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Carolyn's Crown/Shafer Creek Research Natural Area

Guidebook Supplement 28

Reid Schuller

Author

Reid Schuller is a plant ecologist and executive director of the Natural Areas Association, P.O. Box 1504, Bend, OR 97709. The PNW Research Station is publishing this guidebook as part of a continuing series of guidebooks on federal research natural areas begun in 1972.

Abstract

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This guidebook describes the Carolyn's Crown/Shafer Creek Research Natural Area, a 323-ha (798-ac) tract of coniferous forest containing stands of 600- to 900-year-old old-growth Douglas-fir along the transition between the western hemlock zone and the silver fir zone in the Cascade Range in western Oregon.

Keywords: Research natural area, old-growth forest, west-side Cascade Range of Oregon.

Preface

The research natural area (RNA) described in this supplement[1] is administered by the Bureau of Land Management, U.S. Department of the Interior. Bureau of Land Management RNAs are located within districts, which are administrative subdivisions of state offices. Normal management and protective activities are the responsibility of district managers. Scientists and educators wishing to use one of the tracts for scientific or educational purposes should contact the appropriate district office field manager 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.

Carolyn's Crown/Shafer Creek 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 preserved 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.

The federal system is outlined in *A Directory of the Research Natural Areas on Federal Lands of the United States of America.*[2]

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 describe 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.

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[1] Supplement No. 28 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] 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. [Irregular pagination].

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.[3]
- 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 about the tract.
- Avoid conflict between studies.

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.

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[3] 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.

Contents

Introduction

Carolyn's Crown/Shafer Creek Research Natural Area (RNA) is a 323-ha (798-ac) tract of coniferous forest containing stands of 600- to 900-year old-growth *Pseudotsuga menziesii* (see app. 1 for a complete list of scientific and common names of plant species) along the transition between the *Tsuga heterophylla* zone and the *Abies amabilis* zone in the Cascade Range in western Oregon.[1]

This RNA supports a representative cross section of forest associations that occur at midelevations in the Cascade Range in western Oregon. Old-growth stands dominated by 600- to 900-year-old Douglas-fir (*Pseudotsuga menziesii*) are mixed with mature forests variously codominated by western hemlock (*Tsuga heterophylla*) and western redcedar (*Thuja plicata*) at lower elevations. At higher elevations, Pacific silver fir (*Abies amabilis*) becomes more predominant in both the understory and the overstory. Pockets of noble fir (*Abies procera*) occur sporadically at higher elevations. Soils and topography also are considered typical of midelevation forest land in the western Cascades.

The 323-ha Carolyn's Crown/Shafer Creek RNA was established in two phases. The 105-ha Carolyn's Crown unit located in portions of Sections 8, 9, and 17 of T. 11 S., R. 3 E., Willamette Meridian (44° 36'18" N latitude, 122° 27'05" W longitude) was established in 1983. The 218-ha Shafer Creek unit, located immediately south of the Carolyn's Crown unit in Sections 16 and 17, was established in 1995. The two units taken together compose the Carolyn's Crown/Shafer Creek RNA. The RNA is administered by the Salem District of the Bureau of Land Management (BLM).

Access and Accommodations

Carolyn's Crown/Shafer Creek RNA lies approximately 15 mi (24 km) north-northeast of Sweet Home, Oregon, in Linn County. The site may be accessed from the south and from the west across a network of private and public logging roads. Access from the west is achieved by passing through locked gates, and permission to cross these lands must be obtained prior to visiting the site. The following access description is across predominately public lands from the south. Before proceeding, stop at the Salem BLM office to get current road and traffic information and permission to use the RNA (see fig. 1).

