in this Alternative apply. See Appendix ___ for description. Outside timber production and livestock production emphasis areas same as Alternatives 4 and 6.	Not Applicable
Not Applicable	Not Applicable	Not Applicable		**A-O7. Objective:** Inside timber production and livestock production emphasis areas, conserve remaining native aquatic species strongholds and high quality habitat and water for federally listed threatened, endangered, and candidate aquatic species while maximizing production activities.	Not Applicable
				Outside timber production and livestock production emphasis areas:	
Not Applicable	Not Applicable	**Category 1 Watersheds A-O8. Objective:** Conserve and promote watershed health, soil function, aquatic habitat integrity and connectivity, and water quality within Category 1 Watersheds. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See Guidelines A-G___.*			Not Applicable

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Not Applicable	Not Applicable	**Category 2 Watersheds A-O9. Objective:** Conserve remaining native aquatic species strongholds and high quality habitat and water, restore depressed native aquatic species populations, and restore connectivity in watersheds where populations of native aquatic species are presently fragmented because of habitat loss or disruption. Improve watershed health and integrity, soil function, and water quality in areas where natural watershed function and condition have been degraded. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See Guidelines A-G___.*			Not Applicable
Not Applicable	Not Applicable	**Category 3 Watersheds A-O10. Objective:** Conserve remaining native aquatic species strongholds and high quality habitat and water for federally listed threatened, endangered, candidate aquatic species and aquatic species of concern, while preserving future options for watershed and aquatic restoration. Protect or improve water quality to sustain designated beneficial uses. Protect, maintain, and restore designated critical habitat and designated habitat within recovery zones for federally listed aquatic species. See Tables 3-12 and 3-13 for restoration rates by cluster. *See Standards A-S11-13. See guidelines A-G___.*			Not Applicable
Not Applicable	**A-S11. Standard:** Ecosystem Analysis shall be used as required by interim project standards.	**A-S11. Standard:** In Category 1 Watersheds, Ecosystem Analysis shall be completed prior to any activity that requires an Environmental Assessment or Environmental Impact Statement until such time as Region and State Offices jointly develop and implement a pre-project water-scale effect screen that would exempt some activities from Ecosystem Analysis.		**A-S11. Standard:** In timber production emphasis areas, conduct a watershed-scale riparian function and project-specific assessment as described by Fish 2000 prior to timber harvest activities.	**A-S11. Standard:** Same as Alternative 2.
Not Applicable		**A-S12. Standard:** In Category Two and Three Watersheds, Ecosystem Analysis should be performed prior to any activities that require an EA or EIS. If Ecosystem Analysis is not completed, then interim project standards, interim RMAs and interim RMOs shall apply as defined for the Alternatives in the proceeding sections.		**A-S12. Standard:** In livestock production emphasis areas, the Proper Functioning Condition assessment procedure should beused in establishing objectives during the Allotment Management Plan revision process.	
Not Applicable		**A-S13. Standard:** In Category Three watersheds not containing threatened, endangered or candidate species, interim RMAs and RMOs can be adjusted with site-specific data.		**A-S13. Standard:** For other emphasis areas see Alternative 4 and 6 interim project standards, interim RMAs, and interim RMOs and Standards A-S11-S13.	

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Interim Riparian Management Objectives (RMOs): Definitions and Intent - Detailed description in Appendix G for Alternatives 2-7.					
Varies by forest or BLM land use plan.	Landscape-scale interim RMOs describing good habitat for native fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability and lower bank angle, and width to depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).		RMOs describing natural to near natural aquatic habitat conditions were developed through the Project's Science Integration Team, using stream inventory data for large pool and pool frequency, large woody debris, bank stability, and pool width to depth ratio. Instream values are displayed in ranges to account for variability of streams within the interior Columbia River Basin. Applicable published and non-published scientific literature was used to define favorable water temperatures. A riparian vegetation RMO was also developed. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).	*Timber emphasis areas within Forested environments:* Appropriate goals and objectives must be developed on a site-specific basis. Process-based locally developed RMOs, where channels and their key habitat characteristics are measured in the watershed of concern. These measures are then compared with those from streams of similar channel and watershed geomorphic character, which are judged to fully support the waters' beneficial uses, in order to produce "reference conditions. Determination of "fully support" must include documentation of assumptions on which judgements are based, allowing for revision over time as new information becomes available.	RMOs provide a measure of whether the land management practices are providing the watershed and habitat characteristics which will support aquatic species. If conditions at the watershed scale or site-specific scale are below these criteria then it must determined why the watershed is not meeting objectives. Where land management activities are the causal agent for not meeting the riparian management objectives then a plan to remedy the problem needs to be developed.
	The interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time.			Riparian Management Objectives provide guidance to project design and monitoring.	Riparian Management Objectives (RMOs) provide measurable criteria against which attainment, or progress toward attainment, of the Aquatic and Riparian Goals are measured.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	However, the intent of interim RMOs are not to establish a ceiling for what constitutes good habitat conditions. Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are inconsistent with the purpose of this interim direction.			*Livestock emphasis areas within rangeland environments:* RMOs are to be based on the definition of "Proper Functioning Condition." Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to: a) dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; b) filter sediment, capture bedload, and aid floodplain development; c) improve flood-water retention and ground-water recharge; d) develop root masses that stabilize stream banks against cutting action; e) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; f) and support greater biodiversity.	The method of adjusting the RMOs to particular watersheds is through Watershed Analysis; if interagency peer reviewed watershed analysis shows that habitat recovery is enhanced and not retarded by adjustment, or is that these RMOs are not attainable within the watershed, then these RMOs should be adjusted according to the findings of the watershed analysis.
				For forested and rangeland environments outside timber and livestock emphasis areas: Same as Alternatives 4 and 6.	

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Interim Riparian Management Areas (RHCAs or RMAs) Width Definitions - Detailed description in Appendix G for Alternatives 4 and 6.					
Varies by forest and BLM land use plan.	**Fish-bearing streams:** Riparian Habitat Conservation Areas (RHCAs) consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest. **Permanently flowing non-fish-bearing streams:** RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.		**Forested Environments:** Riparian Management Areas (RMAs) for permanently flowing streams (both fish bearing and non-fish bearing) consist of the stream and the area on either side of the stream with a width equal to the height of one site potential tree making up Zone One, and an additional width of a second site potential tree, or the distance required to buffer the stream from nonchannelized sediment, whichever is greater, making up Zone Two. **Range Environments:** Riparian Management Areas (RMAs) for permanently flowing streams (both fish bearing and non-fish bearing) consist of the stream and the area on either side of the stream with a width equal to the flood-prone width based on stream-type as defined in Rosgen (1994).	***In timber emphasis areas:*** **Forested Environments:** Riparian Habitat Conservation Areas (RHCAs) consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the boundary defined by identified individual stream input processes. ***In livestock emphasis areas:*** **Range Environments:** none. ***All areas outside timber and livestock emphasis areas:*** Same as Alternatives 4 and 6.	Standard RHCA definition same as Alternatives 2 and 3.
	Ponds, lakes, reservoirs, and wetlands greater than 1 acre: RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.				Same as Alternatives 2, 3, 4 and 6.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: This category includes features with high variability in size and site-specific characteristics. At a minimum the RHCAs must include: a. the extent of landslides and landslide-prone areas, b. the intermittent stream channel and the area to the top of the inner gorge, c. the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation, and d. the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest;		**Seasonally flowing or intermittent streams:** Riparian Management Areas (RMAs) for forested environments consist of the stream and the area on either side of the stream with a width equal to the height of one-half site potential tree making up Zone One, and an additional width of one-half site potential tree, making up Zone Two. **Landslide Prone Areas:** Landslide prone areas are added to RMAs as indicated by landslide prone analysis.		*Same as Alternatives 2 and 3.*
Interim Project Standards					
Timber Management					
Varies by forest and BLM land use plan.	**Standard:** RMAs shall not be included in the land base used to determine the Allowable Sale Quantity at the time of plan revision, but any volume harvested can contribute to the timber sale program.			**Standard:** Same as Alternatives 2, 3, 4 and 6, except not applicable in timber emphasis areas.	**Standard:** Same as Alternatives 2, 3, 4 and 6. Also applies to "Strongholds" defined as all unroaded areas greater than 1,000 acres allocated for the production of clean water, and aquatic and riparian dependent species.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: Prohibit timber harvest, including fuelwood cutting, in RHCAs (Zone One) except as described below: a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in RHCAs only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other RMOs and where adverse effects can be avoided to aquatic resources. b. Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOs. Apply silvicultural practices in a manner that does not retard attainment of RMOs and that avoids adverse effects on aquatic resources.		**Standard:** Zones One and Two. The primary purpose of RMAs is to protect, maintain or restore the riparian and instream processes and functions. Vegetation management may occur in the RMAs only for the purpose of achieving these functions and processes and the intent of each Zone. RMAs are not intended as important sources of commercial timber. *(See Appendix G for discussion of processes, functions, and intents).* **Standard:** Zone One. Large live, dying and dead (standing and down) trees are recognized for their importance in supporting riparian functions and processes. Vegetation management will be used only to achieve or maintain mature forest conditions adapted to non-lethal, lethal, or mixed fire regimes and other natural disturbances characteristic of the site. Management will minimize ground disturbance and have no predictable measurable instream effects.	*In timber emphasis areas:* **Standard:** There shall be no timber harvest within 20 ft of fish-bearing streams. Only selective timber harvesting is permitted between 20 and 100 ft of fish-bearing streams. a. In riparian areas adjacent to perennial and intermittent streams, trees not required for present or future shade and temperature considerations may be selectively harvested. The maximum area that shall be considered for shade and temperature control is 75 ft from the active channel margin. b. In riparian areas adjacent to perennial and intermittent streams, trees not required for large woody debris recruitment may be selectively harvested. The maximum area that should be considered for large woody debris recruitment is one effective tree height around all active channel migration zones.	**Standard:** Prohibit timber harvest, including fuel wood cutting in RHCAs and Strongholds, except as described below: a. Allow timber extraction including fuel wood cutting from RHCAs only where watershed analysis shows that such projects will be neutral or beneficial to water quality, fish and other riparian dependant resources. Watershed analysis should show compelling scientific and logical reasons to assure that present and future coarse woody debris needs are met, cutting would not prevent attainment of Riparian Objectives or Desired Habitat Standards, and would not result in adverse effects to clean water, fish and other aquatic resources. b. In RHCAs, apply only silvicultural practices to control stocking, reestablish and culture stands, and acquire desired vegetative conditions necessary to attain Riparian Objectives and meet Desired Habitat Standards.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
			Standard: Prescribed fire or thinning may be used in Zone Two only to move stands toward mature forest conditions adapted to non-lethal, lethal, or mixed fire regimes where there is a threat of transmitting lethal fire conditions to Zone One. Management will minimize ground disturbance and have no predictable measurable instream effects, and maintain forest canopy sufficient for microclimate and riparian dependent species.	c. To protect nutrient budgets in riparian areas adjacent to perennial and intermittent streams, there shall be no burning, piling of slash, or soil disturbance within 100 feet of active channel margins. d. To minimize sediment introduction into aquatic systems, there shall be no ground-skidding equipment within 50 ft of active channel margins in areas adjacent to perennial and intermittent streams.	c. Do not harvest any tree species older than 150 years or with a diameter at breast height (dbh)of greater than 20 inches. This is prudent within RHCAs. Trees, other than hazard trees, greater than 150 years of age, or with a dbh greater than 20 inches should not be cut in RHCAs. Hazard trees that fit this description may be cut, but they should be left on-site.
			Standard: Upslope of Zone Two use a variety of tools including silvicultural practices to create vegetation pattern, structure and composition for both upslope and Zone Two to lessen the risk of uncharacteristic disturbances from fire, insect, and disease. Silvicultural practices within Zone Two and related uplands should be designed to achieve desired vegetation characteristics consistent with RMOs while not creating or exacerbating additional risks.	e. Where appropriate, silvicultural treatments can be applied to reduce the risk of large wildfires in riparian areas that have fuel loading levels greater than expected for the biophysical setting. *In all other forested environments outside timber emphasis areas:* Same as Alternatives 4 and 6.	**Standard:** For all timber sales evaluate equivalent clearcut area (ECA) in the watersheds as described in McIntosh et al, 1994. If the ECA exceeds 15% of the potentially forested area, a watershed analysis should be conducted prior to initiating actions that would increase ECA. Actions that would increase ECA should proceed after watershed analysis only if there is low risk of adversely affecting riparian-dependent species habitat and if attainment and maintenance of ecological goals and Riparian Objectives will not be retarded or prevented.

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
Roads Management					
Varies by forest and BLM land use plan.				*In all other forested environments outside timber emphasis areas:*	**Road Definition:** Because any area used by motorized vehicles is prone to erosion and can cause increased sedimentation, or otherwise affect the hydrologic or sediment regimes within a watershed, special standards must apply to road construction and maintenance. Thus, some travelways commonly called trails qualify as roads and are subject to the following Standards.
	Standard: Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain RMOs.				
	Standard: For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Completing watershed analyses prior to construction of new roads or landings in RHCAs.		**Standard:** For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Allowing roads in RMAs only for the purpose of minor stream crossings which have no predicted measurable effect or cumulative effect. Roads paralleling RMAs are prohibited. All minor stream crossings and landings will be consistent with RMOs.	**Standard:** For each existing or planned road, meet the RMOs and avoid adverse effects to aquatic resources by: a. Allowing roads in RMAs only for the purpose of minor stream crossings which have no predicted measurable effect or cumulative effect. Roads paralleling RMAs are prohibited. All minor stream crossings and landings will be consistent with RMOs.	**Standard:** For each existing or planned road, meet the Riparian Management Objectives and Aquatic and Riparian Goals, avoid adverse effects on riparian-dependent species by: a. completing peer reviewed Watershed Analyses prior to construction of new roads or landings in RHCAs. Construct roads and landings only if Watershed Analysis indicates that the antidegradation standard is met.

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards

Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	b. Minimize road and landing locations in RMAs. c. Initiate development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan: 1. Road design criteria, elements, and standards that govern construction and reconstruction, 2. Road management objectives for each road, 3.Criteria that govern road operation, maintenance, and management, 4. Requirements for pre-, during- and post-storm inspections and maintenance, 5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives, 6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control, and 7. Mitigation plans for road failures.				
	d. Avoid sediment delivery to streams from the road surface. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable stream channels, fills, and hillslopes. e. Avoid disruption of natural hydrologic flow paths. f. Avoid side casting of soils or snow. Side casting of road material is prohibited on road segments within or abutting RMOs.				
	Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on aquatic resources by: a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of RMOs, or do not protect priority watersheds from increased sedimentation. b. prioritizing reconstruction based on the current and potential damage to aquatic resources and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of RMAs. c. closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to aquatic resources in priority watersheds, and the ecological value of the riparian resources affected.				
	Standard: Improve existing culverts, bridges, and other stream crossings to accommodate a 100 year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of RMOs. Base priority for upgrading on risks and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failures.				
	Standard: Provide and maintain fish passage at all crossings of existing and potential fish-bearing streams.				

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				In timber emphasis areas: **Standard:** To minimize sediment introduction to perennial and intermittent streams, there should be no roads constructed within 150 ft of active channel margins. For existing and necessary new roads *withing 150 ft of active channel* margins, management actions should be taken to mitigate erosion, stabilize fills, maintain culverts and drainage systems, and to minimize subsoil disturbance.	**Standard:** For proposed/new roads, where road density is greater than 2 miles/square mile, reduce road mileage and emphasize road closure, obliteration, and revegetation. McCammon (1993) described water and sediment delivery *effects associated with road densities* greater than 2 miles/square mile.
				Standard: To protect the natural sediment regime, management actions should not: (1) *increase the incidence of* mass movements, bank erosion, and sediment introduction into stream systems from resulting from human actions (e.g. ground-disturbing activities, road building and maintenance); and (2) protect natural sources of sediment introduction into stream channels.	
Grazing Management					
Varies by forest and BLM land use plan.				*All other rangeland environments outside livestock emphasis areas:*	**Standard:** Eliminate livestock access to spawning reaches of streams during spawning and incubation periods.

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<table>
<tr><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 4 & 6</th><th>Alternative 5</th><th>Alternative 7</th></tr>
<tr><td></td><td colspan="4">Standard: Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of RMOs or are likely to adversely affect aquatic resources. Suspend grazing if adjusting practices is not effective in meeting RMOs.</td><td rowspan="2">Standard: Suspend grazing in RHCAs adjacent to streams that do not meet Desired Habitat Standards and sediment delivery standards if grazing is shown to be a contributing factor to the diminishment of Desired Habitat Standards and sediment delivery standards or is a factor that limits the rate of habitat recovery.</td></tr>
<tr><td></td><td colspan="4">Standard: New livestock handling and/or management facilities shall be located outside of RMAs. For existing livestock handling facilities inside RMAs, assure that facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met.</td></tr>
<tr><td></td><td colspan="4">Standard: Limit livestock trailing, bedding, watering, loading, salting, and other handling efforts shall be restricted to areas and times that will not retard attainment of RMOs or adversely affect aquatic resources.</td><td rowspan="3">Standard: Suspend cattle grazing in RHCAs adjacent to designated critical habitat that: 1) contain perennially saturated meadows with non-cohesive soils; and 2) only contain shrub, grass, and forb vegetation.</td></tr>
<tr><td></td><td colspan="4">Standard: Adjust wild horse and burro management to avoid impacts that prevent attainment of RMOs or adversely affect aquatic resources.</td></tr>
<tr><td></td><td colspan="4"></td></tr>
<tr><td></td><td colspan="4"></td><td>Standard: Only allow grazing in those areas where livestock can be prevented from entering unpermitted riparian areas.</td></tr>
<tr><td></td><td></td><td></td><td></td><td>In livestock emphasis areas:
Standard: Attainment of Proper Functioning Condition shall be a minimum objective for all Riparian Management Areas.</td><td>Standard: Suspend grazing where protective measures cannot be implemented because of: terrain; needed improvements (e.g., off-stream watering holes, or fencing) have not been constructed; administration, funding, or monitoring; or lack of permittee cooperation.</td></tr>
</table>

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Minerals Management					
Varies by forest and BLM land use plan.	**Standard:** Avoid adverse effects to aquatic resources from mineral operations. If a Notice of Intent indicates a mineral operation would be located in a RHCA/RMA, consider the effects of the activity on aquatic resources in the determination of significant surface disturbance pursuant to 36 CFR 228.4 for the USFS and 43 CFR 3809.2-2 for the BLM. For operations in an RHCA/RMA ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat which may be affected by the operations. When bon is required, consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.				**Standard:** All new mining operations (ore body, waste rock, spent ore, tailing, roads, milling, chemical storage, housing, sand, gravel, etc.) must be located outside of Strongholds (unroaded areas) and RHCAs and must comply with all other Standards.
	Standard: Locate structures, support facilities, and roads outside RMAs. Where no alternative to siting facilities in RMAs exists, locate and construct the facilities in ways that avoid impacts to RMAs and streams and adverse effects on aquatic resources. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.				**Standard:** If on-going mining operations are located in drainage that do not meet Desired Habitat Standards and sediment delivery standards and if mining is shown to be a contributing factor to the diminishment of Desired Habitat Standards and sediment delivery standards or is a factor that limits the rate of habitat recovery, then suspend special use permits to mining operations, as necessary, until problems are corrected.
	Standard: Prohibit solid and sanitary waste facilities in RMAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RMAs exists, and releases can be prevented and stability can be ensured, then: a. Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics. b. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in RMAs. c. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to inland aquatic resources and to attain Riparian Management Objectives.				**Standard:** Toxic chemical storage and transfer locations must be in properly lined areas and must be able to hold at least 1.5 times their storage capacity. All must have proper leak detection equipment and alarms.

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	d. Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to inland aquatic resources, and to attain the Riparian Management Objectives. e. Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.				**Standard:** Transport of toxic chemicals along aquatic and riparian-dependent species migration, rearing, and spawning streams and their tributary streams should be either eliminated or the risk of a toxic spill reduced to an insignificant level.
	Standard: For leasable minerals, prohibit surface occupancy within RMAs for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location and Riparian Management Objectives can be attained and adverse effects to aquatic resources can be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of Riparian Management Objectives and (2) avoid adverse effects to native aquatic species.				**Standard:** New mines that have the potential to produce acid rock drainage (either in the ore body, pregnant ore storage area, waste rock storage area, or mine tailings storage area) should not be permitted. On-going mines that have the potential to produce acid rock drainage must change their operation to avoid this problem. Otherwise these mines should have their special use permits revoked.
	Standard: Permit sand and gravel mining and extraction within RMAs only if no alternatives exist, if the action(s) would not retard or prevent attainment of Riparian Management Objectives, and adverse effects to native aquatic species can be avoided.				**Standard:** All mining operations must have a completed restoration plan and be bonded sufficient to finance restoration such that impacted aquatic habitats may be reestablished.
	Standard: Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on native aquatic species.				

