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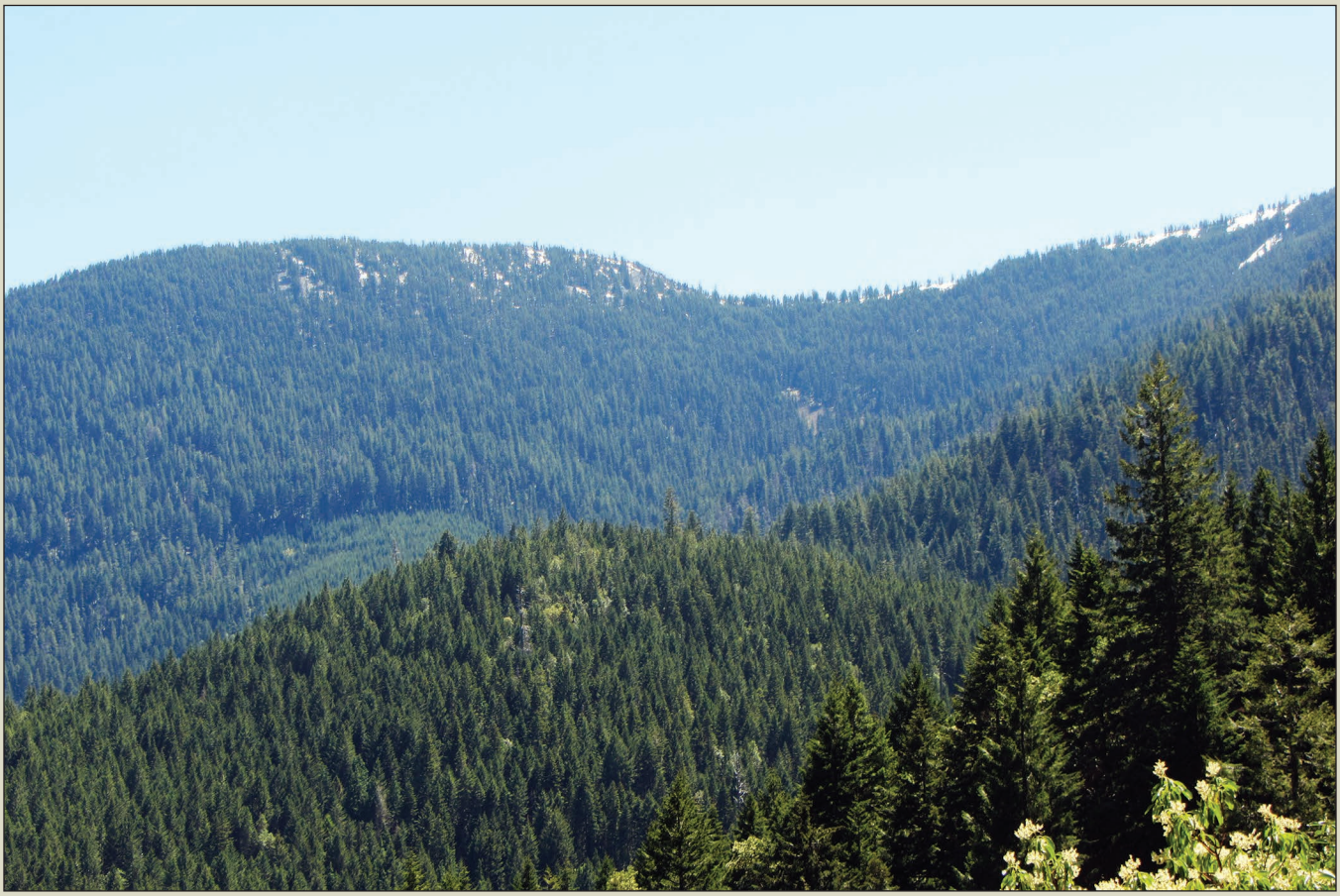
Grayback Glades Research Natural Area: Guidebook Supplement 49

Reid Schuller, Bryan Wender, and Rachel Showalter



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The Pacific Northwest Research Station is publishing this guidebook as part of a continuing series of guidebooks on federal research natural areas begun in 1972.

Cover photograph: Grayback Glades Research Natural Area, by Reid Schuller.

Abstract

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This guidebook describes major biological and physical attributes of the 433-ha (1,070-ac) Grayback Glades Research Natural Area. The area supports high-elevation examples of white fir–Shasta red fir (*Abies concolor*[Gord. + Glend]–*Abies magnifica* var. *shastensis*) forest along the crest of the Siskiyou Mountains in southwestern Oregon. High-elevation Sitka alder (*Alnus viridis* ssp. *sinuata*) glades are also represented on the site. Drainages support large individuals of Port Orford cedar (*Chamaecyparis lawsoniana*[A. Murray bis]).

Keywords: Research natural area, area of critical environmental concern, white fir (*Abies concolor*), Shasta red fir (*Abies magnifica* var. *shastensis*), Port Orford cedar (*Chamaecyparis lawsoniana*), Port Orford cedar root disease, *Phytophthora lateralis*, alder glade, Sitka alder (*Alnus viridis* ssp. *sinuata*).

Preface

The research natural area (RNA) described in this supplement[1] is administered by the Medford District, Bureau of Land Management (BLM), U.S. Department of the Interior.

Grayback Glades RNA is part of a federal system[2] of natural areas established for research and educational purposes.[3] Of the 183 federal RNAs established in Oregon and Washington, 45 are described in "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators" (see footnote 1). This report is a supplement to the guidebook.

Each RNA is a site where elements[4] are protected or managed for scientific purposes and natural processes are allowed to dominate. The objectives for establishing RNA are to:

- Maintain a wide spectrum of high-quality areas that represent the major forms of variability found in forest, shrubland, grassland, alpine, and natural situations that have scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity.

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[1] Supplement No. 49 to Franklin, J.F.; Hall, F.C.; Dyrness, C.T.; Maser, C. 1972. Federal research natural areas in Oregon and Washington: a guidebook for scientists and educators. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 498 p.

[2] Six federal agencies cooperate in this program in the Pacific Northwest: U.S. Department of the Interior, Bureau of Land Management, Fish and Wildlife Service, and National Park Service; U.S. Department of Agriculture, Forest Service; U.S. Department of Energy; and U.S. Department of Defense. In addition, the federal agencies cooperate with state agencies and private organizations in Oregon and Washington in the Pacific Northwest Interagency Natural Area Committee. Taken from Wilson, T.M.; Schuller, R.; Holmes, R.; Pavola, C.; Fimbel, R.A.; McCain, C.N.; Gamon, J.G.; Speaks, P.; Seevers, J.I.; DeMeo, T.E.; Gibbons, S. 2009. Interagency strategy for the Pacific Northwest Natural Areas Network. Gen. Tech. Rep. PNW-GTR-798. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 33 p.

[3] See Wilson et al. (2009) for a more complete discussion of rationale for establishment of RNAs.

[4] Elements are the basic units to be represented in a natural area system. An element may be an ecosystem, community, habitat, or organism. Taken from Dyrness, C.T.; Franklin, J.F.; Maser, C.; Cook, S.A.; Hall, J.D.; Faxon, G. 1975. Research natural area needs in the Pacific Northwest: a contribution to land-use planning. Gen. Tech. Rep. PNW-38. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 231 p.

- Preserve and maintain genetic diversity, including threatened, endangered, and sensitive species.
- Protect against human-caused environmental stressors.
- Serve as reference areas for the study of natural ecological processes, including disturbance.
- Provide onsite and extension educational activities.
- Serve as baseline areas for measuring long-term ecological changes.
- Serve as control areas for comparing results from manipulative research.
- Monitor effects of resource management techniques and practices.

The guiding principle in managing RNAs is to maintain natural ecological processes or conditions for which the site is designated. Activities that impair scientific or educational values are not permitted within RNAs. Management practices necessary to maintain or restore ecosystems may be allowed.

Federal RNAs provide a unique system of publicly owned and protected examples of relatively unmodified ecosystems where scientists can conduct research with minimal interference and reasonable assurance that investments in long-term studies will not be lost to logging, land development, or similar activities. Scientists and educators wishing to visit or use Grayback Glades RNA for scientific or educational purposes should contact the Medford BLM district office manager in advance and provide information about research or educational objectives, sampling procedures, and other prospective activities. Research projects, educational visits, and collection of specimens from the RNA all require prior approval. There may be limitations on research or educational activities.

A scientist or educator wishing to use the RNA is obligated to:

- Obtain permission from the appropriate administering agency before using the area (see footnote 2).
- Abide by the administering agency's regulations governing use, including specific limitations on the type of research, sampling methods, and other procedures.
- Inform the administering agency on progress of the research, published results, and disposition of collected materials.