Bureau of Land Management roads are often not well marked, so it is recommended that visitors use a map in addition to the following written directions. From Sweet Home, drive 4 mi (6.4 km) east on Highway 20 and turn left (north) at a sign for Quartzville and Green Peter Reservoir. Drive 20.5 mi (33 km) on (paved) Quartzville Access Road along Green Peter Reservoir and Quartzville Creek. Turn left onto Yellowstone Access Road (11-3E-35.3 also called Packers Gulch Road), approximately 3 mi (4.8 km) past the reservoir's end. Drive Yellowstone Access Road for 1.9 mi (3.1 km) and turn left onto Yellowstone Tie Road (11-3E-35). Drive Yellowstone Tie Road for 3 mi (4.8 km) and turn right onto Yellowstone Loop (gravel Road 11-3E-22.1). Drive Road 11-3E.22.1 for 4.9 mi (8 km) and turn right onto Road 11-3E-17. Drive Road 11-3E-17 for 0.8 mi (1.3 km) and turn left onto Kiote Creek Road (11-3E-8). Drive Kiote Creek Road for 1.2 mi (2 km), turn right onto Road 11-3E-16.1, and drive for 0.4 mi (0.6 km) to a parking area. Land immediately west of the parking area forms the eastern boundary of the RNA. Foot access into the interior is along an old logging spur road that continues for about 0.5 mi (0.8 km).

[1] Much of the discussion on vegetation has been taken from Wilderman (1991).

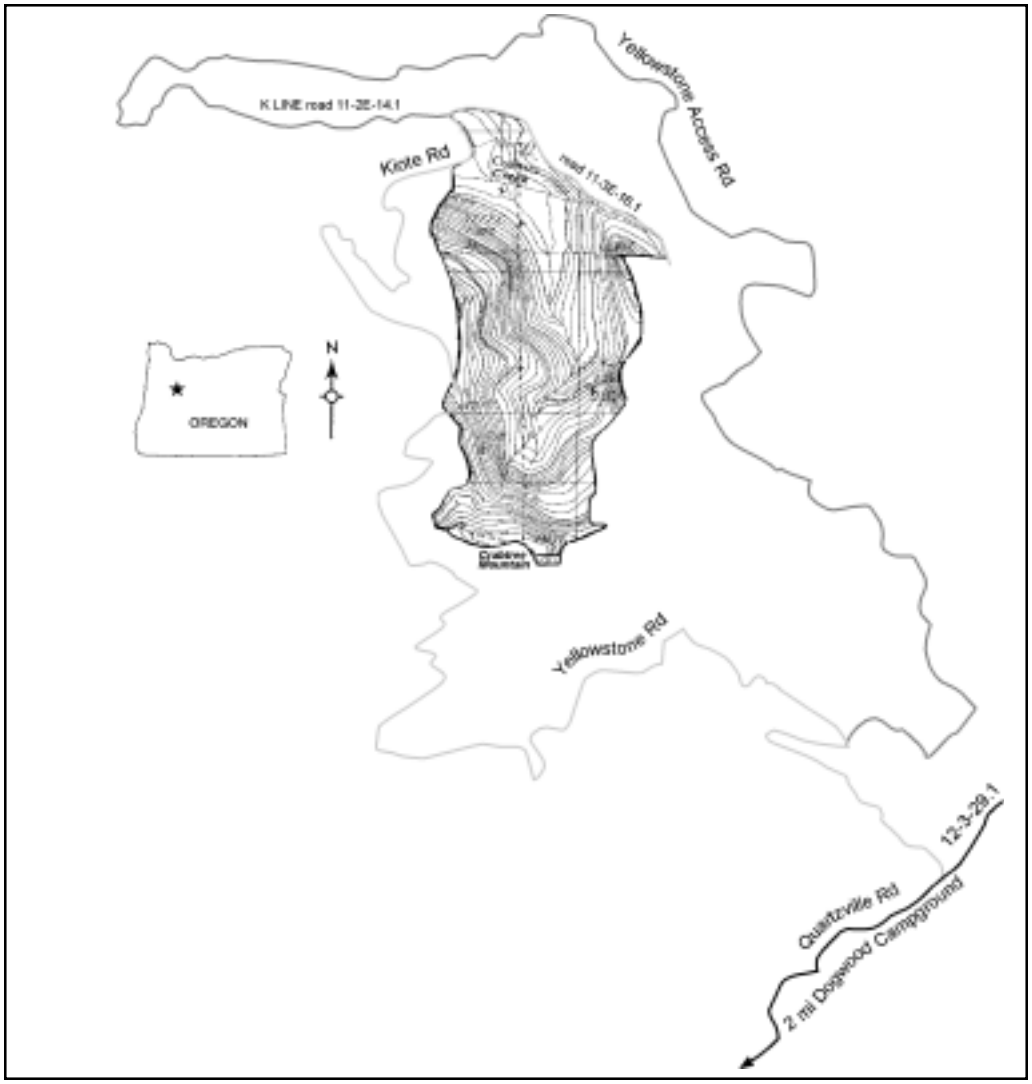

Figure 1—Carolyn's Crown/Shafer Creek Research Natural Area boundary and access.

