



ECO-Report

Summer, 1996

A progress report from a partnership in landscape level ecosystem management

Halfway Home

This spring, the Bitterroot Ecosystem Management Research Project marked the midpoint of its planned five years. A progress report released this January indicates scientists, managers, and the public are working together to achieve the goals of the project. These goals have not changed since the inception of the project in 1993:

The goals of BEMRP are to predict landscape level influences of vegetation management on multiple resource outputs and values in an altered Rocky Mountain ecosystem, and to demonstrate to the public the feasibility of landscape-level rehabilitation management....

[excerpted from Bitterroot Ecosystem Management Research Project Progress Report for October 1, 1994 - January 31, 1996. Copies available on request.]

What do the partners in this project - the Intermountain Research Station, the Bitterroot National Forest, the University of Montana, and the public - view as landmark accomplishments during the project's first years? Information has been obtained about Bitterroot ecosystems and the social setting in the Bitterroot Valley, and methods have been developed for managing information and using it to understand changes. Managers and scientists have collaborated with the community to plan for the Stevensville West Central area.

How are the accomplishments of the Bitterroot Ecosystem Management/Research Project unique? Dave Silviesu, zone interdisciplinary team leader for the Stevensville West Central planning area, comments that models developed through the project enable managers to display the effects of proposed management, especially the no-action alternative, in ways that were not previously possible. Dave Lockman, wildlife and fish biologist, points out that managers often assume that



Fauna Research Team leader L. Jack Lyon (second from right) and Stevensville District Ranger Leslie Weldon (right) describe project for Deputy Chief of National Forest Systems Gray Reynolds (left) and Assistant Director for Northern Region Ecosystem Assessment and Planning Steve Solem (second from left).

increased structural diversity benefits wildlife, but this project has enabled them to ask researchers to address that assumption.

The Bitterroot Ecosystem Management/Research Project was featured as part of a national review of the USFS Northern Region this April. During presentations at the Bear-Fred Burr demonstration site, Regional Forester Hal Salwasser called partnerships between managers and scientists "critically important" to ecosystem management. Deputy Chief Gray Reynolds encouraged researchers to maintain their objectivity as they provide guidance to managers.

Visit Ecosystem Management Demonstration Sites!



Peg Hampton, Hamilton resident, counts fire scars during public field trip to Lick Creek last July. Photo by Madelyn Kempf.

The Bitterroot Ecosystem Management/Research Project will host a field trip for the public on Thursday afternoon and evening, July 11. Join managers and scientists for a visit to ponderosa pine forests above Bass Creek and to the Larry Creek demonstration site.

Larry Creek is a riparian area with aspen and scattered large, old ponderosa pine. Thickets of grand fir and Douglas-fir are being removed from a small area to create

openings that favor aspen, herbs, and ponderosa pine. The Larry Creek demonstration site is scheduled for prescribed burning in the next year.

The tour will leave the Forest Service Stevensville District Office at 4:00 p.m. on July 11. Ecologists and managers will accompany visitors to the field sites. A wildlife biologist and an ornithologist will describe habitat needs of small mammals and nesting birds.

Reservations are required. For more information or to make a reservation, please call the Stevensville District, 406-777-5461.

Inside

- "The hard work": workshop results
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- The "Spotlight"—researchers at work
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Integration: The Ultimate Challenge for Ecosystem-Based Planning

by Clinton E. Carlson, Project Leader

Conducting ecosystem-based management requires a clear vision of what human beings need and desire from forest ecosystems now and in the future. It also requires a clear vision of how ecosystems work over long periods of time. Since human needs and desires will change over time, it is imperative that ecosystems be managed for resilience, to be able to accommodate changes. These tasks require integration of knowledge from many disciplines, over a variety of spatial and time scales; they present no small challenge for ecosystem-based planning!

Recognition of relationships among resources at varying spatial scales is essential to integration. Two modeling tools - SIMPPLLE and MAGIS - have captured many of the relationships conceptualized since the beginning of the Bitterroot Ecosystem Management/Research Project in 1993. Models, however, are only tools for depicting human thought; they cannot possibly integrate what is known about ecosystem process, structure and function, resource values, and human needs and desires. Ultimately ques-

tions concerning management must be resolved collaboratively by people willing to do the hard work of integrating concepts, evaluating model results, and weighing the interplay among resource values.

A concerted effort was launched at the project's second workshop, held in January of 1996, to do the hard work of integration. At the end of the workshop discussions, participants presented complex and thought-provoking responses, some of which are summarized here in ECO-Report. Participants recognized the complexity and impor-

tance of cross-disciplinary integration. Responses indicate that a single study cannot investigate all the linkages among all resource values in an ecosystem. The idea of a so-called "coarse filter approach" (certainly not new with this project) emerged as one way to deal with ecosystem complexity. Managing for a variety of stand sizes, ages, and structures over large landscapes may give reasonable assurance that the habitat needs of the diverse flora and fauna will be met.

Responses to the workshop questions will be applied throughout the remainder of the Bitterroot Ecosystem Management/Research Project, and collaborative integration will continue. It is an adaptive process that requires willingness to learn and flexibility in thought and position. Most important, the integration process causes the diverse specialists to consider their work in the context of a broad, ecosystem picture. Only from this process can a clear vision of sustainable forest ecosystems emerge - ecosystems managed for all inhabitants and all users, and managed for the future.