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Fire Suppression/Fuels Management					
Varies by forest and BLM land use plan.	**Standard:** Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbances of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function or aquatic resources.				Impacts from suppression techniques and fire suppression personnel are to be minimized or avoided in areas where there is potential to adversely effect listed salmon, other riparian-dependent species, and their habitats. Every effort should be made to minimize or avoid stream channel and stream course disturbances, sedimentation, and actions that will result in increased water temperature.
	Standard: Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RMAs. If the only suitable location for such activities is within the RMAs, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland aquatic resources a primary goal. Use and interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.				**Standard.** a. Tractors are not to be used, except for the protection of life and property. b. Other than hazard trees, trees are not to be felled within RHCAs. c. Reopening naturally revegetated roads is to be avoided when reconstruction of road portions within RC would be required.

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	Standard: Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.				a. Using fire retardant chemicals and fuels is to be avoided when potential for stream contamination exists. b. The application of retardant within critical habitat or near live streams is to be avoided. Fire retardant or foam is not to be dropped directly into streams or within designated critical habitat. c. Water is not to be pumped directly from streams if chemical products are going to be injected into a pump or pumping system. If chemicals are needed, a "fold-a-tank" is to be used from which to pump water.
	Standard: Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.				d. Refueling activities, fuel storage, and fuel trucks are to be located outside RHCAs.
	Standard: Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland aquatic resources whenever RMAs are significantly damaged by a wildfire or a prescribed fire burning out of prescription.				e. Helicopter buckets are not to be dipped into streams where juvenile or adult salmon or other listed fish may be present.
					f. Helicopter buckets are to be dipped only after chemical injection systems (storage containers) have been removed from the bucket or helicopter.

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					g. Each land management unit will develop a contingency plan identifying procedures to be initiated should a chemical spill or contamination occur, and a plan and schedule for principal fire suppression personnel to receive chemical spill training in initiating and completing the contingency plan.
					Location of Fire Camps and Fire Suppression Personnel a. A Fishery Biologist will be involved in the development of the Fire Situation Analysis (FSA) and the Emergency Situation Fire Analysis (ESFA), serving with or as the resource advisor. b. Locations for fire camps, staging areas, and fire base heliports will be located outside RC wherever possible. c. An Aquatic or Fishery Biologist will be readily available to the Incident Commander and will review shift plans to assess the potential effects of the planned actions on aquatic species and their habitat.

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					Fire Rehabilitation An emergency rehabilitation team will be assigned to all fires over 100 acres. b. An Aquatic or Fishery Biologist will always be assigned to the emergency and non-emergency rehabilitation teams.
					c. Fire lines are to be water barred, seeded (preferably with native species), and otherwise treated to reduce erosion as they are completed. d. Following a fire, an Aquatic or Fishery Biologist will review the suppression and rehabilitation efforts to determine whether requirements and tactics identified in the FSA or EFSA were successfully implemented, and if the revegetation and rehabilitation of the burned area were successful.

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					e. When large fires affect more than about ten percent of a watershed, a group of scientific experts will be convened to prepare a peer-reviewed watershed analysis of the short- and long-term effects from the wildfire, fire suppression directions and actions, and area revegetation and rehabilitation. The team shall be comprised of scientists from the Federal land management and regulatory agencies. Following the analysis the group may recommend additional appropriate actions for the burned or unburned areas within the watershed.
					Miscellaneous a. Increasing fire intensities within aquatic and riparian habitat during burnout or backfire operations is to be avoided. b. In the case where listed species are potentially affected, FWS or NMFS will be contacted to determine whether emergency consultation should be initiated under the ESA, if any one of these guidelines cannot be met, or if these guidelines are not implemented or not effective in avoiding or minimizing adverse effects to listed salmon and their critical habitat.

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Lands					
Varies by forest and BLM land use plan.	**Standard:** Require instream flows and habitat conditions for hydroelectric and other surface water development proposals that maintain or restore riparian resources, favorable channel conditions, and fish passage, reproduction, and growth. Coordinate this process with the appropriate State agencies. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate State agencies.				**Standard:** Do not issue additional water conveyance permits in watersheds that support fish spawning/rearing habitat until instream flows are documented are shown to be adequate to accommodate both the needs of aquatic and riparian-dependent species and the amount of water being conveyed. The needs of fish are defined as those instream flows necessary to optimize all Desired Habitat Standards and essential features of habitat.
	Standard: Locate new hydroelectric ancillary facilities outside RMAs. For existing ancillary facilities inside the RMA that are essential to proper management, provide recommendations to FERC to assure that the facilities would not prevent attainment of the Riparian Management Objectives and that the adverse effects on inland aquatic resources are avoided. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in RMAs to avoid adverse effects on aquatic resources.				**Standard:** Complete peer-reviewed watershed analysis prior to issuing water conveyance permits. The watershed analysis and peer-reviewed must agree that the water conveyance and its effects will not prevent attainment of Riparian Objectives or the maintenance or recovery of aquatic and riparian-dependent species.
	Standard: Issue leases, permits, rights-of-way, and easements to avoid effects that would be inconsistent with or prevent attainment of the Riparian Management Objectives and avoid adverse effects on aquatic resources. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the Riparian Management Objectives or adversely affect aquatic resources. If adjustments are not effective, eliminate the activity. Where the authority to adjust was not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the Riparian Management Objectives or adversely affect aquatic resources. Priority for modifying existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on aquatic resources and the ecological value of the riparian resources affected.				

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	Guideline: Use land acquisition, exchange, and conservation easements to meet Riparian Management Objectives and facilitate restoration of fish stocks and other species at risk of extinction.				**Standard:** Where instream flows are inadequate to accommodate both the needs of aquatic and riparian-dependent species and Riparian Objectives and the amount of water being conveyed, do not issue new conveyance permits and revoke those conveyance permits already issued.
General Riparian Area Management					**Water Conveyance Continued**
Varies by forest and BLM land use plan.	**Guideline:** Cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.				**Standard:** Determine instream flow requirements of ESA listed aquatic and riparian-dependent species, non-listed aquatic and riparian-dependent species and Riparian Objectives and establish flow requirements to meet these needs.
	Guideline: Trees may be felled in RMAs when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.				**Standard:** All water conveyances across federal land lands should be cataloged and compared against state granted water rights. Those without state water rights should have their conveyance permits revoked.
	Standard: Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of RMOs and avoids adverse effects on aquatic resources.				**Standard:** All water conveyance intakes must meet standards established by these Standards or their conveyance permits should be revoked.

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	Standard: Prohibit storage of fuels and other toxicants within RMAs. Prohibit refueling within RMAs unless there are no other alternatives. Refueling sites within RMAs must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.				**Standard:** All water conveyance permits should require the permittee to use the best methodology to conserve water during conveyance.
	Standard: Locate water drafting sites to avoid adverse effects to aquatic resources and instream flows, and in a manner that does not retard or prevent attainment of RMOs.				
Watershed and Habitat Restoration					
Varies by forest and BLM land use plan.	**Standard:** Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of RMOs.				**Standard:** Begin identifying areas that are in obvious need of watershed restoration in those areas as soon as possible. Base priorities on existing and potential risks and effects to listed salmon and their designated critical habitat, as well as the likely effectiveness of the restoration effort.
	Guideline: Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet RMOs				**Standard:** Develop watershed restoration plans to put instream structures and road obliteration/reconstruction projects into context of all other planned watershed restoration. Plans must address causes of degradation and should use the limiting factor analysis, currently under development by NMFS. The plan also should include: a. Site specific analysis. b. A biological evaluation/ assessment for all "may affect" projects.

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					c. Certification by both a hydrologist and fishery biologist, with the exception of restoration of fish passage.
Fisheries and Wildlife Restoration					
Varies by forest and BLM land use plan.	**Guideline:** Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the RMOs.				
	Guideline: Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of RMOs or adversely affect aquatic resources. For existing fish and wildlife interpretive and other user-enhancement facilities inside RMAs, assure that RMOs are met and adverse effects on aquatic resources are avoided. Where RMOs cannot be met or adverse effects on aquatic resources avoided, relocate or close such facilities.				
	Guideline: Cooperate with Federal, Tribal, and State wildlife agencies to identify and eliminate wild ungulate impacts that prevent attainment of RMOs or adversely affect aquatic resources.				
	Guideline: Cooperate with Federal, Tribal and State fish management agencies to identify and eliminate adverse effects on aquatic resources associated with fish stocking, fish harvest, habitat manipulation, and poaching.				
Recreation Management					
Varies by forest and BLM land use plan.	**Standard:** Design, construct, and operate recreation facilities, including trails, and dispersed sites in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids effects on aquatic resources.				
	Standard: Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas.		**Standard: Allow construction of minor recreation facilities within RMAs consistent with RMOs which have no predicted measurable effect or cumulative effect.**		

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Alternative 1	Alternative 2	Alternative 3	Alternative 4 & 6	Alternative 5	Alternative 7
	Standard: For existing recreation facilities inside RMAs, assure that facilities or use of facilities will not prevent attainment of Riparian Management Objectives or adversely affect native aquatic species. Relocate or close recreation facilities where RMOs cannot be met or adverse effects on aquatic resources cannot be avoided.				
	Standard: Adjust dispersed and developed recreation practices that retard or prevent attainment of RMOs or adversely affect aquatic resources. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting RMOs and avoiding adverse effects on aquatic resources, eliminate the practice or occupancy.				

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UCRB & EASTSIDE Description of Alternatives: Objectives and Standards; S=Substance, P=Process

For levels of activity by alternative and cluster, see tables __-__. For associated guidelines, see list following this O&S table.

<table>
<tr><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 4</th><th>Alternative 5</th><th>Alternative 6</th><th>Alternative 7</th></tr>
<tr><td colspan="7">ADAPTIVE MANAGEMENT (P)</td></tr>
<tr><td colspan="3">P-O1. Objective[P]: Make appropriate adjustments in management strategies and correct problems.</td><td colspan="4">P-O1. Objective[P]: Make appropriate adjustments in management strategies and correct problems as new information, technology, and social desires are identified.</td></tr>
<tr><td colspan="2">Not Applicable</td><td colspan="5">P-S1. Standard[P]: Use adaptive management principles and processes to adjust management practices to meet ecosystem management goals. Adaptive management shall include all four parts of the process (planning, implementation, monitoring, and evaluation as defined in Appendix ___). Resources should be allocated and priorities established so that all parts of adaptive management are completed over an appropriate time frame.</td></tr>
<tr><td colspan="7">P-O2. Objective[P]: To move toward the integrated conditions of the alternative, implement vegetation management activities at a rate that approximates the level described:</td></tr>
<tr><td>Tables 3-1A and 3-1B</td><td>Tables 3-2A and 3-2B</td><td>Tables 3-3A and 3-3B</td><td>Tables 3-4A and 3-4B</td><td>Tables 3-5A and 3-5B</td><td>Tables 3-6A and 3-6B</td><td>Tables 3-7A and 3-7B</td></tr>
<tr><td colspan="6">Not Applicable</td><td>P-S2. Standard[P]: Adjustments to reserve boundaries and corridor locations shown in Figure A7 should be based on basin-wide bio-reserve system needs and consider the following: Select habitats that support populations of scpecies that are rare, narrowly endemic, or significantly declining due to human activity as identified in the Terrestrial STAR. Include centers of endemeism, rarity, or high biodiversity (see Map XX, in Chapter 2) That are located in BLM- or FS- administered lands.</td></tr>
</table>

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For levels of activity by alternative and cluster, see tables __-__. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Not Applicable.						**(P-S2. Continued:)** Use information from GAP analysis and local assessments for additional areas. Include within large reserves (250,000 + acres) at least 10%, but preferrably 20-30% to account for typical disturbance processes, of the range of all major vegetation types. Vegetation type reserves may need to be replicated in multiple locations within the ICBEMP project area if significant differences exist or the risk of large-scale disturbance is high. Reserves should be established for the purpose of conserving biodiversity across the landscape and meet needs of groups of species or plant or animal communities. However, some reserves may be designated for single species purposes (such as for threatened or endangered species).

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For levels of activity by alternative and cluster, see tables __-__. For associated guidelines, see list following this O&S table.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
MONITORING AND EVALUATION (Y)						
Y-O1. Objective[P]: Assess the effects of management strategies by monitoring changes in conditions, and take actions as needed to meet plan objectives.		**Y-O1. Objective[P]:** Assess the effects of management strategies by monitoring changes in conditions, and take actions as needed to meet ecosystem management goals.				
Not Applicable except for table _ displayed for comparison.		**Y-S1. Standard[P]:** Within two years, develop an integrated interagency monitoring and evaluation protocol, coordinated with research, to determine if acceptable progress toward desired conditions is being achieved. The monitoring and evaluation protocol shall include selected key elements to be monitored that can be statistically sampled to provide desired data at a reasonable cost. Monitoring should: (1) Measure the condition and trends of the ICBEMP project area ecosystem. (2) Determine if planned activities have been implemented o BLM- or Forest Service-administered lands, and are meeting the goals and objectives of ecosystem management and remain appropriate; (3) Determine if implementation of activities have achieved desired goals and objectives and whether the standards and guidelines attain goals and objectives of ecosystem management; (4) Ascertain whether cause and effect relationships exist among management activities or resource sand confirm if the predicted results occurred and if assumptions and models used in developing the plan are correct; (5) Be used to make adjustments in management direction.			
Not Applicable	Not Applicable	**Y-S2. Standard[P]:** Regional and State offices shall oversee development and implementation of an annual monitoring program (at various scales from project to river basin level) based on budgets, priorities, and related considerations. The offices shall issue an annual report summarizing monitoring results.				

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Appendix G: Interim Riparian Management Objectives (RMOs)

Alternative 2 & 3

In the development of PACFISH, landscape-scale interim RMOs describing good habitat for anadromous fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability and lower bank angle, and width to depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).This material was reviewed in regard to its applicability to inland native fish. It has been determined that the RMOs described in PACFISH were good indicators of ecosystem health. The analysis that led to development of the RMOs involved watersheds in Oregon, Washington, and Idaho that include inland native fish as well as anadromous fish. With the exception of the temperature objective, which has been modified, the RMOs represented a good starting point to describe the desired condition for fish habitat.

Interim RMOs are considered to be the best watershed scale information available; National Forest managers would be encouraged to establish site-specific RMOs through watershed analysis or site specific analysis. RMOs should be refined to better reflect conditions that are attainable in a specific watershed or stream reach based on local geology, topography, climate, and potential vegetation. Establishment of RMOs would require completion of watershed analysis to provide the ecological basis for the change. However, interim RMOs may be modified by amendment in the absence of watershed analysis where watershed or stream reach specific data support the change. In all cases, the rationale supporting these changes, and the effects of the changes will be documented.

The interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured as described in the DRFC. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time. However, the intent of interim RMOs are not to establish a ceiling for what constitutes good habitat conditions. Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are inconsistent with the purpose of this interim direction. Without the benchmark provided by measurable RMOs habitat suffers a continual erosion. As indicated below, some of the objectives would apply to forested ecosystems, some to non-forested ecosystems, and some to all ecosystems regardless of whether or not they are forested. Objectives for six environmental features have been identified, including one key feature and five supporting features. These features are good indicators of ecosystem health, are quantifiable, and are subject to accurate, repeatable measurements.

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Habitat Feature	Interim Objectives									
Pool Frequency (kf[1]) (all systems)	Varies by channel width									
	Wetted width (feet)	10	20	25	50	75	100	125	150	200
	Pools per mile	96	56	47	26	23	18	14	12	9
Water Temperature (sf[2])	No measurable increase in maximum water temperature (7 day moving average of daily maximum temperature measured as the average of the miximum daily temperature of the warmest consecutive 7 day period). Maximum water temperatures below 59F within adult bulltrout holding habitat and below 48F within bulltrout spawning and rearing habitats. Maximum water temperatures below 64F within Anadromous fish migration and rearing habitats and below 60F withing Anadromous spawning habitats.									
Large Woody Debris (sf) (forested systems)	Coastal California, Oregon, and Washington: > 80 pieces per mile; >24 inch diameter; >50 foot length. East of cascade Crest in Oregon, Washington, Idaho: > 20 pieces per mile; > 12 inch diameter; > 35 foot length.									
Bank Stability (sf) (non-forested systems)	> 80 percent stable.									
Lower Bank Angle (sf) (non-forested systems)	> 75 percent of banks with <90 degree angle (i.e., undercut).									
Width/Depth Ratio (sf) (all systems)	< 10, mean wetted width divided by mean depth									

[1]Key features
[2]Supporting feature

Alternative 4 and 6

Intent of RMOs

Interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. Interim RMOs provide the target toward which agency managers aim as they conduct resource management activities across the landscape in the absence of Ecosystem Analysis. It is not expected that the objectives would be met instantaneously, but rather would be achieved over time. These variables provide a synoptic description and characterization of watershed, riparian, and stream channel processes and existing conditions that can be used to guide management activity design, implementation, and monitoring. RMOs are used as a tool, in combination with watershed management objectives, to help assess attainment of watershed, riparian, and aquatic goals and objectives.

Interim RMOs (Table 1) describe watershed-scale habitat conditions for specific geoclimatic areas within the interior Columbia River Basin. The attributes are divided into three basic categories: Instream variables, water temperature, and riparian vegetation. The following statements provide the intent for use of the interim RMOs and their purpose in a comprehensive conservation program.

1. RMOs are a tool to help evaluate progress towards attainment of watershed, aquatic and riparian goals described within the DRFC.

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2. RMOs **should** be developed/analyzed for application at finer scales through evaluation of reference conditions in similar landforms, valley settings, and stream types. The interim values in Tables 1, 2, and 3 provide a starting point if local analysis is not completed but it is recommended that Field Units conduct their own analysis due to the variable conditions in the interior Columbia River Basin. Field units should consider using similar techniques described by Overton et al. (1995) to define appropriate RMOs.

3. Analysis of stream inventory and riparian data together with Ecosystem Analysis is useful to identify watershed processes and stream reaches that may not be functioning properly.

4. Streams and riparian conditions which currently exceed interim RMOs should be managed consistent with the state water quality anti-degradation policy.

5. Interim RMOs are not to be viewed as independent from other components of the comprehensive Aquatic Conservation Strategy, rather are part of an aquatic conservation progam. Interim RMOs are not sensitive to immediate effects, rather exhibit response to cumulative effects and factors influencing channel history over time.

6. Interim RMOs do not replace State and Federal water quality standards promulgated under federal Clean Water Act or state laws, but should complement these standards in providing measurable habitat attributes.

Procedure for Interim RMO Application

Stream inventory data is primarily viewed as an information source useful in developing an understanding of watershed/stream systems, which then serves as a foundation to make policy and management decisions. This information can then be used to establish management objectives to conserve or restore watershed and aquatic functions. Interim RMOs apply to all perennial streams that support aquatic life for a portion of the year, for example spawning streams that have discontinuous low flow late in the year would still be subject to these attributes. Individual parameters should not be used to evaluate aquatic and riparian condition, rather they should be used in combination to provide a synopsis of condition. Placing emphasis on individual variable interpretations may lead to erroneous conclusions related to watershed, riparian, and aquatic condition.

Interim RMO application or development can follow these steps:

1. Field Units should establish values or ranges of important riparian and in-stream variables expected for natural conditions, stratified by stream types and biophysical environments.

2. The values listed in Tables 1 and 2 are a starting point but local analysis is preferred due to the variable nature of streams within the interior Columbia River Basin.

3. If current conditions are largely different than locally established values or interim values, further analysis should be conducted to determine the reasons for these differences in terms of watershed, riparian, and channel processes. Watershed-scale interim RMOs may be outside the range of natural conditions for a specific area. A fine-scale evaluation of reference condition should be used to identify causal mechanisms. Stream conditions can vary from disturbances and channel evolution histories that influenced channel form and conditions.

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4. Using information from step 3, establish management objectives that relate to conserving or restoring watershed, riparian, and channel processes.
5. Recommend management activities to meet the intent of objectives in step 4 to achieve desired outcomes based on the understanding of watershed, riparian, and channel processes.

6. Conduct implementation and effectiveness monitoring to determine if management activities have the intended results and "feedback" information for future management objectives and actions.

Instream Variables.