The purpose of this approval process is to:

- Ensure that the ecological integrity and scientific and educational values of the RNA are not compromised.
- Provide information to scientists about other research occurring on the RNA so that potential collaborations may be fostered and conflicts avoided.
- Maintain records of research activities and research results to benefit the BLM, other agencies, and future researchers.

Appropriate uses of RNAs are determined by the administering agency. Destructive analysis of vegetation is generally not allowed, nor are studies requiring extensive substrate modification such as extensive soil excavation. Collection of plant and animal specimens is generally restricted to voucher specimens or approved research activities. Under no circumstances may collecting significantly reduce species populations. Collecting must also be carried out in accordance with all other federal and state agency regulations.

Contents

Introduction

Grayback Glades Research Natural Area (RNA) lies at the crest of the Siskiyou Mountains in Josephine County, 26 km (16.2 mi) east of Cave Junction, Oregon. The 433-ha (1,070-ac) site was designated as an RNA in the Medford District Record of Decision and Resource Management Plan (Federal Register 1995, USDI BLM 1995).

The Grayback Glades site was established as an RNA because it supports two forested ecosystems representative of the Klamath ecoregion (ONHAC 2010): (1) white fir (*Abies concolor*)[1] and Shasta red fir (*Abies magnifica* var. *shastensis*) at high elevations with a Sadler oak (*Quercus sadleriana*) understory; and (2) a mid-elevation Port Orford cedar–white fir/Cascade barberry (*Chamaecyparis lawsoniana–Abies concolor*/*Berberis nervosa*) forest plant association. The RNA also supports numerous examples of high-elevation alder glades (ONHAC 2010).

Access and Accommodations

The site is located along the crest of the Siskiyou Mountains in Josephine County. To access the RNA from Williams, Oregon, proceed south from the Williams Post Office on East Fork Road (a.k.a. Williams Highway). At 5.8 km (3.6 mi), take the right fork (paved) onto Bureau of Land Management (BLM) road 39-5-14 (a.k.a. Rock Creek Road). Stay on the pavement to Grayback Mountain trailhead at 9.8 km (6.1 mi). At 10 km (6.2 mi), turn left onto BLM road 39-5-21. A locked gate crosses the road at 10.1 km (6.3 mi). To open the gate, a key must be obtained from the BLM Medford District office. After passing through the gate, continue to 12.1 km (7.5 mi) and take the left fork. Continue to 13.4 km (8.3 mi) and park next to Right Hand Fork Rock Creek on the north boundary of the RNA (fig. 1).

Obtain permission to access the area from the BLM, Medford District office in Medford, Oregon, prior to visiting the site. Maps and additional directions to the area are available at this office, and lodging is available in Grants Pass, Oregon.

Environment

The RNA is situated on the north-facing slope of Big Sugarloaf Peak (fig. 2). Elevations range from 2012 m (6,600 ft) in the southwest portion of the RNA to 1097 m (3,600 ft) along the northern RNA boundary where Right Hand Fork Rock Creek exits the RNA and flows in a northeast direction. First- to third-order streams originate on the upper slopes of Big Sugarloaf Peak and flow north via Rock Creek and Right Hand Fork Rock Creek for 2 km (1.2 mi) before exiting the RNA (fig. 3).

[1] See appendix 1 for scientific and common name of vascular plants found on the Grayback Glades RNA.

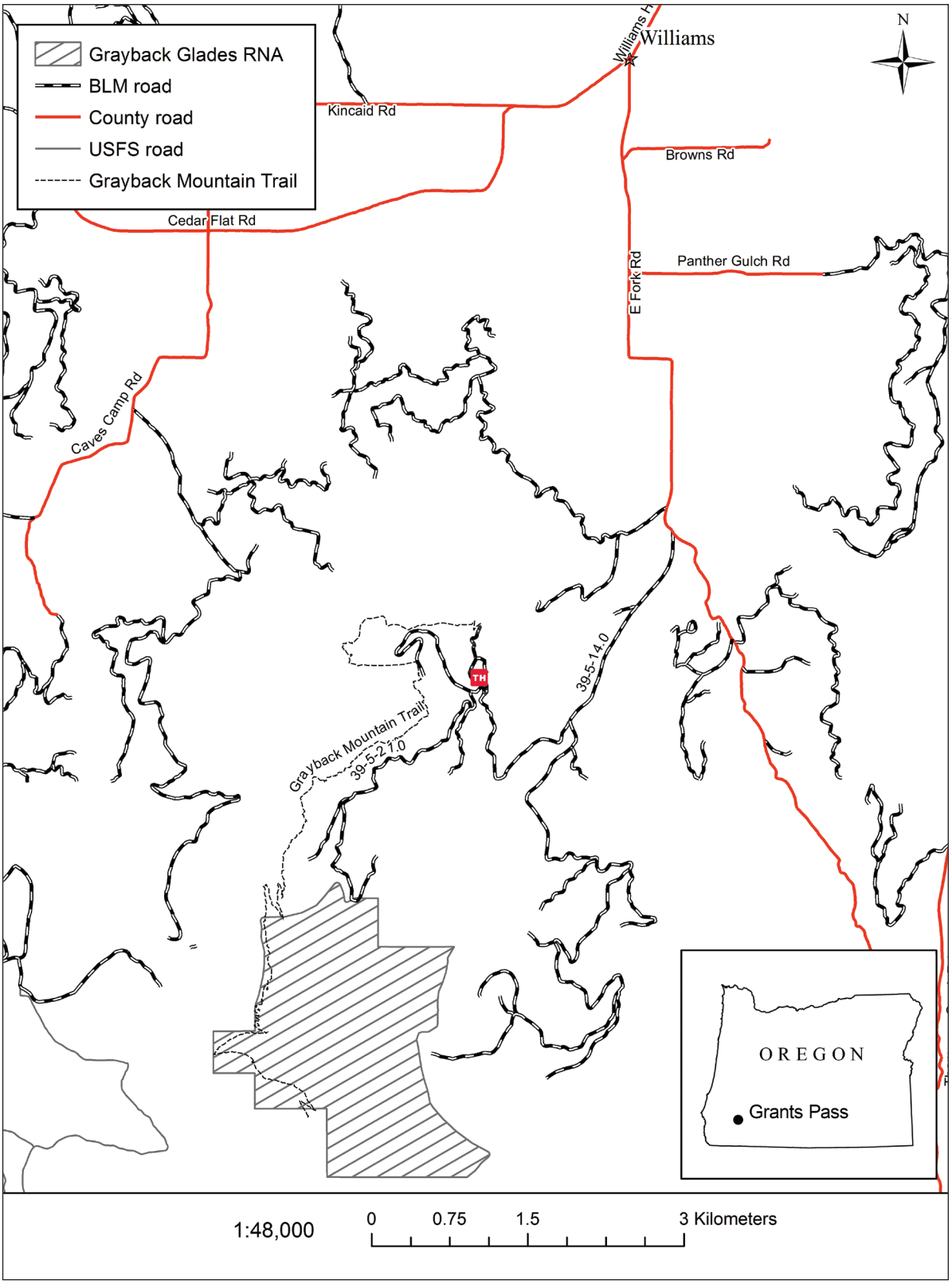

Figure 1—Grayback Glades Research Natural Area (RNA) location and access. TH = trail head. BLM = Bureau of Land Management. USFS = U.S. Forest Service.

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Figure 2—Ridgeline and north-facing slope of Big Sugarloaf Peak (in background) encompassing the Grayback Glades Research Natural Area.

Soils are nonserpentine in character and appear as a complex mix of metamorphic rock types that are covered by a thin mantle of soil. The shallow soil is primarily responsible for lowered site productivity within the forested stands (USDA FS 2013, Vander Schaaf 1987). Crannler, Bigelow, Rogue, and Goodwin soil series are present along with unnamed cryaquepts (USDA FS 2013).

Climate

Grayback Glades RNA has a marine-influenced Mediterranean climate with cool, wet winters and warm, dry summers. From late fall through spring, unstable low-pressure air masses from the Pacific Ocean bring frequent storms, sometimes accompanied by high winds. During the summer, stable high-pressure air masses bring generally clear skies and temperature inversions. Temperatures are modified by proximity to the Pacific Ocean—in winter by its warming influence, and in summer by its cooling influence.