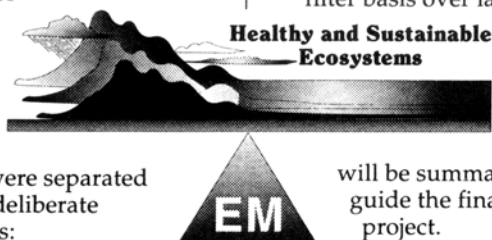
Lunch time on the Bitterroot, discussing ecosystem-based management

January Workshop Records Milestones

The second workshop for the Bitterroot Ecosystem Management/Research Project was held January 24-25, 1996 in Missoula. The workshop represented an opportunity to share results and discuss implications for landscape ecology. The theme of this workshop was "Integrating among disciplines and scales of analysis".

The first day was devoted to presentation of results of research and special projects. These reports furnished the technical context needed for the second day, in which participants were separated into workgroups to deliberate three major questions:

1. How do we assure ecological diversity at the scale represented by Stevensville West Central?
2. What are acceptable management strategies to move toward restoring desired ecological patterns on Stevensville West Central?
3. How can we best characterize coarse woody debris and snags on a coarse-filter basis over landscapes?



Discussion, answers, and inferences generated by the workshop groups will be summarized and used to guide the final two years of the project.

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Editor: Jane Kapler Smith
Associate Editor: Janet Sullivan

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"The Hard Work" of Integration

by J. Sullivan

Responses to the questions discussed by workshop participants.

For a complete copy of workgroup results, contact ECO-Report editor.

1. How do we assure ecological diversity at the scale represented by Stevensville West Central?

The workgroup defined ecological diversity as the variety, richness, and viability of life forms - the BIOTA - and the processes which occur in a specific location. Participants determined that goals for ecological diversity include (1) maintaining the variety of native and desired non-native life forms and (2) maintaining or approximating natural processes at levels consistent with ranges that probably occurred during the past 1,000 to 2,000 years.

The Bitterroot Ecosystem Management/Research Project has improved the exchange and evaluation of ideas among groups involved in forest management and has initiated research that addresses diversity (for example, studying genetic diversity of whitebark and ponderosa pines). The project needs to further address the relationship of the Stevensville West Central planning area to larger-scale and smaller-scale perspectives and to consider the temporal scale of change. Methods for measuring ecological diversity need to be assessed. Several approaches were discussed, including both fine scale and large scale (coarse filter) inventory of species. Suggestions included developing partnerships with private landowners for treatment (where necessary) of low elevation ponderosa pine types and modifying Forest Plan standards that are not compatible with ecosystem management.

The workgroup recommended further sharing of technical information on diversity, including workshops, field trips, Internet, publications, and Ecosystem Management learning centers.

2. What are acceptable management strategies to move toward restoring desired ecological patterns on Stevensville West Central?

The Bitterroot Ecosystem Management/Research Project has demonstrated alternative ecological treatments (Lick Creek), developed state-of-the-art analysis techniques and models, improved public awareness and participation in forest planning, and facilitated interchange of information among management groups.

Successful ecosystem-based management requires monitoring and incorporation of results ("adaptive management") and streamlining of computer analyses. Groups representing other jurisdictions must be included, and critical species must be further considered. Suggested strategies for management include risk analysis (especially regarding wildfire and prescribed fire), prioritizing critical locations, and research on markets for new, different uses of small timber.

Suggested means for sharing technical knowledge include curricular materials for educators and interpreters and continued outreach through meetings, field trips, and the media. Information generated by this project needs to be packaged so that it is applicable to other ecosystem management projects.



Riparian site depicts structural diversity, which was discussed in the first workshop question. Photo courtesy of Josh Tewksbury.

3. How do we best characterize coarse woody debris and snags on a coarse-filter basis over landscapes?

Snags and coarse woody debris (downed trees and large branches) are important for fish, wildlife, stream stabilization, and other purposes. Landscape-level policy is implemented at the stand level, so that is the level that this group considered.

The Bitterroot Ecosystem Management/Research Project has characterized vegetation in streamside management zones. Relationships to pileated woodpecker, pine marten habitat and site classification have been studied. Data and available literature have been compiled. For most functions of coarse woody debris, bigger is better; therefore, the workgroup recommended that as many large snags and large logs be left in a stand as possible.

The workgroup recommended that the Bitterroot National Forest continue its "good work" with the public. The research project needs to address ways to assess coarse woody debris at varying scales, and to improve and assess classifications for stand composition and structure. Vegetation and fauna groups should meet to determine the treatments that will improve snag recruitment and provide adequate woody debris.



Coarse woody debris is important for maintaining soil quality and wildlife habitat. The third workshop question addressed this issue. Photo courtesy of M. Harrington.

Wildlife Research - at Full "Roar"

by L. Jack Lyon

A landmark in fauna research this past winter was the initiation of attempts to link information on wildlife to landscape scales. On one end of the spectrum is the tiny scale of small mammal home range habitats, and on the other end is the vast geographic scale of territories occupied by mountain lions and wolverines.

Small animals, both vertebrates and invertebrates, are receiving considerable attention. Studies of small mammals and breeding birds are described on page 5. The distribution of aquatic insects in five Bitterroot mountain streams is being studied by Andrew Sheldon of the University of Montana. He reports a diverse insect fauna (40 to 50 stonefly species), and a relationship between elevation and the timing of life cycle events. Techniques used in this study may help managers evaluate the condition of small water-

sheds. Vita Wright has continued to study flammulated owls, the pint-sized raptor that feeds on moths and other insects in stands of large, old ponderosa pine. Vita has expanded her analysis of habitat selection from the stand scale to the scale of large landscapes. She hopes to learn ways in which landscape scale is important in the distributional limits of the owl.

As part of the project's consideration of large animals, Bill Koncerak has completed data collection on elk winter range; his study has implications for large landscapes in the Bitterroot Valley. Underburning of ponderosa pine savanna and removal of young Douglas-fir, for example, could have two simultaneous effects on elk habitat: improvement of forage conditions on the winter ranges, and loss of hiding cover.