The values in Table 2 are points of reference from which current conditions can be evaluated if local analysis of reference stream inventory information is not performed. These values were developed from analysis of stream inventory measurements collected from over 2000 streams (6382 reaches) within the project area and synthesized as part of the ICBEMP Assessment (Star—Chapter 3). The ranges in Table 2 display the 50th to 75th percentiles of stream inventory data from watersheds in natural to near natural condition (Management Area Categories 1 and 2; Wilderness and Research Natural Areas). Data is not continuous over the entire assessment area which is reflected by low sample sizes or areas of no data (ERU 10, 11, and 12). Consider using CRB wide RMO values when sample size is low or data is not displayed for a strata. Caution should be used when making interpretations from CRB values or strata with low sample size. It also should be noted that most stream inventory data was collected from forested stream systems and may not be applicable to rangeland stream systems. It is important to consider that if the interim values are not appropriate for the local area, a similar analysis process can be used with local data to determine the appropriate numbers for the scale of concern (e.g. 4th or 6th field HUCs or stream reach).

To calculate large pools, pools, large wood, and single wood per mile from Table 2 use the following conversion:

number per mile=(table frequency value)x5280/average riffle width in feet

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Table 1. Summary of Interim RMOs

Category	Interim Criteria
I. Instream Variables Large Pools per Mile Pools per Mile Pool Width/Depth Large Wood per Mile (forested systems) Single Wood per Mile (forested systems)	Stratified by ERU and stream slope class in Table 2.
Bank Stability (non-forested systems)	>80 percent bank stability in ERUs 1-12 >90 percent bank stability in ERU 13 (Overton et al. 1995)
Fine sediment	Surface fine sediment levels should be developed by local Field Units for their area. In ERU 13, mean surface fines (<6.0 mm) as measured in pool tails and low gradient riffles are described as follows (Overton et al. 1995):

Channel Type	Plutonic Geologic Type	Volcanic Geologic Type	Metamorphic Geologic Type
A	26	25	14
B	23	27	16
C	37	17	no data

II. Temperature	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period) as required by state water quality standards.
III. Riparian Vegetation	Forest and range riparian areas: Mature forest and late ecological status range riparian conditions adapted to non-lethal, lethal, or mixed fire regimes and other disturbances characteristic of the site. This should be measured by the percent similarity of riparian vegetation to the mature forest and late ecological status range community/composition. The percent similarity should be greater than 60 percent (USDA 1992).

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Table 2. Range of instream values for the ICBEMP area displayed by the 50th and 75th percentile for natural and near natural stream data distribution. All values except pool width/mean maximum depth are normalized by stream width. Ranges in the heading represent interior Columbia River Basin conditions and are not stratified by ERU or slope class. Numbers within parentheses are sample sizes. Blank cells indicate no data. A brief description of each variable follows this table.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50 0.009-0.036 (870)	75	50 0.040-0.077 (870)	75	50 5.6 - 4.2 (831)	75	50 0.048-0.158 (450)	75	50 0.179-0.354 (259)	75
1	All	0.020 (143)	0.049	0.048 (143)	0.082	5.4 (140)	4.3	0.092 (135)	0.209	NA	NA
	<2%	0.032 (8)	0.050	0.039 (8)	0.050	7.0 (8)	6.3	0.146 (8)	0.429	NA	NA
	2-4%	0.039 (35)	0.062	0.066 (35)	0.096	6.7 (36)	5.3	0.158 (33)	0.550	NA	NA
	>4%	0.018 (95)	0.042	0.039 (95)	0.076	4.8 (92)	4.1	0.058 (89)	0.176	NA	NA
2	All	0.006 (43)	0.025	0.044 (43)	0.069	6.2 (40)	5.2	0.049 (40)	0.148	NA	NA
	<2%	0.004 (17)	0.032	0.045 (17)	0.103	6.2 (15)	5.2	0.049 (15)	0.148	NA	NA
	2-4%	0.014 (6)	0.061	0.061 (6)	0.168	7.5 (6)	5.9	0.134 (6)	0.427	NA	NA
	>4%	0.006 (19)	0.018	0.031 (19)	0.060	5.5 (18)	4.9	0.049 (18)	0.145	NA	NA
3	All	0.001 (14)	0.009	0.009 (14)	0.023	5.1 (13)	4.2	0.046 (13)	0.084	NA	NA
	<2%	(2)		(2)		8.2 (1)		0.091 (1)		NA	NA
	2-4%	0.014 (5)	0.015	0.024 (5)	0.026	6.2 (5)	4.6	0.073 (5)	0.085	NA	NA
	>4%	0.000 (7)	0.002	0.008 (7)	0.014	4.4 (7)	4.0	0.037 (7)	0.075	NA	NA

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Table 2 Continued.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50 0.009-0.036 (870)	75	50 0.040-0.077 (870)	75	50 5.6 - 4.2 (831)	75	50 0.048-0.158 (450)	75	50 0.179-0.354 (259)	75
4	All	0.000 (59)	0.003	0.027 (59)	0.049	2.4 (45)	2.1	0.019 (44)	0.062	NA	NA
	<2%	0.000 (17)	0.005	0.027 (17)	0.053	2.4 (14)	2.1	0.006 (12)	0.025	NA	NA
	2-4%	0.001 (22)	0.004	0.029 (22)	0.044	2.4 (17)	2.2	0.020 (17)	0.085	NA	NA
	>4%	0.000 (19)	0.000	0.030 (19)	0.051	2.4 (13)	1.9	0.020 (14)	0.067	NA	NA
5	All	0.017 (6)	0.048	0.053 (6)	0.084	4.4 (6)	4.2	0.025 (4)		NA	NA
	<2%	0.035 (1)		0.123 (1)		7.6 (1)				NA	NA
	2-4%	0.043 (2)		0.063 (2)		7.6 (2)		0.032 (2)		NA	NA
	>4%	0.000 (3)	0.000	0.032 (3)		4.4 (3)		0.018 (2)		NA	NA
6	All	0.003 (174)	0.016	0.027 (174)	0.052	4.4 (171)	3.4	0.040 (162)	0.117	NA	NA
	<2%	0.021 (18)	0.042	0.026 (18)	0.048	4.4 (17)	3.8	0.008 (14)	0.068	NA	NA
	2-4%	0.015 (27)	0.048	0.027 (27)	0.061	6.0 (27)	3.5	0.086 (24)	0.133	NA	NA
	>4%	0.001 (126)	0.009	0.027 (126)	0.049	4.2 (124)	3.2	0.038 (121)	0.156	NA	NA
7	All	0.009 (27)	0.018	0.014 (27)	0.028	5.4 (25)	4.3	0.009 (26)	0.040	NA	NA
	<2%	0.017 (6)	0.033	0.017 (6)	0.034	5.7 (6)	5.2	0.009 (6)	0.013	NA	NA
	2-4%	0.013 (9)	0.023	0.018 (9)	0.032	5.7 (9)	4.9	0.009 (9)	0.044	NA	NA
	>4%	0.000 (11)	0.001	0.011 (11)	0.030	4.3 (10)	3.7	0.006 (10)	0.151	NA	NA

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Table 2 Continued.

ERU	Slope Class	Large Pools Per Mile		Pools Per Mile		Pool Width/ Mean Max Depth		Large Wood Per Mile		Single Wood Per Mile	
		50 0.009-0.036 (870)	75	50 0.040-0.077 (870)	75	50 5.6 - 4.2 (831)	75	50 0.048-0.158 (450)	75	50 0.179-0.354 (259)	75
8	All	0.008 (72)	0.027	0.033 (45)	0.051	5.2 (45)	4.2	0.344 (26)	0.652	0.401 (10)	0.498
	<2%	0.016 (11)	0.034	0.032 (11)	0.094	5.3 (11)	4.8	0.149 (1)		0.271 (5)	0.446
	2-4%	0.007 (16)	0.028	0.032 (16)	0.043	5.4 (16)	3.7	0.244 (10)	0.616	0.460 (4)	
	>4%	0.007 (18)	0.032	0.035 (18)	0.060	4.7 (18)	4.1	0.567 (15)	0.718	0.834 (1)	
9	All	(1)		0.162 (1)		6.2 (1)		NA	NA	2.274 (1)	
	<2%	(0)		(0)		(0)		NA	NA	(0)	
	2-4%	(1)		0.162 (1)		6.2 (1)		NA	NA	2.274 (1)	
	>4%	(0)		(0)		(0)		NA	NA	(0)	
13	All	0.018 (358)	0.050	0.058 (358)	0.103	6.5 (345)	5.1	NA	NA	0.170 (248)	0.335
	<2%	0.034 (109)	0.062	0.065 (109)	0.111	7.5 (111)	5.6	NA	NA	0.179 (81)	0.375
	2-4%	0.021 (149)	0.050	0.070 (149)	0.116	6.9 (146)	5.6	NA	NA	0.169 (116)	0.306
	>4%	0.002 (100)	0.027	0.034 (100)	0.070	5.4 (88)	4.5	NA	NA	0.150 (51)	0.348

Large Pool Frequency: The number of pool channel units with a maximum depth greater than 0.8 m (2.6 feet) and surface area greater than 20 m^2 (215 ft^2) per the reach mean riffle width. This is calculated by: (number of large pools)x[(average riffle width)/(reach length)]. Because of the problems with pool frequency measurements for high gradient streams values were not assigned for the slope class >4%.

Pool Frequency: The number of pool channel units per reach mean riffle width. This is calculated by: (number of pools)x[(average riffle width)/(reach length)]. Because of the problems with pool frequency measurements for high gradient streams values were not assigned for the slope class >4%.

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Large Wood Frequency: The number of pieces of wood per reach mean riffle width, surveyed with the USFS Region 6 stream inventory protocol. Tallied wood includes all pieces with diameters greater than 20 inches and lengths greater than 35 ft (the "large" category of the Region 6 protocol). This is calculated by: (number of pieces of large wood in the reach)x[(average riffle width)/(reach length)]. This value should only be used as a reference condition in forested landscapes in eastern Washington and eastern Oregon.

Single Wood Frequency: The number of single pieces of wood per reach mean riffle width, surveyed with the USFS Region1/4 stream inventory protocol. Tallied wood includes pieces with diameters greater than 10 cm (4 inches) and lengths that exceed 3.0 m (9.8 ft) or two thirds the channel width. This is calculated by: (number of pieces of wood in the reach)x[(average riffle width)/(reach length)]. This value should only be used as a reference condition in forested landscapes in Idaho and western Montana.

Alternative 5

Timber emphasis areas within Forested environments

RMOs are locally developed based on key channel and habitat characteristics in the watershed of concern. These measures are then compared with those from streams of highly similar channel and watershed geomorphic character, which are judged to fully support the waters' beneficial uses, in order to produce "reference conditions. Determination of "fully support" must include documentation of assumptions on which judgements are based, allowing for revision over time as new information becomes available. Benchmarks based on the reference conditions can then be established for instream characteristics and remeasured over time to evaluate change. This system allows for the effectiveness of management practices to be monitored in relation to the benchmarks in order to provide a meaningful basis for adaptive management.

A benchmark-based system for developing RMOs can be summarized as follows:

a. Existing riparian conditions are measured and compared with reference conditions, where possible, to establish benchmarks.

b. Prescriptions (site-specific standards and guides) are developed to ensure high levels of function even when the relationship of existing conditions to natural or reference conditions remains uncertain.

c. Monitoring is conducted in an adaptive management framework in order to answer four key questions: 1) was the situation diagnosis correct? 2) was the prescription correct? 3) was the prescription implemented? 4) was the prescription effective?

RMOs are not defined on the basis of instream standards because meaningful instream standards cannot be developed from existing databases at this time, except in some localized situations. Instream characteristics are a product of complex vegetation, channel, and landscape geohydrologic and stochastic processes and interactions. The instream products of these processes and interactions are, by their very nature, difficult to predict for any given place and point in time. However, if riparian zone timber and other attributes are managed on a functional basis, stream inputs will be maintained to produce desired instream attributes and functions.

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In summary, RMOs relevant to each stream input process of concern are integrated into the analysis and subsequent management decision-making system.

Livestock emphasis areas within rangeland environments

RMOs are to be based on the definition of "Proper Functioning Condition" as follows:

Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

a) dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
b) filter sediment, capture bedload, and aid floodplain development;
c) improve flood-water retention and ground-water recharge;
d) develop root masses that stabilize stream banks against cutting action;
e) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
f) and support greater biodiversity.

Other Emphasis Areas

Interim RMOs as described for Alternative 4 and 6 will apply to other emphasis areas.

Alternative 7

RMOs provide measurable criteria against which attainment, or progress toward attainment, of the aquatic and riparian goals are measured as described in the DRFC. These RMOs do not address all the complex elements of the aquatic and riparian goals. RMOs provide a measure of whether land management practices are providing watershed and habitat characteristics which will support aquatic species. If conditions at the watershed scale or site-specific scale are below these criteria then it must be determined why the watershed is not meeting objectives. Where land management activities are the causal agent for not meeting the riparian management objectives then a plan to remedy the problem needs to be developed.

These Riparian Management Objectives were developed based on those from PACFISH, the NMFS PACFISH Biological Opinion (BiOp) and the NMFS LRMP BiOp. These in turn were based on the biological habitat requirements of fish and aquatic resources (Rhodes et al. 1994) or based on conditions in undeveloped watersheds as a benchmark (Peterson et al. 1993). For salmonids, RMOs should address habitat components for life history stages affected by land management activities. Habitat requirements for salmonids have been summarized in Bjornn and Reiser, 1991 and Murphy, 1995.

The method of adjusting the RMOs to particular watersheds is through Watershed Analysis; if interagency peer reviewed watershed analysis shows that habitat recovery is enhanced and not retarded by adjustment, or is that these RMOs are not attainable within the watershed, then these RMOs should be adjusted according to the findings of the watershed analysis. Below are RMOs for sediment delivery, fine sediment, cobble embeddedness, pools, large woody debris, streambank stability, width/depth ratio, and temperature based on those proposed for PACFISH (USDA and USDI 1994) and Rhodes et al. (1994):

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1. Sediment Delivery Standard: Reduce delivery of sediment to streams to no more than 20% over natural from all anthropogenic sources in watersheds containing current or historic spawning or rearing habitat, unless it can be shown through watershed analysis based on peer reviewed science that stream habitat conditions can improve and substrate and pool standards can be met with a different sediment standard.

2. Fine Sediment Standard: Limit stream surface fine sediment (<6.4 mm in diameter) averages to <20% in spawning habitat.

3. Cobble Embeddedness Standard: Limit stream cobble embeddedness to <30% in rearing habitat.

4. Bank Stability Standard: Ninety percent of all stream banks should be in a stable condition.

5. Water Temperature Standard: Reduce or maintain summertime stream temperatures; reduce temperatures if over 60° F in salmon spawning or rearing habitat. In areas where salmon do not occur, the optimal range required by the most sensitive native species should dictate the desired habitat temperature parameter. For instance, where bull trout rear, temperatures should not exceed 46 degrees. During bull trout spawning season, temperatures should not exceed 41 degrees, and adult bull trout habitat should not exceed 59 degrees.

Interim Riparian Management Area (RMA) Delineation

Alternative 4 and 6

Intent of RMAs

Riparian management areas (RMAs) are areas where maintenance, protection, and restoration of aquatic processes and functions are emphasized and goals and objectives for aquatic and riparian habitats are met. Riparian systems are water influence areas that include streams and other aquatic ecosystems. Conservation needs for aquatic and riparian systems can be summarized in four principles (Sedell, personal communication).

1) A stream needs nutrient inputs and energy to sustain its biological functions.
2) Riparian dependent plants and animals rely on the forest adjacent to streams.
3) Small streams are more affected by hillslope processes than larger streams.
4) The likelihood of disturbance resulting in in-stream effects increases as adjacent slopes become steeper.

RMAs can be defined in terms of zones or gradients of influence, with an inner zone, where many primary processes and functions occur, and an outer zone, where processes and functions occur but at different, less important (secondary) levels to the stream channel. The outer riparian zone also functions as a transition and buffer between upslope uses and disturbances and the aquatic environment.

Ecological functions, processes, and disturbance mechanisms are guides for use and protection priorities in riparian areas. Boundaries between the riparian area and the upslopes may need expansion to address each of the larger scale disturbance effects that may negatively or positively impact the unique habitats or sensitive species in riparian environments. To ignore the existence

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of these disturbance effects and attempt to maintain a static reserve system may jeopordize the unique habitats and also the sustainability of associated landscapes (Everett, 1995). The actual size of riparian areas depends on the local characteristics that define them; it is important to understand that the dimensions of entire riparian areas are not always proportional to the size of aquatic systems.

To apply these concepts in RMA delineation, RMAs are divided into two zones as noted: an inner zone (zone 1) and an outer zone (zone 2). The zone concept is an initial attempt to integrate the hierarchical landscape approach with the individual conservation needs of unique riparian habitats. Zoning delineates major influence areas, establishing a basis for different levels of disturbance and vegetation management in each zone. This scheme sets the foundation for cumulative effects determination that is spatially-sensitive in considering watershed disturbing effects.

The dominant processes, functions, disturbance mechanisms for each zone are displayed as variables in Tables 1 and 2, for perennial and intermittent streams.[1]

Intent of Zone 1 and Zone 2

Zone 1 is the inner riparian area, the community and energy influence area. It is most important for protection and maintenance of instream conditions. It also serves to transition processes, functions, and disturbances from streams to floodplains and adjacent riparian areas. Zone 1 is the area most sensitive to management activities and extends from streams the distances that approximate the height of the tallest site potential tree (Sedell, personal commnication).

Zone 2 is the outer riparian area, and provides additional riparian area process and functions (for example, microclimate) and also is a buffer area capable of absorbing disturbances from the uplands. It is commonly variable in width and is the interface and transition between the inner riparian area and the uplands.

Table 1 displays the dominant processes, functions, and disturbance mechanisms for the two riparian zones in perennial stream environments. Table 2 displays the dominant processes, functions and disturbance mechanisms for the two riparian zones for intermittent stream environments. Neither list is inclusive.

Perennial and intermittent streams variables were separated into two tables because the processes, functions and disturbance mechanisms for these systems are different (principle 3 and 4). Intermittent streams often have steeper adjacent sideslopes and can be more prone to slope instability.

[1]Not all variables apply to rangeland systems

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Table 1. Perennial Streams. Dominant Processes, Functions, and Disturbance Mechanisms.

Variables	Zone 1	Zone 2
Shade for stream temperature	P*	
Shade for riparian species	P	S
Large wood delivery to streams		S
Large wood delivery to riparian areas	P	P
Leaf and other organic matter inputs	P	S
Riparian microclimate	P	S
Buffer for water quality	P	P
Nutrient and energy to streams	P	S
Habitat: aquatic species	P	
Habitat: riparian dependent species	P	S
Habitat/migration for terrestrial species	P	
Root strength	P	S
Soil moisture & temperature	P	S
Sediment trapping	P	S
Flooding **	P	S
Fire**	S	S
Insects and Disease**	S	S

* P=primary emphasis S=secondary emphasis
**Primary natural disturbance mechanisms

Table 2. Intermittent Streams. Dominant processes, functions, and disturbance mechanisms.

Variable	Zone1	Zone 2
Shade for riparian species	P	P
Large wood delivery to streams	P	P
Large wood delivery to riparian areas	P	P
Leaf and other organic matter inputs	P	S
Riparian microclimate	P	P
Buffer for water quality	P	P
Nutrient and energy to streams	P	S
Habitat: aquatic species	P	
Habitat: riparian dependent species	P	P
Root strength	P	S
Soil moisture & temperature	P	P
Sediment trapping	P	P
Flooding *	P	S
Debris flows	P	P
Fire*	S	P
Insects and Disease*	S	P

* P=primary influence S=secondary influence
**Primary natural disturbance mechanisms

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RMA Interim Delineation Process

The following process is used for interim delineation of RMA widths, to highlight riparian areas, until more locally specific information from watershed scale and other appropriate analysis is in place.

RMA delineation is based primarily on two indicators: site potential tree heights or extent of floodprone width. For forested environments, site potential tree heights are the primary determinant (concepts taken from FEMAT and PACFISH). For rangeland environments floodprone width by channel type is the primary determinant. Extent of riparian vegetation, for either forested or rangeland systems, can be used as well, if data is available. The determinant for zone 1 would be the extent of the hydro and meso riparian potential natural vegetation, and the determinant for zone 2 would be the extent of the xeroriparian potential natural vegetation.

I. Forested Environments

The process for interim delineation for riparian areas divides RMAs into two zones, using the principle of a site potential tree height for both zones as a starting point and adjustment for additional width, based on adjacent sideslope steepness, to buffer the aquatic environment from disturbances. Floodprone width can also be used. See section II, Rangeland Environments, for procedure.

A. Perennial Streams

Zone 11 site potential tree height, or the extent of the floodprone area; whichever is greater.
Zone 21 site potential tree height plus adjustment for disturbance buffer using Figure 1.