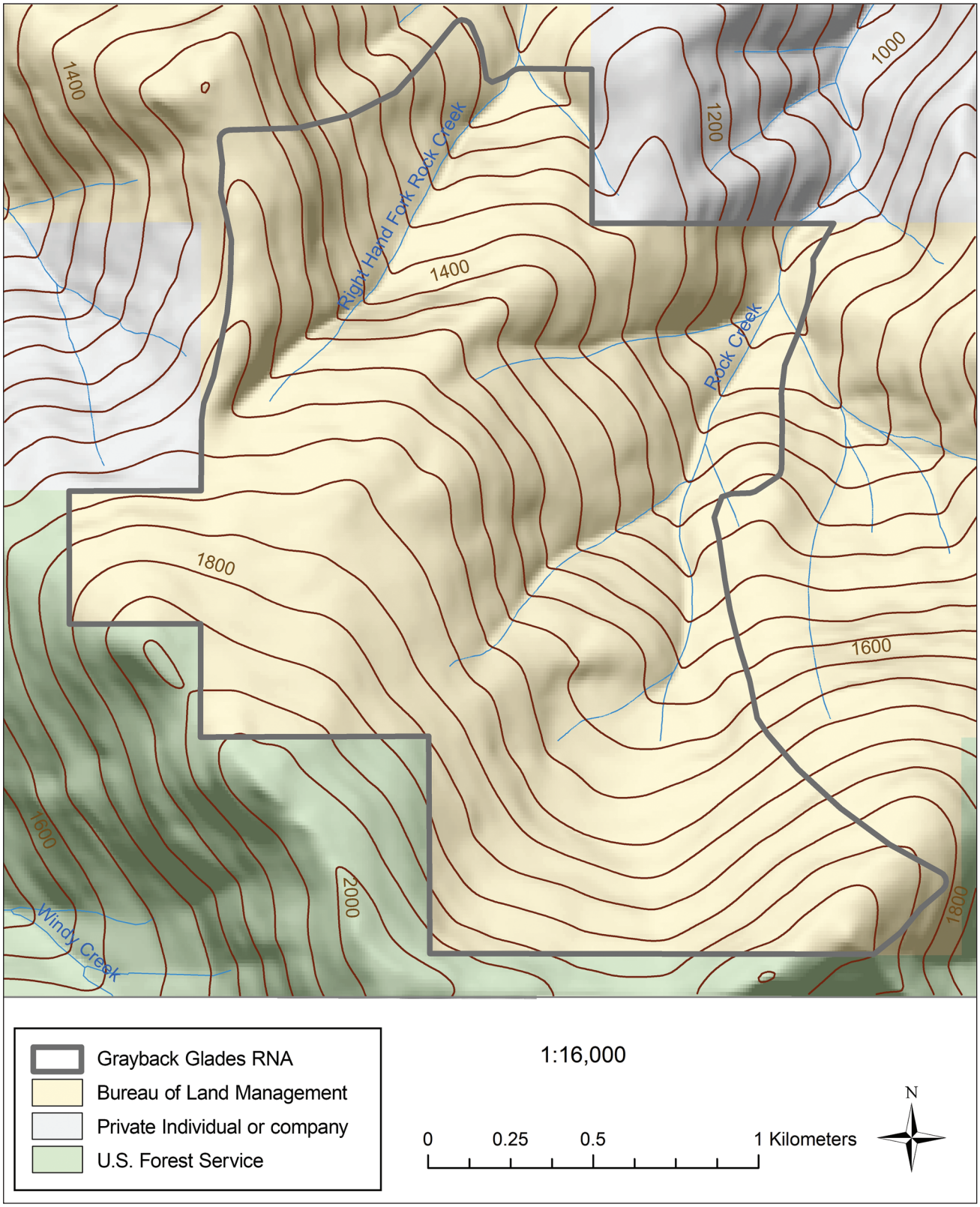

Figure 3—Grayback Glades Research Natural Area (RNA) topography, elevation, hydrology, and boundary.

The Bigelow Camp snow telemetry (SNOTEL) climate station is located 2.5 km (4 mi) southwest of the RNA at an elevation of 1564 m (5,130 ft) (USDA NRCS, n.d.). Table 1 summarizes precipitation data for the years 1980 through 2012 and temperature data for the years 1990 through 2012. The data are likely comparable to the upper elevations and the north slope of Sugarloaf Mountain. Summers are dry, with June through August receiving only 6.1 percent of the average annual total precipitation.

Table 1—Temperature summary (1/1/1990 to 12/31/2012) and precipitation summary (6/10/1980 to 12/31/2012), Bigelow Camp snow telemetry climate station, Oregon

Average minimum January temperature	-8.4 °C (17 °F)
Average annual minimum temperature	-11.3 °C (11.6 °F)
Average maximum July temperature	29.9 °C (85.9 °F)
Average annual maximum temperature	32.1 °C (89.8 °F)
Average annual precipitation	1699 mm (66.9 in)
Average June-August precipitation	103 mm (4.05 in)

Vegetation

The higher elevation forest stands adjacent to the southern RNA boundary are dominated by white fir and Shasta red fir. Mountain hemlock (*Tsuga mertensiana*) occurs at the highest elevations (fig. 4). Forest understories are typically depauperate with Cascade barberry being the most conspicuous understory species.

Mid-elevation forests located in the central portion of the RNA occupy the 1400 to 1700-m (4,563- to 5,577-ft) elevation zone. White fir and Douglas-fir (*Pseudotsuga menziesii*) occur as major overstory trees, with occasional Port Orford cedar, sugar pine (*Pinus lambertiana*), western yew (*Taxus brevifolia*), and giant chinquapin (*Chrysolepis chrysophylla*) occurring as minor associates (fig. 4). Forest understories are characterized by sweet after death (*Achlys triphylla*), Cascade barberry, and vine maple (*Acer circinatum*) (Vander Schaaf 1987).

Mid-elevation talus slopes within the Rock Creek drainage receive substantial spring and early-summer runoff from higher elevation snow beds. These habitats, collectively known as the Grayback Glades, are covered by dense stands of Sitka alder (*Alnus viridis* ssp. *sinuata*) and vine maple and are distinctive features of the north slope of Big Sugarloaf Peak (fig. 5). Sitka alder often occurs in avalanche chutes, suggesting that the glades may be remnants of formerly active avalanche chutes (Vander Schaaf 1987). The glades support numerous herbaceous species, including California false hellebore (*Veratrum californicum*), paintbrush (*Castilleja* sp.), and sickletop lousewort (*Pedicularis racemosa*).