Two fauna research projects

address landscape scales larger than individual watersheds. Kerry Foresman, University of Montana, has completed an initial test of survey methods for detecting four uncommon forest carnivores (see report below). At a scale vastly larger than originally envisioned for this project, Shawn J. Riley, Ph.D. candidate at Cornell University, has included the Bitterroot Valley as part of an analysis of interactions among humans, mountain lions, prey, and habitat. Recent increases in mountain lion-human interactions have created dilemmas for people living and working in the Bitterroot Valley, as well as for agencies who need to manage mountain lions. Using integrated ecosystem analysis and geographic information systems, Shawn will develop a landscape model using Montana data and complete predictive tests on Colorado landscapes.

The Search for Elusive Forest Carnivores

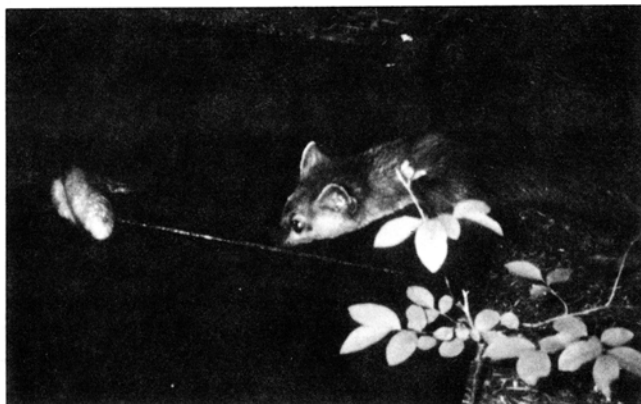
Kerry Foresman and Dean Pearson have evaluated detection methods that can be used to determine presence or absence of wildlife species, and possibly to monitor populations of American marten, fisher, wolverine, and lynx. They studied three detection methods: remote sensing cameras, tracking plates, and snow tracking. Key to the study was an estimate of how much effort is required, using each method, to be "assured" that the species of interest would be detected if

indeed it were present.

How can effort and effectiveness be measured? An example: Even when marten appeared to be relatively abundant in an area, the average time it took before photographic evidence was obtained from remote-sensing cameras (defined as the "latency to detection," or

LTD), was nearly 14 days. Thus we have evidence that, if this method is used for less than 2 weeks in an area with martens present, the odds of detecting a marten are not very good. Surprisingly, the LTD for wolverine was similar to that for marten - 13 days, though in 3 of 4 drainages studied no wolverine were detected even after 30 days or longer. Researchers in Idaho have a mean LTD for wolverine of 45 days, with many individuals not being observed for the first time until well over 100 days!

Tracking plates provided many excellent track images. LTD's for marten averaged 2 to 4 days. The latency to detection for fisher averaged 4 to 6 days. Detection occurred more



American marten crossing a track plate, "caught" by remote camera. Photo by Kerry Foresman and Dean Pearson.



A fisher visited this track plate on Bear Creek between April 30 and May 2, 1995. Print courtesy of Kerry Foresman.

quickly using this method than with remote sensing cameras, but plate tracking is difficult to use when it is rainy or snowy. Successful snow tracking surveys were "hit-or-miss" because of variable weather conditions. Kerry and Dean comment, "Use when nothing else is available and you want an excuse to get out of the office."

According to the researchers, this study proves that Montana winters are hard on cameras, batteries, equipment, supplies, and people. Considerable evidence was obtained to support the old adage, "If you don't like the weather at the moment just wait 5 minutes."

Cowbirds Hogging Nest Time

by J. Tewksbury, S. Hejl, and T. Martin

In the western United States, riparian areas make up less than 1 percent of the landscape, yet between 60 and 80 percent of birds breed primarily in riparian areas. The steady increase in agricultural and urban development surrounding riparian areas may decrease riparian habitat quality and cause declines in bird populations.

We are hoping to learn what factors are most important to populations of riparian birds. We have located sixteen study sites in two habitats: valley

bottom riparian areas largely surrounded by agricultural and urban areas, and foothill riparian areas surrounded by coniferous forest. We are monitoring nests, banding individuals, and analyzing habitat. There were large differences in bird communities between habitat types. Eighteen percent of species were more abundant in foothills sites and 38 percent were more abundant in valley bottom sites. Our nesting data confirms that Brown-headed Cowbirds are parasitizing nests of many species. The highest rates of nest parasitism were on Warbling Vireos and Yellow Warblers. Although parasitism on Yellow Warblers is high, 95 percent of Yellow Warblers renested after nest failure; thus they decreased the effect of parasitism. In contrast, only 20 to 40 percent of parasitized Redstarts renested after nest failure.

American Redstarts and Swainson's



Yellow Warbler nesting. Photo by Mike Hopiak, courtesy of Cornell Laboratory of Ornithology.

Thrush in foothills habitats have critically low nesting success. Warbling Vireos in foothills habitats and Song Sparrows in valley bottoms also have low nesting success. The effect of parasitism is species specific, but preliminary data suggest that riparian sites within a few kilometers of agriculture may have high parasitism pressure.



Riparian stands like this aspen grove provide nest sites for neotropical songbirds. Photo courtesy of Josh Tewksbury.

