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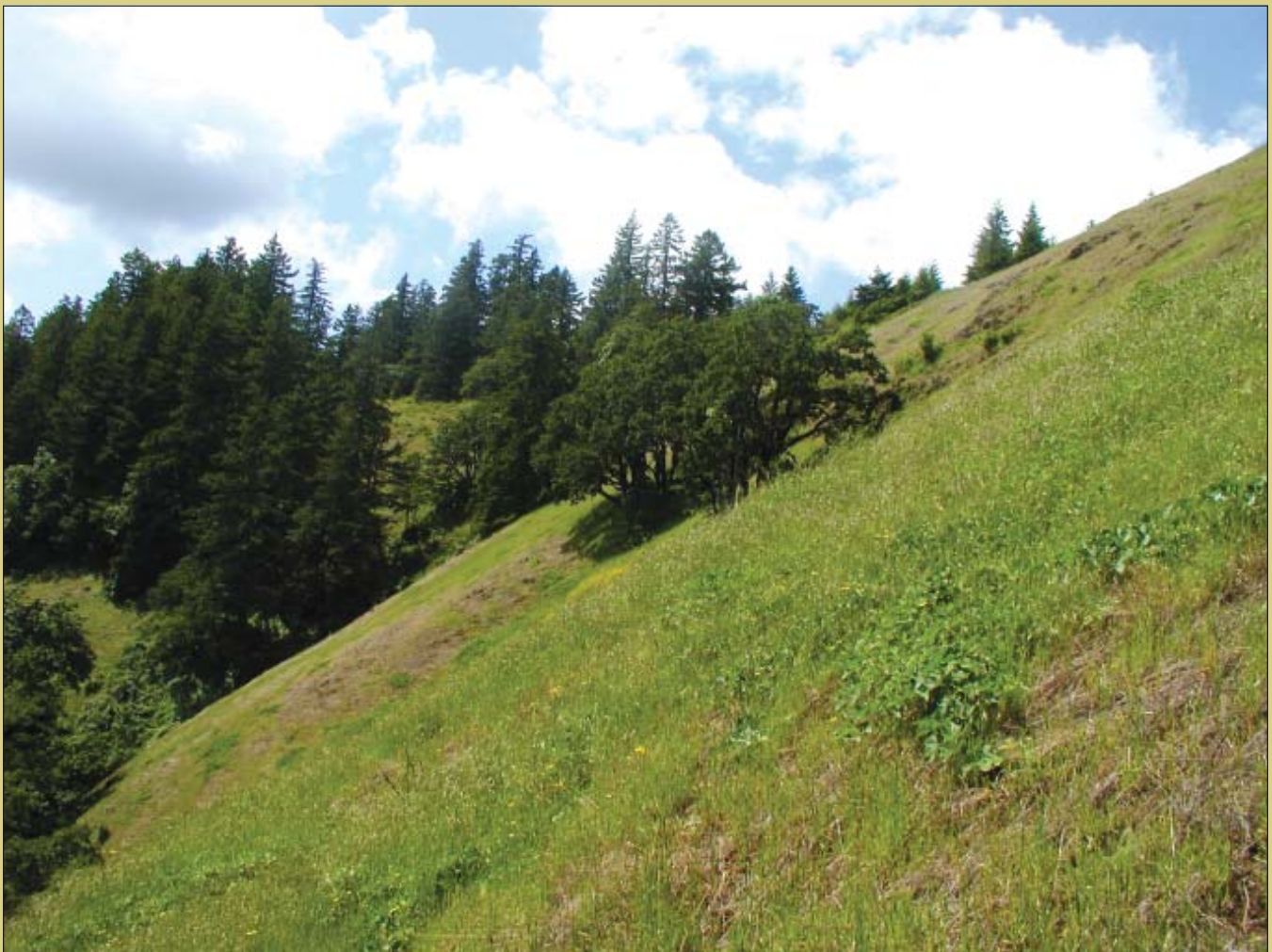
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# Forest Peak Research Natural Area: Guidebook Supplement 33

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

## Cover

Steep slopes of Forest Peak RNA with grass meadow vegetation and Oregon white oak (*Quercus garryana*) coppice in mid-ground and Douglas-fir (*Pseudotsuga menziesii*) in background. Dominant ground cover is a mixture of native and nonnative grasses. The northern ridgeline boundary of Forest Peak is on the upper right.

## Abstract

**Schuller, Reid; Exeter, Ronald L. 2007.** Forest Peak Research Natural Area: guidebook supplement 33. Gen. Tech. Rep. PNW-GTR-730. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 23 p.

This guidebook describes the Forest Peak Research Natural Area (RNA), a 62.8-ha (153.3-ac) tract containing a mature Douglas-fir (*Pseudotsuga menziesii*) forest and a grass bald within the Willamette Valley Foothill Ecoregion. Forest Peak RNA also contains an undisturbed third-order stream reach.

Keywords: Research natural area, Douglas-fir forest, Oregon Coast Range, Willamette Valley foothill forest, grassland meadow, grass bald, third-order stream

## Preface

The research natural area (RNA) described in this supplement<sup>1</sup> is administered by the Bureau of Land Management (BLM), U.S. Department of the Interior. The BLM Salem District office has RNA program administrative responsibility and the Marys Peak Resource Area has on-the-ground management responsibility for the RNA. Scientists and educators wishing to visit or use the RNA for scientific or educational purposes should contact the resource area field 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.

Forest Peak RNA is part of a federal system of such tracts established for research and educational purposes. Each RNA constitutes a site where natural features are protected or managed for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide:

- Baseline areas against which effects of human activities can be measured or compared.
- Sites for study of natural processes in undisturbed ecosystems.
- Gene pool preserves for all types of organisms, especially rare and endangered types.

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<sup>1</sup> Supplement No. 33 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.

The federal system is outlined in *A Directory of the Research Natural Areas on Federal Lands of the United States of America*.<sup>2</sup>

Of the 96 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). Supplements to the guidebook such as this publication constitute additions to the system.

The guiding principle in management of RNAs is to prevent unnatural encroachments or activities that directly or indirectly modify ecological processes or conditions. Logging and uncontrolled grazing are not allowed, for example, nor is public use that might impair scientific or educational values. Management practices necessary to maintain or restore ecosystems may be allowed.

Federal RNAs provide a unique system of publicly owned and protected examples of undisturbed 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. In return, a scientist wishing to use an RNA is obligated to:

- Obtain permission from the appropriate administering agency before using the area.<sup>3</sup>
- 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 these limitations is to:

- Ensure that the scientific and educational values of the tract are not impaired.
- Accumulate a documented body of knowledge and information about the tract.
- Avoid conflict between studies and activities.

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<sup>2</sup> Federal Committee on Ecological Reserves. 1977. A directory of the research natural areas on federal lands of the United States of America. Washington, DC: U.S. Department of Agriculture, Forest Service. 280 p.

<sup>3</sup> 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.