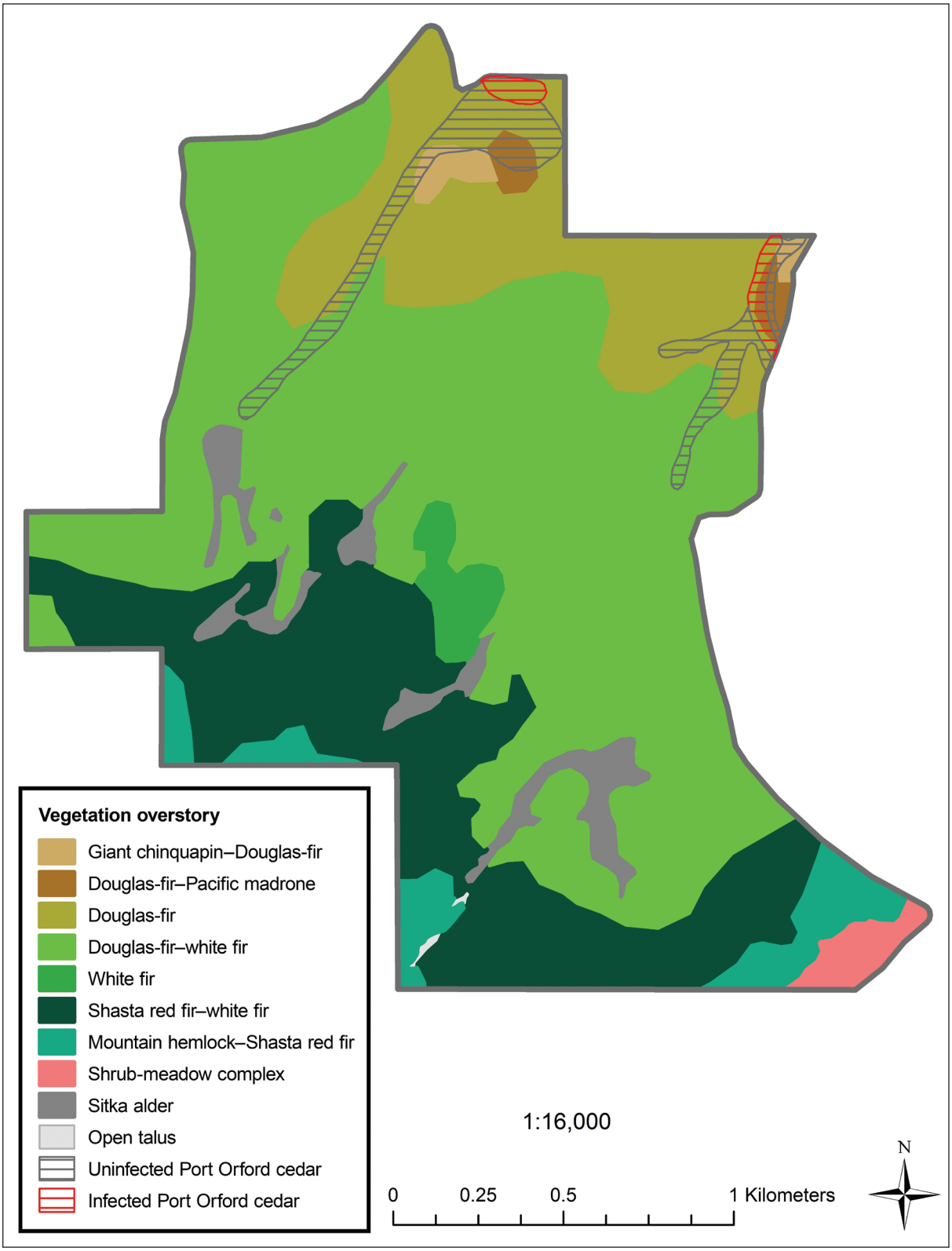

Figure 4—Map of overstory vegetation and distribution of Port Orford cedar root disease within Grayback Glades Research Natural Area.

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Figure 5—Example of typical "grayback glade" opening (middle-center of photo) surrounded by closed coniferous forest.

Lower elevation forests occur from 1400 m (4,563 ft) down to 1120 m (3,675 ft) adjacent to the north boundary of the RNA. Douglas-fir and white fir predominate with Port Orford cedar occurring as a major associated species along riparian areas and adjacent slopes. Pacific madrone (*Arbutus menziesii*), sugar pine, giant chinquapin, and western yew occur sporadically throughout lower elevations (fig. 4).

Vegetation monitoring data describe the lower elevation forest in further detail (Schuller et al. 2013). Figure 6 shows the tree diameter class distribution collected from two 0.1-ha plots located along transects 598 and 599 within the riparian zone and adjacent moist toe slope of Right Hand Fork Rock Creek. The characteristically dense tree reproduction along the creek is shown in figure 7. The high density values for the smallest diameter class most likely reflect the combined effects of moisture availability throughout the summer growing season combined with the sheltering effects of adjacent steep-sloped canyons. Figure 8 shows drier understory conditions typical of most of the lower elevation forest. Figure 9 illustrates tree diameter class distributions from two 0.1-ha plots located along transects 601 and 602 occurring within this micro-environment.

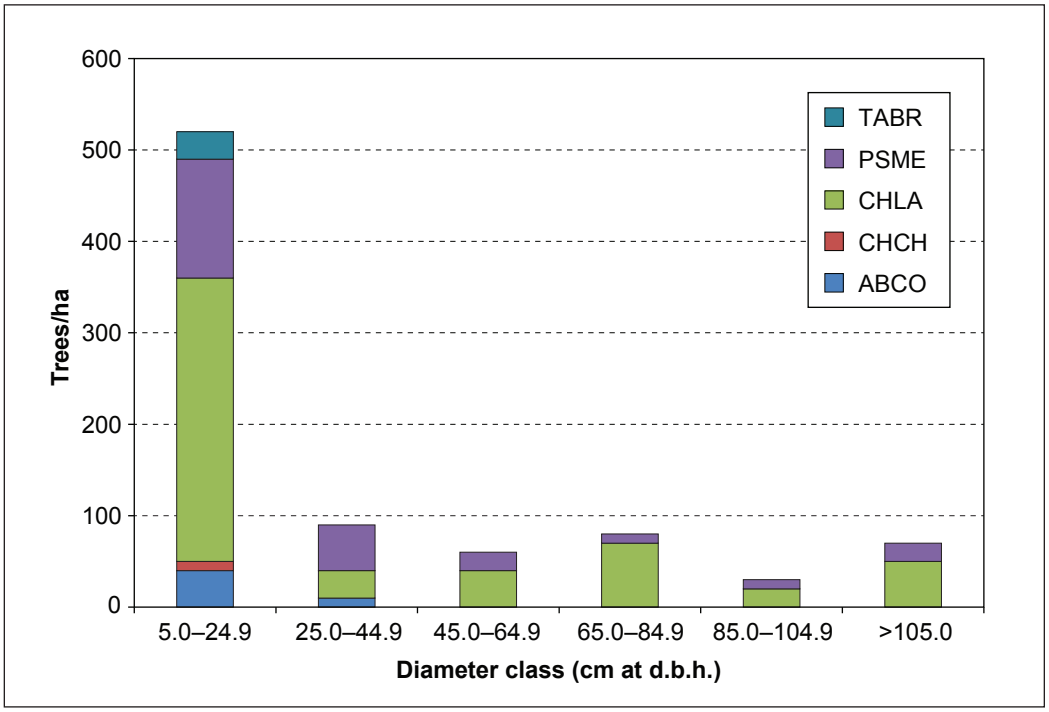

Figure 6—Tree diameter class distribution from two 0.1-ha plots collected within the riparian zone and adjacent moist toe slope of Right Hand Fork Rock Creek, Grayback Glades Research Natural Area. TABR = *Taxus brevifolia*; PSME = *Pseudotsuga menziesii*; CHLA = *Chamaecyparis lawsoniana*; CHCH = *Chrysolepis chrysophylla*; ABCO = *Abies concolor*.

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Figure 7—Characteristically dense tree reproduction along Right Hand Fork Rock Creek.

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Figure 8—Typical depauperate understory in dry Port Orford cedar–Douglas-fir–white fir forest.

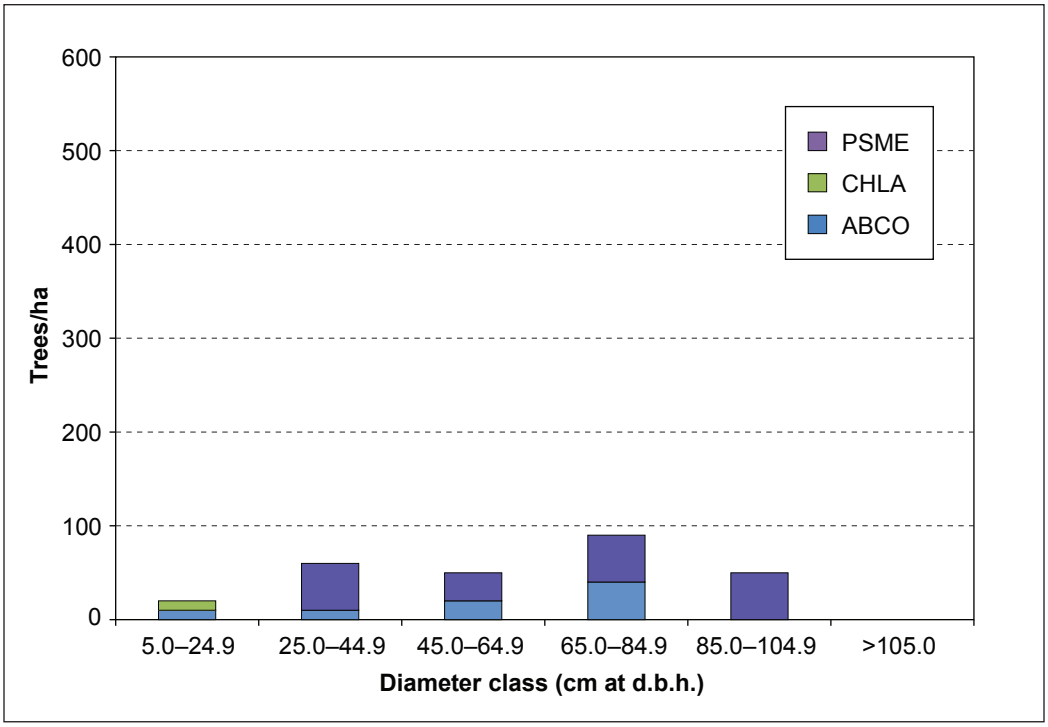

Figure 9—Tree diameter class distribution from two 0.1-ha plots in dry conifer forest at lower elevations within Grayback Glades Research Natural Area. PSME = *Pseudotsuga menziesii*; CHLA = *Chamaecyparis lawsoniana*; ABCO = *Abies concolor*.