Small Mammals Point Up Importance of Coarse Woody Debris

by L. Jack Lyon

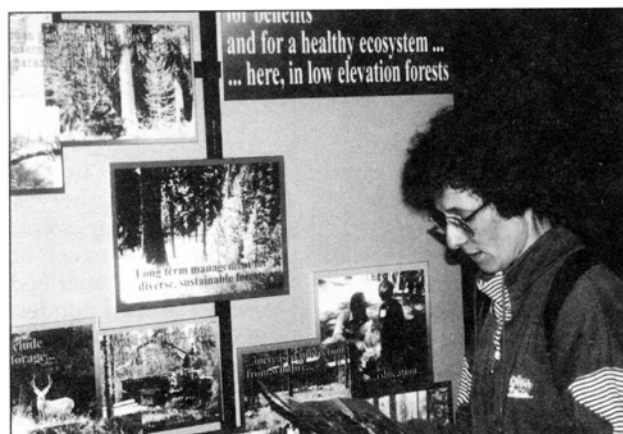
Dean Pearson has completed a review of the literature on small mammals in the Bitterroot Valley. His report discusses ecological importance, habitat associations, and probable response to disturbance for 42 species of small mammals. Fifteen species considered rare or sensitive (11 bats, three shrews, and one bog lemming) are either present on the Bitterroot National Forest or suspected to be present, based on

habitat and presence in nearby areas.

Coarse woody debris, particularly fallen logs, is a key part of stand structure for many species of small mammals. Good habitat includes moderate volumes of coarse woody debris in moist forest stands and somewhat lighter volumes in dry forests. Dean is currently preparing his manuscript for publication as a Forest Service General Technical Report.

Display Ready to Travel

A portable display describing the Bitterroot Ecosystem Management/Research Project made its debut at the Montana Academy of Sciences meeting, University of Montana, April 18. The display illustrates potential benefits from ecosystem-based management, particularly in forests formerly dominated by ponderosa pine. If you would like to borrow the display or suggestion locations for showing it, please contact the ECO-Report editor.



New Human Dimensions chair Jane Kapler Smith checks out project display at Montana Academy of Sciences meeting.

Four-legged and Four-wheeled Lumberjacks

by Jane Kapler Smith

The most sophisticated piece of equipment for some loggers in the Bitterroots is a good harness; for others, it's a winch. Horse logging and 4-wheel-drive farm tractors can be very useful in projects that require removal of understory trees. Both techniques are being evaluated in the Bear-Fred Burr study (see story below).

Jim Lotan, a horse logger from Stevensville, bought the small horse logging sale at Bear-Fred Burr and has worked with two other horse loggers to complete it. "Ned" is an 1,800-pound draft horse working for Pat Marsh on the sale. Ned wears size 5 horseshoes on his front feet - draft size - and size 4 on the back. Draft horses can usually pull at least as much as their weight in a load, points out Chris McCabe, who operates a team. I watched Pat speak quietly to Ned, angling a log between two trees. They left a narrow dirt trail behind - and no scrapes on the trees that they skirted. Does Ned like his work? I asked Pat. "NOW he likes it," Pat replied. "Last winter wasn't fun." The freeze-and-thaw weather produced extremely slippery conditions. A tongue was used to prevent logs from sliding downhill into the horses. Cleats attached to the horseshoes helped prevent slipping but sometimes scraped the horses' ankles severely.

Matt Arno's 85-horsepower farm tractor is less picturesque than Ned but works with a similarly delicate touch in the woods. The tractor is modified for



safety in negotiating steep slopes. It operates with a special harvesting winch that brings logs to the tractor from up to 175 feet away, then lifts them off the ground for skidding; this technique reduces soil disturbance. Farm tractors, says Matt, are very maneuverable in dense stands and thus can move small timber efficiently.

Timber sales for ecosystem-based management remove very few large trees. What products come from the timber removed by horse and farm tractor loggers? I asked Joe Scott. Joe is a farm-tractor logger who has used low-impact harvesting to reduce wildfire hazard in the suburban/wildland interface. "All kinds," he answered. In the past year, Joe has sold loads for studs and pulp, "peeler logs" for plywood, and green firewood. Trained as a forester, Joe likes logging with the ecosystem in mind. "Good silviculture comes first," he says; "logging comes only after that."

Logging on ecosystem management sites. At left, Jim Lotan and team skid out a Douglas-fir log. At right, Matt Arno operates farm tractor and yarding winch on frozen ground. Photos courtesy of S. Arno.



Vegetation Research Growing Strong

by Stephen F. Arno

Currently more than 20 vegetation studies are underway to provide information for ecosystem-based management in the Bitterroot National Forest and similar ecosystems. Stands are being treated to restore ponderosa pine and western larch in areas that they dominated in past centuries (see story at left). Vegetation mosaics in forests dominated by lodgepole pine are being investigated in the Bitterroot and in the Tenderfoot Experimental Forest (see story, page 7).

Carl Fiedler is estimating the costs of different silvicultural approaches for restoring forest ecosystems that are now outside the range of conditions that probably occurred over the last 2,000 years; this study will help managers determine how to get operational-scale restoration treatments done "on the ground." Other vegetation studies include searching for ways to maintain forests of whitebark pine, restoring seral riparian forests that have been degraded from years of fire exclusion, and determining the effects of knapweed invasion on native bunchgrasses and their micorrhizal associates.

Restoring Forests for Large Ponderosa Pine

by Stephen F. Arno

The Bear-Fred Burr demonstration study involves restoration of stands dominated by large ponderosa pine and larch prior to logging in the early 1900s. Today the stands consist mostly of diseased fir in dense thickets. The study site is located near 5,500 feet elevation on the Bitterroot Front west of Victor, Montana, between Bear and Fred Burr Creeks. Ten-acre blocks on moderately steep terrain are being logged commercially using four different technologies: horse logging, 4-wheel-drive farm tractor with harvesting winch, rubber-tired skidder, and caterpillar tractor. All units were marked to retain the scattered remain-

ing pine and healthy firs while removing as much diseased fir as possible. Effects of different harvesting methods on soil and leave trees will be measured. Diseased overstory trees and many understory trees are being removed; harvested overstory trees can be marketed as sawlogs, and understory trees can be marketed as pulpwood. Prescribed fire will be used, and then ponderosa pine will be planted. On a similar site with steeper topography, cable harvesting and underburning are planned to restore open conditions and reduce fuels in a community historically dominated by large ponderosa pine and western larch.