There are no developed trails within the site. Old logging spur roads extend into the RNA, however, and these may be used for access into some areas. Traveling cross country is difficult because of heavy brush cover in some areas, especially vine maple (*Acer circinatum*) and Pacific rhododendron (*Rhododendron macrophyllum*). In other areas, brush cover combines with dead and down woody debris and steep, broken topography to constrain easy travel on foot.

Environment

The Carolyn's Crown/Shafer Creek RNA ranges in elevation from 853 to 1352 m. It is situated, in part, at the head of a small, glacially carved drainage. The landscape reflects the work of past volcanism and glaciation. The site is underlain by the Sardine Formation, which dates back to the middle or late Miocene. In this area, the Sardine Formation consists of a mixture of flows, tuffs, and breccias of largely andesite with lesser amounts of basalt and dacite (Peck et al. 1964).

The RNA was glaciated approximately 15,000 years b.p. during the Wisconsin stage of the Pleistocene Epoch. This was a period when the most recent glacial cirques in the western Cascades were formed. The glacial terrain in which the RNA is located is characterized by very steep headwalls and sidewalls with numerous cliffs and rock outcroppings and an intervening ridge between the sidewalls. This more moderately sloped ridge separates the watersheds of Crabtree Creek and its tributary, Shafer Creek. Two large monoliths occur along the ridge near the eastern boundary. The northern-most is named Carolyn's Butte. Geomorphic activity in the form of mass wasting from cliff faces has produced a number of talus slopes in this area. In addition to these two monoliths, several lesser peaks occur along the southern and western boundaries of the RNA. Carolyn's Crown, a peak similar to Carolyn's Butte but smaller, is located in the extreme north of the area. Slopes on the headwall and western sidewall range from 40 to over 100 percent. Cliff faces, rock outcroppings, and talus fields are common in this area. Slopes in the southeastern portion of the RNA are steep. More moderate slopes occur in the northeastern portion. The central portion of the northern third of the RNA is comparatively flat, especially near the confluence of Crabtree Creek and Shafer Creek (Wilderman 1991).

Ridgetops and upper slopes tend to have very shallow and coarse-textured soils. Mid and lower slopes have more soil development. Valley bottoms and benches have the deepest soils, often consisting of gravelly loams with large, glacially deposited boulders scattered throughout the area.

The RNA is divided into two third-order watersheds. The more extensive western watershed is drained by Shafer Creek, the eastern watershed by Crabtree Creek. Stream channels at upper elevations are usually steep and narrow except for benches where channels widen and some braiding occurs. Upper reaches of Shafer Creek and other unnamed streams cascade over exposed bedrock in numerous areas. Lower reaches of Shafer Creek flow through flatter terrain where the channel widens and begins to meander. Lower reaches of Shafer and Crabtree Creeks typically have large amounts of coarse, woody debris in the channels and along the banks. Geographic Information System data on file at the Salem District of the Bureau of Land Management indicate 3.41 mi (5.49 km) of second-order or larger streams within the Carolyn's Crown/Shafer Creek RNA (Wilderman 1991).