B. Intermittent Streams

Zone 1: 1/2site potential tree height, or extent of the floodplain area, whichever is greater.
Zone 2: 1/2 site potential tree height plus adjustment for disturbance buffer using Figure 2.

C. All streams

Overlay zone 1 and zone 2 widths with unstable and landslide prone areas for full delineation of area requiring emphasis for aquatic and riparian environments.

D. Total RMA for a stream system

The sum of the width determined from steps A through C is the total RMA for the stream network of concern. For example, a perennial sream with a site potential tree height of 150 feet and 40 percent adjacent sideslope has the following RMA width.

Example:
RMA = 1 SPTH (z1) + 1 SPTH (z2) + 0 feet from figure 1 = 300 feet

Additional area requiring special consideration for protection and management is added from landslide prone analysis if it overlaps and extends beyond the RMA. Landslide prone determination shall be based on the procedure outlined in Montgomery (?).

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Site Potential Tree Heights Definitions and SlopeTables

The definition of "site potential tree" for purposes of defining a default is:

"The average maximum height of the tallest dominant trees (200 years or more) for a given site class" (FEMAT, pV-34).

Data from the Science Assessment for the three forested potential vegetation groups (PVGs) in the Interior Columbia Basin shows the following average maximum heights.

PVG	Site Class	Dominant Species	Ave. Max. Height
Dry Forest	?	Ponderosa Pine/W. Larch ?	— feet
Moist Forest	?	Douglas Fir/Grand Fir ?	— feet
Cold Forest	?	SubAlpine Fir/E. Spruce ?	— feet

The height of the dominant trees for any given site is a function of site quality based on elevation, temperature, soil properties, and other determinants, and therefore is subject to wide variation across any given landscape. The numbers in the above table are coarse averages estimated using data from subsample and classifications from an average site class (?). If local data from site potential curves or other sources is available, they can be used instead of the above PVG number, as long as the above definition is applied.

Adjustments for needed sediment buffering will be determined using Figure 1 and 2. The adjustment is based on the steepness of side slopes adjacent to the stream channel (principle number 4), using travel distances of surface erosion as the basis for disturbance buffers. It is well established that surface erosion depends strongly on hillslope gradient and can be expressed as a power function (Selby, 1982). This is consistent with the observations of Megahan and Ketcheson (in press) that sediment travel distances from cross drains on Idaho Batholith roads is proportional to gradient. The curves in figures 1 and 2 are set for sediment travel distances at a 5% exceedence probability as measured by Ketcheson and Megahan (in press) for Batholith soils. Since these soils represent some of the highest surface erosion hazard in the Interior Columbia Basin, travel distances for erosion from other parts of the Basin are expected to be inclusive in the RMA widths as determined from figures 1 and 2.

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Figure 1.

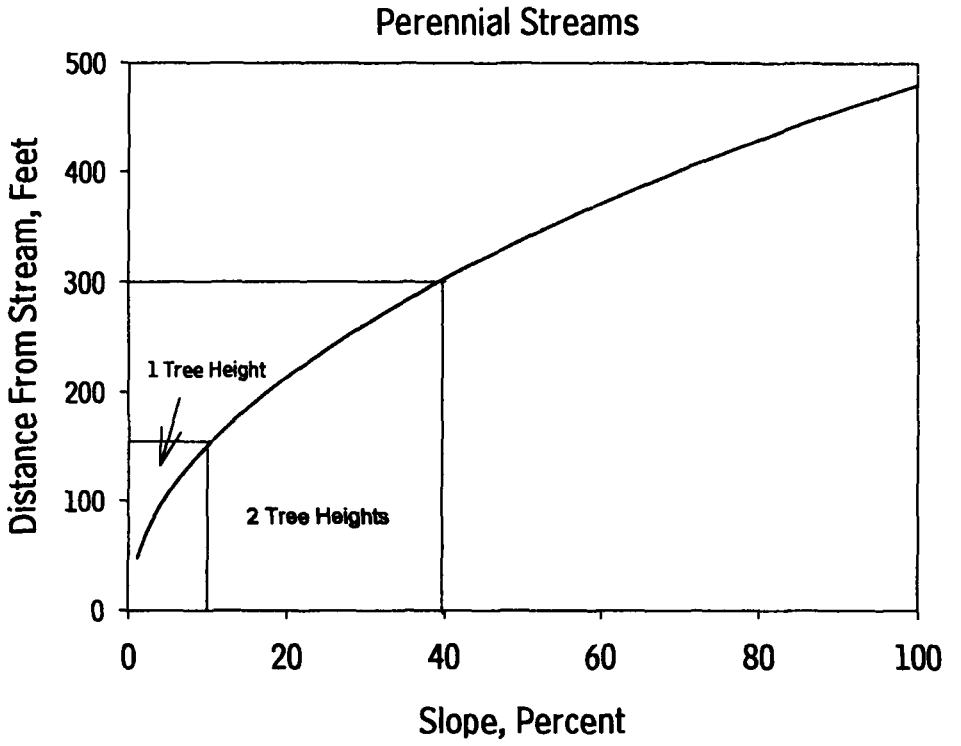
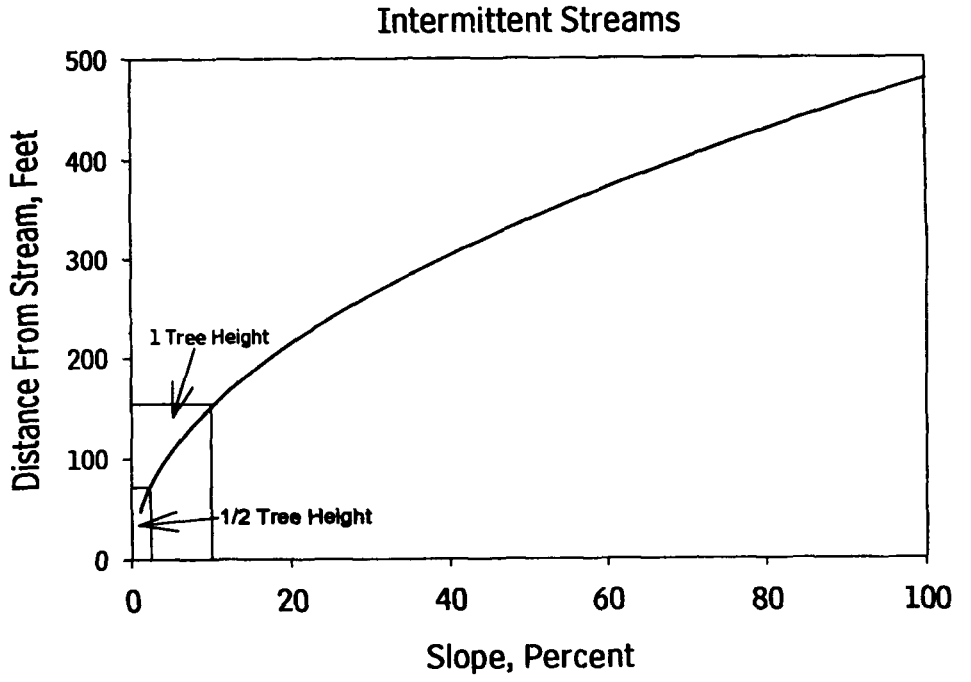


Figure 2.



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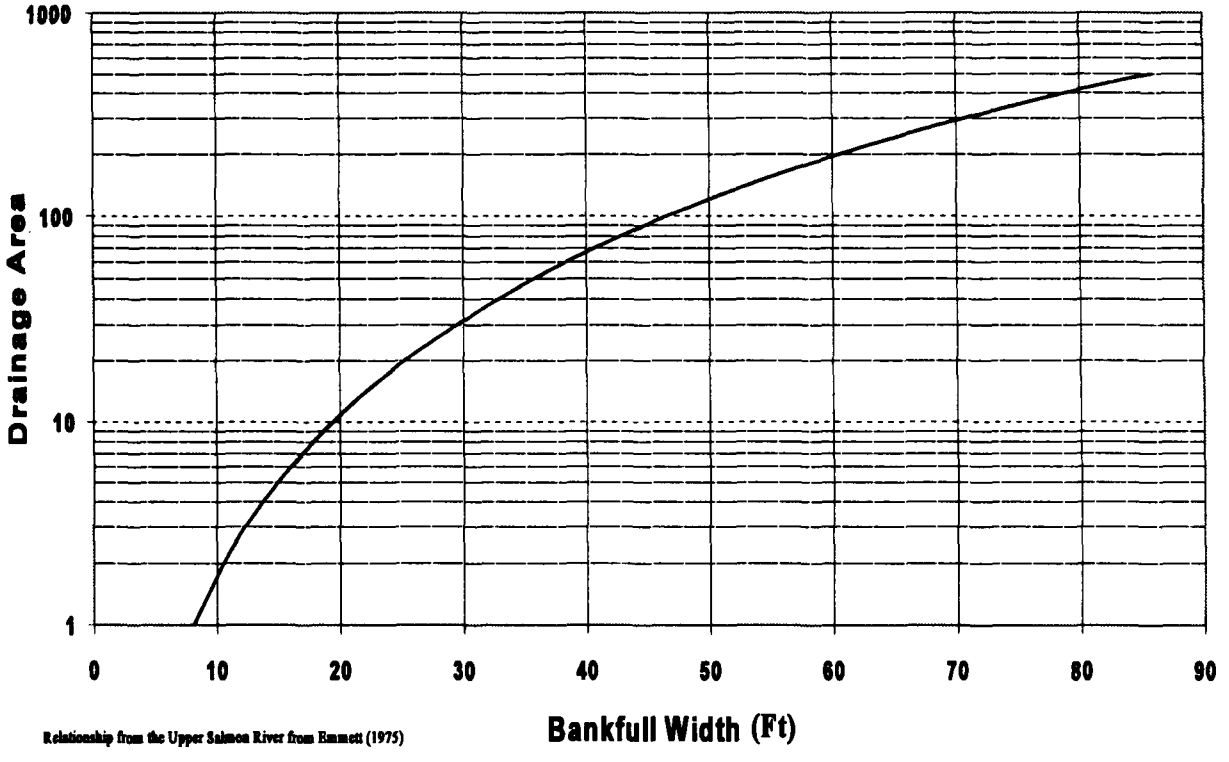
II. Rangeland Streams

Interim riparian management area delineation for rangeland perennial or intermittent streams shall be based on the flood-prone width or the extent of riparian vegetation whichever is greater. Riparian vegetation can be delineated by aerial photographs or field inspection. Floodplain area is essentially equivalent to flood-prone width defined by Rosgen (1994). The following steps can be used to determine the flood-prone area. It is suggested that Field Units develop relationships between bankfull width and drainage area or utilize existing relationships for their area.

1. Determine bankfull width from Figure A for the drainage area above the point on the stream.
2. Determine the channel type (A, B, C, F, or G; Rosgen 1994) from aerial photographs.
3. Select the entrenchment ratio (Rosgen 1994) for the particular channel type.
   A, F, and G channel types = 1.4
   B channel types = 2.2
   C and E channel types = 5.3
4. Calculate the flood-prone area by multiplying the bankfull width and entrenchment ratio.

Figure A.

Relationship Between Bankfull Width and Drainage Area



Relationship from the Upper Salmon River from Emmett (1975)

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Appendix H:
Noxious Weed Control Guidelines Pertinent to an IWM Strategy (from USDI-Bureau of Land Management, 1994)

Use the following cultural, physical, biological, and chemical control guidelines to implement and determine the best method(s) for an integrated approach to noxious weed management.

Cultural

Prevention

1. Develop available preventive measures, such as quarantine and closure, to reduce the spread of the infestation.
2. Determine whether policy and laws allow for the use of all preventive measures, including local quarantine and closure.
3. If past management activities have allowed the introduction and spread of noxious weeds, determine how to change management for selecting a treatment method.

Livestock Manipulation

1. Determine whether changes in livestock grazing will affect the target weeds. a. Reduced grazing may allow for increased competition from beneficial vegetation or just allow for more seeds to be disseminated. b. Increased grazing may reduce beneficial vegetation or may be used to reduce seed source.
2. Determine whether changes in movement or type of livestock is necessary to reduce or contain the infestation due to movement of seeds on or in the animals.
3. Determine whether containing livestock in a weed free area prior to introduction to the area would prevent new infestations.

Wildlife Manipulation

1. Determine whether wildlife or wildlife feeding programs can be managed to reduce weed infestations.
2. Determine feasibility of changes in wildlife movement that would reduce or contain the infestation due to movement of seeds on or in the animals.

Soil Disturbance Activities

1. Revegetate all bare soil following disturbance.
2. Select plant species that will reduce the spread of noxious weeds.
3. Defer soil disturbance if possible until weeds are controlled or under management.

Rock Sources

1. Develop rock source management plans.
2. Keep utilization of rock source confined to existing contaminated roads.
3. Keep new or "clean" rock stockpiles separate from contaminated stockpiles.
4. Obtain rock from uncontaminated sources.

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Public Use

1. Determine most feasible land use to reduce and prevent infestations.
2. Determine whether specific public awareness programs could reduce the infestation or control the spread of weeds.
3. Determine whether exclusion is a possibility and how it would affect the weed infestation.

Physical

Manual Control

1. Determine whether hoeing or "grubbing" will reduce (or increase) the infestation.
2. Determine whether hand pulling the weeds reduces the seed source.

Mechanical Control

1. Evaluate terrain to allow for mowing and determine whether it is an acceptable option for control of the spread of seeds.
2. Evaluate cultivation and other conventional farming practices options that could be utilized cost effectively.

Control by Burning

1. Determine whether policy and laws allow controlled burning and address regulations regarding smoke management.
2. Determine whether the terrain and vegetation cover allow for a controlled burn program.
3. Evaluate a controlled burn program to reduce the infestation.
4. Determine long-term effect of burning on nontarget species.

Biological

Natural Competition

1. Determine whether there are naturally occurring agents within the ecosystem which can reduce the infestation.
2. Determine which elements affect naturally occurring control agents. a. Determine whether these elements can be modified to reduce the negative effect on these agents. b. Determine whether these elements can be enhanced to increase the effectiveness of these agents on the weed infestation.

Introduced Competition

1. Determine whether biological control agents can be introduced into the ecosystem to reduce the amount of infestation.
2. Determine which introduced biological agents provide an acceptable control method for this infestation.
3. Evaluate if the biological control agent has been tested for adverse effects against all nontarget species within the treatment area.
4. Determine whether the introduced biological agent can survive in the environment of the treatment area.

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5. Determine whether policy and laws allow for the introduction of biological control agents.
6. Determine whether policy and laws allow for introduction and grazing of livestock as a biological control measure.

Chemical

Fertilization

1. Determine whether chemical fertilization would reduce the amount of weeds by increasing competition of beneficial plant species.
2. Determine whether increased nitrogen (or other nutrients) would reduce weeds due to direct effect (for example, Curlycup gumweed).

Pesticides

1. Evaluate the acceptability of herbicides (or other pesticides) to control the infestation.
2. Determine whether pesticides are labeled for use on the target weed and use on the infested site (consider nontarget plants, soil type, groundwater location, topography, climate, state labeling). Determine the most effective application techniques.
3. Determine the most effective and cost-effective types of conventional application equipment.
4. Determine whether properly trained personnel are available to apply the pesticides.

Literature Cited

U.S. Department of the Interior, Bureau of Land Management, 1994. Noxious weed strategy for Oregon/Washington. Oregon State Office, Portland, Oregon. BLM/OR/WA/PT-94/36+4220.9.

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Table 2 Last Revised 2-17-96

Forest Cluster
Activity Level Assumptions

		Low	Moderate	High
Harvest (commercial) (% of all forested area treated/decade)	**Alts. 1,2,7 >**	0-4	4-8	8-10
	Alts. 3-6 >	0-5	5-9	9-11
Thin (pre-commercial) (% of all forested area treated/decade)		0-3	3-6	6-8
Decrease Road Density (% of total road miles reduced/decade)		0-25	25-50	50+ change RDC
Watershed Restoration (% of all forested area treated/decade)		0-3	3-6	6-8
Prescribe Burning (% of all forested area treated/decade)		0-5	5-9	9-11
Prescribed Fire Plans (% of all forested area for which plans have been implemented)		0-20	20-40	40+

Key

Harvest = All commercial harvest methods (e.g. single tree selection, group selection, shelterwood, seed tree, overstory removal, clearcut, and commercial thinning from above or below.)

Thin = All pre-commercial thinnings used to alter forest structure, species composition, density, rate of growth, fuel ladders, fire behavior, etc.

Decrease Road Density = Permanent road closure.

Watershed Restoration = Includes increased road mtnce, improved road condition (surface and/or drainage), reduced road related erosion, road obliteration, increased LWM, riparian plantings, in-channel restoration, etc.

Prescribed Burning = Management ignited fire.

Prescribed Fire Plan = Allows natural ignition fires to burn when in prescription and/or identifies areas that require prescribed burning.

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Table 2R

Last Revised 2-17-96

Range Cluster
Activity Level Assumptions

	Low	Moderate	High
Livestock Management (% of all rangeland with improved management)	0-6	6-12	12-20
Improve Rangelands (% of all rangeland treated/decade)	0-4	4-8	8-11
Decrease Road Density (% of total road miles reduced/decade)	0-25	25-50	50+ change RDC
Riparian Restoration (% of all riparian areas treated/decade)	0-25	25-50	50-75
Prescribe Burning (% of all rangeland treated/decade)	0-3	3-6	6-9
Prescribed Fire Plan (% of all rangeland for which plans have been implemented)	0-20	20-40	40+

Key

Livestock Management = A summation of livestock management variables that affect rangeland health, including grazing systems, changing riparian grazing mgnt., season of use (length and timing), number of head, change of class, distribution, grazing deferment, and herding.

Improve Rangelands = Capital Investments: fencing, stockwater improvements, seedings, control of invasion or spread of exotics, and non-fire shrub and juniper control.

Decrease Road Density = Permanent road closure.

Riparian Restoration = Includes improving road condition (drainage and/or surface), riparian plantings, in-channel restoration, and riparian exclosures.

Prescribe Burning = Management ignited fire.

Prescribed Natural Fire = Allows natural ignition fires to burn when in prescription and/or identifies areas that require prescribed burning.

