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# Woodcock Bog Research Natural Area

## Guidebook Supplement 40

Reid Schuller, Susan J. Fritts, Mark Mousseaux

## Authors

**Reid Schuller** is a plant ecologist, Western Stewardship Science Institute, P.O. Box 1173, Bend, OR 97709. **Susan J. Fritts** is a botanist, U.S. Department of the Interior, Bureau of Land Management, Grants Pass Resource Area, 2164 NE Spalding Ave., Grants Pass, OR 97526. **Mark Mousseaux** is a district botanist, U.S. Department of the Interior, Bureau of Land Management, Medford District, 3040 Biddle Road, Medford, OR 97504.

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 Photo: Hanging fen with Jeffrey pine (*Pinus jeffreyi*), incense cedar (*Calocedrus decurrens*), Port-Orford-cedar (*Chamaecyparis lawsoniana*) widely scattered among sedges (*Carex* spp.), cobra lily (*Darlingtonia californica*), and a wide variety of herbaceous species, Woodcock Bog Research Natural Area, southwestern Oregon.

## Abstract

**Schuller, Reid; Fritts, Susan J.; Mousseaux, Mark. 2010.** Woodcock Bog Research Natural Area: guidebook supplement 40. Gen. Tech. Rep. PNW-GTR-824. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 21 p.

This guidebook describes Woodcock Bog Research Natural Area (RNA), a 114-ha (281-ac) area located within the Klamath-Siskiyou ecoregion in southwestern Oregon. The RNA includes a hanging fen and stream segment on ultramafic rock and derived soils. Numerous plant species occur within the fens that are endemic to the Klamath-Siskiyou Mountains of southwestern Oregon and northwestern California. Cobra lily (*Darlingtonia californica*), and sedges (*Carex* spp.) characterize the area. The site also supports very dry, open serpentine forest stands of Jeffrey pine (*Pinus jeffreyi*), along with denser stands of Port-Orford-cedar (*Chamaecyparis lawsoniana*), Douglas-fir (*Pseudotsuga menziesii*), and other conifers typical of the region.

Keywords: Research natural area, area of critical environmental concern, hanging fen, serpentine fen, Klamath-Siskiyou ecoregion, *Darlingtonia* fen, cobra lily, Port-Orford-cedar, *Chamaecyparis lawsoniana*, Jeffrey pine, *Pinus jeffreyi*, serpentine endemism.

## 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.

Woodcock Bog RNA is part of a federal system[2] of natural areas established for research and educational purposes (Federal Committee on Ecological Reserves 1977). 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* (1972). This report is a supplement to the guidebook.

Each RNA is a site where elements[3] 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 for those that are rare and endangered.

The guiding principle in managing RNAs is to maintain natural ecological processes or conditions for which the sites were designated. Timber harvesting and uncontrolled grazing are not allowed, nor is public use that might impair scientific or educational values. Management practices necessary to maintain or restore ecosystems may be allowed (see footnote 2).

[1] Supplement No. 40 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] Elements are the basic units to be represented in a natural area system. An element may be an ecosystem, community, habitat, or organism. Adapted from Oregon Natural Heritage Program [ONHP]. 2003. Oregon natural heritage plan. Salem, OR: Department of State Lands. 167 p.; and 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.

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. Scientists and educators wishing to visit or use the Woodcock Bog 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 tract are not compromised.
- Allow the agency to document research or educational use of the tract.
- Help promote the dissemination and use of information collected at the site.
- Avoid conflict between ongoing studies and activities.

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

Woodcock Bog Research Natural Area (RNA) is a 114-ha (281-ac) area located in Josephine County, Oregon, near the town of Cave Junction (fig. 1). The site was established as a research natural area in 1981 by the Bureau of Land Management (BLM) (USDI BLM 1981). The designation was reaffirmed in the Medford District resource management plan (USDI BLM 1995).

In spite of its name, Woodcock Bog represents an outstanding example of a hanging fen[1] on ultramafic rock and derived soils. The site also supports an example of a very dry serpentine site, with open forest stands of Jeffrey pine (*Pinus jeffreyi*), and denser stands of Port-Orford-cedar (*Chamaecyparis lawsoniana*), Douglas-fir (*Pseudotsuga menziesii*), and other conifers typical of the Siskiyou

[1] A fen is a groundwater-fed wetland ecosystem that has neutral or alkaline water chemistry. A hanging fen occurs on sloping topographic surfaces. Fens differ from bogs, which are fed primarily by rainwater and have acidic water chemistry.

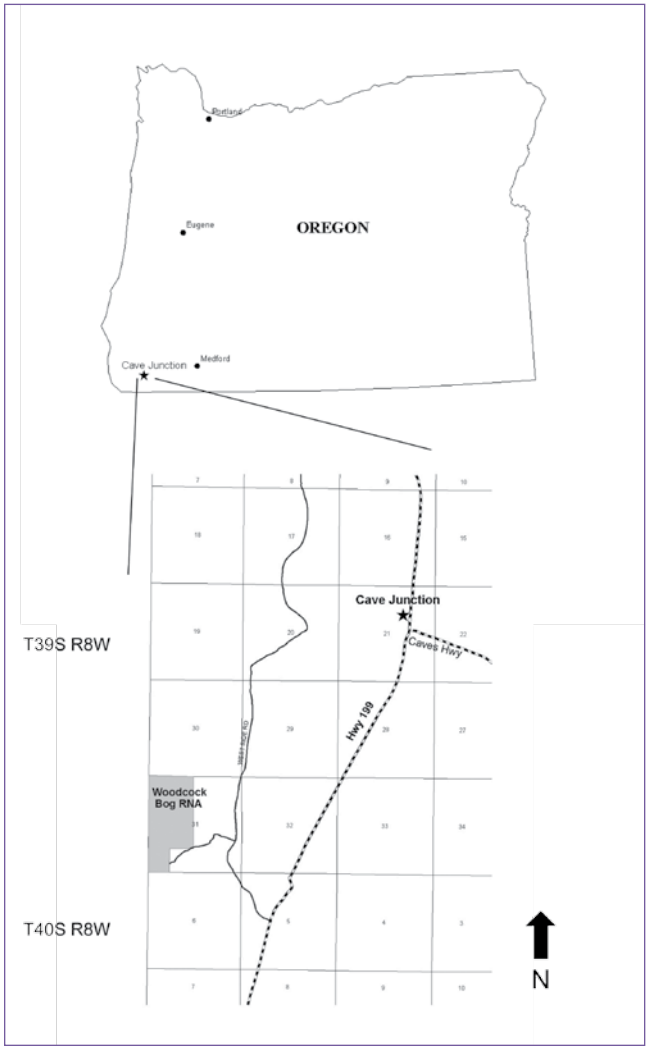


Figure 1–Woodcock Bog Research Natural Area location and access.