Table 1—Climate data for Belknap Springs, Oregon, 1971 to 2000

Average minimum January temperature	-2 °C (28 °F)
Average maximum January temperature	4 °C (39 °F)
Average minimum July temperature	9 °C (49 °F)
Average maximum July temperature	27 °C (81 °F)
Average annual precipitation	1930 mm (75.97 in)
Average June-August precipitation	136 mm (5.35 in)

Climate

Lower elevations within the Carolyn's Crown/Shafer Creek RNA lie within the wet, mild climate typical of the *Tsuga heterophylla* zone (Franklin and Dyrness 1973). The climate is strongly maritime, although the site is 80 mi (128.7 km) from the Pacific Ocean. Summers are usually dry and warm with the June to August period receiving less than 10 percent of the total annual precipitation. Winters are typically cool and wet. Upper elevations within the RNA lie within the wetter, cooler climate typical of the *Abies amabilis* zone (Franklin and Dyrness 1973). Microclimatic conditions vary significantly with elevation, slope, and aspect. Precipitation probably increases substantially from the lowest to the highest elevations in the RNA. Snow cover varies from transient snow cover at lower elevations to accumulations of 1 m or more at higher elevations that may persist until June.

Meteorological data from the nearest climatic station at Belknap Springs 8 N (located 35 mi [56.3 km] to the southeast of the RNA at 655 m elevation) are in table 1 (Oregon Climate Service 2003).

Vegetation

About 70 percent of the Carolyn's Crown/Shafer Creek RNA is covered by old-growth and mature coniferous forest stands. Old-growth Douglas-fir are between 600 and 900 years old (McKee 1976). Forest vegetation exhibits characteristics of both the *Tsuga heterophylla* and *Abies amabilis* zones (Franklin and Dyrness 1973, McCain and Diaz 2002) and reflects a transition between the two zones. Thirty percent of the remaining vegetation consists of young, harvested stands and nonforested communities such as rock outcroppings, cliffs, talus, and wetlands.

Below 975 m, forest canopies are variously codominated by Douglas-fir, western hemlock, and western redcedar. Tree reproduction in the forest understory is a mixture of western hemlock and Pacific silver fir. Above 975 m, canopies have similar composition with Pacific silver fir contributing significantly to the overstory. Pacific silver fir seedlings and larger reproduction size classes dominate the understory and midcanopy in most of the area. Noble fir occurs in small pockets at upper elevations.

Shrub and herb vegetation varies with elevation, aspect, slope, and soil conditions. Common shrubs include Pacific rhododendron, vine maple, Alaska huckleberry (*Vaccinium alaskense*), and salal (*Gaultheria shallon*). Common herbs include bunchberry dogwood (*Cornus canadensis*), coolwort foamflower (*Tiarella trifoliata*), queencup beadlily (*Clintonia uniflora*), and twinflower (*Linnaea borealis*). Table 2 summarizes understory vegetation data collected in 2002 from six permanent plots. Appendix 1 lists vascular plants by scientific and common names and is arranged by life form.

Table 2—Physical features, plant association, and understory coverage in six permanent plots in the Carolyn's Crown/Shafer Creek Research Natural Area

	Plot number					
Item	**1**	**2**	**3**	**4**	**5**	**6**
Physical features:						
Elevation (m)	1006	1000	1006	860	869	853
Slope (percent)/ aspect (degrees)	20/340	30/282	40/266	20/260	10/248	20/270
Landform	Mid 1/3 slope	Mid 1/3 slope	Mid 1/3 slope	Lower 1/3 slope	Lower 1/3 slope	Lower 1/3 slope
Plant association	ABAM/OXOR	ABAM/RHMA3 -VAAL/COCA13	ABAM/RHMA3 -VAAL/COCA13	ABAM/VAAL/ COCA13	ABAM/VAAL/ COCA13	ABAM/VAAL/ COCA13
Shrub cover (percent)						
Alaska huckleberry	1	20	8	32	21	48
Pacific rhododendron	tr	35	17	tr	tr	
vine maple	20			2	14	
wintergreen		tr	1			
dwarf Oregon grape		tr				
fool's huckleberry					tr	
red huckleberry	tr		tr		tr	tr
big huckleberry				tr		
little prince's pine			tr			
trailing blackberry				tr		
Herb cover (percent)						
Oregon oxalis	5					
bunchberry dogwood		1		7	4	6
beargrass		2	2			
rattlesnake plantain		2	tr	tr		
deer fern	2					
twinflower	1	tr		5	9	
Oregon goldthread	1			3	1	tr
starry false solomonseal	tr					tr
sidebells wintergreen	tr					
three-leaved anemone	tr					
coolwort foamflower	tr			1	1	
liverleaf wintergreen	tr					
Pacific trillium	tr					
heartleaf twayblade			tr	4		
queencup beadlily				3	1	4
woodland strawberry				tr	tr	
western swordfern				tr		

ABAM-*Abies amabilis*, COCA13-*Cornus canadensis*, OXOR-*Oxalis oregana*, RHMA3-*Rhododendron macrophyllum*, VAAL-*Vaccinium alaskense*. Tr = trace.