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Table 3 Last Revised 1-21-96

Changing Road Density Class

Calculations depicting the % of road closures necessary to effect a change in road density class

Class	Density (miles/sq. mile)	Mean Density	Multiplier (between classes)	% of roads that would have to be closed to drop one density class
None	0-.02	.006		
			10	90
Very Low	.02-.1	.06		
			7	80
Low	.1-.7	.4		
			3	70
Moderate	.7-1.7	1.2		
			2.5	60
High	1.7-4.7	3.2		
			2	50
Extreme	4.7+	6		

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Table 3-3. Summary: Comparison of Alternatives by Activity Level, by Cluster

Cluster/Activity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Forest Cluster 1							
Harvest	L	L	L	L	L	L	L
Thin	L	L	L	L	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Watershed Restoration	L	M	M	M	M	M	L
Prescribed Burning	L	L	M	H	L	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Forest Cluster 2							
Harvest	M	L	L	L	L	L	L
Thin	L	L	L	M	L	M	L
Decrease Road Density	L	L	M	M	L	M	M
Watershed Restoration	L	M	M	H	M	M	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Forest Cluster 3							
Harvest	H	M	M	M	M	L	L
Thin	M	L	M	H	H	M	L
Decrease Road Density	L	L	M	M	M	H	H
Watershed Restoration	L	M	M	M	M	M	L
Prescribed Burning	L	L	M	M	M	M	M
Prescribed Fire Plan	L	L	L	M	M	M	H
Forest Cluster 4							
Harvest	H	M	M	M	H	M	L
Thin	M	M	H	H	H	H	L
Decrease Road Density	L	L	M	M	L	M	M
Watershed Restoration	L	L	L	M	L	M	L
Prescribed Burning	L	L	L	M	L	M	M
Prescribed Fire Plan	L	L	L	M	L	M	M
Forest Cluster 5							
Harvest	H	L	M	M	M	L	L
Thin	M	M	H	H	H	H	M
Decrease Road Density	L	M	H	H	M	M	H
Watershed Restoration	L	L	L	M	M	M	L
Prescribed Burning	L	L	M	H	M	H	L
Prescribed Fire Plan	L	L	M	H	H	H	M
Forest Cluster 6							
Harvest	M	L	L	L	M	L	L
Thin	L	L	H	H	M	H	L
Decrease Road Density	L	L	L	M	L	L	L
Watershed Restoration	L	L	L	L	L	L	L
Prescribed Burning	L	L	M	M	M	M	M
Prescribed Fire Plan	L	L	M	M	L	M	M

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Range Cluster 1							
Livestock Management	L	M	M	M	L	M	H
Improve Rangeland	L	L	M	M	L	M	L
Decrease Road Density	L	L	L	H	L	M	M
Riparian Restoration	L	L	L	M	M	M	L
Prescribed Burning	L	L	M	H	L	H	M
Prescribed Fire Plan	L	L	M	H	H	H	H
Range Cluster 2							
Livestock Management	H	H	H	H	H	H	H
Improve Rangeland	L	L	L	L	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Riparian Restoration	L	L	L	M	L	M	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	H	H	H	H	H	H	H
Range Cluster 3							
Livestock Management	M	H	H	H	H	H	H
Improve Rangeland	L	L	L	M	M	M	L
Decrease Road Density	L	L	L	M	L	L	M
Riparian Restoration	L	L	M	M	L	L	L
Prescribed Burning	L	L	M	H	M	M	L
Prescribed Fire Plan	L	L	M	H	M	H	H
Range Cluster 4							
Livestock Management	L	M	M	M	M	M	H
Improve Rangeland	L	L	L	M	L	M	L
Decrease Road Density	L	L	M	M	L	M	M
Riparian Restoration	L	L	L	M	M	M	M
Prescribed Burning	L	L	M	M	L	L	L
Prescribed Fire Plan	L	L	L	M	L	M	M
Range Cluster 5							
Livestock Management	L	M	L	M	M	H	H
Improve Rangeland	L	L	M	M	L	L	L
Decrease Road Density	L	L	L	L	L	L	L
Riparian Restoration	L	L	M	M	M	M	L
Prescribed Burning	L	L	M	M	L	M	M
Prescribed Fire Plan	L	L	L	M	L	M	H
Range Cluster 6							
Livestock Management	L	M	M	M	M	M	H
Improve Rangeland	L	L	M	H	M	M	L
Decrease Road Density	L	L	L	M	L	M	M
Riparian Restoration	L	L	M	M	M	M	M
Prescribed Burning	L	L	L	L	L	L	L
Prescribed Fire Plan	L	L	L	L	L	L	M

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Table 7 Last Revised 2-17-96

Alternative 5
"Priority Management" Areas

FOREST CLUSTER	PRIMARY Priority	SECONDARY Priority
1	Primitive Recreation	Aquatics
2	Aquatics	Recreation
3	Aquatics	Timber
4	Timber	Wildlife
5	Timber	Livestock
6	Wildlife	Recreation

RANGE CLUSTER	PRIMARY Priority	SECONDARY Priority
1	Livestock	Timber
2	Recreation	Aquatics
3	Recreation	Wildlife
4	Wildlife	—
5	Livestock	Recreation
6	Livestock	Wildlife

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Table 9 Last Revised 2-12-96

Overall Management Strategy by Alternative

(Summarization of General Management Emphasis by Forest Cluster)

Forest Cluster	ALTERNATIVE 1	2	3	4	5	6	7
1	C	C	C-R	C-R	C	C-R	C
2	P-C	C	R	R	C-R	R	C
3	P	P-C	R	R	R	R	C-R
4	P	P-C	R-P	R	P	R	C-R
5	P	C-R	R	R	R	R	C-R
6	P-C	C	C-R	R	R-P	C-R	C

Used to generate Alternative maps

Table 9R Last Revised 2-12-96

Overall Management Strategy by Alternative

(Summarization of General Management Emphasis by Range Cluster)

Range Cluster	ALTERNATIVE 1	2	3	4	5	6	7
1	P	P-C	R-P	R	R-P	R	C-R
2	C	C	C	C-R	C	C-R	C
3	P-C	C	C-R	R	C-R	C-R	C
4	P	P-C	R-P	R	P-C	R	C-R
5	P	P-C	R	R	P-C	C-R	C
6	P	P-C	R-P	R	R-P	R	C-R

Used to generate Alternative maps

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Table 10 Last Revised 2-10-96

HARVEST

ALTERNATIVES 1, 2 & 7

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-4%	MODERATE 4-8%	HIGH 8-10%
5,156	1	0-200	200-400	400-500
10,724	2	0-450	450-850	850-1,050
3,955	3	0-150	150-300	300-400
9,296	4	0-350	350-750	750-950
7,560	5	0-300	300-600	600-750
2,687	6	0-100	100-200	200-250

ALTERNATIVES 3, 4, 5 & 6

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-5%	MODERATE 5-9%	HIGH 9-11%
5,156	1	0-250	250-450	450-500
10,724	2	0-550	550-950	950-1,200
3,955	3	0-200	200-350	350-450
9,296	4	0-450	450-850	850-1,000
7,560	5	0-400	400-700	700-850
2,687	6	0-150	150-250	250-300

THIN

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-8%
5,156	1	0-150	150-300	300-400
10,724	2	0-300	300-650	650-850
3,955	3	0-100	100-250	250-300
9,296	4	0-300	300-550	550-750
7,560	5	0-250	250-450	450-600
2,687	6	0-100	100-150	150-200

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PRESCRIBED BURNING

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-5%	MODERATE 5-9%	HIGH 9-11%
5,156	1	0-250	250-450	450-550
10,724	2	0-550	550-950	950-1,200
3,955	3	0-200	200-350	350-450
9,296	4	0-450	450-850	850-1,000
7,560	5	0-400	400-700	700-850
2,687	6	0-150	150-250	250-300

WATERSHED RESTORATION

Forest Acres (M)	FOREST CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-8%
5,156	1	0-150	150-300	300-400
10,724	2	0-300	300-650	650-850
3,955	3	0-100	100-250	250-300
9,296	4	0-300	300-550	550-750
7,560	5	0-250	250-450	450-600
2,687	6	0-100	100-150	150-200

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Table 10R

Last Revised 2-10-96

LIVESTOCK MANAGEMENT

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-6%	MODERATE 6-12%	HIGH 12-20%
1,632	1	0-100	100-195	
103	2	0-6	6-12	12-20
107	3	0-6	6-12	12-20
32	4	0-2	2-4	
13,367	5	0-800	800-1,600	1,600-2,670
14,640	6	0-880	880-1,760	1,760-2,925

IMPROVE RANGELANDS

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-4%	MODERATE 4-8%	HIGH 8-11%
1,632	1	0-65	65-130	130-180
103	2	0-5	5-10	
107	3	0-5	5-10	
32	4	0-5		
13,367	5	0-535	535-1,070	1,070-1,470
14,640	6	0-585	585-1,170	1,170-1,610

PRESCRIBED BURNING

Forest Acres (M)	RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-3%	MODERATE 3-6%	HIGH 6-9%
1,632	1	0-50	50-100	100-150
103	2	0-5	5-10	
107	3	0-5	5-10	
32	4	0-5		
13,367	5	0-400	400-800	
14,640	6	0-440	440-880	

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RIPARIAN RESTORATION

RANGE CLUSTER	ACRES (in thousands per decade) LOW 0-25%	MODERATE 25-50%	HIGH 50-75%
1	0-10	10-20	
2	0-1		
3	0-1		
4	0-1		
5	0-65	65-135	
6	0-75	75-145	

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Desired Range of Future Conditions

Alternative 1 — No Action

The following Desired Range of Future Conditions (DRFC) was derived from the various individual land-use plans and represents a general summary of conditions expected under those plans, intended as a comparison to the DRFCs expected under the action alternatives. However, no single current plan contains all of the DRFC items listed below. For precise wording of desired future conditions for an individual Forest or BLM District, consult the appropriate plan.

Social

Many forested areas include Wilderness, scenic areas, Research Natural Areas, unroaded lands, old growth reserves, and other locations not subject to timber management activities. These areas would be influenced by fire, natural events, recreation, and other uses. Larger expanses of forests in middle to late structural stages will be evident, with patches of intolerant or climax species. Other areas will show more open, subclimax seral stages due to extensive use of prescribed fire. Some areas show evidence of younger seral stages due to stand replacing wildfire. Prescribed and natural fires and other activities have reduced evidence of forest insect and diseases in most areas.

All plans identify areas where varied recreational opportunities from wilderness, special interest areas, non-motorized and roadless areas, and motorized dispersed activities are provided. National Forests and BLM Districts also provide developed recreation areas and facilities and have programs that seek to maintain scenic quality. National Forests along the Cascade crest emphasize management of recreation and wilderness resources. Certain lands and features are identified and incorporated into a system of classified or special interest areas, areas of critical environmental concern, or research natural areas to protect and manage unique values such as scenic quality, wildlife, raptors, sensitive plants, historic sites, cultural resources, recreation opportunities, and others. Wilderness and Wild and Scenic Rivers have also been designated, or found administratively suitable for designation, and managed to conserve their values.

Changing forest and rangeland conditions also influence recreation activities, settings, and experience opportunities. At the same time, demand for recreation of all types will grow substantially. Both agencies respond to this increased demand by providing additional recreation opportunities. In some areas more roads provide a base of roaded recreation opportunities, heavily used and very popular. In other areas, increased road closures provide for more primitive or semi-primitive opportunities. Additional developed facilities, restored and maintained recreation sites, expanded and well maintained trail systems, and new winter use areas are a few of the means used to meet the demand. Visual quality will be emphasized in the important recreation and related areas; natural appearing conditions featuring larger trees or other desirable vegetation will be created and maintained through management. Some reduction in the amount of unroaded area has occurred. But wilderness, unroaded and other areas continue to meet some of the demand for primitive opportunities across the region. However, frequency of encounters will be noticeably increased. All areas continue to emphasize their feature attractions such as wild rivers, scenic areas, wildlife and fish, botanical, geologic and historic areas and interpreted cultural resource properties.

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Economics

The "traditional" industries that use and produce resources from public lands will continue to contribute to rural economic activity. Economic activity will be focused on recreation, timber, livestock forage, water, and other locally and regionally important resources.

Resource Management

Forests, shrub, and grass lands managed by the cooperating agencies continue to provide a mix of natural resource-based goods and services. Management focuses on providing resource outputs including timber, livestock forage, huntable wildlife, and minerals while also providing for other multiple uses and values including aesthetics, recreation opportunities, wildlife, and clean air and water. Current management has improved some conditions on public lands. Resource management emphasis continues to vary among National Forests and BLM Districts based on the character of the land and resources, and public interests.

On National Forest and BLM forested areas, the general thrust is to emphasize or accommodate sustained timber, wood fiber, and livestock forage production in an environmentally prudent manner, while managing and protecting other resources and values. Under this approach, timber harvest and livestock outputs are planned to be near levels produced at the time plans were approved. Timber production is planned only in areas classified as suitable for such production. Because BLM, and some National Forests, management tends to be more in grass and shrub land areas, their general perspective is to produce forage for livestock grazing, wildlife, and wild horses at or near levels when plans were approved. Under current management, timber and livestock management are integated and coordinated with the maintenance or enhancement of wildlife and fish habitat, scenic quality, recreation opportunities, and other resource values to achieve overall, multiple-use goals and objectives.

In general, most lands are open and accessible for mineral resource and gas and oil exploration and development, provided that unnecessary and undue degradation of public lands does not result from operations.

Riparian Areas

Riparian areas and stream habitat conditions have improved as a result of protection and management, including extensive stream habitat enhancement and restoration work. Management has promoted desirable riparian vegetative species, density and structural conditions, floodplain and bank stability and resiliency, appropriate sediment budgets and water temperatures, and channel morphological processes and characteristics. All conditions interact to support improved habitat, benefiting fish and wildlife across the region. Improved riparian and instream conditions move fish habitat capability toward its potential. Some previously imperiled and other sensitive fish species show an increasing or stable trend in abundance and distribution.

Uses are coordinated to enhance fisheries, water quality, and riparian resources, focusing on maintaining, protecting, and restoring natural functions to achieve healthy and productive ecological conditions. Many Forests and BLM Districts plan to maintain or enhance fish habitat capability and riparian resources, often through restoration and improvement activities.

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Soil and Water

Across the region, soil function, processes and productivity is maintained or improved through application of prevention mitigation, or restoration measures. Effective ground cover is present in amounts and distribution to prevent erosion. Water quality is enhanced through management, so that most streams are providing cool, clear, clean water. Quality water is even more precious than at present; demand will be high from all users. However, the available water supply from forest and rangelands remains essentially unchanged, although summer low flows are increased. In the long-term, air quality is good. Although use of prescribed burning has increased, application of best management practices, expanded fiber utilization, and reduced catastrophic wildfire contribute toward quality air.

Protection and maintenance of soil and water resources and productivity is emphasized by all National Forests and BLM Districts.

Rangelands

Grass-shrub uplands evidence steady improvement and positive trends in vegetative and ecologic conditions. Rangelands have increased amount and production of desirable shrubs, forbs, and grasses and improved structural diversity. Downward trends have been arrested, damaged conditions restored, and the spread of invasive and noxious weed has been slowed or stopped. Most areas are meeting or moving toward objectives. Changes have occurred through active grazing management and range betterment activities. As a result, authorized livestock forage use levels are near current levels, and output levels are maintained on a sustained basis.

Other DRFC elements include:

- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.
- Riparian-wetland areas are in properly functioning condition.
- Stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and landform.
- Healthy, productive and diverse populations of native species exist and are maintained.

Forestlands

Forests feature a diversity of stand conditions. Portions of the landscape are heavily influenced by commodity production and recreation use, while other locations are largely natural appearing. On lands suitable for timber production, forests show evidence of management activity at the stand level. Use of available technologies result in a forest managed to favor seral species (such as ponderosa pine, lodgepole pine, western larch, Douglas-fir) with reduced stand densities, improved growth and yields, restored and maintained soil productivity, and prompt reforestation achieved with genetically improved trees. Use of prescribed fire and thinning to manage vegetation and reduce fuel loads and ladders is also evident. Some areas emphasize evenaged stand management. Horizontal diversity exists with a variety of stand patch sizes (<40 acres) and shapes visible. Stands are in a range of seral structural condition, primarily early (regenerated stands) to middle stages (stands near 20" dbh and up to 120 years old). Vertical diversity and a more naturally appearing forest, with larger, older trees and several canopy layers exist in areas where unevenaged management is emphasized, or long rotations are used. As a result of man-

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agement over the long-term, projected annual timber yields of desired timber sizes and quality are produced; long-term timber harvest sustainability is attained. Increased transitory forage will be available for livestock, big game, and other wildlife use.

Disturbances

As a result of prescribed fire, thinning and insect abatement efforts, the health, vigor, and diversity of the forest has improved. Disturbance events, including fire, insects, and diseases are within or close to natural range of variation and effect. Ecosystems are healthier and have improved function. Resistance to epidemics has increased and undesirable impacts of insects, diseases, and weeds have been mitigated through integrated pest management.

Wildlife Habitat

The amount and diversity of wildlife habitat will be maintained or improved through time. Late/old seral forests, and grass-shrublands, exist in varying sized blocks and well distributed patterns across the landscape. Snags and dead/down tree habitat continues to be available at planned and sustained levels. Some decline in old growth and dead/down tree dependent species populations will occur where intensive forest management activities reduce the total amount of these key habitats. Big game species continue to be featured in many areas. Ongoing management of forest and rangeland habitat components and conditions (such as vegetative cover, forage, and roads), and key areas maintain big game populations near state wildlife agency objectives. Hunting continues to be enjoyed throughout the region. Improved forest, grass-shrubland, and riparian area conditions support and benefit a variety of other species by increasing the quality, quantity, and variety of habitat. Such species include water fowl, upland game, raptors, and nongame species. Management has helped to create the long-term changes and improvements that contribute toward restoring some sensitive species, and toward recovery of several listed species.

On many Forest and BLM Districts, big game habitat needs are emphasized through management of vegetation to achieve specified conditions. Old growth, dead and down tree habitats and late successional tall shrub habitats are provided. In timber harvest areas, old growth and dead and down tree habitat is retained to meet wildlife requirements (See R-6 Regional Guide and NFMA 36 CFR 219.27).

Alternative 2

Under Alternative 2 forests and rangelands managed by the Forest Service and BLM continue to provide a mix of natural resource based goods and services. Rangelands show improving conditions and trends discussed in Alternative 1 desired future conditions. On forests areas not subject to timber management activities, desired future conditions are also the same as described in Alternative 1. On areas subject to timber management and/or areas within designated riparian areas of key/priority watersheds, some differences in DFCs (from Alternative 1) apply.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

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2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective functioning of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:

   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) Habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Desired Range of Future Conditions Common to Alternatives 3-7

The desired range of future conditions (DRFC) is a summary of the conditions desired or expected in 50 to 100 years as a result of meeting objectives. The DRFC is expressed as a range of processes and/or conditions that provide a vision of the long-term condition of the land.

The following DRFC applies to ALL action alternatives. In addition, each alternative will be described by a specific DRFC that is expected in 50-100 years.

- State and Federal resource management-related legal requirements are met.
- Tribal treaty rights and other Federal trust responsibilities are met.
- State, county, and tribal governments are involved in Federal agency planning, decision-making, and implementation of programs.
- A broad range of recreational opportunities are available.
- Vegetation and fuel management strategies reduce the risk of life and property loss from wildfire.

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- There is no downward trend in quality and quantity of riparian areas, wetlands, and lakes. Some are showing an upward trend.

- Water quality meets Clean Water Act requirements and State water quality standards and contributes to habitat quality and stream and lake conditions.

- Most soils have at least minimal protective cover, soil organic matter, and coarse woody material (in woodlands and forests). Soils have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes in most soils function similarly to soils that have not been harmfully disturbed. Microbiotic crusts are stable or increasing in coverage on all suitable sites.

- In the dry forest type, stand density, species composition, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with a natural fire regime. The majority of fires are nonlethal underburns, generally occurring on more gentle terrain and rocky areas at less that 25 year intervals. Some lethal fires, that kill the overstory, continue to occur where topography funnels winds, in geographically windy areas, or low productivity sites where trees rarely become tall enough for their crowns to survive flames. The smallest proportion of fires are mixed severity.

- Dominant species in the dry forest type are resistant to low intensity fires. Stands of ponderosa pine are pure mixed with Douglas-fir or grand fir. The dry forest group is predominately an open community.

- In the moist forest type, mixed severity fires occur intermingled with surface and crown fires. Stand density, species compositions, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with the natural and highly variable fire regime. The majority of fires are mixed severity at intervals ranging from 25 to 150 years. Nonlethal fires occur on benches and ridges, and fires lethal to the overstory occur on upland slopes.

- Dominant species in the moist forest type are resistant to low and moderate intensity fires. Stands of Douglas-fir, lodgepole pine, or ponderosa pine are pure or mixed with western larch, western white pine, grand fir/white fir, western hemlock/western redcedar or Engelmann spruce/subalpine fir.

- In the cold forest type, stand density, species composition, structure, fuel loading and distribution, and duff depth are moving toward that which is typically associated with a natural fire regime. Nonlethal underburns occur on benches and ridges where whitebark and lodgepole pine dominate. The lethal crown fire regime is found on moist to wet steep slopes. The most common fires are mixed severity, which usually occur intermingled with nonlethal and lethal fires during one or a series of fire events, with a frequency ranging from 25 to 150 years.

- Dominant species in the cold forest type are somewhat resistant to low intensity fires. Stands of lodgepole pine, Douglas-fir, or whitebark pine are pure or mixed with Engelmann spruce/subalpine fir, mountain hemlock, whitebark pine/subalpine larch, or aspen.

- Annual rate of spread of new infestations of noxious weeds is declining in response to aggressive weed management programs.

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- Dense shrublands are reduced in extent.
- Juniper encroachment into previously unoccupied communities is declining.
- Shrub communities are of sufficient size and of appropriate arrangement to enhance connectivity among similar habitats.
- Species viability is not limited by habitat conditions.
- Natural Areas and habitats supporting high species endemism or biodiversity are present and contribute to species viability.
- There are fewer roads in riparian areas and in the uplands, where road miles causing accelerated erosion have been reduced. Riparian areas are stable and free of alteration to the natural streamflow and sediment regimes. In some areas, open roads are stable.
- Watersheds are stable and provide for the capture, storage and safe release of water appropriate to soil type, climate, and landform.
- Healthy, productive and diverse populations of native plants are maintained or obtained relative to site potential.
- Rangelands reseeded with mixtures including nonnative plants are functioning to maintain adequate life form diversity, production, nutrient cycling, energy flow, and the hydrologic cycle.
- Monocultures of undesirable plants (cheatgrass, medusahead wildrye, and noxious weeds) at least provide for soil stability and offer opportunitites for improved vigor and numbers of remnant native or seeded plants relative to site condition.
- Habitats are suitable to maintain viable populations of listed and sensitive species.
- Riparian/wetland vegetation structure and diversity are, or are making significant progress toward, functioning properly.
- Stream channels and floodplains are, or are making significant progress toward, functioning properly.
- Surface and groundwater on public lands fully support, or are making significant progress toward fully supporting, designated beneficial uses described in the State water quality standards.
- **Category 1 Watersheds:** Watershed processes, riparian and aquatic habitat conditions, and their interactions provide habitat conditions that support strong populations of native species. Although previously introduced species are present, they do not dominate the aquatic community. Large blocks of continuous high quality, diverse habitat is provided spatially and temporally within the watersheds. Connectivity within the watershed is at least maintained, and all native aquatic biota are present, including migratory forms. These watersheds provide a system of habitats large enough and well dispersed enough to be resilient in the face of large-scale disturbance. Category 1 watersheds provide conditions necessary for the long-term persistence of native aquatic communities and are important sources for refounding populations in other water-

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sheds. While human disturbances (management activities) have and do occur, natural processes predominate or are not altered to a point beyond that which the native biota evolved and can persist over the long term. Past management activities which affect watershed processes and aquatic and riparian habitats are mitigated, and new management activities do not affect watershed processes in a manner that would be adverse to aquatic biota.