Mountains of southwestern Oregon. A population of purple-flowered rush-lily (*Hastingsia atropurpurea*) is present along with numerous other plant species endemic to southwestern Oregon (Becking 1986, 1997) (see appendix 1 for scientific names) (table 1).

From a statewide perspective, Woodcock Bog contains examples of elements listed in the Oregon Natural Heritage Plan (ONHP 2003). Elements present at Woodcock Bog that are listed in the plan as requiring representation within the Klamath-Siskiyou ecoregion include:

- Darlingtonia fen on serpentine-peridotite, with western azalea and camas along margins.
- Riparian on serpentine-peridotite, with Port-Orford-cedar, western azalea and cobra lily—a 0.4-km (0.25-mi) stream segment.
- Jeffrey pine with incense cedar and dry shrubs—a small stand.

## Access and Accommodations

The site is located 3 miles (5 km) south-southwest of Cave Junction, Oregon, in Josephine County (fig 1). Access into the RNA crosses private land and is coordinated by the BLM. Permission to access the area for research or educational purposes should be obtained from the Medford District office prior to visiting the site. Access details will be provided by the BLM upon approval of a request. Lodging is available in Cave Junction, and Grants Pass, Oregon.

## Environment

The RNA is situated along the lower slopes of Woodcock Mountain. Elevations within the site range from 448 m (1,470 ft) in the southeast to 856 m (2,810 ft) in the

**Table 1–Special status, rare, and locally endemic plant species of Woodcock Bog Research Natural Area, Josephine County, Oregon**

| Scientific name | Common name |
|---|---|
| *Calochortus howellii* | Howell's mariposa lily |
| *Epilobium oreganum* | Oregon willow-herb |
| *Erythronium citrinum* var. *citrinum* | Howell's fawn lily |
| *Gentiana setigera* | Elegant gentian |
| *Hastingsia atropurpurea* | Purple-flowered rush-lily |
| *Hastingsia serpentinicola* | Serpentine rush-lily |
| *Lomatium cookii* | Agate desertparsley |
| *Microseris howellii* | Howell's silverpuffs |
| *Packera hesperia* | Siskiyou butterweed |
| *Poa piperi* | Piper's bluegrass |
| *Quercus garryana* var. *breweri* | Brewer's white oak |
| *Salix denortensis* | Del Norte willow |
| *Viola x primulifolia* | Western bog violet |

northeast. Slopes are oriented east to southeast and are moderately inclined (20 to 50 percent). Woodcock Creek is a perennial stream and flows southeast through the southern portion of the RNA (fig 2).

Underlying rocks include the 100-million-year-old Jurassic Galice formation, which is best exposed along Woodcock Creek (Wells 1953). Jurassic peridotite, about 136 to 190 million years old, occurs on the lower slopes of Woodcock Mountain. The peridotite is partially altered to serpentine. The peridotites are highly weathered and contribute to the rocky soils present on the site today. Several faults occur within the peridotites and are marked by zones of intensely sheared serpentine with freshwater springs that rise along the faults (Ramp 1978).

**Serpentine substrate**

Soil parent material is colluvium and residuum derived from serpentinite and peridotite. Gently inclined slopes are mapped in the Eightlar series and the Brockman series. Steeper slopes are mapped as the Pearsoll-Rock outcrop complex. A typical profile of the Eightlar extremely stony clay, with 20- to 35-percent slopes is as follows (USDA NRCS 2009): 0 to 254 mm (0 to 10 in) extremely stony clay; 254 to 1549 mm (10 to 61 in) very stony clay.

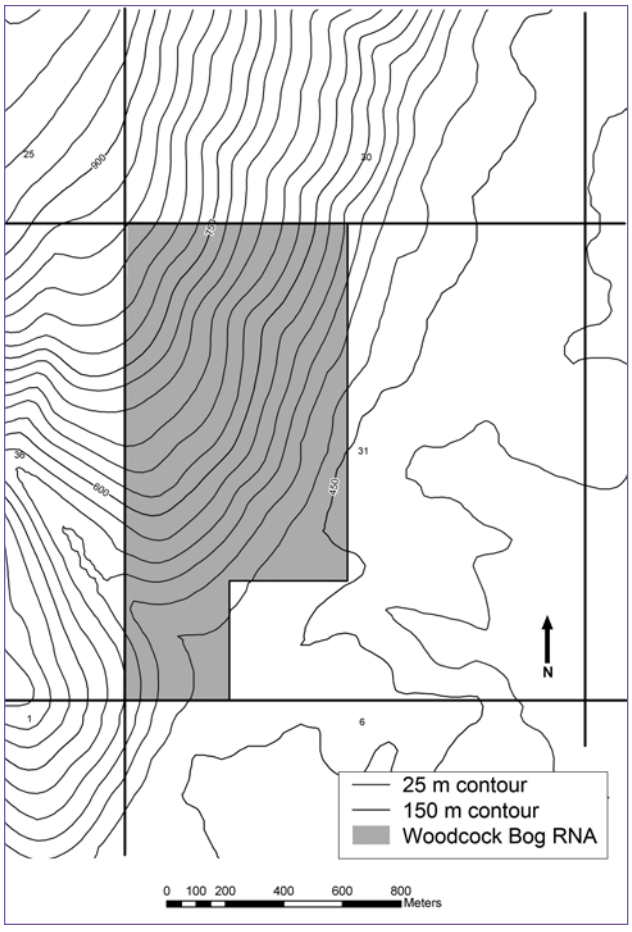


Figure 2–Woodcock Bog Research Natural Area boundary and topography.