Research must be essentially nondestructive; destructive analysis of vegetation is generally not allowed, nor are studies requiring extensive modification of the forest floor or extensive excavation of soil. Collection of plant and animal specimens should be restricted to the minimum necessary to provide voucher specimens and other research needs. Under no circumstances may collecting significantly reduce populations of species. Collecting also must be carried out in accordance with agency regulations. Within these broad guidelines, appropriate uses of RNAs are determined by the administering agency.

Salem BLM management direction is to preserve, protect, or restore native species composition and ecological processes of biological communities (including terrestrial and aquatic cells<sup>4</sup> listed in the 2003 Oregon Natural Heritage Plan). These RNAs are available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured. The Marys Peak Resource Area does not issue special forest product permits within RNAs.

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<sup>4</sup> Cells are the basic units that must be represented in a natural area system. A cell can 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.

# **Contents**

- 1 Introduction**
- 2 Access and Accommodations**
- 3 Environment**
- 5 Climate**
- 6 Vegetation**
- 10 Fauna**
- 10 Disturbance History**
- 12 Research History**
- 12 Maps and Aerial Photography**
- 12 Acknowledgments**
- 13 English Equivalents**
- 13 References**
- 15 Appendix 1: Plants**
- 20 Appendix 2: Amphibians, Reptiles, Birds, and Mammals**

## Introduction

Forest Peak Research Natural Area (RNA) is a 62.8-ha (155.3-ac) area located in the western foothills of the Willamette Valley, Oregon. The tract was designated as an RNA in 1995.<sup>1</sup> The tract contains first- and second-order stream reaches in addition to a small segment of an undisturbed, third-order stream within the Willamette Valley Ecoregion<sup>2</sup> (Oregon Natural Heritage Program 2003).

Most of the RNA contains a high-quality, representative example of mature Douglas-fir (*Pseudotsuga menziesii*) forest (see appendixes for species names and authorities). Historically, Douglas-fir forests were a common feature within the Willamette Valley foothills. This has changed significantly over the past century owing to timber harvesting. Today, low-elevation Douglas-fir stands that are uncut and unroaded are few in number and small. In contrast to other remnant Douglas-fir stands in the region, Forest Peak is comparatively large. Much of the closed-canopy forest of the RNA has retained its “interior stand” integrity and is less vulnerable to edge effects (windthrow, altered insolation budgets) than most smaller RNAs within the region (Juday 1976).

Douglas-fir is a prominent feature in other RNAs occurring within and along the foothill margins of the Willamette Valley. As a group, the Douglas-fir forest communities located within the Willamette Valley and Valley Margin ecological provinces occur along a moisture gradient with drier sites in the south and increasingly wetter sites to the north. Along this gradient, many of the mature and old-growth stands within RNAs support stands of Douglas-fir in the upper canopy that are successional to either grand fir (*Abies grandis*) or western hemlock (*Tsuga heterophylla*). For further comparison, see Fox Hollow RNA, Mohawk RNA, and Camas Swale RNA to the south of Forest Peak, and Little Sink RNA, and The Butte RNA to the north.

Forest Peak is distinctive in that it occurs along the wetter end of the moisture gradient, based on the presence of grand fir along the streams at lower elevations within the RNA. The mesic moisture regime is also reflected by the abundance of bigleaf maple (*Acer macrophyllum*) and swordfern (*Polystichum munitum*). But the

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### Remnant Douglas-fir forest

<sup>1</sup> In May, 1995, 54.2-ha (134-ac) were designated in the Salem District Resource Management Plan. An additional 8.6 ha (21.3-ac) parcel is proposed for addition to the designated RNA. The combined 62.8-ha (155-ac) parcels are treated in this report.

<sup>2</sup> Roughly the same geographic area has variously been referred to as the Western Oregon Interior Valleys Province—Willamette Valley section (Dyrness et al. 1975), the Valley Margin Zone (Juday 1976), and the Western Interior Valleys Physiographic Province (USDI BLM 1996).

Douglas-fir stands at Forest Peak are **not** successional to western hemlock and do not appear to be successional to grand fir, at least on the mid and upper slopes of Forest Peak. We sampled three Douglas-fir stands in 2006 and provisionally placed them into the Douglas-fir series based on the sparse cover or absence of grand fir. The comparatively large size of the RNA, the presence of a core area without edge effects, and the occurrence of the Douglas-fir on the mesic end of a moisture gradient combine to provide a distinctive niche for Forest Peak within the region (Greene 1989). A 3.2-ha (8-ac) grass meadow<sup>3</sup> along the summit ridge fringed by an Oregon white oak (*Quercus garryana*) woodland represents additional site diversity within Forest Peak RNA. Magee (1985) defined grass bald as any meadow that occurs on or near the summits of montane peaks and ridges. The sites on which they occur are generally located within the climatic tolerance ranges of adjacent tree species.

Forest Peak RNA is administered by the Salem District of the USDI Bureau of Land Management (BLM) and managed as part of the Marys Peak Resource Area.

## Access and Accommodations

Forest Peak RNA is located in section 29, township 10 South, range 5 West, Willamette Meridian. Contact the Salem BLM for access information and permission to access the area (fig.1). Vehicle access via BLM Road 10-6-14 is as follows: From Monmouth, Oregon, at the intersection of Hwy. 99W and Main Street E, travel south on Hwy. 99 for approximately 11.8 km (7.3 mi) to the intersection of Hwy. 99W and Airlie Road. Turn west on Airlie Road for approximately 9.5 km (5.9 mi) to the Junction of Maxfield Creek Road. Turn south on Maxfield Creek road and continue approximately 8.5 km (5.3 mi) to the junction of BLM Road 10-6-14. This junction is located between two bridges on the south side of Maxfield Creek Road. Access to BLM Road 10-6-14 goes through the residential properties at 24820 and 24822 Maxfield Creek Road. Vehicle access is restricted by private landowners and two locked gates. Past the second gate proceed on Road 10-6-14 for 5.2 km (3.2 mi) to road junction 10-5-20. Continue on road 10-6-14 approximately 2 km (1.25 mi) to the ridgetop and park. Walk west-southwest approximately 0.3 km (0.2 mi) to the Forest Peak RNA boundary.

An alternate access route (not shown) is available, but access is also restricted by locked gates on private lands.

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<sup>3</sup> We refer to “grass meadows” throughout the text, replacing the less descriptive term “grass bald.”