Alternative 3

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 3:

FOREST

In the *dry forest Potential Vegetation Group (PVG),* successional and disturbance processes are maintained through endemic insect and disease disturbances, vegetation management on high priority sites to re-establish dominance of old single story ponderosa pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
60-70%	10-20%	15-25%

There is a moderate abundance and persistence of old single story forest, dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Stands are fairly well distributed in a mosaic of age classes (table A).

In the *moist forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, windthrow often aided by root rot, vegetation management on high priority sites to re-establish western white pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	30-40%	50-60%

There is a moderate abundance and persistence of young forest consisting of western white pine, western larch, and ponderosa pine with a minor component of grand fir. Stands are distributed in a mosaic of age classes (table A).

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic and epidemic insect and disease disturbances, vegetation management on high priority sites to re-establish whitebark pine, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	15-25%	65-75%

There is a moderate component of young forest consisting of seral whitebark pine along with Engelmann spruce/subalpine fir. Stands are distributed in large-patch mosaics of age classes (table A).

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The forested potential vegetation groups have an overall range of structural stages as follows:

Table A. Desired Structural Stages, Alt. 3

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry	10-20	25-35	20-30	20-40	0-15
Moist	15-25	50-60	15-25	5-15	
Cold	15-25	45-55	20-30	5-10	1-2
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
***refers to understory of grasses, shrubs, forbs**					

Forest wildlife habitat. The needs of forest-dependent wildlife species are met by the presence of the necessary structures and composition, ecological processes, and ecosystem functions. Forested land contains habitat attributes of old forests. Natural areas with high species endemism or biodiversity are present and contribute to species viability and the delisting of threatened or endangered species. Amounts and distribution of habitat attributes are increased where needed to meet the needs of endemic species and species with the largest home range requirements. Some blocks of old forest habitats connect areas of similar vegetation. Human activities are at levels that allow sufficient useable habitat for all species to be represented and well distributed, although species densities may be variable. Management activities are dispersed, except in areas following major disturbances such as large fires and insect infestations. In many forest areas, some roads are closed (seasonal or permanent), or located to achieve the desired wildlife habitat conditions.

RANGELANDS

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native and exotic perennial grasses. There is a slight management emphasis on maintaining a grass-dominated plant community in the shrublands, although forbs and shrubs are a substantial part of the plant community. Most seedings have been diversified by the addition of various forb and shrub species. New infestations of noxious weeds, especially when located in vegetation types highly susceptible to invasion, are controlled, but most existing large infestations remain and continue to spread along their boundaries. Control that results in some reduction of existing large infestations is prioritized at a site-specfic level and directed by local input, especially for species that are problematic on a project area-wide level (yellow starthistle, diffuse knapweed, spotted knapweed, and leafy spurge).

Western juniper is being reduced by various treatments on rangelands. Yet, the overall amount remains about the same since the extent of new invasions equals the extent of existing juniper-dominated areas being treated.

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Microbiotic crust cover is improving in shallow soil areas. Microbiotic crusts are not declining in other rangeland plant communities. Prescribed burning and prescribed natural fire is apparent, although the burning is not continuous and is prescribed as mosaic. Altered sagebrush steppe is maintained at existing levels with emphasis on preventing the spread of cheatgrass to adjacent areas. Greenstripping and other fire breaks are apparent along roads and along the altered sagebrush steppe boundaries.

Potential Vegetation Groups (PVGs)

Dry Grass PVG

Forty to 60 percent of the fires in this group are nonlethal, burning in hebaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Fifty to 70 percent of the area is dominated by native grasses and forbs with minimal conifer and shrub encroachment.

Dry Shrub PVG

About 85-95 percent of the fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

Forty to 60 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Five to 20 percent of the area is dominated by native grass and forb communities. The remaining area is dominated by dense shrub communities with declining herbaceous layers, by annual grasses, or by seedings of exotic grasses and other plants.

Cool Shrub PVG

Eighty to 95 percent of fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 26- to 150-year intervals, with higher frequencies on more productive sites. Five to 15 percent of fires are nonlethal within herbaceous-dominated stages at intervals of less than 25 years.

Fifty to 70 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Ten to 30 percent of the area contains mixtures of perennial grasses and forbs. Conifers are dominant on less than 20 percent of the area.

Rangeland wildlife habitat. Rangelands have the necessary structure and composition, ecological processes, and ecosystem functions to meet most needs of Federal and State listed and sensitive rangeland-dependent wildlife species. To enhance wildlife forage production, rehabilitation or restoration of native perennial bunchgrass has been accomplished. Natural Areas and areas of high species endemism or biodiversity are present and contribute to species viability, but gains in species viability are moderate. Vegetation is appropriate for the site with multiple age classes of shrubs and grass being common. These habitats are becoming less fragmented and more connected due to increasing abundance of native vegetation. Blocks of similar habitats are fairly well connected with areas of similar vegetation. Human activities are at a level that allows most species to maintain a desired distribution, but species densities may be low. In many rangeland areas, roads are closed or located to achieve the desired resource conditions. Management activi-

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ties are dispersed and infrequent. In some situations, human activities require seasonal restrictions in selected habitats.

SOCIAL AND ECONOMIC

Social and economic systems are minimally affected by adjustments or updates to Forest Service of BLM land-use plans.

Local public needs and desires continue to influence levels of commodity and noncommodity outputs.

Customary uses continue and stability improves for the participant customers (firms, ranches, etc.).

Reductions in commodity outputs are minimized and reflect either changes in ecosystem health or minimum levels needed to achieve compliance with applicable laws and regulations.

Payments to local units of governments continue and generally are stable within a normally accepted range.

AQUATIC — RIPARIAN — WATERSHEDS

Riparian areas in Proper Functioning Condition are managed to maintain that condition, within their site potential, with no downward trends. Tall trees, moderate or large in diameter, within riparian areas are infrequent. Some riparian areas are connected to the streams and uplands, unfragmented by roads and openings, and free of barriers to species migration. On rangelands, some riparian area soils are vegetated with native deep-rooted plants and shrubs. Riparian woodlands are rare but increasing on forested lands. Wetlands are stable but not common across the lower gradient valley bottoms.

Forested streams in Category 2 and portions of Category 3 watersheds are moderately productive and habitat is becoming complex and diverse, supporting native aquatic species. Instream, bank, and overhead cover, and structure provided by large wood and willows, are moderate and increasing. Large deep pools in lower gradient streams are fairly common. Rangeland streams and forested streams in portions of Category 3 watersheds are low in productivity, and have habitat that is simple and uniform, supporting aquatic species that require low to moderate quality habitat. Instream, bank, and overhead cover, and structure provided by large wood and willows, are low to moderate. Substrate is largely homogeneous and tends to be of finer size than characteristic for the geoclimatic setting. Large deep pools in lower gradient streams are infrequent.

Some portions of the landscape have minimal protective soil cover, organic matter, and coarse woody material. Most biomass is stored in smaller plant parts and as litter. Vegetative growth and hydrologic function are moderately impaired in some areas.

Roads in riparian areas are frequent but stable. Some road corridors from new roads are apparent. The landscape is moderately fragmented in appearance. Riparian vegetation separate and disconnected from upslope vegetation.

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Aquatic species habitat. Water quality and aquatic habitat are moving towards watershed, riparian, and aquatic habitat goals within Category 2 and portions of Category 3 watersheds. Restoration strategies are implemented on nearly all high-risk sites within Category 2 watersheds, allowing recovery of watershed, riparian, water quality, and aquatic conditions characteristic for the geoclimatic setting. Improved aquatic habitat conditions allow threatened or endangered (TES) aquatic species populations to stabilize and expand. Major river corridor habitat and water quality conditions are improving.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Alternative 4

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 4:

FOREST

In the *dry forest Potential Vegetation Group (PVG)*, successional and disturbance processes are restored and maintained through aggressive vegetation management, endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

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Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
75-85%	5-15%	5-15%

There is an abundance and persistence of old single story forest, dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Stands are well distributed in a mosaic of age classes (table B).

In the *moist forest PVG*, successional and disturbance processes are restored and maintained through aggressive vegetation management; endemic insect and disease disturbances; wind-throw, often aided by root rot; and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
10-20%	20-30%	55-65%

There is an abundance and persistence of old forest dominated by Douglas-fir, lodgepole pine, and ponderosa pine in the single story structural stage. Seral western white pine dominates the young forest structural stage. Stands are well distributed in a mosaic of age classes (table B).

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, vegetation management, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	5-15%	75-85%

There is an abundance and persistence of old forest dominated by lodgepole pine and Douglas-fir in the multi-layer structural stage, and the young forest stages are dominated by seral whitebark pine with a moderate component of Engelmann spruce/subalpine fir. Stands are distributed in large-patch mosaics of age classes (table B).

The potential vegetation groups have an overall range of structural stages as follows:

Table B. Desired Structural Stages, Alt. 4

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry	5-15	30-40	10-20	35-50	0-15
Moist	20-30	40-50	20-30	10-20	
Cold	15-25	35-45	25-35	5-15	1-2
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
***refers to understory of grasses, shrubs, forbs**					

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Forest wildlife habitat. The needs of forest-dependent wildlife species are met by the structure and composition, ecological processes, and ecosystem functions. Habitat attributes of old forests are abundant. Natural Areas with high species endemism or biodiversity are common and contribute to species viability and the delisting of threatened or endangered species. Management is designed to increase amounts and distribution of habitat attributes where needed to be sufficient to meet the needs of endemic species and species with the largest home range requirements. Blocks of old forest habitats are large and connect with areas of similar forest types. Human activities are at levels that allow most species to maintain an adequate distribution in forested environments. In the long term, management activities are dispersed and infrequent; in the short term, management activities are common. In many forest areas, many roads are closed (seasonal or permanent), or located to achieve the desired wildlife habitat conditions.

RANGELANDS

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native grasses with management emphasis on maintaining a diverse native plant community. Seedings have been diversified by the addition of various native grasses, forbs, and shrubs, and have been converted to native plants where possible. New infestations of noxious weeds are not common across the landscape and existing large infestations are slowly declining.

Western juniper-dominated sites are rare across the rangelands. The exception to this is rock outcrops, ridges, mesas, or other areas not prone to fire, which typically have shallow soils with little accumulation of fine fuels. Some areas have diverse plant communities with low densities of western juniper as well as a full complement of native understory shrubs, grasses, and forbs.

Microbiotic crust cover has improved in all dry shrub types. Microbiotic crusts are also increasing in other rangeland plant communities. Prescribed burning and prescribed natural fire have maintained the diverse, mosaic shrub steppe plant communities as well as the grassland communities that are subject to conifer encroachment. Most of the altered sagebrush steppe consists of diverse perennial plant communities, with the grass components dominated by both native and exotic perennial grasses. Greenstripping and other fire breaks are still apparent along roads and along the remaining altered sagebrush steppe boundaries.

Potential Vegetation Groups

Dry Grass Potential Vegetation Group

At least 60 to 80 percent of the fires in this group are nonlethal, burning in herbaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Sixty to 80 percent of the area is dominated by native grasses and forbs without conifer and shrub encroachment.

Dry Shrub Potential Vegetation Group

About 80-90 percent of the fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

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Fifty to 70 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Ten to 25 percent of the area is dominated by native grass and forb communities. The remaining area is dominated by closed shrub communities with declining herbaceous layers, by seedings of exotic and native grasses and other plants, and in a small area by annual grasses and noxious weeds.

Cool Shrub Potential Vegetation Group

Seventy to 90 percent of fires in this group are lethal, causing overstory mortality in stages dominated by shrubs and conifers at 16- to 150-year intervals, with higher frequencies on more productive sites. Ten to 30 percent of fires are nonlethal within herbaceous-dominated stages at intervals of less than 25 years.

Sixty to 80 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Fifteen to 40 percent of the area contains mixtures of perennial grasses and forbs. Closed canopy sagebrush and conifers dominate the remaining area.

Rangeland wildlife habitat. Rangelands have the necessary structure and composition, ecological processes, and ecosystem function to meet most needs of Federal and State listed and sensitive rangeland-dependent wildlife species. The distribution of different amounts and ages of shrubs, grassland, and woodland are approaching desired levels in a mosaic pattern. Rehabilitation or restoration of native shrub communities are accomplished where site potential permits to enhance wildlife habitat. Natural areas and areas of high species endemism or biodiversity are common and contribute to species viability, but gains in species viability are moderate. Vegetation is appropriate for the site with multiple age classes of shrubs and grass being common. These habitats are becoming less fragmented and more connected due to increasing abundance of native vegetation. Areas are large and connected with other areas of similar vegetation to maintain species distribution and densities that are closely associated with rangeland habitats. Human activities are at a level that allows species to maintain expected distribution, but some species densities may be low due to human activities. In many areas roads are closed or located to reduce habitat fragmentation and reduce human disturbance; road densities are low in many areas. Blocks of similar habitats are large and connect with areas of similar vegetation. In many areas roads are closed, (seasonally or permanently) or located to achieve the desired wildlife habitat conditions.

SOCIAL AND ECONOMIC

Social and economic systems have adjusted (in some locations grown) to the changed amounts and product mix of commodity and noncommodity outputs. Enhanced forest, range, riparian and aquatic ecosystems enable individuals and firms to obtain social and economic benefits from sustained levels of management projects and restoration actions.

Local public needs and desires are reconciled with the Federal agencies' ecosystem restoration needs and opportunities.

Payments to local units of governments continue within an acceptable range based on local conditions and need for restoration.

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AQUATIC — RIPARIAN — WATERSHEDS

Riparian areas are resilient, diverse, and functioning within their site potential. Riparian areas in Proper Functioning Condition are managed to maintain that condition with no downward trends, and there is an annual increase in the number of areas functioning at risk that show an upward trend towards Proper Functioning Condition. Less resilient and more sensitive areas are recovering. Tall trees, moderate or large in diameter, within riparian areas are fairly frequent. Riparian areas are covered by protective vegetation and generally connected with their streams and upslopes.

Most soils have protective cover, adequate levels of soil organic matter, and coarse woody material distributed in varying sizes and types. Soils also have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes in all soils function similarly to soils that have not been harmfully disturbed.

Roads in riparian areas are few and stable. Roads exist in riparian areas only under the following circumstances: where needed for major public transportation thoroughfares, where they do not cause problems to aquatic and riparian resources, or where there are no other practical alternatives. Some road corridors from new roads are apparent, but roads in sensitive landscapes are few and stable. There is moderate-to-strong evidence of human management activity across the landscape.

Aquatic species habitat. Restoration strategies are implemented on nearly all high risk sites within Category 2 and portions of Category 3 watersheds, promoting recovery of watershed, riparian, water quality and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened and endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population's strongholds are increasing basin-wide. Major river corridor conditions allow most aquatic species to achieve their full life cycles.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) (a) Sediment regimes that are appropriate to geoclimatic setting. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
(b) Hydrologic regimes in streams, lakes, and wetlands appropriate to the geoclimatic setting. Important elements of the hydrologic regime include those processes necessary to sustain proper channel form and riparian, aquatic, and wetland habitats and to allow proper patterns of sediment, nutrient, and wood routing. This includes the timing, magnitude, duration, and spatial distribution of peak, high, and low flows.

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

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5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

7) Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) Habitat to support viable populations of native plant, invertebrate, and vertebrate aquatic and riparian-dependent species, including threatened and endangered species, that are well distributed within their historical ranges.

9) Habitat to support harvestable populations of native aquatic and riparian-dependent species of commercial, cultural, and recreational significance.

10) Habitat to support desired recreational fishing opportunities for non-native species where they will not further erode native species status or prevent attainment of objectives for native species.

Alternative 5

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 5:

FOREST

In the *dry forest PVG*, successional and disturbance processes are maintained through vegetation management, endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
60-70%	10-20%	15-25%

There are either large patches dominated by young forest and old multi-story forests within timber emphasis areas, or a mosaic of age classes composed of ponderosa pine and Douglas-fir in other emphasis areas (table C).

In the *moist forest PVG,* successional and disturbance processes are maintained through intensive vegetation management, endemic insect and disease disturbances, windthrow often aided by root rot, and fire. Forest species and composition are consistent with the following fire regime:

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Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	20-40%	50-65%

There are either large patches of young forest and old multi-story forest within timber emphasis areas, or a mosaic of age classes in the other emphasis areas (table C). Seral western white pine dominates the young forest structural stage.

In the *cold forest PVG*, successional and disturbance processes are maintained through endemic and epidemic insect and disease disturbances, and minimal vegetation management. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-15%	5-15%	75-85%

There is a high abundance and persistence of old forest dominated by lodgepole pine and Douglas-fir in the multi-story structural stage. The young forest stages have a moderate component of seral whitebark pine and Engelmann spruce/subalpine fir. Stands are well distributed in a mosaic of age classes (table C).

The forest potential vegetation groups have an overall range of structural stages as follows:

Table C. Desired Structural Stages: Alt. 5

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry Within**	5-15	30-40	10-20	35-50	0-15
Dry Outside**	10-20	25-35	20-30	20-40	
Moist Within**	20-30	40-50	20-30	10-20	
Moist Outside**	15-25	50-60	15-25	5-15	
Cold Within**	15-25	35-45	25-35	5-15	1-2
Cold Outside**	15-25	45-55	20-30	5-10	
Shade-Intolerant Species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	

***refers to understory of grasses, shrubs, forbs**
****Within=within timber emphasis areas; Outside=outside timber emphasis areas**

Forest wildlife habitat. Forested wildlife emphasis areas have the necessary forest structure and composition, ecological processes, and ecosystem function to meet the needs of all species associated with forest communities. Areas of habitat are extensive to assure species distribution and densities associated with forest habitats. Forested land contains habitat attributes of old forests which connect with areas of similar vegetation. Natural Areas have high species endemism or biodiversity and contribute to moderate gains in species viability. Human activities are at levels that

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allow sufficient useable habitat for most species to be represented and well distributed in forested environments. Management activities occur primarily in areas of major disturbances. Roads are few.

In forest PVGs, other emphasis areas have the necessary forest structure and composition, ecological processes, and ecosystem function to meet the needs of most forest-dependent wildlife species, but species densities are low. Forested land contains habitat attributes of old forests which are mostly connected with areas of similar vegetation. Human activities are at levels that allow most species to maintain a desired distribution in forested environments. Management activities occur primarily in areas of major disturbances.

RANGELANDS

Within Livestock Emphasis Areas

Rangelands reflect a mosaic of multiple-aged shrubs, forbs, and native and exotic perennial grasses. There is a management emphasis on maintaining a grass-dominated plant community in the shrubland types for livestock production. Forbs and shrubs are a minor, but significant, part of the plant community. Seedings have been diversified by the addition of various forb and shrub forage species. New infestations of noxious weeds are not common across the landscape and existing large infestations are slowly declining.

Western juniper-dominated sites are rare across the rangelands. The exception is rock outcrops, ridges, mesas, or other sites not prone to fire which typically have shallow soil areas with little accumulation of fine fuels.

Microbiotic crust cover is improving in shallow soil areas or sites that have an inherent low potential for vascular plant cover. Microbiotic crusts are not declining in other rangeland plant communities. Prescribed burning and prescribed natural fire have maintained the more grass-dominated communities although the burning is not continuous and is prescribed as 'mosaic'. Altered sagebrush steppe has been converted to diverse perennial plant communities that provide forage production. Greenstripping and other fire breaks are apparent along roads and along the altered sagebrush steppe boundaries.

Outside Livestock Emphasis Areas

Same as Alternative 4 for the general description. The specific description by PVG is described below.