Table 2 records vegetation understory cover and frequency for grasses, forbs, and shrubs occurring within four permanent plots located along four transects. The shrub layer is sparse to moderate in these areas, and major shrubs include salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*), and Cascade barberry (Schuller et al. 2013, Vander Schaaf 1987). Vine maple is often a dominant shrub along the creeks (fig. 7) and other mesic sites.

Table 2—Plant association, understory coverage, and frequency of four permanent plots in Grayback Glades Research Natural Area

		Plant association[a]							
		CHLA-ABCO/BENE2[b]				ABCO/BENE2/ACTR			
		Transect 598		Transect 599		Transect 601		Transect 602	
Scientific name[c]	Code	Frequency[d]	Cover	Frequency	Cover	Frequency	Cover	Frequency	Cover
		Percent							
Shrubs and subshrubs:									
Acer circinatum[d]	ACCI	—	—	—	—	50	20	50	9
Berberis nervosa	BENE2	50	2	50	1	25	7	100	14
Gaultheria shallon	GASH	100	47	100	11				
Rosa gymnocarpa	ROGY	—	—	—	—	25	1	50	2
Rubus ursinus	RUUR	25	2	—	—	—	—	—	—
Vaccinium ovatum	VAOV2	50	1	25	1	—	—	—	—
Vaccinium parvifolium	VAPA	50	22	50	4	—	—	—	—
Herbs and ferns:									
Achlys triphylla	ACTR	11	4	4	+	46	5	7	2
Adenocaulon bicolor	ADBI	—	—	—	—	25	5	18	5
Antilclea occidentalis	ANOC	4	1	—	—	—	—	—	—
Athyrium filix-femina var. *cyclosorum*	ATFIC	4	2	—	—	—	—	—	—
Calypso bulbosa	CABU	—	—	—	—	4	+		
Campanula scouleri	CASC7	—	—	—	—	46	2	14	1
Carex bolanderi	CABO2	4	+	—	—	—	—	—	—
Chimaphila menziesii	CHME	—	—	4	+	—	—	—	—
Chimaphila umbellata var. *occidentalis*	CHUMO2	—	—	4	+	—	—	—	—
Clintonia uniflora	CLUN2	—	—	—	—	54	5	—	—
Collomia heterophylla	COHE2	—	—	—	—	7	+	—	—
Cystopteris fragilis	CYFR2	—	—	—	—	—	—	4	+
Dryopteris arguta	DRAR3	4	1	—	—	—	—	—	—
Festuca occidentalis	FEOC	—	—	—	—	4	+	4	+
Fragaria vesca var. *bracteata*	FRVEB2	—	—	—	—	4	+		
Galium triflorum	GATR3	4	1	—	—	29	+	4	+
Goodyera oblongifolia	GOOB2	—	—	4	+	7	+		
Heuchera micrantha	HEMI7	—	—	—	—	—	—	18	2
Hieracium albiflorum	HIAL2	—	—	—	—	14	1	4	+

Table 2—Plant association, understory coverage, and frequency of four permanent plots in Grayback Glades Research Natural Area (continued)

		Plant association[a]							
		CHLA-ABCO/BENE2[b]				ABCO/BENE2/ACTR			
		Transect 598		Transect 599		Transect 601		Transect 602	
Scientific name[c]	Code	Frequency[d]	Cover	Frequency	Cover	Frequency	Cover	Frequency	Cover
Lathyrus vestitus var. *ochropetalus*	LAVEO2	—	—	4	+	—	—	—	—
Linnaea borealis ssp. *longiflora*	LIBOL	32	4	—	—	11	1	7	+
Listera sp.	LISTE	4	+	—	—	—	—	—	—
Lonicera hispidula	LOHI2	—	—	—	—	—	—	7	+
Mainanthemum stellatum	MAST4	—	—	—	—	4	+	7	+
Melica subulata	MESU	—	—	11	1	25	+	—	—
Mitella ovalis	MIOV	—	—	—	—	7	+	—	—
Moehringia macrophylla	MOMA3					21	+	7	+
Nemophila parviflora	NEPA	—	—	—	—	4	+	—	—
Osmorhiza berteroi	OSBE	—	—	—	—	21	1	7	+
Petasites frigidus var. *sagittatus*	PEFRS5	4	2	—	—	—	—	—	—
Phlox adsurgens	PHAD2	—	—	—	—	14	+	4	+
Polystichum munitum	POMU	4	+	—	—	—	—	11	8
Prosartes hookeri	PRHO2	—	—	—	—	14	1	—	—
Pyrola asarifolia	PYAS	4	+	—	—	—	—	—	—
Senecio triangularis var. *triangularis*	SETRT	4	1	—	—	—	—	—	—
Streptopus amplexifolius	STAM2	4	+	—	—	—	—	—	—
Tiarella trifoliata var. *unifoliata*	TITRU	29	3	4	+	4	1	4	+
Trientalis borealis ssp. *latifolia*	TRBOL	—	—	—	—	14	1	4	+
Trillium ovatum	TROV2	4	+	—	—	—	—	—	—
Trisetum canescens	TRCA21	—	—	—	—	—	—	11	+
Vancouveria hexandra	VAHE	4	+	7	+	—	—	7	+
Veratrum californicum	VECA2	—	—	—	—	—	—	—	—
Viola glabella	VIGL	—	—	4	+	4	+	—	—
Viola sempervirens	VISE3	—	—	—	—	—	—	7	1
Whipplea modesta	WHMO	4	1	—	—	—	—	7	+

[a] Plant associations are named based on a combination of the dominant life form plus the characteristic or dominant plant species in the various plant layers (trees, shrubs, and herbs). Plant association acronyms are a shorthand form for communicating the plant association name. Each acronym is made up of the first two letters of the genus name of the dominant or characteristic species within a layer, and combined with the first two letters of the specific epithet of the species (e.g., Abies concolor is shortened to ABCO). Plant associations are generally defined by the dominant or characteristic species that occupies or has the biological potential to occupy the uppermost vegetation layer. In forested plant associations, this is the tree layer. Additional names are used for understory layers when they contain dominant, characteristic, or diagnostic species (e.g., white fir/Cascade barberry/sweet after death (*Abies concolor*/*Berberis nervosa*/*Achlys triphylla*). Life form layers are separated by a slash (/). Codominants within a layer are separated by a dash (—).

[b] ABCO = *Abies concolor*, CHLA = *Chamaecyparis lawsoniana*, BENE2 = *Berberis nervosa*, ACTR = *Achlys triphylla*, + = trace (<0.5 percent foliar cover), — = not recorded.

[c] See appendix 1 for a listing of scientific and common names.

[d] Frequency is expressed as a percentage of relative frequency of occurrence within all 2 dm × 5 dm quadrats. Cover is expressed as an average percentage of foliar cover within all 2 dm × 5 dm quadrats. Zero values are not included.

A list of scientific and common names for vascular plants known to occur within Grayback Glades RNA appears in appendix 1. A list of scientific and common names for fungi can be found in appendix 2.

Fauna

Amphibians, reptiles, birds, and mammals known or expected to occur within the RNA are listed in appendix 3. These lists were derived from field observations made by experienced local biologists and from the published literature (Csuti et al. 1997) using species distribution, life history characteristics, and availability of habitat within the RNA as criteria for inclusion on the list.

Disturbance History

Port Orford cedar root disease is present along and adjacent to the lower reaches of Rock Creek and Right Hand Fork Rock Creek. A fungus, *Phytophthora lateralis*, is the cause of the highly contagious disease. Because spores of the fungus normally are not airborne, the spread of the disease can be avoided by minimizing and isolating sources of infection and by preventing the movement of soil from infected to uninfected areas. *Phytophthora lateralis* depends on free water to spread and infect other plants and on humans for long-distance spread (Roth et al. 1987). Restricting movement and activities of vectors, principally humans, is a primary control method within the RNA. Control and containment restrictions include closing roads to travel and sanitizing boots and affected clothing when leaving the infected area.

Blackened tree trunks and charcoal pieces observed throughout the RNA are evidence of past fire activity. A complex of wildfires burned across the Siskiyou Mountains in 1936, including parts of Little Sugarloaf, Big Sugarloaf, and Grayback Mountains. Approximately 71 ha (175 ac) of ridgetops and upper slopes burned within the RNA (USDI BLM 2013a). No major fires have been recorded within the RNA since 1936. However, at least three lightning ignited fires within the RNA have been suppressed by Oregon Department of Forestry fire crews (ODF 2013), including one on August 12, 2014, when a lightning strike ignited forest vegetation near Big Sugarloaf Peak (Gallimore 2014). The Big Sugarloaf fire was suppressed at 1 ha (2.47 ac) using multiple loads of retardant dropped from aircraft and water dropped from helicopter buckets.