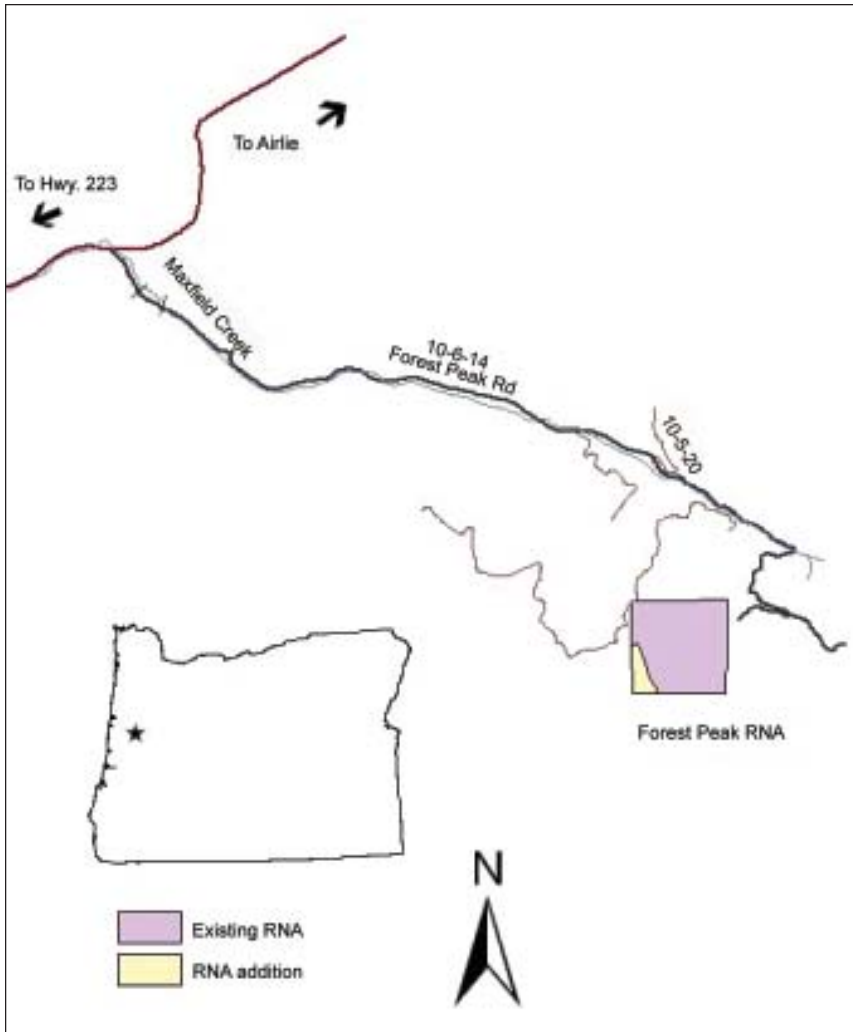


Figure 1—Forest Peak Research Natural Area (RNA) location and access.

There are no maintained trails within the RNA. Cross-country foot travel is generally difficult owing to steep slopes and loose soils. Nearby lodging accommodation is available in Monmouth or Corvallis, Oregon.

## Environment

Elevations range from 278 m (912 ft) in the southeastern portion where an unnamed, third-order stream flows south out of the RNA to 540 m (1,778 ft) along the ridgeline of Forest Peak in the northern portion of the tract (fig. 2). Slopes are moderately inclined (20 to 40 percent) and face southeast along the summit ridgeline, but then drop steeply (40 to 80 percent) through the central portion of the

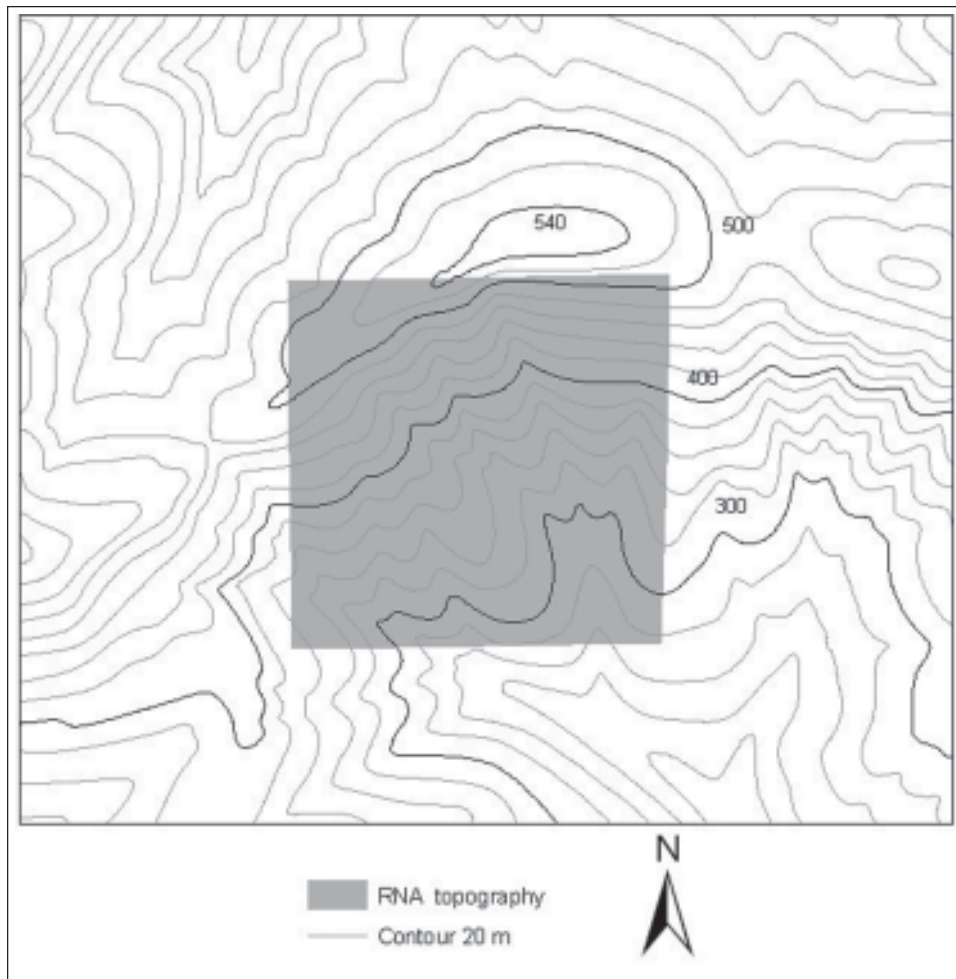


Figure 2—Forest Peak Research Natural Area (RNA) boundary and topography.

RNA. Slopes are oriented south to southeast in the southern third of the area, and drainages are moderately steep.

Bedrock exposed along the summit ridge of Forest Peak has been mapped as part of the Siletz River Volcanics series of lower Eocene age. These rocks are part of a broad, northeast trending belt extending from the northwest corner of the Monroe quadrangle to Coffin Butte in the Albany quadrangle. Rocks consist of a thick sequence of zeolitic pillow lava, basalt flows, and flow breccia, which can be interbedded with minor amounts of tuffaceous siltstone and fine tuff (Vokes et al. 1954).

The primary (85 percent of the area) soil mapping unit within the RNA is the Price-MacDunn-Ritner complex, 30- to 60-percent slopes. Parent material is a loamy colluvium derived from basalt over a clayey colluvium derived from basalt.