Restoring the Subalpine Mosaic

by Ward McCaughey, Cathy Stewart and Colin Hardy

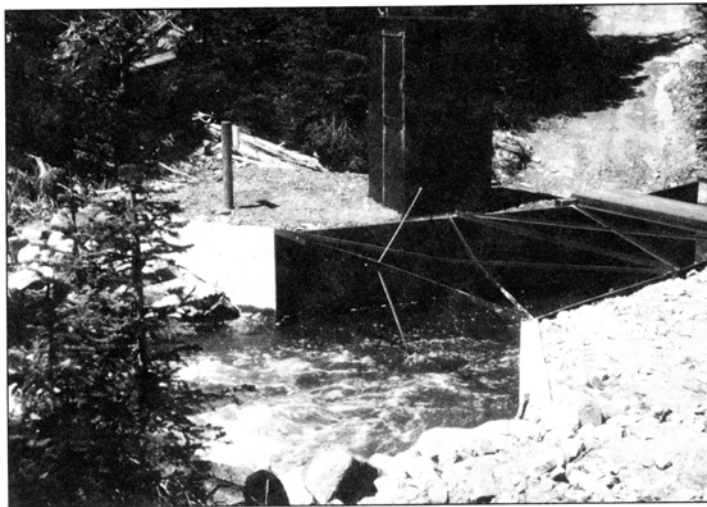
Fire dependent lodgepole pine communities are an important component of upper elevation forests of the Bitterroot Mountains and the Northern Rockies in general. A study of 1937 aerial photos from the Bitterroot National Forest is describing the pre-1900 disturbances that shaped lodgepole pine mosaics. The 1937 photos will be compared with stand history information provided by Mike Hartwell and Paul Alaback of the University of Montana to describe shifts in species dominance and age-class structure during the past half century. This information will be used to design management that reflects to some extent the landscape patterns of subalpine forests in the centuries prior to 1800.

Tenderfoot Creek Experimental Forest near White Sulphur Springs, MT, has been chosen as a demonstration site for landscape-scale silvicultural and fire treatments in lodgepole pine ecosystems. Like the lodgepole pine

forests of the Bitterroot National Forest, those at Tenderfoot are spatially complex. A fire history study by Steve Barrett indicates that most stands are one- or two-aged, with two-aged structures caused by historic fires of mixed severity. This project will evaluate the effects of alternative harvesting methods in lodgepole pine stands on water, wildlife, forest health, fuels, and vegetation. Innovative fire

applications will be used, including fuel augmentation and spring prescribed burning. Research on the Tenderfoot is based on the premise that treatments should be based on knowledge from past fire-shaped vegetation mosaics. Prescriptions found effective in this project can be adapted to other lodgepole pine forests, including those of the Bitterroot National Forest.

An important aspect of the Tenderfoot project is its historic database. Hydrologic monitoring since 1992 provides information on water flow, sediment production, and water quality. Two weather stations and seven hydrologic stations are in operation. Fisheries, fish habitat, stream channels, neotropical birds, meadow vegetation patterns, snow accumulation and interception patterns, geology, and soils have been studied. A geographic information system describes the landscape. Prescriptions found effective at Tenderfoot can be used on other sites, including similar lodgepole pine ecosystems in the Bitterroots.



Flume for measuring stream flow in Tenderfoot Creek Experimental Forest. Photo courtesy of Ward McCaughey.



ECO-News of Summer 1995 included a photo series showing this Lick Creek stand before treatment and at various stages in the first year after treatment. This followup photo pair shows the pretreatment stand (left) and the treated stand two years after harvesting and prescribed burning (right).



Monitoring at Lick Creek

Questions and Answers from January workshop

The January workshop for the Bitterroot Ecosystem Management/Research Project was as much about questions as about answers. If you would like a complete copy of workshop questions and answers, please contact ECO-Report editor.

IMPACT OF SMOKE?

QUESTION: *What will be the social impact of smoke from fires?*

ANSWER from Dave Parsons:

Addressing public concerns regarding smoke for an accelerated prescribed fire program, both within and outside wilderness, will be one of the biggest challenges facing efforts to restore fire to the Selway-Bitterroot Wilderness. We need to be honest about expected smoke effects, while we also address the ecological, safety, and property impacts of various fire management options. Of course, smoke has always been a part of this system and there is nothing we can do to completely eliminate it.

OPTIMIZATION OF HABITAT?

QUESTION: *How would you approach optimizing habitat quality for joint occupation by flammulated owl, neotropical migratory birds, elk, and small mammals?*

ANSWER from Jack Lyon:

Rule #1. Everything is connected to everything else.

Rule #2. There is no free lunch.

From these premises, it follows that it is not possible to optimize habitat for more than one species at a time.... Before this turns into a total cop-out, let me explain why ecosystem management won't turn into non-optimization and overall mediocrity. As far as I know, there are no vertebrate species completely intolerant of the normal ecosystem processes in the Bitterroot. Thus we can assume any process that produces a result within the normal range of variation will do no permanent damage at the population level....

My approach to managing for all the species you mention would emphasize stands of large, old ponderosa pine with snags and an open understory. In addition,

1. for elk, close as many roads as possible
2. for small mammals, retain and create snags and down woody material
3. for neotropical migratory birds, develop a riparian burning program
4. for flammulated owls, restore old-growth ponderosa pine (and also #2.)