## Climate

The climate is typical of inland valleys within the Klamath ecoregion of southwestern Oregon (Franklin and Dyrness 1988, ONHP 2003). Summers are warm to hot, and dry. Extended periods of drought during the summer months are common. Winters are cool and moist. Some winter precipitation occurs as snow, although the snowpack at lower elevations is often of short duration. The weather station nearest to the RNA is the Cave Junction, Oregon (351448) weather station, located about 5 miles to the north of Woodcock Bog at similar elevation. Average summer maximum temperatures of 32.1 ˚C (89.8 ˚F) occur in July. Average winter minimum temperatures of 0.4˚ C (32.7˚F) occur in January. Average annual precipitation is 1553 mm (61.14 in). Six percent of annual precipitation occurs during the 4-month growing period from May through August. Snowfall may occur from November through April, but the majority of snowfall occurs between December and the end of February. Average annual snowfall is 384 mm (15.1 in) (Western Regional Climate Center 2009).

## Vegetation

Rock and soil chemistry strongly influence vegetation patterns within the Klamath-Siskiyou Mountains (Coleman and Kruckeberg 1999) and within the RNA. Hanging fens occur along the east and southeast slopes of Woodcock Mountain (fig. 3). Fen vegetation is distinguished by cobra lily (*Darlingtonia californica*) (fig. 4). The groundwater fen wetlands originate from springs and seeps that emerge from fractures in the serpentine bedrock. The fens are interspersed with dry, forested areas dominated by Jeffrey pine (*Pinus jeffreyi*), Port-Orford-cedar (*Chamaecyparis lawsoniana*), and in places, incense cedar (*Calocedrus decurrens*). Brewer's white oak (*Quercus garryana* var. *breweri*), a shrub endemic to the Klamath-Siskiyou ecoregion, occupies small ridges along the lower slopes.

The serpentine fens support one of the most distinctive plant communities of the Klamath-Siskiyou ecoregion in southwest Oregon and northwest California. These communities, typically dominated by the insect-trapping cobra lily, occur in areas where cold water flows year-round over soils derived from ultramafic or serpentine parent materials. Serpentine-derived substrates cover large areas in the Siskiyou Mountains and support a unique and diverse vascular flora including a high proportion of edaphic, endemic species (Coleman and Kruckeberg 1999, Frost et al. 2004). These patchy habitats occur as relatively small "green islands" surrounded by dry forest communities that support strikingly different types of vegetation (Frost et al. 2004).


Figure 3–Woodcock Bog Research Natural Area vegetation types.

Figure 4–Cobra lily (*Darlingtonia californica*), a distinctive insectivorous plant of Woodcock Bog Research Natural Area fen.

Serpentine fens are particularly valuable as research natural areas because they provide habitat for concentrations of locally endemic plant species having limited natural ranges and narrow habitat requirements (table 1).

## Fen vegetation

Three, 80-m (262 ft)-long transects were established in 2009 to monitor long-term trends of plant species. Both physical attributes and vegetation were documented (tables 2 and 3). Trees were widely scattered throughout the fens (front cover). Tree seedlings were very sparse, and tree regeneration in these areas appeared to be episodic. Shrubs were a conspicuous component in two of the three transects. The showy western azalea (fig. 5) was the only shrub present in all three transects, ranging from less than 1 to 14 percent cover, respectively. Cobra lily was a major herbaceous species present on all three transects, along with Josephine horkelia (*Horkelia congesta* ssp. *nemorosa*), western burnet (*Sanguisorba annua*), and three sedge species: Mendocino sedge (*Carex mendocinensis*), star sedge (*C. echinata*), and slenderbeak sedge (*C. athrostachya*). Trees are widely scattered, and low to tall shrubs, sedges, and a variety of showy herbaceous species occupy the area (fig. 6). The overall aspect of the fen is an open, elongated green garland that follows seepage courses downslope from their spring source areas.

A concentration of regionally endemic, special status plant species also occurred within the RNA (table 1). Some populations occur along vegetation-monitoring transects (tables 2, 3). A list of vascular plant species documented to occur within the RNA is provided in appendix 1.

**Table 2–Physical attributes of three permanent transects within Woodcock Bog Research Natural Area**

| | Transect | | |
|---|---|---|---|
| **Attribute** | **987** | **988** | **989** |
| Elevation (m) | 1671 | 1628 | 1609 |
| Aspect (°) | 331 | 310 | 5 |
| Slope grade (°) | 22 | 20 | 12 |
| Slope position | mid 1/3 | mid 1/3 | mid 1/3 |

**Table 3–Shrub and herb vegetative cover and frequency within three permanent transects in Woodcock Bog Research Natural Area**

| | Transect | | | | | |
|---|---|---|---|---|---|---|
| | 987 | | 988 | | 989 | |
| **Species** | **Cover[a]** | **Frequency[b]** | **Cover** | **Frequency** | **Cover** | **Frequency** |
| Shrubs | | | | | | |
| *Arctostaphylos viscida* | 1 | - | | - | | - |
| *Ceanothus pumilus* | 1 | - | | - | | - |
| *Rhamnus californica* ssp. *occidentalis* | 3 | - | 4 | - | | - |
| *Rhododendron occidentale* | 5 | - | 14 | - | + | - |

**Table 3–Shrub and herb vegetative cover and frequency within three permanent transects in Woodcock Bog Research Natural Area (continued)**