Soils are silty clay loams to a depth of 2.5 to 20 cm (1 to 8 in), and silty clay at depths of 79 to 137 cm (31 to 54 in). A gravelly silty clay loam layer occurs at 137 to 218 cm (54 to 86 in) depth and overlies bedrock. The taxonomic classification of this complex includes fine, mixed, superactive, mesic Typic Haploxerepts; and clayey-skeletal, mixed, superactive mesic Typic Haploxerepts (USDA NRCS 2006). Soils underlying the grass bald are mapped as Witzel-Ritner complex, 30- to 60-percent slopes. Parent material is gravelly colluvium derived from basalt. Soils are shallow and are very cobbly loam to a depth of 0 to 10 cm (0 to 4 in) and very cobbly clay loam to a depth of 28 to 43 cm (11 to 17 in) to contact unweathered bedrock (USDA NRCS 2006).

## Climate

The climate of Forest Peak RNA is modified by a rain-shadow effect resulting from its position along the lee side of the Oregon Coast Range (Franklin and Dyrness 1988) and by its geographic proximity to the warm, dry Willamette Valley (Hawk 1974). Summers are usually moderately dry and warm with the June-August period receiving about 4 percent of the total annual precipitation. Winters are typically cool and wet with the majority of precipitation occurring during the November-March period, mostly in the form of rain. Average annual snowfall of 193 mm (7.6 in) occurs predominantly from December through February. Snowpack typically melts quickly. For the 40-year period 1961 to 2001, snowpack depth monthly averages were negligible (Western Regional Climate Center 2006).

Meteorological data from the climatic station of comparable elevation and distance from the Pacific Ocean nearest to Forest Peak, the Corvallis, Oregon, station (Western Regional Climate Center 2006). The Corvallis station is located approximately 11.3 km (7 mi) south-southwest of the RNA.

Period of record: 7/1/1948 to 12/31/2005—Corvallis Water Bureau, Oregon (station 351877)

Average minimum January temperature	0.4 °C	(32.8 °F)
Average maximum January temperature	7.4 °C	(45.4 °F)
Average minimum July temperature	10.3 °C	(50.6 °F)
Average maximum July temperature	26.0 °C	(78.8 °F)
Average annual precipitation	1715 mm	(67.51 in)
Average June-August precipitation	61 mm	(2.42 in)
Average annual snowfall	193 mm	(7.60 in)

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**Modified by a rain-shadow effect**

## Vegetation

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### Douglas-fir forest

Forest Peak RNA has two major vegetation cover types: coniferous forest and grassland meadows. The conifer forest overstory is dominated by Douglas-fir. Bigleaf maple (*Acer macrophyllum*) is also abundant and scattered throughout the RNA where it forms a subcanopy beneath the taller Douglas-fir. Grand fir (*Abies grandis*) is a component of the forest canopy adjacent to the third-order stream at lower elevations in the southeastern portion of the tract. It also occurs sporadically as a sapling in the southern half (lower elevation portion) of the RNA (Alvorsen 1989), but occurs infrequently on the steep, upper elevation slopes below the summit ridge. Western hemlock (*Tsuga heterophylla*) and western redcedar (*Thuja plicata*) are both absent from the RNA. Oregon white oak (*Quercus garryana*) forms a narrow fringe surrounding the grassland meadows. Pacific madrone (*Arbutus menziesii*) also occurs sporadically adjacent to the summit ridgeline where openings in the upper canopy provide more sunlight. At lower elevations, red alder (*Alnus rubra*) and Oregon ash (*Fraxinus latifolia*) are locally common within riparian habitats (Alvorsen 1989).

The forest understory is quite open, and tall shrubs such as California hazelnut (*Corylus cornuta* var. *californica*) and oceanspray (*Holodiscus discolor*) have a patchy distribution and are only locally abundant. The low shrub, dwarf Oregongrape (*Berberis nervosa*), is widespread and abundant on steep, forested slopes. Poison oak (*Toxicodendron diversilobum*) is locally abundant along the grassland meadow margins and in forest openings.

Herbaceous ground cover within the Douglas-fir forest is variable. Swordfern (*Polystichum munitum*) is locally abundant in some areas. Common associates may include alpine circaea (*Circaea alpina*), parsley-leaved lovage (*Ligusticum apiifolium*), Hooker's fairybells (*Prosartes hookeri*), inside-out flower (*Vancouveria hexandra*), vanilla leaf (*Achlys triphylla*) (Alvorsen 1989), and bracken fern (*Pteridium aquilinum*).

Plant association descriptions of old-growth forests in the Valley Margin Zone indicate that the most common and widespread plant association in the region is present within the RNA: the Douglas-fir–bigleaf maple/hazel/pathfinder plant association (*Pseudotsuga menziesii*-*Acer macrophyllum*/*Corylus cornuta* var. *californica*/*Adenocaulon bicolor*) (Juday 1976). A recent classification of forest plant associations in the Oregon Coast Range (McCain and Diaz 2002) describes an additional plant association that occurs at lower elevations within Forest Peak RNA: the grand fir/dwarf Oregongrape-salal (*Abies grandis*/*Berberis nervosa*-*Gaultheria shallon*) plant association. Other plant associations were identified in 2006 when

three permanent vegetation plots were established to quantitatively characterize stand structure and vegetation composition of representative stands within the RNA (tables 1 and 2). These have been identified as Douglas-fir/California hazelnut-creeping snowberry/swordfern (*Pseudotsuga menziesii*/*Corylus cornuta* var. *californica*-*Symphoricarpos mollis*/*Polystichum munitum*) (fig. 3), and Douglas-fir/dwarf Oregongrape (*Pseudotsuga menziesii*/*Berberis nervosa*) (fig. 4). Classification of these associations is provisional and is based on the minor role or absence of shade-tolerant conifers. We placed these stands in the Douglas-fir series based on the sparse cover or absence of grand fir. In the nearby and more heavily managed McDonald-Dunn Forest, Hubbard (1991) concluded that the presence of a Douglas-fir series (e.g., association without grand fir) was not supported by her data.

A recent botanical survey of the grass meadow found it to be a mix of nonnative and invasive grass species and a diverse array of native grasses and herbaceous species. Dominant nonnative species include tall oatgrass (*Arrhenatherum elatius*), soft brome (*Bromus hordeaceus*), poverty brome (*Bromus sterilis*), hedgehog dogtail (*Cynosurus echinatus*), and medusahead wildrye (*Taeniatherum caput-medusae*). A native species of bracken fern (*Pteridium aquilinum*) is a major component of the herb layer, which increases with fire and/or soil disturbance. Native herbaceous species that are not dependent on or increase with soil disturbance include broadpetal strawberry (*Fragaria virginiana*), blue fieldmadder (*Sherardia arvensis*), and Oregon sunshine (*Eriophyllum lanatum*). Native bunchgrasses such as Roemer's fescue (*Festuca roemeri*), Lemmon's needlegrass (*Achnatherum lemmonii*), California danthonia (*Danthonia californica*), and junegrass (*Koeleria macrantha*) are present in minor amounts (Salix Associates 2004). Noteworthy additions to the herbaceous flora include species typical of Willamette Valley prairies: Puget balsamroot (*Balsamorhiza deltoidea*), rhombic-petaled clarkia (*Clarkia rhomboidea*), American carrot (*Daucus pusillus*), and spatulate-leaved spurge (*Euphorbia spathulata*) (Alvorsen 1989) (see app. 1).