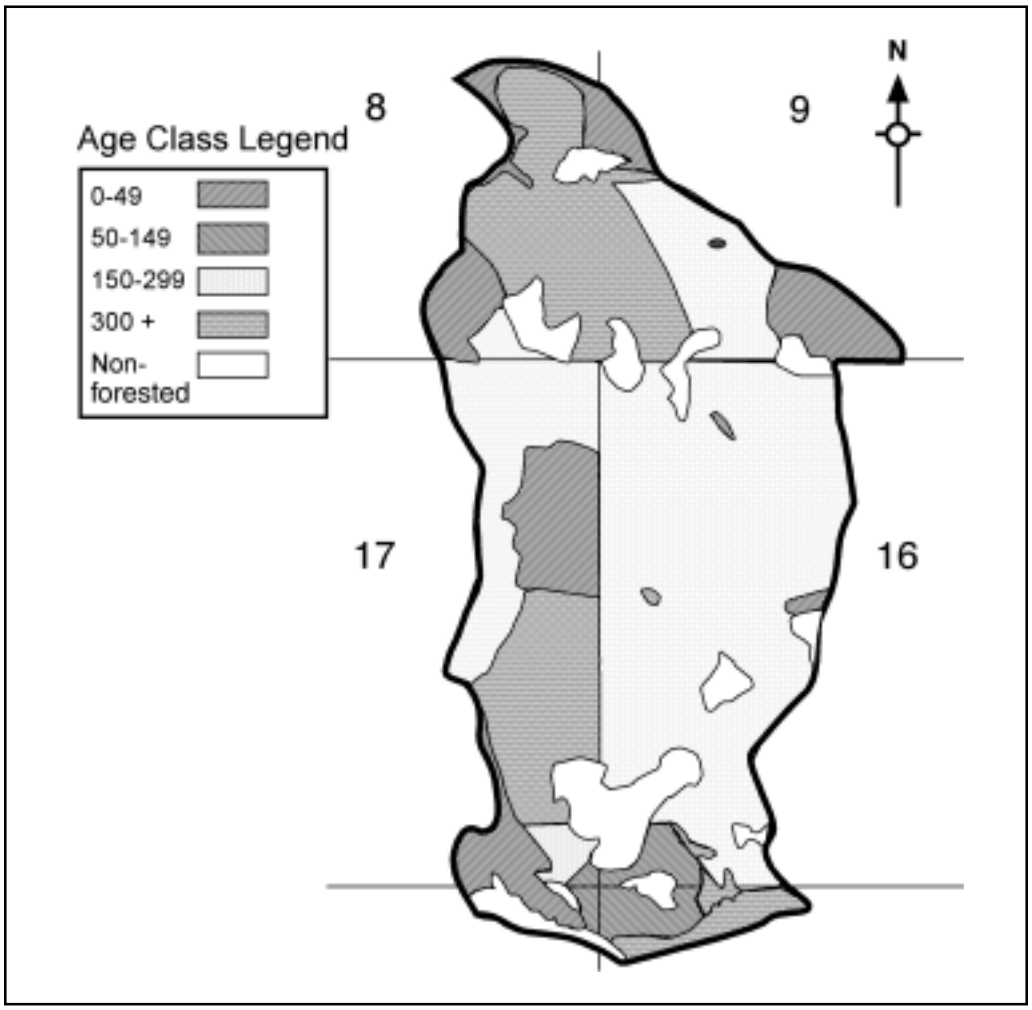

Figure 2—Stand age class distribution within Carolyn's Crown/Shafer Creek Research Natural Area (adapted from Wilderman 1991).