| | Transect | | | | | |
|---|---|---|---|---|---|---|
| | 987 | | 988 | | 989 | |
| **Species** | **Cover[a]** | **Frequency[b]** | **Cover** | **Frequency** | **Cover** | **Frequency** |
| Herbs and grasses | | | | | | |
| *Darlingtonia californica* | 5 | 18 | 2 | 20 | + | 25 |
| *Carex mendocinensis* | 6 | 45 | 4 | 45 | 10 | 23 |
| *Carex echinata* | 1 | 10 | 1 | 18 | 1 | 30 |
| *Horkelia congesta* ssp. *nemorosa* | 6 | 65 | + | 8 | 5 | 20 |
| *Sanguisorba officinalis* | 1 | 10 | 17 | 85 | 4 | 30 |
| *Carex athrostachya* | 1 | 8 | 2 | 13 | 8 | 30 |
| *Danthonia californica* | 3 | 43 | 7 | 33 | | |
| *Hastingsia serpentinicola* | 4 | 73 | | | | |
| *Achnatherum lemmonii* | 1 | 25 | | | | |
| *Aspidotus densa* | 1 | 8 | | | | |
| *Allium* sp. | + | 10 | | | | |
| *Calystegia atriplicifolia* | + | 8 | | | | |
| *Epilobium minutum* | + | 3 | | | | |
| *Festuca roemeri* var. *klamathensis* | + | 3 | | | | |
| *Lomatium triternatum* var. *triternatum* | + | 8 | | | | |
| *Microseris howellii* | + | 8 | | | | |
| *Polygala californica* | + | 5 | | | | |
| *Ranunculus occidentalis* | + | 3 | | | | |
| *Toxicoscordion venenosum* | + | 5 | | | + | 3 |
| *Hastingsia atropurpurea* | | | 6 | 68 | 4 | 75 |
| *Helenium bigelovii* | | | 2 | 35 | 1 | 23 |
| *Carex klamathensis* | | | + | 3 | 2 | 75 |
| *Viola primulifolia* | | | 1 | 30 | + | 3 |
| *Triantha glutinosa* | | | 1 | 8 | + | 5 |
| *Narthecium californicum* | | | + | 3 | 3 | 15 |
| *Hypericum anagalloides* | | | + | 3 | + | 3 |
| *Juncus covillei* | | | + | 3 | + | 3 |
| *Elymus glaucus* | | | + | 3 | | |
| *Platanthera sparsiflora* | | | + | 3 | | |
| *Rudbeckia glaucescens* | | | + | 3 | | |
| *Symphyotrichum spathulatum* | | | + | 3 | | |
| *Dichantelium acuminatum* var. *fasiculatum* | | | | | + | 15 |

[a] Cover is expressed as percentage of foliar cover averaged across the total number of 2 x 5 dm microplots occurring along each transect. Zero values are not included.

[b] Frequency is expressed as a percentage of occurrence within the total number of 2 x 5 dm microplots occurring along each transect. Frequency is not recorded for shrubs.

Figure 5–Western azalea (*Rhododendron occidentale*), a widely scattered and showy tall shrub of Woodcock Bog Research Natural Area.

Figure 6–Cobra lily, a conspicuous fen dominant, along with Josephine horkelia (*Horkelia congesta* ssp. *nemorosa*), western burnet (*Sanguisorba annua*) and a variety of sedges (*Carex mendocinensis*, *C. echinata*, and *C. athrostachya*).

## Fauna

Reptiles, amphibians, birds, and mammals known or expected to occur within the RNA are listed in appendix 2. These lists were derived from both field observation and published literature (Csuti et al.1997).

## Disturbance History

Port-Orford-cedar root disease is present at Woodcock Bog. It is highly contagious and caused by the fungus *Phytophthora lateralis.* Unlike many other fungal spores that are spread by wind, *P. lateralis* depends on free water for spread and infection. It can also be unintentionally transported by humans through contact with clothing and footwear. Infection of trees can be avoided by minimizing and isolating sources of infection, preventing the movement of soil and water from infected to uninfected areas, and by reducing human contact (Roth et al. 1987). Restricting movement and activities of humans is the primary control method used at Woodcock Bog RNA. This includes closing roads to travel and sanitizing boots, tools, and clothing when leaving infected areas.

Lightning-ignited fire is a common occurrence in the forests of southwestern Oregon (Martin 1997). Although the fire landscape has changed since Native Americans burned prairies and woodlands prior to Euro-American settlement of the region, fire remains an integral part of the ecology of many terrestrial vegetation types, including fens surrounded by dry, Jeffrey pine forest.

No extensive fires have burned into the Woodcock Bog RNA in recent years. However, large wildfires, such as the Biscuit Fire (Cramer 2005), have recently burned extensive areas within the Klamath-Siskiyou region. Important decisions regarding the role of fire in maintaining natural processes will define stewardship management of research natural areas into the future (Wilson et al. 2009).

## Research History

Data have been collected at Woodcock Bog RNA by researchers from a variety of disciplines, including ethnobotany (Lang 1997), plant systematics (Becking 1986), and plant ecology (Becking 1997, Coleman and Kruckeberg 1999, Cramer 2005, Frost et al. 2004).

## Maps

Maps applicable to Woodcock Bog RNA: Topographic—Cave Junction, Oregon 7.5 minute, 1:24,000 scale, 1996; Transportation—Medford District Bureau of Land Management Grants Pass resource area transportation map. 2006 (rev).

## Acknowledgments

We thank Jason Riley, wildlife biologist, for reviewing the list of wildlife likely to occur within the area (app. 2). We thank Todd Wilson, wildlife biologist and research natural area coordinator, U.S. Forest Service, Pacific Northwest Research Station; Anthony Kerwin, planning and environmental coordinator, Bureau of Land Management Medford District; and Ron Halvorson, (retired) BLM Prineville District botanist for reviewing the manuscript. We also acknowledge the Medford District BLM for funding this project and the USFS PNW Research Station for publishing this guidebook supplement.

## 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
Degrees Celsius (˚C) = 0.56(degrees Fahrenheit – 32)

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## Appendix 1: Plants[1 2]