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## Grass meadow

**Table 1—Physical features of three permanent plots in Forest Peak Research Natural Area**

Physical features	Plot		
	103	104	105
Elevation (m)	466	383	425
Aspect (°)	324	294	352
Slope grade (%)	15	27	30
Slope position	Upper	Mid	Mid

**Table 2—Plant association, understory coverage, and frequency of three permanent plots in the Forest Peak Research Natural Area**

Species	Plant association <sup>a</sup> and plot					
	Psme/Cococ-Symo/Pomu Plot 103		Psme/Bene Plot 104		Psme/Bene Plot 105	
	Cover <sup>b</sup>	Frequency	Cover	Frequency	Cover	Frequency
	<i>Percent</i>					
Shrubs:						
<i>Berberis nervosa</i> <sup>c</sup>		—	66	—	52	—
<i>Corylus cornuta</i> var. <i>californica</i>		—		—	7	—
<i>Holodiscus discolor</i>	7	—		—		—
<i>Rosa gymnocarpa</i>	tr	—	1	—	3	—
<i>Symphoricarpos mollis</i>	1	—	2	—	1	—
<i>Toxicodendron diversilobum</i>		—	1	—		—
Herbs, grasses, and ferns:						
<i>Polystichum munitum</i>	28	57	4	7	18	29
<i>Circaea alpina</i>	2	28				
<i>Ligusticum apiifolium</i>	4	36				
<i>Hieracium albiflorum</i>	tr	7				
<i>Goodyera oblongifolia</i>	tr	4				
<i>Lathyrus</i> sp.	tr	4				
<i>Viola sempervirens</i>	tr	4				
<i>Trientalis latifolia</i>	tr	4			tr	4
<i>Lactuca muralis</i>	tr	7			1	4
<i>Melica subulata</i>	tr	14			tr	4
<i>Galium triflorum</i>	1	21			tr	14
<i>Moehringia macrophylla</i>	1	14	tr	4		
<i>Pteridium aquilinum</i>			2	7		
<i>Iris chrysophylla</i>			tr	4		
<i>Vancouveria hexandra</i>			3	11	3	25
<i>Adenocaulon bicolor</i>			tr	4	2	11
<i>Rubus ursinus</i> <sup>d</sup>			tr	4	tr	7
<i>Trisetum</i> sp.			tr	4	tr	7
<i>Osmorhiza berteroi</i>			tr	4	tr	4
<i>Anemone deltoidea</i>			tr	7	tr	4
<i>Prosartes smithii</i>					4	29
<i>Thalictrum occidentale</i>					2	7
<i>Trillium ovatum</i>					1	7
<i>Bromus vulgaris</i>					tr	14
<i>Nemophila parviflora</i>					tr	4
<i>Fragaria vesca</i> var. <i>crinita</i>					tr	4

Note: PSME = *Pseudotsuga menziesii*, COCOC = *Corylus cornuta* var. *californica*, SYMO = *Symphoricarpos mollis*, POMU = *Polystichum munitum*, BENE = *Berberis nervosa*. tr = trace (<0.5 percent foliar cover).

<sup>a</sup> Plant association names all have a suffix, NWO Coast, that differentiates them from plant associations having similar names that occur in the Oregon Cascades sensu McCain and Diaz (2002).

<sup>b</sup> Cover is expressed as percentage of foliar cover; frequency is expressed as percentage of relative frequency. Zero values are not included.

<sup>c</sup> McCain and Diaz (2002) referred to *Berberis nervosa* as *Mahonia nervosa*. We use the currently accepted genus name of *Berberis* in this document. See Flora of North America (2006) and the Oregon Flora Project (2006) in the “References” section.

<sup>d</sup> Treated as an herb in this data set.



Figure 3—Understory vegetation with oceanspray (*Holodiscus discolor*) occupying the tall shrub layer and swordfern (*Polystichum munitum*) a conspicuous component of the herbaceous layer within a 150-year-old stand of Douglas-fir (*Pseudotsuga menziesii*). Taken from plot number 103.



Figure 4—Understory vegetation with California hazelnut (*Corylus cornuta* var. *californica*) occupying the tall shrub layer and dwarf Oregon grape (*Berberis nervosa*) a dominant component of the low shrub layer. Swordfern (*Polystichum munitum*) is patchy and locally abundant. Taken from plot number 104.

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## Tree age data

Tree age data were collected in 2006 from 12 Douglas-fir (four samples collected from dominant individuals within each of three permanent plots). Tree diameters at core height ranged between 66 and 125 cm (26 and 49 in). Tree ages ranged from 113 years old to 183 years. Eight of the twelve trees were aged between 152 and 167 years old. Douglas-fir mean age is 151 years, and median age is 155 years. This indicates a major period of forest establishment around 1840 to 1850, probably a result of a stand-destroying fire preceding Douglas-fir establishment. This period coincides with the immigration of Euro-Americans into the adjacent Willamette Valley. Similarly, this period coincides with the cessation of annual prairie burning by Native Americans (Johannessen 1971, Morris 1934). The presence of a grass meadow within the RNA raises the probability that a grassland burn escaped into the adjacent forest. Further support for this scenario is the presence of fire-charred old-growth Douglas-fir situated along the third-order stream in the southeastern portion of the tract (Alvorsen 1989). These >183-cm (6-ft) diameter at breast height (d.b.h.) specimens are located in a ravine at the confluence of two small streams. This topographic position is where Juday (1976) often located old-growth stringers (linear stands) that survived stand-destroying fires in the Valley Margin Zone and the Oregon Coast Range.

Figure 5 illustrates the current age-class distribution of forest stands within the RNA. It is consistent with a history of a stand-destroying fire followed by a surge of Douglas-fir recruitment and establishment, followed by periodic establishment of Douglas-fir and bigleaf maple.

## Fauna

Reptiles, amphibians, birds, and mammals known or expected to occur within the RNA are listed in appendix 2. Lists have been compiled from a combination of field observations and published literature. They represent an informed approximation based on geographic location, habitat availability, and species distribution patterns (Csuti et al. 1997).

## Disturbance History

A stand-destroying fire burned through the RNA some time before about 1840. This period also marked a significant increase in Euro-American settlement of the Willamette Valley. Soon after, the pattern of annual burning of grassland meadows and prairies for hunting and collection of food plants by Native Americans was significantly curtailed. Large fires in the *Tsuga heterophylla* Zone of the Oregon



Figure 5—Stand age-class distribution in Forest Peak Research Natural Area.