Figure 2 illustrates the general distribution of forest communities by age class. Note the large proportion of stands 150+ years of age.

Forest communities in the RNA (fig. 3) provide a cross section of communities in the *Abies amabilis* zone of Oregon's western Cascade Range. Forested plant associations in the Carolyn's Crown/Shafer Creek RNA include (following the classification of McCain and Diaz 2002):

- Pacific silver fir/Alaska huckleberry/bunchberry dogwood
- Pacific silver fir/Pacific rhododendron-Alaska huckleberry/bunchberry dogwood
- Pacific silver fir/Oregon oxalis
- Pacific silver fir-western hemlock/Pacific rhododendron-salal
- Pacific silver fir/Pacific rhododendron/beargrass
- Pacific silver fir/dwarf Oregon grape

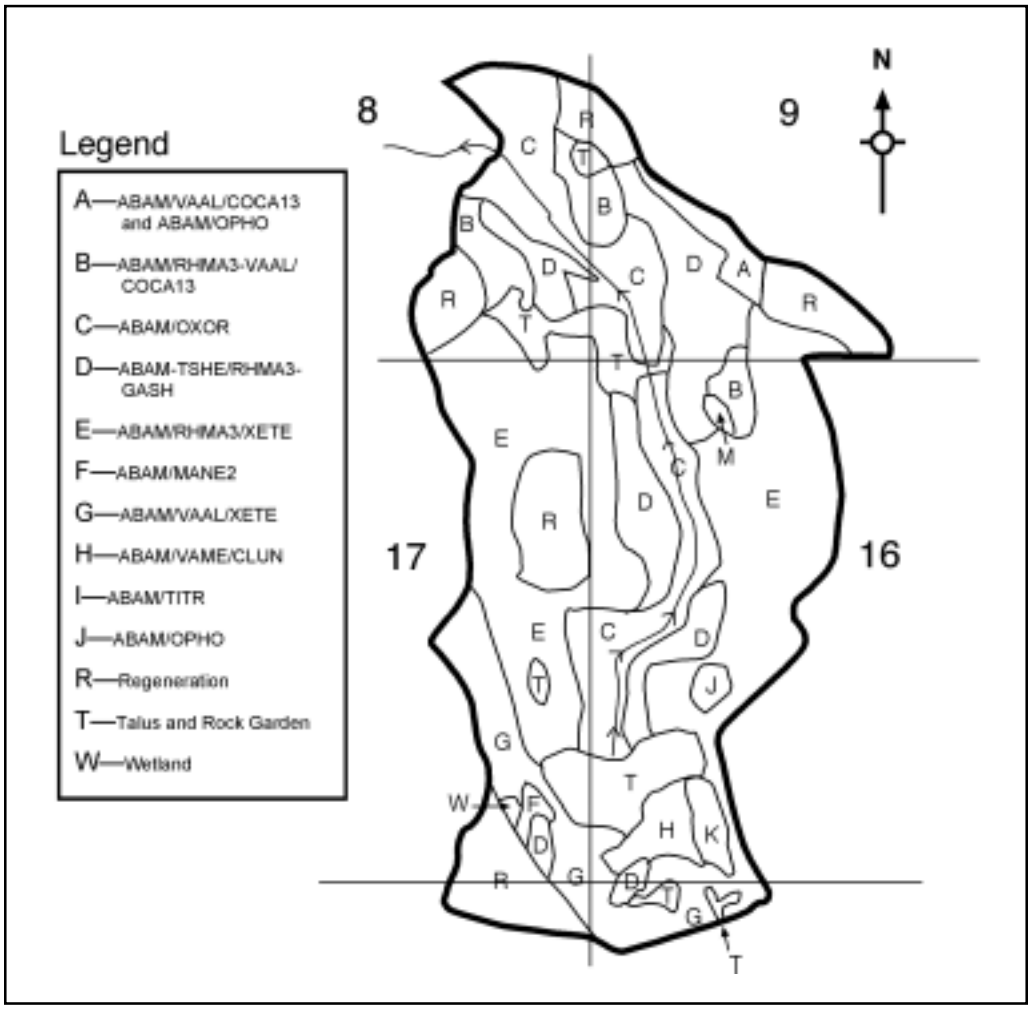

Figure 3—Plant associations and cover types within Carolyn's Crown/Shafer Creek Research Natural Area (adapted from Wilderman 1991).