| Scientific name | Common name |
|---|---|
| Trees | |
| *Arbutus menziesii* Pursh | Pacific madrone |
| *Calocedrus decurrens* (Torr.) Florin | Incense cedar |
| *Chamaecyparis lawsoniana* (Murray) Parl. | Port-Orford-cedar |
| *Pinus attenuata* Lemmon | Knobcone pine |
| *Pinus jeffreyi* Balf. | Jeffrey pine |
| *Pinus lambertiana* Dougl. | Sugar pine |
| *Pinus monticola* Dougl. ex D. Don | Western white pine |
| *Pinus ponderosa* Laws. | Ponderosa pine |
| *Pseudotsuga menziesii* (Mirb.) Franco Nutt. | Douglas-fir |
| Shrubs | |
| *Amelanchier pallida* Greene | Pale serviceberry |
| *Arctostaphylos viscida* Parry | Sticky whiteleaf manzanita |
| *Ceanothus cuneatus* (Hook.) Nutt. | Buckbrush |
| *Ceanothus pumilus* Greene | Dwarf ceanothus |
| *Lonicera hispidula* (Lindl.) Douglas ex Torr. & A. Gray | Pink honeysuckle |
| *Quercus garryana* Dougl. ex Hook. var. *breweri* (Engelm.) Jeps. | Brewer's white oak |
| *Rhamnus alnifolia* L'Hér. | Alder buckthorn |
| *Rhamnus californica* Eschsch. ssp. *occidentalis* (Howell) C.B. Wolf | California buckthorn |
| *Rhododendron occidentale* (Torr. & A. Gray) A. Gray | Western azalea |
| *Salix delnortensis* C.K. Schneid. | Del Norte willow |
| *Toxicodendron diversilobum* (Torr. & A. Gray) Greene | Pacific poison oak |
| Grasses and grass-like plants | |
| *Achnatherum lemmonii* (Vasey) Barkw. | Lemmon's needlegrass |
| *Bromus carinatus* Hook. & Arn. | California brome |
| *Calamagrostis koelerioides* Vasey | Fire reedgrass |
| *Carex athrostachya* Olney | Slenderbeak sedge |
| *Carex densa* (L.H. Bailey) L.H. Bailey | Dense sedge |
| *Carex echinata* Murray | Star sedge |
| *Carex klamathensis* B.L. Wilson & L.P. Janeway | Klamath sedge |
| *Carex mendocinensis* Olney ex W. Boott | Mendocino sedge |
| *Danthonia californica* Bol. | California oatgrass |
| *Deschampsia cespitosa* (L.) P. Beauv. | Tufted hairgrass |
| *Dichanthelium acuminatum* (Sw.) Gould & C.A. Clark ssp. *fasciculatum* (Torr.) Freckmann & Lelong | Western panicgrass |
| *Eleocharis palustris* (L.) Roem. & Schult. | Common spikerush |
| *Elymus elymoides* (Raf.) Swezey | Bottlebrush squirreltail |
| *Elymus glaucus* Buckley | Blue wildrye |
| *Eriophorum crinigerum* (A. Gray) Beetle | Fringed cottongrass |
| *Festuca californica* Vasey | California fescue |

| Scientific name | Common name |
|---|---|
| *Festuca roemeri* (Pavlick) E.B. Alexeev var. *klamathensis* B.L. Wilson | Roemer's fescue |
| *Festuca rubra* L. | Red fescue |
| *Holcus lanatus* L. | Velvetgrass |
| *Hordeum brachyantherum* Nevski | Meadow barley |
| *Juncus arcticus* Willd. var. *balticus* (Willd.) Trautv. | Baltic rush |
| *Juncus covillei* Piper | Colville's rush |
| *Koeleria macrantha* (Ledeb.) Schult. | Prairie junegrass |
| *Lolium multiflorum* Lam. | Italian ryegrass |
| *Luzula* sp. DC. | Woodrush |
| *Melica geyeri* Munro ex Bol. | Geyer's oniongrass |
| *Poa piperi* Hitchc. | Piper's bluegrass |
| *Schedonorus arundinaceus* (Schreb.) Dumort. | Tall fescue |
| *Vulpia microstachys* (Nutt.) Munro | Small fescue |
| | |
| Herbs | |
| *Achillea millefolium* L. | Common yarrow |
| *Adiantum pedatum* L. | Northern maidenhair |
| *Allium amplectens* Hook. | Narrowleaf onion |
| *Allium falcifolium* Hook. & Arn. | Scytheleaf onion |
| *Angelica arguta* Nutt. | Lyall's angelica |
| *Arabis aculeolata* Greene | Waldo rockcress |
| *Arnica cernua* Howell | Serpentine arnica |
| *Asclepias* sp. L. | Milkweed |
| *Aspidotis densa* (Brack.) Lellinger | Indian's dream |
| *Balsamorhiza sericea* W.A. Weber | Silky balsamroot |
| *Blepharipappus scaber* Hook. | Blepharipappus |
| *Calochortus howellii* S. Wats. | Howell's mariposa lily |
| *Calochortus tolmiei* Hook. & Arn. | Oregon mariposa lily |
| *Calochortus uniflorus* Hook. & Arn. | Monterey mariposa lily |
| *Calystegia atriplicifolia* Hallier f. ssp. *atriplicifolia* | Night-blooming false bindweed |
| *Calystegia occidentalis* (A. Gray) Brummitt ssp. *occidentalis* | Chapparal false bindweed |
| *Camassia quamash* (Pursh) Greene | Camas |
| *Castilleja brevilobata* Piper | Short-lobed paintbrush |
| *Castilleja elata* Piper | Siskiyou paintbrush |
| *Castilleja rubicundula* (Jeps.) T.I. Chuang & Heckard ssp. *lithospermoides* (Benth.) T.I. Chuang & Heckard | Cream sacs |
| *Cerastium arvense* L. | Field chickweed |
| *Chlorogalum pomeridianum* (DC.) Kunth | Wavyleaf soap plant |
| *Clarkia* sp. Pursh | Clarkia |
| *Collinsia heterophylla* Buist ex Graham | Purple Chinese houses |
| *Crepis pleurocarpa* A. Gray | Nakedstem hawksbeard |
| *Cypripedium californicum* A. Gray | California lady slipper |
| *Darlingtonia californica* Torr. | Cobra lily |
| *Delphinium glaucum* S. Wats. | Mountain larkspur |
| *Dichelostemma congestum* (Sm.) Kunth | Cluster lily |
| *Dodecatheon hendersonii* A. Gray | Henderson's shooting star |