Coast Range, the Cascade Mountains, and the Olympic Mountains of Washington were recorded in the first part of the 20<sup>th</sup> century. The mid and late 20<sup>th</sup> century witnessed the advent of modern fire suppression and timber harvesting techniques that greatly reduced the chance of fires burning free the way they once did (Agee 1993). The absence of wildfire within Forest Peak RNA over the past century and a half has led to filling in of small openings and the margins of the grassland meadows so that the former openings now have an overstory of Douglas-fir suppressing the shade-intolerant Oregon white oak (*Quercus garryana*) and Pacific madrone (*Arbutus menziesii*). The absence of a major fire event for the past 150 years has allowed for the development of the Douglas-fir and bigleaf maple forest present on the site today.

The impacts of road building, forest harvesting, and grazing practices in the past century have contributed to the invasion and spread of highly invasive, weedy plant species. Evidence of weed invasion is most pronounced in the grass meadows where numerous nonnative grass species have invaded along with a small population of the highly invasive shrub, Scot's broom (*Cytisus scoparius*). Grass invaders

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**Absence of a recent major fire**

present in the grass bald include tall oatgrass (*Arrhenatherum elatius*), soft brome (*Bromus hordeaceus*), poverty brome (*Bromus sterilis*), hedgehog dogtail (*Cynosurus echinatus*), and Medusahead wildrye (*Taeniatherum caput-medusae*). A highly invasive perennial grass, slender falsebrome (*Brachypodium sylvaticum*), has also been recorded in the RNA. Meadow knapweed (*Centaurea pratensis*), another highly invasive species, has recently been observed growing in the vicinity on cutover private forest lands (Salix Associates 2004). The grass meadows and surrounding environs were grazed by domestic livestock and feral goats at different times in the past (Alvorsen 1989).

## Research History

Alvorsen (1989) conducted a floristic inventory and natural area assessment in 1989. Salix Associates (2004) conducted a botanical inventory of seven land parcels in the vicinity of Forest Peak. Three permanent vegetation plots were established in 2006 to characterize forest structure and composition and to establish a baseline from which to monitor vegetation change over time (the project summarized, in part, in table 2). Data are on file at the Salem District office of the BLM, and the Forestry Sciences Laboratory, Pacific Northwest (PNW) Research Station, U.S. Department of Agriculture, Forest Service, Corvallis, Oregon.

## Maps and Aerial Photography

Maps applicable to Forest Peak RNA: Topographic—Airlie South 7.5 minute 1:24,000 scale, 1984; BLM Salem District Westside Recreation Map 1:10,560, 1996. Aerial Photography: 2003 color 1:12,000 (6-07-2003 BLM 12 0-03-SAL 10-38, 0, 1, 2, 3); 1998 (7-23-1998 BLM 12 0-98-SAL 30-20-20,21,22); 1993 (6-2-1993 BLM 12 0-93-ASC 41-27-57); 1982 (5-29-1982 BLM 12 0-82-ASC 10-23 A-7); and 1956 (7-16-1956 PO 8-1,2,3,4).

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## English Equivalents

1 hectare (ha) = 2.47 acres (ac)

1 kilometer (km) = 0.62 mile (mi)

1 meter (m) = 3.28 feet (ft)

1 centimeter (cm) = 0.394 inch (in)

1 millimeter (mm) = 0.0394 inch

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## Appendix 1: Plants<sup>12</sup>

Scientific name	Common name
Coniferous trees	
<i>Abies grandis</i> (Dougl.) Lindl.	Grand fir
<i>Pseudotsuga menziesii</i> (Mirbel) Franco.	Douglas-fir
<i>Taxus brevifolia</i> Nutt.	Western yew
<i>Thuja plicata</i> Donn ex D. Don	Western redcedar
<i>Tsuga heterophylla</i> (Raf.) Sarg.	Western hemlock
Deciduous trees >8 m (26.3 ft) tall	
<i>Acer macrophyllum</i> Pursh	Bigleaf maple
<i>Alnus rubra</i> Bong.	Red alder
<i>Arbutus menziesii</i> Pursh	Pacific madrone
<i>Corylus cornuta</i> L. var. <i>californica</i> (DC.) Sharp	California hazelnut
<i>Quercus garryana</i> Dougl.	Oregon white oak
Tall shrubs 2 to 8 m (6.6 to 26.3 ft) tall	
<i>Acer circinatum</i> Pursh	Vine maple
<i>Amelanchier alnifolia</i> Nutt.	Serviceberry
<i>Cornus nuttallii</i> Aud. ex T. & G.	Pacific dogwood
<i>Cornus stolonifera</i> Michx.	Red-osier dogwood
<i>Fraxinus latifolia</i> Benth.	Oregon ash
<i>Holodiscus discolor</i> (Pursh) Maxim.	Oceanspray
<i>Oemleria cerasiformis</i> Torr. & Gray	Indian plum
<i>Philadelphus lewisii</i> Pursh	Mockorange
Medium shrubs 0.5 to 2 m (1.6 to 6.6 ft) tall	
<i>Berberis aquifolium</i> Pursh	Tall Oregongrape
<i>Cytisus scoparius</i> (L.) Link	Scot's broom, Scotch broom
<i>Gaultheria shallon</i> Pursh	Salal
<i>Lonicera ciliosa</i> (Pursh) DC.	Orange honeysuckle
<i>Lonicera hispidula</i> (Lindl.) Dougl.	Hairy honeysuckle
<i>Ribes bracteosum</i> Dougl.	Stink currant
<i>Rosa gymnocarpa</i> Nutt.	Baldhip rose
<i>Rubus leucodermis</i> Dougl. ex T. & G.	Whitebark raspberry
<i>Symphoricarpos mollis</i> Nutt.	Creeping snowberry
<i>Toxicodendron diversilobum</i> (Torr. & Gray) Greene	Poison oak
Low shrubs <0.5m (1.6 ft) tall	
<i>Berberis nervosa</i> Pursh	Dwarf Oregongrape
<i>Rubus ursinus</i> Cham. & Schlecht.	Trailing blackberry
<i>Whipplea modesta</i> Torr.	Whipplevine