Research History

Atzet et al. (1996) sampled forest stands within the RNA when preparing the *Field Guide to the Forested Plant Associations of Southwestern Oregon*.

Four long-term vegetation monitoring plots were established in 2013 (Schuller et al. 2013). Two plots are located within the Rock Creek drainage at approximately 1372 m (4,500 ft), and two plots are in the Right Hand Fork Rock Creek drainage at approximately 1128 m (3,700 ft).

Maps

Maps applicable to Grayback Glades RNA: Topographic—Williams, Oregon, 7.5 minute; 1:24,000 scale, 1986; Medford District-western portion, BLM transportation map, 1:126,720.

Acknowledgments

The following people merit recognition for their contributions. Jason Reilly, wildlife biologist, Grants Pass Resource Area, Medford District, BLM, reviewed and improved the list of animals in appendix 3. The three manuscript reviewers were Todd Wilson, wildlife biologist and research natural area coordinator, U.S. Forest Service, Pacific Northwest Research Station; Marlin Pose, wildlife biologist, BLM, Medford District, Grants Pass Resource Area; and Sarah Davison, forester, BLM, Medford District, Grants Pass Resource Area. The project is funded through the BLM Medford District and is administratively supported by the U.S. Forest Service, Pacific Northwest Research Station.

English Equivalents

When you know:	Multiply by:	To find:
Hectare (ha)	2.47	Acres (ac)
Kilometer (km)	0.62	Mile (mi)
Meter (m)	3.28	Feet (ft)
Square meter (m2)	10.76	Square feet (ft^2)
Centimeter (cm)	0.394	Inch (in)
Millimeter (mm)	0.0394	Inch
Degrees Fahrenheit	(0F – 32)/1.8	Degrees Celsius

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Appendix 1: List of Scientific and Common Names for Vascular Plants Found on the Grayback Glades Research Natural Area [a b]

Scientific name	Common name[c]
Coniferous trees:	
Abies concolor (Gord. & Glend.) Lindl. ex Hildebr.	White fir
Abies magnifica A. Murray bis var. *shastensis* Lemmon	Shasta red fir
C*hamaecyparis lawsoniana* (A. Murray) Parl	Port Orford cedar
Pinus lambertiana Dougl.	Sugar pine
Pinus ponderosa Laws. & C. Laws.	Ponderosa pine
Pseudotsuga menziesii (Mirbel) Franco	Douglas-fir
Taxus brevifolia Nutt.	Western yew
T*suga mertensiana* (Bong.) Carr.	Mountain hemlock
Deciduous trees >8 m (26.3 ft) tall:	
A*lnus rubra* Bong.	Red alder
Arbutus menziesii Pursh	Pacific madrone
Chrysolepis chrysophylla (Dougl. ex Hook.) Hjelmq.	Giant chinquapin
Notholithocarpus densiflorus (Hook. & Arn.) Manos. et al.	Tanoak
Tall shrubs 2 to 8 m (6.6 to 26.3 ft) tall:	
Acer circinatum Pursh	Vine maple
Alnus viridis (Chaix) DC. ssp. *sinuata* (Regel) Á. Löve & D. Löve	Sitka alder
Amelanchier alnifolia Nutt.	Western serviceberry
Holodiscus discolor (Pursh) Maxim	Oceanspray
Quercus sadleriana R. Br. ter	Deer oak
Medium shrubs 0.5 to 2 m (1.6 to 6.6 ft) tall:	
Gaultheria shallon Pursh	Salal
Rosa gymnocarpa Pursh	Dwarf rose
Symphoricarpos albus (L.) S. F. Blake	Common snowberry
Vaccinium membranaceum Dougl. ex Torr.	Thinleaf huckleberry
Vaccinium ovatum Pursh	California huckleberry
Vaccinium parvifolium Sm.	Red huckleberry
Low shrubs <0.5 m (1.6 ft) tall:	
Berberis nervosa Pursh	Cascade barberry
Lonicera hispidula (Lindl.) Douglas ex Torr. & A. Gray	Pink honeysuckle
Rubus ursinus Cham. & Schldtl.	California dewberry
Whipplea modesta Torr.	Common whipplea

Scientific name	Common name[c]
Ferns and allies:	
Adiantum pedatum L.	Northern maidenhair
Athyrium filix-femina (L.) Roth var. *cyclosorum* (Rupr.) C. Chr.	Subarctic ladyfern
Cystopteris fragilis (L.) Bernh.	Brittle bladderfern
Dryopteris arguta (Kaulf.) Watt	Coastal woodfern
Polystichum munitum (Kaulf.) Presl	Western swordfern
Pteridium aquilinum (L.) Kuhn.	Bracken fern
Herbs:	
Achlys triphylla (Sm.) DC.	Sweet after death
Adenocaulon bicolor Hook	American trailplant
Anticlea occidentalis (A. Gray) Zoml. & Judd	Western featherbells
Aquilegia formosa Fisch. ex DC.	Western columbine
Calypso bulbosa (L.) Oakes	Fairy slipper
Campanula scouleri Hook. ex A. DC.	Pale bellflower
Castilleja sp.	Paintbrush
Chimaphila menziesii (R. Br. ex D. Don) Spreng	Little prince's pine
Chimaphila umbellata (L.) Bart. ssp. *occidentalis* (Rydb.) Hultén	Pipsissewa
Clinopodium douglasii (Benth.) Kuntze	Yerba buena
Clintonia uniflora (Menzies ex Schult. & Schult. f.) Kunth	Bride's bonnet
C*ollomia heterophylla* Dougl. ex Hook.	Variableleaf collomia
Corallorhiza maculata (Raf.) Rag.	Summer coralroot
Fragaria vesca L. ssp. *bracteata* (A. Heller) Staudt	Woodland strawberry
G*alium triflorum* Michx.	Sweet scented bedstraw
Goodyera oblongifolia Raf.	Western rattlesnake plantain
Heuchera micrantha Lindley	Small-flowered alumroot
Hieracium albiflorum Hook.	White hawkweed
Lathyrus vestitus Nutt. var. *ochropetalus*	Bolander's pea
Lilium sp.	Lily
Linnaea borealis L. var. *longiflora* (Torr.) Hultén	Longtube twinflower
Listera caurina Piper	Northwestern twayblade
Maianthemum stellatum (L.) Link	Starry false lily of the valley
Mitella ovalis Greene	Coastal miterwort
Moehringia macrophylla (Hook.) Fenzl	Largeleaf sandwort
Nemophila parviflora Dougl. ex Benth.	Smallflower nemophila
Nothochelone nemorosa (Dougl. ex Lindl.) Straw	Woodland beardtongue
Osmorhiza berteroi DC.	Sweetcicely

Scientific name	Common name[c]
Pedicularis racemosa Dougl. ex Benth.	Sickletop lousewort
Petasites frigidus (L.) Fr. var. *sagittatus* (Banks ex Pursh) Cherniawsky	Arrowleaf sweet coltsfoot
Phlox adsurgens Torr. ex A. Gray	Northern phlox
Platanthera dilatata (Pursh) Lindl. ex Beck var. *leucostachys* (Lindl.) Luer	Sierra bog orchid
Prosartes hookeri Torr.	Drops-of-gold
Pyrola asarifolia Michx.	Liverleaf wintergreen
Pyrola picta Sm.	Whiteveined wintergreen
Senecio triangularis Hook.	Arrowleaf ragwort
Streptopus amplexifolius (L.) DC.	Claspleaf twistedstalk
Tiarella trifoliata L. var. *unifoliata* (Hook.) Kurtz	Oneleaf foamflower
Trientalis borealis Raf. ssp. *latifolia* (Hook.) Hultén	Broadleaf starflower
Trillium ovatum Pursh	Pacific trillium
Vancouveria hexandra (Hook.) C. Morren & Decne.	White inside out flower
Veratrum californicum Durand	California false hellebore
Viola glabella Nutt.	Pioneer violet
Viola sempervirens Greene	Evergreen violet
Grasses, rushes, and sedges:	
Carex bolanderi Olney	Bolander's sedge
Festuca occidentalis Hook.	Western fescue
Festuca subulata Trin.	Bearded fescue
Melica subulata (Griseb.) Scribn.	Alaska oniongrass
Trisetum canescens Buckl.	Tall trisetum

[a] Nomenclature follows the *Flora of North America* (FNA 1993+) and the *Oregon Flora Project* (Cook et al. 2013).
[b] Compiled from field surveys (Schuller et al. 2013).
[c] Common names follow the USDA Plants Database (USDA NRCS 2013).