| Scientific name | Common name |
|---|---|
| *Epilobium minutum* Lindl. ex Lehm. | Small-flowered willow-herb |
| *Epilobium oreganum* Greene | Oregon willow-herb |
| *Epipactis gigantea* Dougl. ex Hook. | Stream orchid |
| *Eriophyllum lanatum* (Pursh) Forbes | Common woolly sunflower |
| *Erythronium citrinum* S. Wats. var. *citrinum* | Howell's fawn lily |
| *Fritillaria affinis* (Schult.) Sealy | Checker lily |
| *Galium ambiguum* W. Wright ssp. *siskiyouense* (Ferris) Dempster & Stebbins | Siskiyou bedstraw |
| *Galium aparine* L. | Stickywilly |
| *Gayophytum diffusum* Torr. & A. Gray ssp. *diffusum* | Spreading groundsmoke |
| *Gentiana setigera* A. Gray | Elegant gentian |
| *Gilia capitata* Sims ssp. *capitata* | Globe gilia |
| *Hastingsia atropurpurea* Becking | Purple-flowered rush-lily |
| *Hastingsia bracteosa* S. Wats. var. *bracteosa* | Large-flowered rush-lily |
| *Hastingsia serpentinicola* Becking | Serpentine rush-lily |
| *Helenium bigelovii* A. Gray | Tall sneezeweed |
| *Hieracium* sp. L. | Hawkweed |
| *Horkelia congesta* Dougl. ex Hook. ssp. *nemorosa* D.D. Keck | Josephine horkelia |
| *Horkelia sericata* S. Wats. | Silky horkelia |
| *Hypericum anagalloides* Cham. & Schltdl. | Tinker penny |
| *Iris bracteata* S. Wats. | Siskiyou iris |
| *Lathyrus delnorticus* C.L. Hitchc. | Del Norte pea |
| *Lewisia oppositifolia* (S. Wats.) B.L. Rob. | Opposite-leaved lewisia |
| *Lilium bolanderi* S. Wats. | Bolander's lily |
| *Lilium pardalinum* Kellogg ssp. *vollmeri* (Eastwood) M.W. Skinner | Vollmer's lily |
| *Limnanthes gracilis* Howell ssp. *gracilis* | Slender meadowfoam |
| *Lomatium cookii* J.S. Kagan | Agate desertparsley |
| *Lomatium macrocarpum* (Nutt. ex Torr. & A. Gray) J.M. Coult. & Rose | Large-fruited lomatium |
| *Lomatium nudicaule* (Pursh) J.M. Coult. & Rose | Barestem lomatium |
| *Lomatium triternatum* (Pursh) J.M. Coult. & Rose ssp. *triternatum* | Nineleaf biscuitroot |
| *Lomatium utriculatum* (Nutt. ex Torr. & A. Gray) J.M. Coult. & Rose | Pomocelery lomatium |
| *Lupinus johannis-howellii* C.P. Sm. | Howell's lupine |
| *Madia* sp. Molina | Tarweed |
| *Microseris howellii* A. Gray | Howell's silverpuffs |
| *Mimulus guttatus* DC. | Seep monkeyflower |
| *Monardella purpurea* Howell | Serpentine monardella |
| *Narthecium californicum* Baker | Bog asphodel |
| *Navarretia intertexta* (Benth.) Hook. | Needleleaf navarretia |
| *Oreostemma alpigenum* (Torr. & A. Gray) Greene var. *andersonii* (A. Gray) G.L. Nesom | Tundra aster |
| *Packera cana* (Hook.) W.A. Weber & A. Löve | Woolly groundsel |
| *Packera hesperia* (Greene) W.A. Weber & A. Löve | Siskiyou butterweed |
| *Parnassia californica* (A. Gray) Greene | California grass of Parnassus |

| Scientific name | Common name |
|---|---|
| *Penstemon* cf. *azureus* Benth. | Azure penstemon |
| *Perideridia gairdneri* (Hook. & Arn.) Mathias ssp. *borealis* T.I. Chuang & Constance | Common yampah |
| *Phacelia corymbosa* Jeps. | Serpentine phacelia |
| *Phlox speciosa* Pursh | Showy phlox |
| *Platanthera sparsiflora* (S. Wats.) Schltr. | Sparse-flowered bog orchid |
| *Polygala californica* Nutt. | California milkwort |
| *Polygonum* sp. L. | Knotweed |
| *Potentilla glandulosa* Lindl. | Sticky cinquefoil |
| *Potentilla gracilis* Dougl. ex Hook. var. *fastigiata* (Nutt.) S. Wats. | Graceful cinquefoil |
| *Prunella vulgaris* L. var. *lanceolata* (W. Bartram) Hultén | Native heal all |
| *Pteridium aquilinum* (L.) Kuhn | Western brackenfern |
| *Ranunculus occidentalis* Nutt. | Western buttercup |
| *Rudbeckia californica* A. Gray | California coneflower |
| *Rudbeckia glaucescens* Eastwood | Waxy coneflower |
| *Sanguisorba annua* (Nutt. ex Hook.) Nutt. ex Torr. & A. Gray | Western burnet |
| *Sanguisorba officinalis* L. | Official burnet |
| *Sanicula bipinnatifida* Dougl. ex Hook. | Purple sanicle |
| *Sanicula peckiana* J.F. Macbr. | Peck's blacksnakeroot |
| *Scutellaria* sp. L. | Skullcap |
| *Sedum laxum* (Britton) A. Berger | Roseflower stonecrop |
| *Sidalcea malviflora* (DC.) A. Gray ex Benth ssp. *elegans* (Greene) C. L. Hitchc. | Dwarf checkerbloom |
| *Silene hookeri* Nutt. | Hooker's silene |
| *Sisyrinchium bellum* S. Wats. | Western blue-eyed grass |
| *Streptanthus howellii* S. Wats. | Howell's jewelflower |
| *Symphyotrichum spathulatum* (Lindl.) G.L. Nesom | Western mountain aster |
| *Toxicoscordion venenosum* (S. Wats.) Rydb. | Meadow deathcamas |
| *Triantha glutinosa* (Michx.) Baker | Sticky tofieldia |
| *Trillium rivale* S. Wats. | Brook wakerobin |
| *Triteleia hyacinthina* (Lindl.) Greene | White brodiaea |
| *Viola cuneata* S. Wats. | Wedgeleaf violet |
| *Viola hallii* A. Gray | Oregon violet |
| *Viola x primulifolia* (pro sp.) | Western bog violet |

[1] Compiled from numerous sources.

[2] Scientific nomenclature for vascular plants, ferns, and fern-allies follows the Flora of North America (1993+), and the Oregon Flora Project Web site (2009). Scientific names for sedges (*Carex* species) follow Wilson et al. (2008). Common names follow the USDA Plants Database (USDA NRCS 2010).