Scientific name	Common name
<i>Trillium ovatum</i> Pursh	Western trillium
<i>Vancouveria hexandra</i> (Hook.) Morr. & Dcne.	Inside-out flower
<i>Veratrum</i> sp.	False hellebore
<i>Veronica arvensis</i> L.	Common speedwell
<i>Vicia americana</i> Muhl. ex Willd.	American vetch
<i>Vicia hirsuta</i> (L.) Gray	Hairy vetch
<i>Vicia sativa</i> L.	Common vetch
<i>Viola glabella</i> Nutt.	Stream violet; yellow wood v.
<i>Viola sempervirens</i> Greene	Redwoods violet
<i>Wyethia angustifolia</i> (DC.) Nutt.	Narrowleaf wyethia
<i>Yabea microcarpa</i> (Hook. & Arn.) Koso-Pol.	California hedge parsley
<b>Grasses, sedges, and rushes</b>	
<i>Achnatherum lemmonii</i> (Vasey) Barkw.	Lemmon's needlegrass
<i>Agrostis hallii</i> Vasey	Hall's bentgrass
<i>Aira caryophyllea</i> L.	Silver hairgrass
<i>Arrhenatherum elatius</i> (L.) Presl.	Tall oatgrass
<i>Brachypodium sylvaticum</i> (Huds.) Beauv.	Slender falsebrome
<i>Bromus carinatus</i> H. & A.	California brome
<i>Bromus hordeaceus</i> L. ssp. <i>hordeaceus</i>	Soft brome
<i>Bromus secalinus</i> L.	Chess brome
<i>Bromus sitchensis</i> Trin.	Alaska brome
<i>Bromus sterilis</i> L.	Poverty brome
<i>Bromus tectorum</i> L.	Cheatgrass brome
<i>Bromus vulgaris</i> (Hook.) Shear	Columbia brome
<i>Carex deweyana</i> Schw.	Dewey's sedge
<i>Carex hendersonii</i> L.H. Bailey	Henderson's sedge
<i>Carex rossii</i> Boott	Ross' sedge
<i>Cynosurus echinatus</i> L.	Hedgehog dogtail
<i>Dactylis glomerata</i> L.	Orchardgrass
<i>Danthonia californica</i> Boland.	California danthonia
<i>Elymus glaucus</i> Buckl. var. <i>glaucus</i>	Blue wildrye
<i>Festuca californica</i> Vasey	California fescue
<i>Festuca occidentalis</i> Hook.	Western fescue
<i>Festuca roemerii</i> (Pavlick) S. Aiken	Roemer fescue
<i>Koeleria macrantha</i> (Ledeb.) J.A. Schultes	Junegrass
<i>Glyceria elata</i> (Nash) M.E. Jones	Tall mannagrass
<i>Juncus effusus</i> L.	Common rush
<i>Luzula comosa</i> E. Mey.	Pacific woodrush
<i>Melica subulata</i> (Griseb.) Scribn.	Alaska oniongrass
<i>Poa pratensis</i> L.	Kentucky bluegrass
<i>Taeniatherum caput-medusae</i> (L.) Nevski	Medusahead wildrye
<i>Trisetum</i> sp.	Oatgrass

<sup>1</sup> Compiled from numerous sources.

<sup>2</sup> Nomenclature for vascular plants, ferns, and fern-allies follows the Flora of North America Web site (2006) and the Oregon Flora Project Web site (2006).

## Appendix 2: Amphibians, Reptiles, Birds, and Mammals<sup>1</sup>

Order	Scientific name	Common name
<b>Amphibians</b>		
Caudata	<i>Ambystoma gracile</i>	Northwestern salamander
	<i>Ambystoma macrodactylum</i>	Long-toed salamander
	<i>Aneides ferreus</i>	Clouded salamander
	<i>Dicamptodon tenebrosus</i>	Pacific giant salamander
	<i>Ensatina eschscholtzi</i>	Ensatina
	<i>Plethodon dunni</i>	Dunn's salamander
	<i>Plethodon vehiculum</i>	Western redback salamander
	<i>Rhyacotriton variegatus</i>	Southern torrent salamander
	<i>Taricha granulosa</i>	Rough-skinned newt
Anura	<i>Ascaphus truei</i>	Tailed frog
	<i>Bufo boreas</i>	Western toad
	<i>Pseudacris regilla</i>	Pacific chorus frog
	<i>Rana aurora</i>	Red-legged frog
<b>Reptiles</b>		
Squamata	<i>Elgaria coerulea</i>	Northern alligator lizard
	<i>Charina bottae</i>	Rubber boa
	<i>Coluber constrictor</i>	Racer
	<i>Contia tenuis</i>	Sharptail snake
	<i>Eumeces skiltonianus</i>	Western skink
	<i>Sceloporus occidentalis</i>	Western fence lizard
	<i>Thamnophis elegans</i>	Western terrestrial garter snake
	<i>Thamnophis ordinoides</i>	Northwestern garter snake
<i>Thamnophis sirtalis</i>	Common garter snake	
<b>Birds</b>		
Falconiformes	<i>Accipiter cooperii</i>	Cooper's hawk
	<i>Accipiter gentilis</i>	Northern goshawk
	<i>Accipiter striatus</i>	Sharp-shinned hawk
	<i>Buteo jamaicensis</i>	Red-tailed hawk
	<i>Cathartes aura</i>	Turkey vulture
	<i>Circus cyaneus</i>	Northern harrier
	<i>Falco sparverius</i>	American kestrel
	<i>Haliaeetus leucocephalus</i>	Bald eagle
Galliformes	<i>Bonasa umbellus</i>	Ruffed grouse
	<i>Callipepla californica</i>	California quail
	<i>Dendragapus obscurus</i>	Blue grouse
	<i>Oreortyx pictus</i>	Mountain quail
	<i>Phasianus colchicus</i>	Ring-necked pheasant
Charadriiformes	<i>Actitis macularia</i>	Spotted sandpiper
	<i>Brachyramphus marmoratus</i>	Marbled murrelet
	<i>Charadrius vociferus</i>	Killdeer

Order	Scientific name	Common name
Columbiformes	<i>Columba fasciata</i>	Band-tailed pigeon
	<i>Zenaida macroura</i>	Mourning dove
Strigiformes	<i>Aegolius acadicus</i>	Northern saw-whet owl
	<i>Bubo virginianus</i>	Great-horned owl
	<i>Glaucidium gnoma</i>	Northern pygmy owl
	<i>Otus kennicottii</i>	Western screech-owl
	<i>Strix occidentalis</i>	Spotted owl
	<i>Strix varia</i>	Barred owl
Caprimulgiformes	<i>Chordeiles minor</i>	Common nighthawk
Apodiformes	<i>Chaetura vauxi</i>	Vaux's swift
	<i>Selasphorus rufus</i>	Rufous hummingbird
Coraciiformes	<i>Ceryle alcyon</i>	Belted kingfisher
Piciformes	<i>Colaptes auratus</i>	Northern flicker
	<i>Dryocopus pileatus</i>	Pileated woodpecker
	<i>Picoides pubescens</i>	Downy woodpecker
	<i>Picoides villosus</i>	Hairy woodpecker
	<i>Sphyrapicus ruber</i>	Red-breasted sapsucker
Passeriformes	<i>Bombycilla cedrorum</i>	Cedar waxwing
	<i>Carduelis pinus</i>	Pine siskin
	<i>Carduelis tristis</i>	American goldfinch
	<i>Carpodacus purpureus</i>	Purple finch
	<i>Catharus ustulatus</i>	Swainson's thrush
	<i>Certhia americana</i>	Brown creeper
	<i>Chamaea fasciata</i>	Wrentit
	<i>Cinclus mexicanus</i>	American dipper
	<i>Coccothraustes vespertinus</i>	Evening grosbeak
	<i>Contopus borealis</i>	Olive-sided flycatcher
	<i>Contopus sordidulus</i>	Western wood peewee
	<i>Corvus brachyrhynchos</i>	American crow
	<i>Corvus corax</i>	Common raven
	<i>Cyanocitta stelleri</i>	Steller's jay
	<i>Dendroica coronata</i>	Yellow-rumped warbler
	<i>Dendroica nigrescens</i>	Black-throated gray warbler
	<i>Dendroica occidentalis</i>	Hermit warbler
	<i>Dendroica petechia</i>	Yellow warbler
	<i>Empidonax difficilis</i>	Pacific-slope flycatcher
	<i>Empidonax hammondii</i>	Hammond's flycatcher
	<i>Empidonax traillii</i>	Willow flycatcher
	<i>Geothlypis trichas</i>	Common yellowthroat
	<i>Ixoreus naevius</i>	Varied thrush
	<i>Junco hyemalis</i>	Dark-eyed junco
	<i>Loxia curvirostra</i>	Red crossbill
	<i>Melospiza melodia</i>	Song sparrow
	<i>Molothrus ater</i>	Brown-headed cowbird
<i>Myadestes townsendi</i>	Townsend's solitaire	
<i>Oporornis tolmiei</i>	MacGillivray's warbler	
<i>Parus atricapillus</i>	Black-capped chickadee	