Appendix 2: List of Scientific and Common Names for Fungi Found on the Grayback Glades Research Natural Area [a b c]

Scientific name	Common name
Albatrellus ellisii (Berk.) Pouzar	—
Aleuria aurantia (Pers.) Fuckel	—
Amanita cokeri E-J. Gilbert & Kühner ex E-J. Gilbert	—
Boletopsis grisea (Peck) Bondartsev & Singer	—
Boletus sp.	Bolete
Boletus fibrillosus Thiers	—
Boletus luridiformis Rostk.	—
Boletus subtomentosus J.A. Palmer	—
Bondarzewia montana (Quél.) Singer	—
Chlorociboria aeruginascens (Nyl.) Kanouse	—
Chrysomphalina chrysophylla (Fr.) Clémençon	—
C*lavaria vermicularis* Batsch	—
Clavariadelphus ligula (Schaeff.) Donk	—
Clavariadelphus occidentalis Methven	—
Clavariadelphus truncatus Donk	—
Clavicorona sp.	—
Clavulina cristata (Holmsk.) J. Schröt.	—
Clavulinopsis laeticolor (Berk. & M.A. Curtis) R.H. Petersen	—
Clavulina sp.	—
Clavulinopsis laeticolor (Berk. & M.A. Curtis) R.H. Petersen	—
Clitocybe gigantea Quél.	—
Clitocybe avellaneoalba Murrill	—
Clitocybe cyathiformis (Bull.) P. Kumm.	—
Clitocybe gigantea Quél.	—
Clitocybe sp.	—
Clitocybula familia (Peck) Singer	—
Clitocybe odora (Bull.) P. Kumm.	Anise-scented clitocybe
Collybia sclorotia	—
Collybia oregonensis A.H. Sm.	—
Coltricia perennis (L.) Murrill	—
Cortinarius elegantior (Fr.) Fr. 1838 group	—
Cortinarius camphoratus (Fr.) Fr.	—
Cortinarius clandestinus Kauffman	—
Cortinarius infractus (Pers.) Fr.	—
Cortinarius malachius (Fr.) Fr.	—
Cortinarius mucosus (Bull.) J. Kickx f.	—
Cortinarius olympianus A.H. Sm.	—
Cortinarius percomis Fr.	—
Cortinarius purpurascens Fr.	—

Scientific name	Common name
Cortinarius sp.	—
Craterellus tubaeformis (Fr.) Quél.	—
Cryptoporus volvatus (Peck) Shear	—
Cudonia circinans	—
Cudoniella sp.	—
Cystoderma amianthinum (Scop.) Fayod	—
Cystoderma fallax A.H. Sm. & Singer	—
Cystodermella granulosa (Batsch) Harmaja	—
Cortinarius smithii Ammirati, Niskanen & Liimat.	—
Entoloma bloxamii (Berk. & Broome) Sacc.	—
Entolomataceae	—
Entoloma sp.	—
Floccularia albolanaripes (G.F. Atk.) Redhead	—
Fomitopsis cajanderi (P. Karst.) Kotl. & Pouzar	—
Galerina sp.	—
Galerina marginata (Batsch) Kühner	—
Galerina stricta	—
Geastrum famicatum	—
Fomitopsis cajanderi (P. Karst.) Kotl. & Pouzar	—
Gomphidius sp.	—
Gomphus clavatus (Pers.) Gray	Pig's ear
Gomphus kauffmanii (A.H. Sm.) Corner	—
Gymnomyces sp.	—
Gymnopilus sp.	—
Gymnopilus punctifolius (Peck) Singer	—
Gymnopus acervatus (Fr.) Murrill	—
Hebeloma hiemale Bres.	—
Helvella crispa Bull.	—
Hohenbuellia sp.	—
Hydnum repandum L.	Hedgehog mushroom
Hydnum umbilicatum Peck	Belly-button mushroom
Hygrocybe acutoconica (Clem.) Singer	—
Hygrocybe nitida (Berk. & M.A. Curtis) Murrill	—
Hygrocybe singeri (A.H. Sm. & Hesler) Singer	—
Hygrocybe virginea (Wulfen) P.D. Orton & Watling	—
Hygrophorus sp.	—
Hygrophorus agathosmus (Fr.) Fr.	—
Hygrophorus piceae Kühner	—
Hygrophorus pratensis var. *pratensis* (Fr.) Fr.	—
Hygrophorus russocoriaceus Berk. & Jos.K. Mill.	—
Hygrophorus saxatilis A.H. Sm. & Hesler	—
Hygrophorus sordidus Peck	—
Hygrophorus subalpinus A.H. Sm.	—

Scientific name	Common name
Hygrophorus coccineus (Schaeff.) Fr.	—
Hymenochaete tabacina (Sowerby) Lév.	—
Hypholoma capnoides (Fr.) P. Kumm.	—
Inocybe sp.	—
Inocybe olympiana A.H. Sm.	—
Inocybe pudica Kühner	—
Jahnoporus hirtus (Cooke) Nuss	—
Kheuneromyces sp.	—
Laccaria amethysteo-occidentalis G.M. Muell.	—
Laccaria laccata (Scop.) Cooke	—
Lactarius alpinus var. *mitis* Hesler & A.H. Sm.	—
Lactarius deliciosus (L.) Gray	Delicious milk-cap
Lactarius kauffmanii Hesler & A.H. Sm.	—
Lactarius sp.	—
Lactarius subflammeus Hesler & A.H. Sm.	—
Lactarius xanthogalactus Peck	—
Lentinellus ursinus (Fr.) Kühner	—
Lentinellus montanus O.K. Mill.	—
Leotia viscosa Fr.	—
Lepista aeruginosa (H.E. Bigelow) Harmaja	—
Leptonia cyanea Mazzer	—
Leptonia parva Peck	—
Leptonia sp.	—
Marasmius sp.	—
Marasmius copelandii Peck	—
Mucroella sp.	—
Muscicolous fungi	
Mycena aurantiidisca (Murrill) Murrill	—
Mycena galericulata (Scop.) Gray	—
Mycena aculate Cleland	—
Mycena pterigena (Fr.) P. Kumm.	—
Otidea sp.	—
Phellodon tomentosus (L.) Banker	—
Pholiota aurivella (Batsch) P. Kumm.	—
Pholiota squarrosa (Vahl) P. Kumm.	—
Pluteus sp.	—
Polyporus melanopus (Pers.) Fr.	—
Psathyrella longistriata (Murrill) A.H. Sm.	—
Psilocybe montana (Pers.) P. Kumm.	—
Ramaria sp.	Coral mushroom
Ramaria (subgenus *Echinoramaria*)	—
Ramaria (orange tips)	—
Ramaria apiculata var. *apiculata* (Fr.) Donk	—

Scientific name	Common name
Ramaria apiculata var. *brunnea* R.H. Petersen	—
Ramaria botrytis var. *botrytis* (Pers.) Ricken	—
Ramaria cauliflоriformis (Leathers) Corner	—
Ramaria formosa (Pers.) Quél.	—
Ramaria rubiginosa Marr & D.E. Stuntz	—
Ramaria sandaracina var. *euosma* Marr & D.E. Stuntz	—
Ramaria stuntzii Marr	—
Ramaria subviolacea R.H. Petersen & Scates	—
Ramaria violaceibrunnea (Marr & D.E. Stuntz) R.H. Petersen	—
Rhizopogon sp.	—
Rhizopogon truncatus Linder	—
Rhodocollybia sp.	—
Rozites caperatus (Pers.) P. Karst.	—
Russula cessans A. Pearson	—
Russula sanguinea Fr.	—
Sarcomyxa serotina (Pers.) P. Karst.	—
Scutellinia scutellata (L.) Lambotte	—
Spathularia flavida Pers.	—
Stereocyphellum sp.	—
Stereum hirsutum (Willd.) Pers.	—
Strobilurus albipilatus (Peck) V.L. Wells & Kempton	—
Stropharia sp.	—
Suillus punctatipes (Snell & E.A. Dick) Singer	—
Tapesia fusca (Pers.) Fuckel	—
Ticholomopsis sp.	—
Tremiscus helvelloides (DC.) Donk	—
Trichoglossum hirsutum (Pers.) Boud.	—
Tricholoma portentosum (Fr.) Quél.	—
Tricholoma sp.	—
Tricholoma equestre (L.) P. Kumm.	—
Tricholoma magnivelare (Peck) Redhead	—
Tricholoma sulphureum (Bull.) P. Kumm.	—
Tricholoma venenatum G.F. Atk.	—
Tricholomopsis decora (Fr.) Singer	—
Tricholomopsis rutilans (Schaeff.) Singer	—
Tricholoma portentosum (Fr.) Quél.	—
Truncocolumella citrina Zeller	—
Tyromyces mollis (Pers.) Kotl. & Pouzar	—
Xylaria sp.	—

[a] Nomenclature follows Mycobank (2014).
[b] Compiled from field surveys (USDI BLM 2013b).
[c] — = no common name is available.