One thing I've noticed about various products of public land management is this: If it looks ugly and out of place, it probably is.

ELK WINTER COVER

QUESTION: *If historic forests had more open, old growth ponderosa pine, then why maintain Douglas-fir stands for thermal cover on winter range?*

ANSWER from John Ormiston and Kerry McMenus:

The current Forest Plan directs maintaining thermal cover on winter range. Here is one perspective concerning the intent of providing thermal cover and changes since historic times:

The prehistoric landscape probably included areas of old growth Douglas-fir on what could be classified as pine sites. I think the generality of pine sites supporting a savanna-like stand in the natural condition is a good generality, but the reality is that on any given site, you might have had a period that grew Douglas-fir....

The intent of the thermal cover requirement in the Forest Plan was to provide some severe weather cover and some security late in the hunting season when snows usually move elk to lower elevations. Whether 25 percent is the correct level or not is certainly debatable, especially from the standpoint of capability of the habitat to support elk. I'm sure they can get by with less, but we would also increase their vulnerability to hunters....

TREATMENTS FOR PINE RESTORATION

QUESTION: *How much acreage on the Bitterroot National Forest would need treatment to restore pine forests? What would the cost be, with and without a pulp market? Is there hope?*

ANSWER from Steve Arno:

This question is foremost in the minds of managers considering restoration in the historic ponderosa pine type. As a researcher and a small private forest owner who has done this restoration work, I would focus on accomplishing restoration on the sites that are most feasible to treat and where major benefits would result....

On moderately steep tractor ground certain operators can bid modestly for a sale if there are at least two truckloads of logs to each load of pulpwood. Logs include sawlogs, studs, and peelers, generally from larger Douglas-fir that should be removed.... Two local operators have recently sold log truckloads of pulpwood as bulk firewood for use the following year. Unlike snag harvesting, this uses firewood for a silvicultural purpose.

Simpplle Predictions and Magis Models

by J. Greg Jones

Construction of the SIMPPLLE model (SIMulating vegetative Patterns and Processes at Landscape ScaLEs) for planning in the Stevensville West Central area of the Bitterroot National Forest was completed last fall. We defined the vegetative states in the area, that is, the type, density, size, and structural classes. We determined the pathways from one vegetation state to another - with and without management treatments, and with natural processes. Finally, we estimated the probability of occurrence of the natural processes modeled (fire, spruce budworm, root disease, and mountain pine beetle).

Managers used SIMPPLLE to identify likely patterns of vegetation change over time in the absence of management treatments and with fire suppression. The simulations indicated that, without management activities, lodgepole pine and hardwoods are likely to decrease over the next five decades. Plant communities dominated by shade tolerant species,



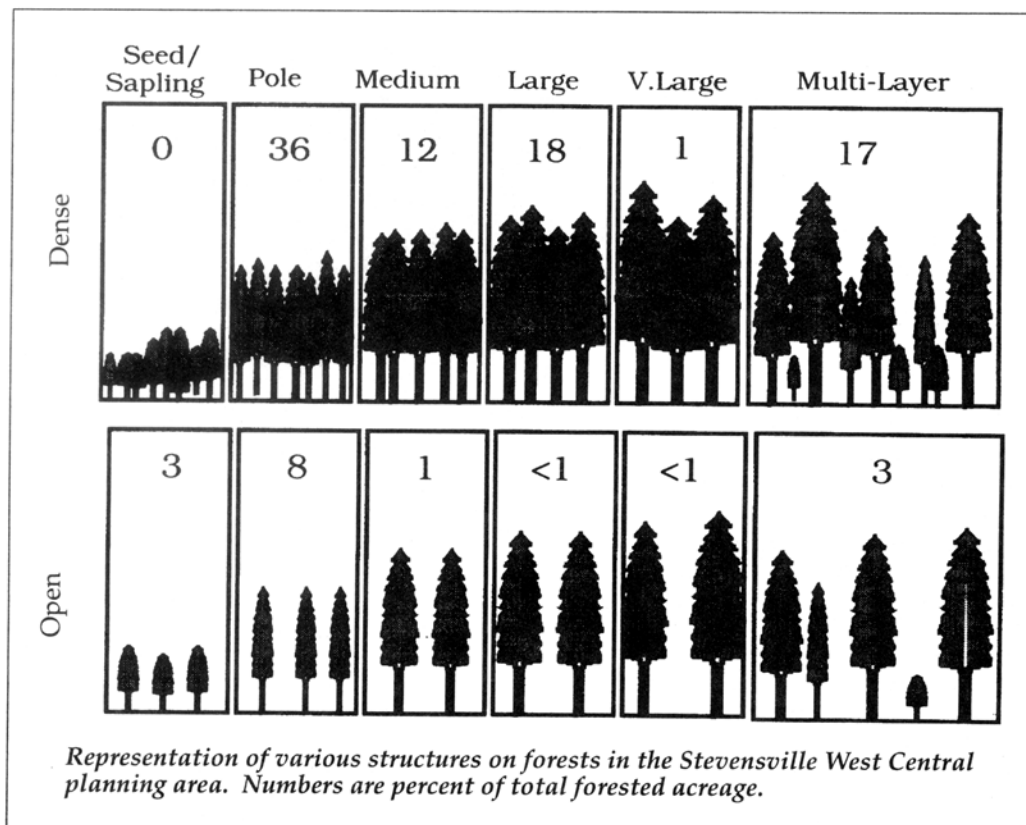
such as true firs and Douglas-fir, would increase significantly. Many of these stands would be multi-story, increasing the chance of catastrophic fires in the area. The simulations also identified stands with the highest probabilities for fire and other disturbances; results will help managers identify stands to treat. Results from SIMPPLLE simulations parallel the thoughts of many residents and managers concerning stand development and changing likelihood of disturbance in the Stevensville West Central area, lending credibility to the modeling systems.