Order	Scientific name	Common name
	<i>Parus rufescens</i>	Chestnut-backed chickadee
	<i>Perisoreus canadensis</i>	Gray jay
	<i>Pheucticus melanocephalus</i>	Black-headed grosbeak
	<i>Pipilo maculatus</i>	Spotted towhee
	<i>Piranga rubra</i>	Western tanager
	<i>Progne subis</i>	Purple martin
	<i>Psaltriparus minimus</i>	Bushtit
	<i>Regulus satrapa</i>	Golden-crowned kinglet
	<i>Sialia mexicana</i>	Western bluebird
	<i>Sitta canadensis</i>	Red-breasted nuthatch
	<i>Sitta carolinensis</i>	White-breasted nuthatch
	<i>Spizella passerina</i>	Chipping sparrow
	<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow
	<i>Tachycineta bicolor</i>	Tree swallow
	<i>Tachycineta thalassina</i>	Violet-green swallow
	<i>Thryomanes bewickii</i>	Bewick's wren
	<i>Troglodytes aedon</i>	House wren
	<i>Troglodytes troglodytes</i>	Winter wren
	<i>Turdus migratorius</i>	American robin
	<i>Vermivora celata</i>	Orange-crowned warbler
	<i>Vermivora ruficapilla</i>	Nashville warbler
	<i>Vireo gilvus</i>	Warbling vireo
	<i>Vireo huttoni</i>	Hutton's vireo
	<i>Vireo solitarius</i>	Solitary vireo
	<i>Wilsonia pusilla</i>	Wilson's warbler
	<i>Zonotrichia leucophrys</i>	White-crowned sparrow
<b>Mammals</b>		
Didelphimorphia	<i>Didelphis virginiana</i>	Virginia opossum
Insectivora	<i>Neurotrichus gibbsii</i>	Shrew-mole
	<i>Scapanus orarius</i>	Coast mole
	<i>Scapanus townsendii</i>	Townsend's mole
	<i>Sorex bairdi</i>	Baird's shrew
	<i>Sorex bendirii</i>	Pacific marsh shrew
	<i>Sorex pacificus</i>	Pacific shrew
	<i>Sorex sonomae</i>	Fog shrew
	<i>Sorex trowbridgii</i>	Trowbridge's shrew
	<i>Sorex vagrans</i>	Vagrant shrew
Chiroptera	<i>Corynorhinus townsendii</i>	Townsend's big-eared bat
	<i>Eptesicus fuscus</i>	Big brown bat
	<i>Lasionycteris noctivagans</i>	Silver-haired bat
	<i>Lasiurus cinereus</i>	Hoary bat
	<i>Myotis californicus</i>	California myotis
	<i>Myotis evotis</i>	Long-eared myotis
	<i>Myotis lucifugus</i>	Little brown myotis

Order	Scientific name	Common name
	<i>Myotis thysanodes</i>	Fringed myotis
	<i>Myotis volans</i>	Long-legged myotis
	<i>Myotis yumanensis</i>	Yuma myotis
Lagomorpha	<i>Lepus americanus</i>	Snowshoe hare
	<i>Sylvilagus bachmani</i>	Brush rabbit
Rodentia	<i>Aplodontia rufa</i>	Mountain beaver
	<i>Castor canadensis</i>	American beaver
	<i>Clethrionomys californicus</i>	Western red-backed vole
	<i>Erethizon dorsatum</i>	Common porcupine
	<i>Glaucomys sabrinus</i>	Northern flying squirrel
	<i>Microtus longicaudus</i>	Long-tailed vole
	<i>Microtus oregoni</i>	Creeping vole
	<i>Microtus townsendii</i>	Townsend' vole
	<i>Neotoma cinerea</i>	Bushy-tailed woodrat
	<i>Neotoma fuscipes</i>	Dusky-footed woodrat
	<i>Peromyscus maniculatus</i>	Deer mouse
	<i>Phenacomys albipes</i>	White-footed vole
	<i>Phenacomys longicaudus</i>	Red tree vole
	<i>Spermophilus beecheyi</i>	California ground squirrel
	<i>Tamias townsendii</i>	Townsend's chipmunk
	<i>Tamiasciurus douglasii</i>	Douglas' squirrel
	<i>Thomomys mazama</i>	Western pocket gopher
	<i>Zapus trinotatus</i>	Pacific jumping mouse
Carnivora	<i>Canis latrans</i>	Coyote
	<i>Felis concolor</i>	Mountain lion
	<i>Lutra canadensis</i>	Northern river otter
	<i>Lynx rufus</i>	Bobcat
	<i>Martes americana</i>	American marten
	<i>Mephitis mephitis</i>	Striped skunk
	<i>Mustela erminea</i>	Ermine
	<i>Mustela frenata</i>	Long-tailed weasel
	<i>Mustela vison</i>	Mink
	<i>Odocoileus hemionus</i> ssp. <i>columbianus</i>	Black-tailed deer
	<i>Procyon lotor</i>	Common raccoon
	<i>Spilogale gracilis</i>	Western spotted skunk
	<i>Urocyon cinereoargenteus</i>	Common gray fox
	<i>Ursus americanus</i>	Black bear
	<i>Vulpes vulpes</i>	Red fox
Artiodactyla	<i>Cervus elaphus</i>	Elk

<sup>1</sup>Nomenclature, distribution, and habitat characteristics taken from Csuti et al. 1997

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