Appendix 3: List of Scientific and Common Names for Amphibians, Reptiles, Birds, and Mammals Found on the Grayback Glades Research Natural Area[a b]

Family	Scientific name	Common name
Amphibians:		
Ambystomatidae	*Ambystoma gracile*	Northwestern salamander
Dicamptodontidae	*Dicamptodon tenebrosus*	Pacific giant salamander
	Rhyacotriton variegatus	Southern torrent salamander
Plethodontidae	*Aneides ferreus*	Clouded salamander
	Ensatina eschscholtzi	Ensatina
	Plethodon dunni	Dunn's salamander
	Plethodon elongatus	Del Norte salamander
Salamandridae	*Taricha granulosa*	Roughskin newt
Hylidae	*Pseudacris regilla*	Pacific chorus frog
Leiopelmatidae	*Ascaphus truei*	Tailed frog
Ranidae	*Rana aurora*	Red-legged frog
	Rana boylii	Foothill yellow-legged frog
	Rana catesbeiana	Bullfrog
Reptiles:		
Anguidae	*Elgaria coerulea*	Northern alligator lizard
	Elgaria multicarinata	Southern alligator lizard
Phrynostomatidae	*Sceloporus graciosus*	Sagebrush lizard
	Sceloporus occidentalis	Western fence lizard
Scincidae	*Eumeces skiltonianus*	Western skink
Boidae	*Charina bottae*	Rubber boa
Colubridae	*Coluber constrictor*	Racer
	Contia longicaudae	
	Contia tenuis	Sharptail snake
	Diadophis punctatus	Ringneck snake
	Lampropeltis getula	Common kingsnake
	Lampropeltis zonata	California mountain kingsnake
	Pituophis catenifer	Gopher snake
	Thamnophis atratus	Pacific Coast aquatic garter snake
	Thamnophis couchii	Western aquatic garter snake
	Thamnophis elegans	Western terrestrial garter snake
	Thamnophis ordinoides	Northwestern garter snake
	Thamnophis sirtalis	Common garter snake
Viperidae	*Crotalus viridis*	Western rattlesnake

Family	Scientific name	Common name
Birds:		
Cathartidae	*Cathartes aura*	Turkey vulture
Accipitridae	*Accipiter cooperii*	Cooper's hawk
	Accipiter gentilis	Northern goshawk
	Accipiter striatus	Sharp-shinned hawk
	Buteo jamaicensis	Red-tailed hawk
Phasianidae	*Bonasa umbellus*	Ruffed grouse
	Dendragapus fuliginosus	Sooty grouse
	Oreortyx pictus	Mountain quail
Columbidae	*Columba fasciata*	Band-tailed pigeon
Strigidae	*Aegolius acadicus*	Northern saw-whet owl
	Asio otus	Long-eared owl
	Bubo virginianus	Great-horned owl
	Glaucidium gnoma	Northern pygmy-owl
	Otus flammeolus	Flammulated owl
	Otus kennicottii	Western screech-owl
	Strix occidentalis caurina	Northern spotted owl
	Strix nebulosa	Great gray owl
Apodidae	*Chaetura vauxi*	Vaux's swift
Trochilidae	*Selasphorus rufus*	Rufous hummingbird
	Stellula calliope	Calliope hummingbird
Picidae	*Colaptes auratus*	Northern flicker
	Dryocopus pileatus	Pileated woodpecker
	Picoides albolarvatus	White-headed woodpecker
	Picoides pubescens	Downy woodpecker
	Picoides villosus	Hairy woodpecker
	Sphyrapicus ruber	Red-breasted sapsucker
Tyrannidae	*Contopus borealis*	Olive-sided flycatcher
	Contopus sordidulus	Western wood peewee
	Empidonax difficilis	Pacific-slope flycatcher
	Empidonax hammondii	Hammond's flycatcher
	Empidonax oberholseri	Dusky flycatcher
Corvidae	*Corvus brachyrhynchos*	American crow
	Corvus corax	Common raven
	Cyanocitta stelleri	Steller's jay
	Perisoreus canadensis	Gray jay
Paridae	*Parus atricapillus*	Black-capped chickadee
	Parus rufescens	Chestnut-backed chickadee
	Poecile gambeli	Mountain chickadee
Sittidae	*Sitta canadensis*	Red-breasted nuthatch
Certhiidae	*Certhia americana*	Brown creeper
Troglodytidae	*Salpinctes obsoletus*	Rock wren
	Troglodytes troglodytes	Pacific wren

Family	Scientific name	Common name
Muscicapidae	*Catharus guttatus*	Hermit thrush
	Catharus ustulatus	Swainson's thrush
	Ixoreus naevius	Varied thrush
	Myadestes townsendi	Townsend's solitaire
	Regulus calendula	Ruby-crowned kinglet
	Regulus satrapa	Golden-crowned kinglet
	Turdus migratorius	American robin
Vireonidae	*Vireo cassinii*	Cassin's vireo
	Vireo gilvus	Warbling vireo
	Vireo huttonii	Hutton's vireo
Emberizidae	*Dendroica coronata*	Yellow-rumped warbler
	Dendroica nigrescens	Black-throated gray warbler
	Dendroica occidentalis	Hermit warbler
	Dendroica townsendi	Townsend's warbler
	Junco hyemalis	Dark-eyed junco
	Melospiza lincolnii	Lincoln sparrow
	Melospiza melodia	Song sparrow
	Oporornis tolmiei	MacGillivray's warbler
	Passerella iliaca	Fox sparrow
	Pheucticus meelanocephalus	Black-headed grosbeak
	Piranga rubra	Western tanager
	Zonotrichia leucophrys	White-crowned sparrow
Fringillidae	*Carduelis pinus*	Pine siskin
	Carpodacus cassinii	Cassin's finch
	Carpodacus purpureus	Purple finch
	Coccothraustes vespertinus	Evening grosbeak
	Loxia curvirostra	Red crossbill
Mammals:		
Soricidae	*Sorex trowbridgii*	Trowbridge's shrew
Talpidae	*Neurotrichus gibbsii*	American shrew-mole
Vespertilionidae	*Corynorhinus townsendii*	Townsend's big-eared bat
	Eptesicus fuscus	Big brown bat
	Lasionycteris noctivagans	Silver-haired bat
	Myotis californicus	California myotis
	Myotis evotis	Long-eared myotis
	Myotis lucifugus	Little brown myotis
	Myotis thysanodes	Fringed myotis
	Myotis volans	Long-legged myotis
Leporidae	*Lepus americanus*	Snowshoe hare
Aplodontidae	*Aplodontia rufa*	Mountain beaver

Family	Scientific name	Common name
Sciuridae	*Glaucomys sabrinus*	Northern flying squirrel
	Sciurus griseus	Western gray squirrel
	Spermophilus lateralis	Golden-mantled ground squirrel
	Tamias townsendii	Townsend's chipmunk
	Tamiasciurus douglasii	Douglas' squirrel
Muridae	*Clethrionomys californicus*	Western red-backed vole
	Microtus californicus	California vole
	Microtus longicaudus	Long-tailed vole
	Microtus oregoni	Creeping vole
	Microtus townsendii	Townsend's vole
	Neotoma cinerea	Bushy-tailed woodrat
	Neotoma fuscipes	Dusky-footed woodrat
	Arborimus albipes	White-footed vole
	Arborimus longicaudus	Red tree vole
Dipodidae	*Zapus trinotatus*	Pacific jumping mouse
Erethizontidae	*Erethizon dorsatum*	Common porcupine
Canidae	*Canis latrans*	Coyote
	Urocyon cinereoargenteus	Gray fox
Ursidae	*Ursus americanus*	Black bear
Procyonidae	*Procyon lotor*	Common raccoon
Mulstelidae	*Martes pennati*	Pacific fisher
	Mustela erminea	Ermine
	Mustela frenata	Long-tailed weasel
	Spilogale gracilis	Western spotted skunk
Felidae	*Felis concolor*	Mountain lion
	Lynx rufus	Bobcat
Cervidae	*Cervus elaphus*	Elk
	Odocoileus hemionus ssp. *columbianus*	Black-tailed deer

[a] Nomenclature follows Csuti et al. (1997).
[b] List was compiled from habitat descriptions and distribution maps taken from Csuti et al. (1997).

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