MAGIS (Multi-resource Analysis and Geographic Information System) is a model for planning activities on a landscape. For the Stevensville West Central area, MAGIS has been run for the "no action" alternative and for various management alternatives. MAGIS simulated changes over five decades. Under the "no action" alternative, sapling and large size classes were predicted to increase in the area, and decreases were predicted for the seedling and medium size classes. Acres in forage production were predicted to decline, accompanied by increases in hiding cover, thermal cover, and the pine marten habitat index. MAGIS indicates that sediment yield will be essentially constant over time, indicating that recovery from past activities may have already occurred. MAGIS is now being used to investigate approaches for improving economic aspects of management alternatives while at the same time achieving environmental and ecosystem objectives.

Describing the Forest: Stand Structure Classes

by Janet Sullivan

Robert Pfister and his colleagues have developed a vegetation structure classification for use in the Bitterroot Ecosystem Management/Research Project. The structural classes provide users and modelers with a uniform method to classify areas as nonforest or forest, and to classify forested stands on the basis of density, structure, and average size. The graphic at right shows the current proportion of different forest structures in the Stevensville West Central area; the number in each box is the percentage of forested lands in all ownerships represented by each class. "Dense" stands have a tree basal area greater than 50 square feet/acre; "open" stands have less basal area. Tree size classes are defined according to quadratic mean diameter: seedlings/saplings < 5", poles 5-8", medium trees 8-10", large trees 10-14", very large trees >14".



The "Spotlight"...highlighting researchers at work

Long-time Forest Ecologist Heads BEMRP

by Madelyn Kempf

Clint Carlson began his Forest Service career in 1961 as a lookout on the West Fork District of the Bitterroot National Forest - the year of the Sleeping Child Burn on the Darby District. By 1970 Clint had worked his way through timber sales and data management to plant pathology; he helped evaluate the white pine blister rust control program. Clint's study team determined that efforts to eradicate currant plants and use of antibiotics were futile.

From 1970 to 1977 Clint devoted most of his time to studying the environmental consequences of air pollution in the northern Rocky Mountains. He directed vegetation studies near point sources of air pollution and testified at regional hearings concerning air pollution effects on forests.

In 1978 Clint transferred to the Intermountain Research Station as a Research Forester, the same kind of position held decades ago by Bob Marshall at the Missoula Forestry Sciences Laboratory. Clint's first assignment was to determine relationships of western spruce budworm to

site and forest conditions in the northern Rockies. With colleagues, he developed silvicultural treatments to reduce budworm, methods which are now used in the western U.S. and Canada.

In 1988 Clint began to investigate hybridization between western larch and alpine larch. He and his colleagues located sites in the Bitterroot Range where the two species hybridize. Artificial hybrids were developed; resultant seedlings are being tested for growth and adaptation within and outside the range of the parent species.

Clint's involvement in ecosystem management grew out of New Perspectives forestry studies at Lick Creek. This project now functions as a rich source of data on innovative management and is a public showcase for cooperative efforts. With the help of colleagues at the Intermountain



Project Leader Clint Carlson (right) on Lick Creek field trip. Photo by Madelyn Kempf.

Research Station, Clint developed a proposal for ecosystem management research in the Bitterroot National Forest in 1993; this project became the Bitterroot Ecosystem Management/Research Project, with Clint the Project Leader. In 1994, Clint was asked to lead a Research Work Unit, Ecology and Management of northern Rocky Mountain Forest Ecosystems. 1996 is Clint's thirty-first year with the Forest Service.

At the Rodeo?

Jane Kapler Smith is the new chair of the Human Dimensions Research Group, filling "just one shoe," she says, for Madelyn Kempf, who moved to the Cleveland National Forest, Corona, California, last November.

by Jane Kapler Smith

In a place that is changing as fast as the Bitterroot Valley, I knew that successful communications would be elusive - "trying to hit a moving target," it was explained to me. But after I studied the history of Forest Service policy and the development of this project, I realized that the public must also see the Forest Service as a moving target. Forest Service policies have changed over the years, each change accompanied by a new set of requirements and a new set of terms. It's a bit like calf roping at the rodeo:



Part of the "human dimension": private home on managed forest land in the Bitterroot Valley. Photo courtesy of S. Arno.

trying to catch a moving target from a moving horse. I have great respect for anyone who can accomplish that!

My new insights came mostly from a report by Christian F. Gebhardt, a graduate of the University of Montana whose studies were directed by Hal Salwasser, now Regional Forester. Chris points out that the use of facilitated meetings for public involve-

ment has increased in the Forest Service since its first use in the 1970s. Such meetings were used in planning for the Stevensville West Central area of the Bitterroot National Forest. How successful was this two-year effort? Leslie Weldon, Ranger on the Stevensville District, comments that the Forest Service has benefited from early involvement of the public. She cautions, however, that "... more needs to be done to ensure that the diverse needs of the public are effectively considered in land management decisions."

Katie Guthrie and Rick Pukis, both at the University of Montana, plan to learn more about the public involvement process in the Stevensville West Central area. Katie will interview participants to evaluate the effectiveness of collaborative techniques. Rick is making a videotape to describe the public involvement effort. We need to understand our history and have a creative approach to the future to make sure that all of us "moving targets" continue to learn from each other.