# Appendix 2: Amphibians, Reptiles, Birds, and Mammals[1 2 3]

| Family | Scientific name | Common name |
|---|---|---|
| **Amphibians** | | |
| Ambystomatidae | *Rhyacotriton variegatus* | Southern torrent salamander |
| Bufonidae | *Bufo boreas* | Western toad |
| | *Pseudacris regilla* | Pacific chorus frog |
| Dicamptodontidae | *Dicamptodon tenebrosus* | Pacific giant salamander |
| Leiopelmatidae | *Ascaphus truei* | Tailed frog |
| Plethodontidae | *Aneides ferreus* | Clouded salamander |
| | *Aneides flavipunctatus* | Black salamander |
| | *Ensatina eschscholtzii* | Ensatina |
| | *Plethodon elongatus* | Del Norte salamander |
| Ranidae | *Rana aurora* | Red-legged frog |
| | *Rana boylii* | Foothill yellow-legged frog |
| | *Rana catesbeiana* | Bullfrog |
| Salamandridae | *Taricha granulosa* | Roughskin newt |
| **Reptiles** | | |
| Anguidae | *Elgaria coerulea* | Northern alligator lizard |
| | *Elgaria multicarinata* | Southern alligator lizard |
| Boidae | *Charina bottae* | Rubber boa |
| Colubridae | *Coluber constrictor* | Racer |
| | *Contia tenuis* | Sharptail snake |
| | *Diadophis punctatus* | Ringneck snake |
| | *Lampropeltis zonata* | California mountain kingsnake |
| | *Pituophis melanoleucus* | Gopher snake |
| | *Thamnophis couchii* | Western aquatic garter snake |
| | *Thamnophis elegans* | Western terrestrial garter snake |
| | *Thamnophis ordinoides* | Northwestern garter snake |
| | *Thamnophis sirtalis* | Common garter snake |
| Iguanidae | *Sceloporus graciosus* | Sagebrush lizard |
| | *Sceloporus occidentalis* | Western fence lizard |
| Scincidae | *Eumeces skiltonianus* | Western skink |
| Viperidae | *Crotalus viridis* | Western rattlesnake |
| **Birds** | | |
| Accipitridae | *Accipiter cooperii* | Cooper's hawk |
| | *Accipiter striatus* | Sharp-shinned hawk |
| | *Aquila chrysaetos* | Golden eagle |
| | *Buteo jamaicensis* | Red-tailed hawk |
| Aegithalidae | *Psaltriparus minimus* | Bushtit |
| Apodidae | *Chaetura vauxi* | Vaux's swift |
| Bombycillidae | *Bombycilla cedrorum* | Cedar waxwing |
| Caprimulgidae | *Chordeiles minor* | Common nighthawk |
| | *Phalaenoptilus nuttallii* | Common poorwill |
| Cathartidae | *Cathartes aura* | Turkey vulture |
| Certhiidae | *Certhia americana* | Brown creeper |
| Charadriidae | *Charadrius vociferus* | Killdeer |
| Cinclidae | *Cinclus mexicanus* | American dipper |
| Columbidae | *Columba fasciata* | Band-tailed pigeon |
| | *Zenaida macroura* | Mourning dove |

| Family | Scientific name | Common name |
|---|---|---|
| Corvidae | *Aphelocoma californica* | Western scrub-jay |
| | *Corvus brachyrhynchos* | American crow |
| | *Corvus corax* | Common raven |
| | *Cyanocitta stelleri* | Steller's jay |
| Emberizidae | *Dendroica coronata* | Yellow-rumped warbler |
| | *Dendroica nigrescens* | Black-throated gray warbler |
| | *Dendroica occidentalis* | Hermit warbler |
| | *Dendroica petechia* | Yellow warbler |
| | *Euphagus cyanocephalus* | Brewer's blackbird |
| | *Geothlypis trichas* | Common yellowthroat |
| | *Icteria virens* | Yellow-breasted chat |
| | *Icterus bullockii* | Bullock's oriole |
| | *Junco hyemalis* | Dark-eyed junco |
| | *Melospiza melodia* | Song sparrow |
| | *Molothrus ater* | Brown-headed cowbird |
| | *Oporornis tolmiei* | Macgillivray's warbler |
| | *Passerculus sandwichensis* | Savannah sparrow |
| | *Passerella iliaca* | Fox sparrow |
| | *Passerina amoena* | Lazuli bunting |
| | *Pheucticus melanocephalus* | Black-headed grosbeak |
| | *Pipilo crissalis* | California towhee |
| | *Pipilo maculatus* | Spotted towhee |
| | *Piranga rubra* | Western tanager |
| | *Pooecetes gramineus* | Vesper sparrow |
| | *Spizella passerina* | Chipping sparrow |
| | *Vermivora celata* | Orange-crowned warbler |
| | *Vermivora ruficapilla* | Nashville warbler |
| | *Wilsonia pusilla* | Wilson's warbler |
| | *Zonotrichia leucophrys* | White-crowned sparrow |
| Falconidae | *Falco sparverius* | American kestrel |
| Fringillidae | *Carduelis pinus* | Pine siskin |
| | *Carduelis psaltria* | Lesser goldfinch |
| | *Carduelis tristis* | American goldfinch |
| | *Carpodacus cassinii* | Cassin's finch |
| | *Carpodacus mexicanus* | House finch |
| | *Carpodacus purpureus* | Purple finch |
| | *Coccothraustes vespertinus* | Evening grosbeak |
| | *Loxia curvirostra* | Red crossbill |
| Hirundinidae | *Hirundo pyrrhonota* | Cliff swallow |
| | *Hirundo rustica* | Barn swallow |
| | *Stelgidopteryx serripennis* | Northern rough-winged swallow |
| | *Tachycineta bicolor* | Tree swallow |
| | *Tachycineta thalassina* | Violet-green swallow |
| Muscicapidae | *Catharus guttatus* | Hermit thrush |
| | *Catharus ustulatus* | Swainson's thrush |
| | *Chamaea fasciata* | Wrentit |
| | *Ixoreus naevius* | Varied thrush |
| | *Myadestes townsendi* | Townsend's solitaire |
| | *Regulus satrapa* | Golden-crowned kinglet |
| | *Sialia mexicana* | Western bluebird |
| | *Turdus migratorius* | American robin |