- Pacific silver fir/Alaska huckleberry/beargrass
- Pacific silver fir/blue huckleberry/queencup beadlily
- Pacific silver fir/coolwort foamflower
- Pacific silver fir/devilsclub
- Talus and rock garden types
- Wetland (nonforested)

Lower and mid slopes of the eastern ridge and western sidewall have tree composition similar to the flats but with less western redcedar and more complete dominance of Pacific silver fir in the reproduction layer. Western hemlock reproduction is more confined to rotting snags and nurse log substrates. Canopy trees include 91- to 183-cm d.b.h. (diameter at breast height) Douglas-fir, 61 to 150 cm d.b.h. western hemlock in great abundance, and scattered Pacific silver fir and western red cedar (see fig. 4). Understory shrubs and herbs are similar to the northern flats described above.

Table 6—Mammals[a]

Order	Scientific name	Common name
Insectivora	*Neurotrichus gibbsii*	Shrew-mole
	Scapanus orarius	Coast mole
	Sorex bendirii	Marsh shrew
	Sorex monitcolus	Montane shrew
	Sorex trowbridgii	Trowbridge's shrew
	Sorex vagrans	Vagrant shrew
Chiroptera	*Corynorhinus townsendii*	Townsend's big-eared bat
	Eptesicus fuscus	Big brown bat
	Lasionycteris noctivagans	Silver-haired bat
	Lasiurus cinereus	Hoary bat
	Myotis californicus	California myotis
	Myotis evotis	Long-eared myotis
	Myotis lucifugus	Little brown myotis
	Myotis volans	Long-legged myotis
	Myotis yumanensis	Yuma myotis
Lagomorpha	*Lepus americanus*	Snowshoe hare
	Ochotona princeps	American pika
Rodentia	*Aplodontia rufa*	Mountain beaver
	Castor canadensis	American beaver
	Clethrionomys californicus	Western red-backed vole
	Erethizon dorsatum	Porcupine
	Glaucomys sabrinus	Northern flying squirrel
	Microtus longicaudus	Long-tailed vole
	Microtus richardsoni	Water vole
	Neotoma cinerea	Bushy-tailed woodrat
	Peromyscus maniculatus	Deermouse
	Phenacomys longicaudus	Red tree vole
	Tamias townsendi	Townsend chipmunk
	Tamiasciurus douglasi	Douglas' squirrel
Carnivora	*Canis latrans*	Coyote
	Lontra canadensis	Northern river otter
	Lynx rufus	Bobcat
	Martes americana	American marten
	Mustela erminea	Ermine
	Mustela frenata	Long-tailed weasel
	Mustela vison	Mink
	Procyon lotor	Raccoon
	Puma concolor	Mountain lion
	Spilogale gracilis	Western spotted skunk
	Ursus americanus	Black bear
	Vulpes vulpes	Red fox
Artiodactyla	*Cervus elaphus* ssp. *roosevelti*	Roosevelt elk
	Odocoileus hemionus ssp. *columbianus*	Black-tailed deer

[a]Adapted from Greene and Franklin (1987). Supplemented by data from USDI BLM (2001). Faunal nomenclature taken from Johnson and O'Neil (2001).

Figure 4—Pacific silver fir/Pacific rhododendron-Alaska huckleberry/bunchberry dogwood plant association with large standing Douglas-fir and western hemlock and mixed western hemlock and Pacific silver fir in reproduction layer to subcanopy with vine maple and Alaska huckleberry as major shrubs. Taken from plot 5 (see table 2).

Figure 5—Pacific silver fir/Oregon oxalis plant association supports large western hemlock and Douglas-fir with standing snags and large woody debris on the forest floor. Taken from plot 1 (see table 2).

Figure 6—Pacific silver fir/Pacific rhododendron-Alaska huckleberry/bunchberry dogwood plant association illustrating the multistoried canopy of Douglas-fir, western hemlock, western redcedar, Pacific silver fir, and Pacific yew. Taken from plot 2 (see table 2).