Potential Vegetation Groups (both within and outside Livestock Emphasis Areas)

Dry Grass Potential Vegetation Group

Within this group, nonlethal fires predominate on 70-90 percent of the area within livestock emphasis areas, and 40-60 percent of the area outside emphasis areas, burning in herbaceous vegetation at less than 25-year intervals. The remaining fires are lethal, or mixtures of nonlethal and lethal, causing mortality of overstory shrubs or conifers. Seventy to 90 percent of the area within livestock emphasis areas, and up to 80 percent of the area outside livestock emphasis areas, are dominated by native grasses and forbs without conifer and shrub encroachment.

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Dry Shrub Potential Vegetation Group

In this group, about 75-85 percent of the fires are lethal within livestock emphasis areas, and 85-95 percent are lethal outside these areas, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, non-lethal fires predominate at 25- to 75-year intervals.

Thirty to 50 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Fifteen to 25 percent of the area within livestock emphasis areas is herbaceous-dominated, as is 5-15 percent of the area outside emphasis areas. The remaining areas are dominated by desirable exotic and native plant seedings, annual grasses or noxious weeds, and a small amount of closed shrub communities with declining herbaceous layers.

Cool Shrub Potential Vegetation Group

In this group, the dominant fire regime is lethal on 60-80 percent of the area within livestock emphasis areas and 80-95 percent of the lands outside emphasis areas. These lethal fires cause overstory mortality in stages dominated by shrubs and conifers at 25- to 150-year intervals, with higher frequencies on more productive sites. Twenty to 40 percent of the fires within livestock emphasis areas, and 5-15 percent of fires outside emphasis areas are nonlethal, occuring within herbaceous-dominated stages at intervals of less than 25 years.

Sixty to 80 percent of the area in this group is dominated by native grasses and forbs with an overstory layer of shrubs. Twenty to 40 percent of the area within the livestock emphasis areas, and 5-15 percent of the area outside emphasis areas contains mixtures of perennial grasses and forbs. Conifers are dominant on less than 5 percent of the area within livestock emphasis area, and on less than 30 percent of the land outside livestock emphasis areas.

Rangeland wildlife habitat. Within rangelands, wildlife emphasis areas have the necessary structure and composition, ecological processes, and ecosystem function to meet the needs of Federal and State listed and sensitive rangeland-dependent wildlife species. The distribution of different amounts and ages of shrubs, grassland, and woodland is approaching desired levels in a mosaic pattern. Rehabilitation or restoration of native bunchgrass is accomplished where site potential permits. Management activities to control exotics are frequent and concentrated. Blocks of habitats are more connected with areas of similar vegetation. Human activities are at a level that allows most species to maintain a desired distribution. Roads are few.

Other emphasis areas in rangelands may have the necessary structure and composition, ecological processes, and ecosystem functions to meet needs of all Federal and State listed and special status species dependent on rangeland habitat. Vegetation is appropriate for the site, with multiple age classes of shrubs and grass being common. Rehabilitation or restoration of native shrub and grass communities has been accomplished. Management activities to control exotic plants are frequent. These habitats are more fragmented and less connected due to changes in abundance of native vegetation. Areas may not be connected with other areas of similar vegetation to maintain species distribution and densities. Human activities are at a level that allows sufficient useable habitat for most species to be represented and maintain expected distribution, but some species densities may be low. In many areas roads are closed (seasonal or permanent) or relocated to increase habitat quality by reducing human disturbance; road densities are variable.

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SOCIAL AND ECONOMIC

Social and economic systems have adjusted to significant changes in the location, amounts and product mix of commodity and noncommodity outputs.

Where economic efficiency and biological capability direct land management toward commodity outputs, land allocations have significantly increased outputs of these commodities, and economic and social systems have adjusted accordingly.

Where land capability is more suited to support ecological values (such as endangered species), land allocations emphasize the economic and social values of protected biological resources, and economic and social systems have adjusted accordingly.

The role of Federal agencies in local communities has changed based on agency emphasis on the particular suite of goods and services emphasized in a particular area.

AQUATIC — RIPARIAN — WATERSHEDS

The DRFC for riparian areas, streams, lakes, soil, and road corridors in aquatic emphasis areas, is similar to the DRFC of alternatives 4 and 6.

There is no downward trend in riparian condition and function in timber emphasis areas. While large trees are rare, small to moderate sized trees provide some watershed protection. Many riparian areas remain open and without vegetation cover. Some areas are connected to their streams and upslopes and some (the more sensitive and less responsive areas) are fragmented and isolated. Some streams are low in productivity and have habitat that is simple and uniform. Structure is provided by small diameter wood in the smaller streams; structure is transient or absent in the larger, lower gradient streams. Substrate is fairly homogeneous and tends to be of finer size than is characteristic for the geoclimatic setting. Large and deep pools in the larger lower gradient streams are infrequent.

Large portions of the landscape in timber emphasis areas have minimal protective soil cover, organic matter and coarse woody material; most biomass is stored in small diameter trees and as litter. Vegetation growth and hydrologic function are moderately impaired. There is evidence of openings from old and new road corridors across the landscape. Large amounts of the landscape are open or partially open and next to the road corridors. The landscape appears fragmented. Riparian vegetation appears separate and disconnected from upslope vegetation.

There is no downward trend in riparian condition and function in livestock emphasis areas, where exotic grasses are dominant and shrubs are rare. Most riparian areas appear open and are minimally covered by vegetation. Some areas are connected to stream channel, floodplains, and subsurface flow networks, but most are disconnected from these processes. Woodlands are rare. Some streams are low in productivity, and have habitat that is simple and uniform. Structure is provided by exotic vegetation and infrequent shrubs. Substrate is fairly homogeneous and tends to be of finer size and more abundant than characteristic for the geoclimatic setting and stream type. Large deep pools in the larger lower gradient streams are infrequent. Many streams are wide and shallow.

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Large portions of the landscape in livestock emphasis areas have minimal protective soil cover and organic matter, mostly in the form of above ground biomass and shallow rooted plants. Soil and hydrologic function is moderately impaired.

Riparian areas in recreation emphasis areas are fragmented in areas of concentrated and developed recreation. Small openings are frequent because of trails and other developments. In undeveloped areas, riparian areas are resilient and functioning within condition characteristic for that valley bottom setting and vegetation type. Streams are generally productive and somewhat diverse, and areas of concentrated or developed use have bare or reinforced streambanks interspersed with vegetated and resilient streambanks. Structure is intermittent; substrate tends to be uniform in areas of concentrated use and of various sizes in areas of dispersed use. Habitat is fairly simple and uniform in concentrated use areas, and increasingly complex in areas of less use. Large deep pools are concentrated in some areas and absent in others.

New roads in some riparian areas within recreation emphasis areas are evident and stable, but overall roads in riparian areas are few. Old and new road corridors blend into the landscape as much as possible.

Aquatic species habitat. Restoration strategies have been implemented on nearly all high risk sites within aquatic and recreation emphasis areas, allowing recovery of watershed, riparian, water quality, and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened and endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population strongholds are increasing basin-wide. Major river corridor conditions have improved to allow most species to achieve their complete life cycles.

The following DRFC applies to Forest Service- or BLM-administered lands identified in PACFISH and INFISH. The DRFC is to maintain or restore:

1) Water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3) Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4) Natural timing and variability of the water table elevation in meadows and wetlands;

5) Diversity and productivity of native and desired non-native plant communities in riparian zones;

6) Riparian vegetation to:
   a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones;
   c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

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7) riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region;

8) habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Alternative 6

In addition to the DRFC elements Common to All Action Alternatives, Alt. 6 is portrayed by a DRFC that is similar to that of Alt. 4. Acknowledging that in the short term (<50 years), conditions are likely to look different under Alt. 6 than they do under Alt. 4, it is anticipated that in the long term, conditions would look similar to those described under Alt. 4. Therefore, for the DRFC specific to Alt. 6, see Alt. 4.

Alternative 7

In addition to the DRFC elements common to all action alternatives, the following is the vision of the long-term (50-100 years) condition of the land under Alternative 7:

FOREST

In the *dry forest Potential Vegetation Group (PVG)*, successional and disturbance processes are maintained through endemic insect and disease disturbances, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
50-70%	10-25%	15-30%

Within reserves, there is a high occurrence and persistence of young forest dominated by ponderosa pine in the regeneration and young forest structural stages. Stands are fairly well distributed in a mosaic of age classes (table E). Outside reserves, there is a moderate occurrence of old single story forest dominated by ponderosa pine with a moderate component of Douglas-fir and a minor component of grand fir. Vegetation management is used in addition to natural disturbances and fire to maintain successional and disturbance processes. Stands are fairly well distributed in a mosiac of age classes (table E).

In the *moist forest PVG*, successional and disturbance processes are maintained through endemic insect and disease disturbances, windthrow often aided by root rot, and fire. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	20-40%	50-65%

Within reserves, there is a high occurrence and persistence of regeneration, young forest, and old multi-story stages dominated by shade-intolerant species, grand fir/white fir, and Engelmann spruce/subalpine fir (table E). Outside the reserves there is a moderate occurrence and persistence of young forest consisting of western white pine, western larch and ponderosa pine with a

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minor component of grand fir. Vegetation management is used in addition to natural disturbances and fire to maintain successional and disturbance processes. Stands are distributed in a mosaic of age classes (table E).

In the *cold forest PVG*, successional and disturbance processes are maintained through fire and endemic insect and disease disturbances. Forest species and composition are consistent with the following fire regime:

Nonlethal Underburns	Lethal Fires	Mixed Severity Fires
5-20%	15-30%	55-75%

Within reserves, there is a high occurrence and persistence of regeneration, young forest, and old multi-story stages of Douglas-fir, lodgepole pine, and Engelmann spruce/subalpine fir. Stands are distributed in mosaics of age classes (table E). Outside reserves, the young forest stage is dominated by seral whitebark pine with a moderate component of Engelmann spruce/subalpine fir in a mosaic of age classes. Stands are distributed in large-patch mosaics of age classes (table E).

The potential vegetation groups have an overall range of structural stages as follows:

Table E. Desired Structural Stages: Alt.7

PVG	Regen	Young	Old Multi	Old Single	Other*
Distribution (expressed as a % of the PVG)					
Dry Within** Dry Outside**	20-30 10-20	45-55 25-35	10-20 20-30	5-15 20-40	0-15
Moist Within** Moist Outside**	15-25 15-25	40-50 50-60	15-25 15-25	10-20 5-15	
Cold Within** Cold Outside**	20-30 15-25	40-50 45-55	10-20 20-30	10-20 5-10	1-2
Shade-intolerant species (expressed as a % of the structural stages)					
Dry	90-100	60-70	50-70	90-100	
Moist	75-85	70-75	50-75	90-100	
Cold	75-80	60-70	35-50	80-100	
*refers to understory of grasses, shrubs, forbs **Within=within reserves; Outside=outside reserves					

Forest wildlife habitat. Within reserves, habitat is maintained to contribute to biodiversity, species viability, and delisting of threatened, endangered, and special status species. All major vegetation types are included in large reserves, providing an adequate representation of wildlife habitats. Forested areas within reserves contain necessary structure, composition, and attributes of old forests. Reserves have often absorbed large disturbance events and impacts from activities adjacent to reserves and still provide sufficient habitat. Reserves of all vegetation types are present in more than one location so that large-scale disturbances are less likely to disrupt the intent of the reserve in the short term. Human activities are at levels that allows all species to maintain

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their distribution. Densities of species may be low, but all expected species are present. Road use restrictions are common to maintain species densities and prevent disturbances that will cause animals to be displaced.

Outside of reserves the DRFC for forested wildlife habitat is similar to that of Alternative 3.

RANGELANDS

Within Reserves

Where noxious weeds or other exotic plants have not dominated the vegetation types, rangelands (especially the cool shrub areas) reflect a diverse mosaic of multiple-aged shrubs, forbs, and native grasses. Seedings include native species, especially in the moist areas, and have become more diverse especially in the shrub component. Noxious weeds are increasing on the rangelands as a result of minimal control and due to the increasing competitiveness of noxious weeds with native plant species. The dry shrublands are especially affected by noxious weeds, with a majority already infested.

Western juniper encroachment onto dry grassland, dry and cool shrubland, and riparian areas, is retarded by natural fire where the understory vegetation provides adequate fine fuel to permit fire. Some juniper stands are being reduced in spatial extent by limited juniper cutting, especially those stands that (1) are of sufficient density that site biodiversity is being compromised, and (2) are not likely to be affected by wildfire. Western juniper presence is confined primarily, but not exclusively, to sites such as rock outcrops, ridges, mesas and other sites that are not fire prone, which typically are characterized by low fine fuel accumulation and shallow soils.

Microbiotic crust cover has improved in all rangeland types, with the exception of those dominated by altered sagebrush steppe. The frequency of fire in the altered sagebrush steppe has prevented substantial microbiotic crust cover from occurring.

Altered sagebrush steppe has occupied a majority of the dry shrub communities, especially the Wyoming sagebrush warm sites. Some altered sagebrush steppe areas, especially those in the more moist areas, are slowly moving toward a native plant community as native plants re-invade these areas. The slow conversion of altered sagebrush steppe sites to medusahead and yellow starthistle is apparent in some areas. Greenstripping and other fire breaks have been naturally colonized by some native species, although the seeded species is still dominant.

Outside Reserves

Same as Alternative 3, for the general description. The specific description by PVG is described below.

Potential Vegetation Groups (both within and outside Reserves)

Dry grass Potential Vegetation Group

Within this group, nonlethal fires predominate on 70-90 percent of the area within reserves, and 40-60 percent of the area outside reserves, burning in herbaceous vegetation at less that 25-year intervals. The remaining fires are lethal or mixtures of nonlethal and lethal, with mortality of over-

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story shrubs or conifers occurring. Seventy to 90 percent of the area within reserves areas, and 50-70 percent of the area outside reserves, are dominated by native grasses and forbs without conifer and shrub encroachment.

Dry Shrub Potential Vegetation Group

In this group, about 25-45 percent of the fires are lethal within reserves, and 85-95 percent are lethal outside reserves, causing overstory mortality in stages dominated by shrubs and conifers at 25- to 75-year intervals. On perennial bunchgrass dominated sites, nonlethal fires predominate at 25- to 75-year intervals.

Twenty to 40 percent of the area in this group within reserves is dominated by native grasses and forbs with an overstory layer of shrubs. Five to 15 percent of the area within reserves is herbaceous-dominated. The remaining area within reserves is dominated by cheatgrass and noxious weeds, dense sagebrush canopy areas, and seedings. Forty to 60 percent of the area outside of reserves in the dry shrub potential vegetation group is dominated by shrub stages with a healthy understory layer in which native grasses and forbs are well represented. Five to 20 percent of the area is dominated by native grass and forb communities outside of reserves. The remaining area outside reserves is dominated by closed shrub communities with declining herbaceous layers, by annual grasses or by seedings of exotic grasses, and by other plants.

Cool Shrub Potential Vegetation Group

In this group, 60-80 percent of the fires are lethal within reserves, and 80-95 percent of the fires are lethal ouside reserves. These lethal fires cause overstory mortality in stages dominated by shrubs and conifers at 25- to 150-year intervals, with higher frequencies on more productive sites. Twenty to 40 percent of the fires within reserves, and 5-15 percent of fires outside reserves are nonlethal, occurring within herbaceous-dominated stages at intervals of less than 25 years.

Fifty to 70 percent of the area in this group is dominated by shrub stages with a healthy understory layer in which native grasses and forbs are well represented. Twenty to 40 percent of the area within reserves, and 10-30 percent of the area outside reserves contains mixtures of perennial grasses and forbs. Conifers are dominant on 5-10 percent of the area within reserves, and less than 30 percent of the land outside reserves.

Rangeland wildlife habitat. All major rangeland cover types are included in the reserve system, providing representation of habitat and areas large enough to support all native species. Reserves represent the same habitats in several locations, to ensure that if a large disturbance event occurs in one reserve, the effects are short term relative to the communities represented in all reserves. Human activities are at levels that allow species to maintain expected distribution and abundance for the habitats represented. Few roads are located within reserves. Because of these conditions, biodiversity, species viability, and continued recovery of federally listed threatened and endangered species is occurring within reserves.

Rangeland habitat attributes outside of reserves are meeting the needs of endemic species, but not to the same extent as within reserves. Vegetation conditions are not barriers to movement of species between reserves. Conditions outside of reserves do not cause reserves to become islands of habitat. Human activities are at levels that allow all species to maintain distribution and abundance, but densities may be reduced. Use of roads are regulated as needed to maintain habitat effectiveness for species persistence.

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SOCIAL AND ECONOMIC

Social and economic systems have adjusted to significant changes in the location, amounts and product mix of commodity and noncommodity outputs from Federal lands in different parts of the basin.

Human use and activities are very low within reserves but increase with distance away from reserve boundaries. Because short-term restoration actions within reserves have been completed by 50-100 years, economic benefits are no longer derived from reserve restoration activities.

In areas most affected by reserves, economic and social adjustments have completed a shift away from commodity outputs and toward deriving the economic and social benefits of protected biological resources.

In areas more distant from reserves and corridors, economic and social systems have adjusted to stable outputs of commodities.

AQUATIC — RIAPARIAN — WATERSHEDS

Within Reserves

Riparian areas within reserves are resilient, diverse, and functioning within their site potential. Many less resilient, more sensitive areas are recovering. Tall trees, moderate or large in diameter, are fairly frequent within riparian areas. Riparian areas are covered by protective vegetation and generally connected with their streams and upslopes. In rangeland reserves, riparian area soils are dominated by native, deep-rooted plants, and shrubs are especially common along stream banks. Wetlands are prevalent across the lower gradient valley bottoms.

Streams within reserves are generally productive, having a diversity and complexity of habitat. Stream cover and structure from inputs of large wood and bank vegetation are abundant. Substrates consist of a variety of particle sizes, which accommodate the spawning and rearing needs of all species. Large, deep, and complex pools are common.

Most soils within reserves have protective cover, adequate levels of soil organic matter, and coarse woody material that is well distributed in varying sizes and plant parts. Soils also have adequate physical properties for vegetation growth and hydrologic function. Physical, chemical, and biological processes of all soils function similarly to comparable soils which have not been harmfully disturbed.

There is little evidence of openings from old road corridors across the landscape within reserves, in riparian areas or elsewhere, and no evidence of new openings from road corridors.

Aquatic species habitat: within reserves. Restoration strategies have been implemented on nearly all high-risk sites within reserve areas. This allows recovery of watershed, riparian, water quality and aquatic conditions characteristic for that geoclimatic setting. Improved aquatic habitat conditions allow threatened or endangered aquatic species populations to stabilize and expand into previously occupied habitat. Native aquatic species population strongholds have increased basin-wide. Major river corridor conditions allow near full expression of aquatic life histories.

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Outside of reserves

Riparian areas outside of reserves are mostly resilient and becoming diverse. Tall trees are uncommon in riparian areas. Most non-reserve riparian areas are connected to their upslopes and streams.

In rangelands outside of reserves, riparian area soils are covered by a mixture of exotic and native vegetation. Wetlands are visible but infrequent in the lower gradient valley bottoms.

Streams are moderately productive and complex. Large, deep and complex pools are present in many streams.

Many soils have protective cover, adequate levels of soil organic matter and coarse woody material.

The following DRFC also applies in Alternative 7:

1) Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species populations and communities are uniquely adapted.

2) Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact strongholds. These connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3) Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4) Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the ecosystem, benefitting survival, growth, reproduction, and migration of individuals composing its aquatic and riparian communities.

5) Maintain and restore the sediment regime with which the aquatic system evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6) Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distributions of peak, high, and low flows must be protected.

7) Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8) Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of large wood sufficient to sustain physical complexity and stability.

9) Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

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Appendix II

Common and scientific names of species.