| Family | Scientific name | Common name |
|---|---|---|
| Paridae | *Parus atricapillus* | Black-capped chickadee |
| | *Parus gambeli* | Mountain chickadee |
| | *Parus inornatus* | Plain titmouse |
| | *Parus rufescens* | Chestnut-backed chickadee |
| Passeridae | *Passer domesticus* | House sparrow |
| Phasianidae | *Bonasa umbellus* | Ruffed grouse |
| | *Callipepla californica* | California quail |
| | *Dendragapus obscurus* | Blue grouse |
| | *Meleagris gallopavo* | Wild turkey |
| | *Oreortyx pictus* | Mountain quail |
| Picidae | *Colaptes auratus* | Northern flicker |
| | *Dryocopus pileatus* | Pileated woodpecker |
| | *Melanerpes lewis* | Lewis' woodpecker |
| | *Picoides albolarvatus* | White-headed woodpecker |
| | *Picoides arcticus* | Black-headed woodpecker |
| | *Picoides pubescens* | Downy woodpecker |
| | *Picoides villosus* | Hairy woodpecker |
| | *Sphyrapicus ruber* | Red-breasted sapsucker |
| Sittidae | *Sitta canadensis* | Red-breasted nuthatch |
| | *Sitta carolinensis* | White-breasted nuthatch |
| Strigidae | *Aegolius acadicus* | Northern saw-whet owl |
| | *Bubo virginianus* | Great horned owl |
| | *Glaucidium gnoma* | Northern pygmy-owl |
| | *Otus flammeolus* | Flammulated owl |
| | *Otus kennicottii* | Western screech-owl |
| | *Strix varia* | Barred owl |
| Sturnidae | *Sturnus vulgaris* | European starling |
| Trochilidae | *Calypte anna* | Anna's hummingbird |
| | *Selasphorus rufus* | Rufous hummingbird |
| | *Stellula calliope* | Calliope hummingbird |
| Troglodytidae | *Salpinctes obsoletus* | Rock wren |
| | *Thryomanes bewickii* | Bewick's wren |
| | *Troglodytes aedon* | House wren |
| | *Troglodytes troglodytes* | Winter wren |
| Tyrannidae | *Contopus sordidulus* | Western wood-pewee |
| | *Empidonax difficilis* | Pacific-slope flycatcher |
| | *Empidonax hammondii* | Hammond's flycatcher |
| | *Empidonax oberholseri* | Dusky flycatcher |
| | *Empidonax traillii* | Willow flycatcher |
| | *Sayornis nigricans* | Black phoebe |
| | *Tyrannus verticalis* | Western kingbird |
| Vireonidae | *Vireo gilvus* | Warbling vireo |
| | *Vireo huttoni* | Hutton's vireo |
| | *Vireo solitarius* | Solitary vireo |
| **Mammals** | | |
| Aplodontidae | *Aplodontia rufa* | Mountain beaver |
| Canidae | *Canis latrans* | Coyote |
| | *Urocyon cinereoargenteus* | Common gray fox |

| Family | Scientific name | Common name |
|---|---|---|
| Cervidae | *Cervus elaphus* | Elk |
| | *Odocoileus hemionus* var. *columbianus* | Black-tailed deer |
| Erethizontidae | *Erethizon dorsatum* | Common porcupine |
| Felidae | *Felis concolor* | Mountain lion |
| | *Lynx rufus* | Bobcat |
| Geomyidae | *Thomomys bottae* | Botta's pocket gopher |
| | *Thomomys mazama* | Western pocket gopher |
| Leporidae | *Lepus californicus* | Black-tailed jackrabbit |
| | *Sylvilagus bachmani* | Brush rabbit |
| 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 |
| | *Mus musculus* | House mouse |
| | *Neotoma cinerea* | Bushy-tailed woodrat |
| | *Neotoma fuscipes* | Dusky-footed woodrat |
| | *Ondatra zibethicus* | Muskrat |
| | *Peromyscus maniculatus* | Deer mouse |
| | *Peromyscus truei* | Piñon mouse |
| | *Phenacomys albipes* | White-footed vole |
| | *Phenacomys longicaudus* | Red tree vole |
| | *Reithrodontomys megalotis* | Western harvest mouse |
| Mustelidae | *Martes pennanti* | Fisher |
| | *Mephitis mephitis* | Striped skunk |
| | *Mustela erminea* | Ermine |
| | *Mustela frenata* | Long-tailed weasel |
| | *Mustela vison* | Mink |
| | *Spilogale gracilis* | Western spotted skunk |
| Procyonidae | *Bassariscus astutus* | Ringtail |
| | *Procyon lotor* | Common raccoon |
| Sciuridae | *Glaucomys sabrinus* | Northern flying squirrel |
| | *Sciurus griseus* | Western gray squirrel |
| | *Spermophilus beecheyi* | California ground squirrel |
| | *Spermophilus lateralis* | Golden-mantled ground squirrel |
| | *Tamias amoenus* | Yellow-pine chipmunk |
| | *Tamias siskiyou* | Siskiyou chipmunk |
| | *Tamiasciurus douglasii* | Douglas' squirrel |
| Soricidae | *Sorex sonomae* | Fog shrew |
| | *Sorex trowbridgii* | Trowbridge's shrew |
| | *Sorex vagrans* | Vagrant shrew |
| Talpidae | *Neurotrichus gibbsii* | Shrew-mole |
| | *Scapanus latimanus* | Broad-footed mole |
| | *Scapanus orarius* | Coast mole |
| | *Scapanus townsendii* | Townsend's mole |
| Ursidae | *Ursus americanus* | Black bear |

| Family | Scientific name | Common name |
|---|---|---|
| Vespertilionidae | *Myotis californicus* | California myotis |
| | *Antrozous pallidus* | Pallid bat |
| | *Eptesicus fuscus* | Big brown bat |
| | *Lasionycteris noctivagans* | Silver-haired bat |
| | *Lasiurus cinereus* | Hoary bat |
| | *Myotis evotis* | Long-eared myotis |
| | *Myotis lucifugus* | Little brown myotis |
| | *Myotis thysanodes* | Fringed myotis |
| | *Myotis volans* | Long-legged myotis |
| | *Myotis yumanensis* | Yuma myotis |
| | *Plecotus townsendii* | Townsend's big-eared bat |

[1] Taken from range maps and habitat descriptions in Csuti et al. 1997.

[2] Species known or suspected to occur within the area based on species range and habitat characteristics.

[3] Species are arranged in taxonomic order by evolutionary relationship, then alphabetically by common name within family.

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Pacific Northwest Research Station
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