Tree Tales

A display entitled "Fire Ecology - Science Around the Flames" was presented at the Montana Education Association conference held in Missoula last Oct. 18-20. The display featured educational materials for in-class use as well as field trips, and included information on the Lick Creek Demonstration Forest in the Bitterroot National Forest. More than 3,500 teachers attended the conference. Nancy McMurray and Jane Kapler Smith (Intermountain Fire Sciences Laboratory), Carolyn Durgin (The University of Montana), and Ashley Emerson (Glacier Institute) talked with hundreds of educators who visited the display; they distributed more than 1,000 copies of curricular materials. A directory to forest "learning sites," including the Lick Creek site, was also distributed.

"The Story Tree," a cross section of an ancient ponderosa pine, was displayed at the convention. This cross section was taken from a ponderosa pine stump found near the road to the Snow Bowl ski area north of Missoula. The tree originated in the early 1300's and survived fires every 25 to 30 years for many centuries. The Story Tree was cut in 1919, possibly after being killed by fire. A section from a younger, living pine tree in the same forest shows no evidence of fire after 1919. Without fire, forest cover



First grader reaches for lodgepole pine cone to count seeds.



Regional program assistant Elaine Poser explains the history of the Story Tree to elementary students visiting Southgate Mall during Earth Week.

in the area is changing from ponderosa pine and western larch to Douglas-fir. Like many forests in western Montana, the home of the Story Tree is threatened by fire exclusion.

Other educational materials were distributed at the convention and are available to educators in the Bitterroot Valley. "Which Tree, Which Forest?"

is a brochure that depicts tree "adaptations" to fire as an ecological puzzle, solvable if you find clues in the descriptions of pine forests common to western Montana.

"Recipe for a Lodgepole Pine Forest" is a small kit for extracting and

planting seeds from serotinous lodgepole pine cones. For budding mathematicians and managers, calculations regarding seed crops and tree densities are included. Other educational materials relating to fire ecology are available through the Intermountain Fire Sciences Laboratory. Contact ECO-Report editor for more information.

Environmental Assessment Being Completed

**by Leslie Weldon,
Stevensville District Ranger**

The Stevensville Ranger District plans to release the environmental assessment for management in the Stevensville West Central area for public comment this June. Along with the completed environmental analysis, I will recommend an alternative that the Forest Service feels will do the best job of meeting ecological and social goals, and will move the area toward desired conditions in the future. The public has 30 days to submit comments to the Forest Service regarding the environmental assessment. We encourage interested people to also contact me or members of the interdisciplinary team with comments or questions.

Through the Bitterroot Ecosystem Management Research Project partnership, the Stevensville West Central area has been

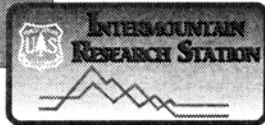
used as a "real-life" experiment in methods of assessing landscape conditions. We used the vegetation models SIMPLLE and MAGIS to simulate vegetation and to help determine efficient techniques for meeting management goals and for evaluating effects on wildlife, watershed, and other ecosystem components. Preparing for and applying these new tools resulted in longer planning times than usual. This was also true for the public involvement process for this Bitterroot landscape, which began in the initial stages of planning. The involvement of local citizens and interest groups contributed in a big way to identifying long-term goals and management actions for Stevensville West Central. It took participants a lot of time and dedication, willingness to learn about the Bitterroots, and willingness to share their values and concerns about their future. This process

was not without its challenges, but there has been great value to the Bitterroot National Forest and hopefully to everyone involved. THANKS to all involved for building bridges with this project.

After a 30-day comment period on the environmental assessment regarding Stevensville West Central, the Forest Service team will review and respond to comments submitted by the public. These responses will all be included as an appendix to the analysis. A Decision Notice will identify the alternative to be implemented in the area; it will explain why this alternative was selected and how it responds to issues raised by members of the public. A 45-day appeal period follows, within which members of the public who can demonstrate reasons why this decision should not be implemented can do so by filing an appeal to the Northern Regional Forester.



BITTERROOT
ECOSYSTEM
MANAGEMENT
RESEARCH
PROJECT



School of Forestry
University of
Montana



Ecosystem Management means partnership

Furthering the goals of this project requires public participation in decision-making processes. Would you like to become a partner?

For more information, please call or write to:

Clinton E. Carlson, Project Leader
Intermountain Research Station
P. O. Box 8089
Missoula, MT 59807
(406) 542-4151

Leslie Weldon, District Ranger
Stevensville Ranger District
88 Main Street
Stevensville, MT 59870
(406) 777-5461

Professor Robert Pfister
University of Montana
School of Forestry
Missoula, MT 59812
(406) 243-6582

Visit BEMRP on the Internet!
<http://www.xmission.com/~int> with link to Web site or
<http://www.forestry.umt.edu/bemrp>

Yeas and Nays

Participants at the project workshop in January were asked what aspects of the workshop they considered most beneficial and what they would change. Here are some of their comments:

- Hearing the different aspects of the research, both results and processes, was very interesting. The workshops this year were most beneficial because an open forum of discussion is extremely useful for gaining greater understanding of what BEMRP is all about.

- I would encourage making workgroup questions more specific (and thus more tangible and answerable!). Schedule it so people aren't quite so exhausted at the final presentations - when more input from the general audience would be beneficial....

- I would consider a poster session for more in-depth idea exchange.

- Invite more observers from other agencies and special interest groups, including media, and opposing groups....

- I liked the workgroup idea, which gives opportunities for freewheeling thought and the expression of ideas from each individual's area of expertise. That is refreshing. This thought provoking and collaborative process is necessary in such a wide ranging arena as ecosystem management.

ECO-Report

Bitterroot Ecosystem Management
Research Project
USDA Forest Service
Intermountain Research Station
P.O. Box 8089
Missoula, MT 59807

*When you try to change any single thing,
you find it hitched to everything else in
the universe. - John Muir*