Common name	Scientific name
Flora:	
African rue	*Peganum harmala*
Alder	*Alnus hill*
Bitter brush	*Purshia tridentata* (Pursh) DC.
Blue-leaved penstemon	*Penstemon glaucinus*
Broad-fruit mariposa	*Calochortus nitidus*
Brome-grass	*Bromus* L.
Buck rush	*Ceanothus cuneatus* (Hook.) T. & G.
Canada thistle	*Cirsium arvense*
Cheatgrass	*Bromus tectorum* L.
Clustered lady's-slipper	*Cypripedium fasciculatum*
Common crupina	*Crupina vulgaris*
Crenulate grape-fern	*Botrychium crenulatum*
Crested wheatgrass	*Agropyron cristatum* (L.) Gaertn.
Cronquist's stickseed	*Hackelia cronquistii*
Dalmatian toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Douglas-fir	*Pseudotsuga menziesii* (Mirbel) Franco.
Dyers woad	*Isatis tinctoria*
Grand fir	*Abies grandis* (Dougl.) Forbes
Green-tinged paintbrush	*Castilleja chlorotica*
Halogeton	*Halogeton glomeratus*
Howellia	*Howellia aquatilis*
Howell's gumweed	*Grindelia howellii*
Huckleberries	*Vaccinium* L.
Iberian starthistle	*Centaurea iberica*
Idaho fescue	*Festuca idahoensis* Elmer
Juniper	*Juniperus* L.
Kentucky bluegrass	*Poa pratensis* L.
Knapweed	*Centaurea* L.
Leafy spurge	*Euphorbia esual* L.
Lemhi penstemon	*Penstemon lemhiensis*
Lodgepole pine	*Pinus contorta* Dougl.
Long-bearded mariposa-lily	*Calochortus longebarbatus* var. *longebarbatus*
Macfarlane's four-o'clock	*Mirabilis macfarlanei*
Malheur wire-lettuce	*Stephanomeria malheurensis*
Manzanita	*Arctostaphylos* Adans.
Matgrass	*Nardus stricta*
Mediterranean sage	*Salvia aethiopis*
Medusahead	*Taeniatherum caput-medusae*
Mountain hemlock	*Tsuga mertensiana* (Bong.) Carr.
Mt. Mazama collomia	*Collomia mazama*

Mulford's milk-vetch	*Astragalus mulfordiae*
Musk thistle	*Carduus nutans*
Orange hawkweed	*Hieracium aurantiacum*
Osgoodmountains milkvetch	*Astragalus yoder-williamsii*
Palouse goldenweed	*Haplopappus liatriformis*
Payson's milkvetch	*Astragalus paysonii*
Peck's mariposa-lily	*Calochortus longebarbatus* var. *Peckii*
Perennial pepperweed	*Lepidium latifolium*
Picabo milkvetch	*Astragalus oniciformis*
Ponderosa pine	*Pinus ponderosa* Dougl.
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Pygmy monkeyflower	*Mimulus pygmaeus*
Rush skeletonweed	*Chondrilla juncea*
Russian knapweed	*Centaurea repens*
Sagebrush	*Artemisia* L.
Saltcedar	*Tamarix ramosissima*
Scotch thistle	*Onopordum acanthium*
Spalding's campion	*Silene spaldingii*
Spiny cocklebur	*Xanthium spinosum*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea virgata*
St. Johnswort	*Hypericum perforatum*
Subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.
Suksdorf's lomatium	*Lomatium suksdorfii*
Sulfur cinquefoil	*Potentilla recta*
Syrian bean-caper	*Zygophyllum fabago*
Tansy ragwort	*Senecio jacobaea*
Thompson's clover	*Trifolium thompsonii*
Twin-spike moonwort	*Botrychium paradoxum*
Upward-lobed moonwort	*Botrychium ascendens*
Washington monkeyflower	*Mimulus washingtonensis* var. *Washingtonensis*
Washington polemonium	*Polemonium pectinatum*
Weak milk-vetch	*Astragalus solitarius*
Western hemlock	*Tsuga heterophylla* (Raf.) Sarg.
Western juniper	*Juniperous occidentalis* Hook.
Western redcedar	*Thuja plicata* Donn.
Western white pine	*Pinus monticola* Dougl.
Wheat	*Triticum aestivum* L.
White bark pine	*Pinus albicaulis* Engelm.
White fir	*Abies concolor* (Gord. & Glend.) Lindl.
Whitetop	*Cardaria* spp.
Willow	*Salix* L.
Yellow hawkweed	*Hieracium pratense*
Yellow starthistle	*Centaurea solstitialis*
Annual, Biennial Forb:	
	Alyssum desertorum
	Amisimkia intermedia

	Blepharipappus scaber *Clarkia pulchella* *Coldenia grandiflora* *Collinsia parviflora* *Collomia grandiflora* *Cordylanthus ramosus* *Cryptantha affinis* *Cryptantha ambigua* *Descurainia pinnata* *Descurainia richardsonii* *Draba verna* *Epilobium minutum* *Epilobium paniculatum* *Eriogonum vimineum* *Erodium cicutarium* *Euphorbia* spp. *Galium bifolium* *Gayophytum humile* *Gapophytum nuttallii* *Hemizonia pungens* *Holosteum umbellatum* *Lactuca ludoviciana* *Lagophylla ramosissima* *Layia galndulosa* *Lepidium perfoliatum* *Linanthus harknessi* *Lupinus microcarpus* *Madia gracilis* *Madia sativa* *Microsteris gracilis* *Mimulus breweri* *Montia perfoliata* *Navarretia* sp. *Orthocarpus tenuifolius* *Phacelia linearis* *Plectritis macrocera* *Polemonium micranthum* *Polygonum majus* *Ranunculus testiculatus* *Ranunculus occidentalis* *Sanguisorba minor* *Sisymbrium altissimum* *Taraxacum ceratophorum* *Tragopogon dubius* *Verbascum thapsus*
Annual Grass:	*Agrostis interrupta* *Bromus brizaeformis* *Bromus japonicus*

	Bromus mollis *Bromus tectorum* *Festuca bromoides* *Festuca microstachys* *Festuca octoflora* *Taeniatherum asperum*
Perennial Forb:	
	Achillea millefolium *Agoseris glauca* *Agoseris grandiflora* *Allium acuminatum* *Allium douglasii* *Antennaria rosea* *Antennaria dimorpha* *Arabis hoboelii* *Arabis puberula* *Arabis sparsiflora* *Aster campestris* *Astragalus beckwithii* *Astragalus curvicarpus* *Astragalus filipes* *Astragalus lentiginosus* *Astragalus prushii* *Astragalus reventus* *Astragalus stenophyllus* *Balsamorhiza careyana* *Balsamorhiza sagittata* *Calochortus macrocarpus* *Castilleja applegatei* *Castilleja chromosa* *Chaenactis douglasii* *Cheilanthes gracillima* *Crepis acuminata* *Crepis intermedia* *Erigeron bloomeri* *Erigeron elegantulus* *Erigeron filifolius* *Erigeron linearis* *Erigeron poliospermus* *Erigeron pumilus* *Eriogonum heracleoides* *Eriogonum microthecum* *Eriogonum niveum* *Eriogonum ovalifolium* *Eriogonum sphaerocephalum* *Eriogonum strictum* *Eriogonum thymoides* *Eriogonum umbellatum* *Eriophyllum lanatum*

	Fritillaria pudica *Geum campanulatum* *Hydrophyllum capitatum* *Leptodactylon pungens* *Linum perenne* *Lithophragma bulbifera* *Lomatium canbyi* *Lomatium cous* *Lomatium macrocarpum* *Lomatium triternatum* *Lupinus caudatus* *Lupinus laxiflorus* *Lupinus lepidus* *Mertensia longiflora* *Microseris nutans* *Microseris troximoides* *Orobanche uniflora* *Penstemon humilis* *Penstemon gracilis* *Penstemon laetus* *Penstemon richardsoni* *Penstemon speciosus* *Petalostemon ornatum* *Phacelia hastata* *Phlox douglasii* *Phlox hoodii* *Phlox longifolia* *Potentilla glandulosa var. intermidia* *Ranunculus occidentalis* *Senecio canus* *Senecio integerrimus* *Sisyrinchium douglasi* *Sisyrinchium idahoense* *Stellaria americana* *Stellaria nitens* *Trifolium dubium* *Trifolium macrocephalum* *Trifolium microcephalum* *Zygadenus paniculatus*
Perennial Grass:	*Agropyron saxocpla* *Agropyron smithii* *Agropyron spicatum* *Bromus carinatus* *Danthonia unispicata* *Elymus cinereus* *Keoleria cristata* *Oryzopsis humenoides* *Poa ampla*

	Poa bulbosa
	Poa compressa
	Poa cusickii
	Poa pratensis
	Poa sandbergii
	Sitanion hystrix
	Stipa columbiana
	Stipa comata
	Stipa occidentalis
	Stipa thurberiana
Sedge:	
	Carex rossii
	Carex geyeri
	Kobresia simpliciuscula
Shrub:	
	Artemisia arbuscula
	Atremisia tridentata spp. *tridentata*
	Atremisia tridentata ssp. *wyomingensis*
	Artemisia tridentata ssp. *vaseyana*
	Artemisia rigida
	Cercocarpus ledifolius
	Chrysothamnus nauseosus
	Chrysothamnus viscidiflorus
	Grayia spinosa
	Holodiscus dumosus
	Purshia tridentata
	Ribes cereum
	Symphoricarpos oreophilus
	Tetradymia canescens
	Tetradymia glabrata
Lichen:	*Texosporium sancti-jacobi*
Invertebrates:	
Arachnida, Pseudoscorpionida	
Gastropoda	*Apochtonius malheuri*
	Acroloxus coloradensis
	Cryptomastix magnidentata
	Discus marmorensis
	Megomphix lutarius
	Monadenia felis minior
	Oreohelix idahoensis idahoensis
	Oreohelix jugalis
	Oreohelix nevadensis
	Oreohelix strigosa delicata
	Oreohelix strigosa honiogyra
	Oreohelix vortex
	Oreohelix waltoni

Insecta, Coleopatera	*Agonum belleri*
	Cicindela arenicola
	Glacicavicola bathyscoides
	Nebria gebleri fragariae
	Nebria vandykei wyeast
Insecta, Lepidoptera	*Charidryas acastus dorothyea*
	Euphilotes rita mattonii
	Limenitis archippus lahontani
	Polites sabuleti sinemaculata
	Polites mardon
Insecta, Orthopera	*Acrolophitus pulchellus*
Mollusks:	
Banbury Springs lanx	*Lanx* n. sp. 1
Snake River physa	*Physa natricina*
Idaho springsnail	*Pyrgulopsis idahoensis*
Bliss Rapids springsnail	*Taylorconcha serpenticola*
Desert valvata	*Valvata utahensis*
Vertebrates:	
Fish:	
Bass	*Micropterus* spp.
Bull trout	*Salvelinus confluentus*
Brook trout	*Salvelinus fontinalis*
Chinook salmon	*Oncorhynchus tshawytscha*
Goose Lake sucker	*Catostomus occidentalis lacusanserinus*
Klamath largescale sucker	*Catostomus snyderi*
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*
Leatherside chub	*Gila copei*
Lost River sucker	*Deltistes luxatus*
Malheur sculpin	*Cottus bairdi* ssp.
Margined sculpin	*Cottus marginatus*
Oregon Lakes tui chub	*Gila bicolor oregonensis*
Pacific lamprey	*Lampetra tridentata*
Pit-Klamath Brook lamprey	*Lampetra lethophaga*
Pygmy whitefish	*Prosopium coulteri*
Rainbow trout	*Oncorhynchus mykiss*
Redband trout	*Oncorhynchus mykiss* ssp.
Shorthead sculpin	*Cottus confusus*
Shortnose sucker	*Chasmistes brevirostris*
Slender sculpin	*Cottus tenuis*
Sockeye salmon	*Oncorhynchus nerka*
Steelhead	*Oncorhynchus mykiss mykiss*
Torrent sculpin	*Cottus rhotheus*
Walleye	*Stizostedion vitreum vitreum*
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*

Wood River Bridgelip sucker	*Catostomus columbianus hubbsi*
Wood River sculpin	*Cottus leiopomus*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Birds:	
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bald eagle	*Haliaeetus leucocephalus*
Band-tailed pigeon	*Columba fasciata*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Barred owl	*Strix varia*
Black-backed woodpecker	*Picoides arcticus*
Black-billed magpie	*Pica pica*
Black-capped rosy finch	*Leucosticte arctoa*
Black-chinned hummingbird	*Archilochus alexandri*
Black-throated gray warbler	*Dendroica nigrescens*
Blue grouse	*Dendragapus obscurus*
Bobolink	*Dolichonyx oryzivorus*
Bohemian Waxwing	*Bombycilla garrulus*
Boreal owl	*Aegolius funereus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-tailed hummingbird	*Selasphorus platycercus*
Burrowing owl	*Athene cunicularia*
Bushtit	*Psaltriparus minimus*
Canyon Wren	*Catherpes mexicanus*
Cedar Waxwing	*Bombycilla cedrorum*
Chestnut-backed chickadee	*Parus rufescens*
Chipping sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cliff swallow	*Hirundo pyrrhonota*
Columbia sharp-tailed grouse	*Tympanuchus phasianellus columbianus*
Common loon	*Gavia immer*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Common raven	*Corvus corax*
Common snipe	*Gallinago gallinago*
Cooper's hawk	*Accipiter cooperii*
Downy woodpecker	*Picoides pubescens*
Dusky flycatcher	*Empidonax oberholseri*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Flammulated ow	*lOtus flammeolus*
Golden eagle	*Aquila chrysaetos*
Grasshopper sparrow	*Ammodramus savannarum*
Gray flycatcher	*Empidonax wrightii*

Gray partridge	*Perdix perdix*
Great horned owl	*Bubo virginianus*
Greater sandhill crane	*Grus canadensis tabida*
Great gray owl	*Strix nebulosa*
Green-tailed towhee	*Pipilo chlorurus*
Hammond's flycatcher	*Empidonax hammondii*
Harlequin duck	*Histrionicus histrionicus*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Lazuli bunting	*Passerina amoena*
Lewis' woodpecker	*Melanerpes lewis*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-eared owl	*Asio otus*
Merlin	*Falco columbarius*
Mountain bluebird	*Sialia currucoides*
Mountain chickadee	*Parus gambeli*
Mountain quail	*Oreortyx pictus*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipiter gentilis*
Northern pygmy-owl	*Glaucidium gnoma*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shrike	*Lanius execubitor*
Northern spotted owl	*Strix occidentalis caurina*
Olive-sided flycatcher	*Contopus borealis*
Pileated woodpecker	*Dryocopus pileatus*
Pine siskin	*Carduelis pinus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Prairie Falcon	*Falco mexicanus*
Pygmy nuthatch	*Sitta pygmaea*
Red-eyed vireo	*Vireo olivaceus*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock wren	*Salpinctes obsoletus*
Rough-legged hawk	*Buteo lagopus*
Rufous hummingbird	*Selasphorus rufus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sage grouse	*Centrocercus urophasianus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Sharp-shinned hawk	*Accipiter striatus*
Short-eared owl	*Asio flammeus*
Southern red-backed vole	*Clethrionomys gapperi*
Spotted sandpiper	*Actitis macularia*

Steller's Jay	*Cyanocitta stelleri*
Swainson's hawk	*Buteo swainsoni*
Three-toed woodpecker	*Picoides tridactylus*
Townsend's solitaire	*Madestes townsendi*
Townsend's Warbler	*Dendroica townsendi*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Upland sandpiper	*Bartramia longicauda*
Vaux's swift	*Chaetura vauxi*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Western bluebird	*Sialia mexicana*
Western meadowlark	*Sturnella neglecta*
Western red-backed vole	*Clethrionomys californicus*
Western screech owl	*Otus kennicottii*
Western snowy plover	*Charadrius alexandrinus nivosus*
Western tanager	*Piranga ludoviciana*
White-breasted nuthatch	*Sitta carolinensis*
White-headed woodpecker	*Picoides albolarvatus*
White-winged crossbill	*Loxia leucoptera*
Wild turkey	*Meleagris gallopavo*
Willet	*Catoptrophorus semipalmatus*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Willow flycatcher	*Empidonax traillii*
Wilson's warbler	*Wilsonia pusilla*
Winter wren	*Troglodytes troglodytes*
Wood duck	*Aix sponsa*
Woodpecker	*Picoides* spp.
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-breasted chat	*Icteria virens*
Yellow-rumped Warbler	*Dendroica coronata*
Yellow warbler	*Dendroica petechia*

Mammals:

American badger	*Taxidea taxus*
American marten	*Martes americana*
Black bear	*Ursus americanus*
Black-tailed jackrabbit	*Lepus californicus*
Bobcat	*Lynx rufus*
Bushy-tailed woodrat	*Neotoma cinerea*
California bighorn sheep	*Ovis canadensis californiana*
Chipmunk	*Tamias* spp.
Common porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Domestic horse (Feral)	*Equus caballus*
Elk	*Cervus elaphus*

Fisher	*Martes pennanti*
Fringed myotis	*Myotis thysanodes*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Gray wolf	*Canis lupus*
Great basin pocket mouse	*Perognathus parvus*
Grizzly bear	*Ursus arctos*
Hoary bat	*Lasiurus cinereus*
Least chipmunk	*Tamias minimus*
Little brown myotis	*Myotis lucifugus*
Long-eared myotis	*Myotis evotis*
Long-legged myotis	*Myotis volans*
Long-tailed weasel	*Mustela frenata*
Lynx	*Lynx lynx*
Moose	*Alces alces*
Mountain lion	*Felis concolor*
Mountain (or bighorn) sheep	*Ovis canadensis*
Mule or black-tailed deer	*Odocoileus hemionus*
Northern flying squirrel	*Glaucomys sabrinus*
Northern grasshopper mouse	*Onychomys leucogaster*
Ord's kangaroo rat	*Dipodomys ordii*
Pale western big-eared bat	*Plecotus townsendii pallescens*
Pallid bat	*Antrozous pallidus*
Pinon mouse	*Peromyscus truei*
Pronghorn antelope	*Antilocapra americana*
Pygmy rabbit	*Brachylagus idahoensis*
Rocky Mountain elk	*Cervus elaphus nelsonii*
Rocky Mountain gray wolf	*Canis lupis irremotus*
Silver-haired bat	*Lasionycteris noctivagans*
Spotted bat	*Euderma maculatum*
Squirrel	*Ammospermophilus* spp.
Townsend's big-eared bat	*Plecotus townsendii*
Townsend's ground squirrel	*Spermophilus townsendii*
Washington ground squirrel	*Spermophilus washingtoni*
Western small-footed myotis	*Myotis ciliolabrum*
White tail deer	*Odocoileus virginianus*
White-tailed jack rabbit	*Lepus townsendii*
Wolverine	*Gulo gulo*
Woodland caribou	*Rangifer tarandus caribou*
Yellow-pine chipmunk	*Tamias amoenus*
Yuma Myotis	*Myotis yumanensis*

Amphibians and Reptiles:

Coeur d'Alene salamander	*Plethodon idahoensis*
Common garter snake	*Thamnophis sirtalis*
Desert horned lizard	*Phrynosoma platyrhinos*
Gopher snake	*Pituophis melanoleucus*
Longnose leopard lizard	*Gambelia wislizenii*
Long-toed salamander	*Ambystoma macrodactylum*

Mojave black-collared lizard	*Crotaphytus bicinctores*
Night snake	*Hypsiglena torquata*
Northern leopard frog	*Rana pipiens*
Pacific treefrog	*Pseudacris regilla*
Painted turtle	*Chrysemys picta*
Racer	*Coluber constrictor*
Rubber boa	*Charina bottae*
Sagebrush lizard	*Sceloporus graciosus*
Sharp-tailed snake	*Contia tenuis*
Short-horned lizard	*Phrynosoma douglassii*
Side-blotched lizard	*Uta stansburiana*
Southern alligator lizard	*Elgaria multicarinatas*
Spotted frog species A	*Rana pretiosa* sp. A
Spotted frog species B	*Rana pretiosa* sp. B
Striped whipsnake	*Masticophis taeniatus*
Tailed frog	*Ascaphus truei*
Western fence lizard	*Sceloporus occidentalis*
Western pond turtle	*Clemmys marmorata*
Western rattlesnake	*Crotalus viridis*
Western skink	*Eumeces skiltonianus*
Western toad	*Bufo boreas*
Woodhouse's toad	*Bufo woodhousii*

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The Evaluation of EIS Alternatives by the Science Integration Team describes the outcomes, interactions, effects, and consequences likely to result from implementing seven different management strategies on Forest Service (FS) and Bureau of Land Management (BLM) administered lands within the Interior Columbia Basin and portions of the Klamath and Great Basins. Two environmental impact statement teams developed seven alternative approaches to the management of forest, rangeland, aquatic, and watershed systems of FS- and BLM- administered lands. The alternatives varied from continuation of current management, to managing biodiversity within a network of large reserves, to actively managing to restore ecosystem health and integrity. Continuing with current management direction, in the absence of interim protection measures, results in continued declining trends in ecological integrity and increasing risk to species. No single alternative was found to result in improved outcomes for all species, reduced risk to ecological integrity, and improved resiliency for social and economic systems. Alternatives that prioritize activities to restore and/or maintain ecological integrity and simultaneously provide desired goods and services within the capability of the ecosystem appear to have favorable trends in most species outcomes, landscape functions, and resiliency in social and economic systems. The Draft and Final Environmental Impact Statements are expected to differ to some extent from the preliminary Draft Environmental Impact Statement analyzed for this evaluation.

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