Forested communities in the northern end of the RNA, which occur on flats or gentle slopes, support scattered Douglas-fir 62 to 244 cm d.b.h., with western hemlock 91 to 183 cm d.b.h., and western redcedar 91 to 274 cm d.b.h. on the wetter sites. A few Pacific silver fir 30 to 61 cm d.b.h. have reached the subcanopy beneath the tallest trees. The understory consists of western hemlock seedlings, saplings, and pole-size and mature trees. Pacific silver fir and western redcedar also are present in lesser amounts in all size classes. Pacific yew (*Taxus brevifolia*) is present as a minor sub-canopy component. Large snags and large, woody debris are common in these areas (fig. 5). The shrub layer typically consists of Alaska huckleberry, vine maple, and Pacific rhododendron (fig. 6). Herbs are most abundant in the moist sites and typically include deer fern (*Blechnum spicant*), bunchberry dogwood, queencup beadlily, and twinflower.

Upper slopes of the western sidewall of the eastern ridge from Carolyn's Butte south are similar to contiguous stands on mid and lower slopes. Tree growth is more stunted and stands are more open on rocky, shallow-soiled ridges. Alaska yellow-cedar (*Chamaecyparis nootkatensis*) and western white pine (*Pinus monticola*) are minor components on rocky sites and ridgetops. Mountain hemlock (*Tsuga mertensiana*) and noble fir are present in varying amounts, and noble fir becomes an upper canopy species in pockets with d.b.h. from 76 to 91 cm. The shrub layer is often dominated by Pacific rhododendron in areas of sparse tree cover. Oregon boxwood (*Paxistima myrsinites*) is a minor shrub associate along with vine maple, salal, and huckleberries (*Vaccinium* spp.).

The upper slopes and ridge on the southern third of the western sidewall are slightly higher than the northern two-thirds of the western sidewall and support different shrub and herb species. Shrub cover is sparse and is composed of big huckleberry (*Vaccinium membranaceum*), oval-leaf huckleberry (*V. ovalifolium*), and/or Alaska huckleberry. Beargrass (*Xerophyllum tenax*) dominates the herb layer with minor amounts of queencup beadlily, vanillaleaf (*Achlys triphylla*), and bunchberry dogwood.

There are five patches of clearcut regeneration scattered throughout the RNA. Totaling 20 ha, these areas were cut over between 1960 and the mid-1970s.

Numerous talus fields within the RNA support a somewhat distinctive flora. Dense intermingled shrubs alternate with bryophyte-covered and bare rocks. Sitka alder (*Alnus sinuata*) and vine maple are the most common, with salmonberry (*Rubus spectabilis*), stink currant (*Ribes bracteosum*), and devilsclub (*Oplopanax horridus*) occupying talus substrates in riparian areas.

Rock outcroppings often support a distinctive mix of low shrubs, herbs, lichens, and mosses. Kinnikinnick (*Arctostaphylos uva-ursi*), pinemat manzanita (*Arctostaphylos nevadensis*), and common juniper (*Juniperus communis*) are typical shrubs. Common understory species include selaginella (*Selaginella densa*), Oregon sunshine (*Eriophyllum lanatum*), and a rich variety of other species.

Two small wetlands occur within the RNA. In the southwest corner, a moss-dominated (including *Sphagnum* spp.) area supports herbs such as twin-flowered marshmarigold (*Caltha biflora*), Jeffrey's shootingstar (*Dodecatheon jeffreyi*), sticky tofieldia (*Tofieldia glutinosa*), and false bugbane (*Trautvetteria caroliniensis*). Another small wetland is dominated by taller emergent vegetation such as sedges (especially *Carex obnupta*), triangle-leaf groundsel (*Senecio triangularis*), American bulrush (*Schoenplectus americanus*), and false bugbane.

Appendix 1 lists the vascular plants, ferns, fern allies, bryophytes, lichens, and hepatics compiled from field surveys from 1970 through 2002.

Fauna

Tentative lists of terrestrial vertebrates—reptiles, amphibians, birds, and mammals—are given in appendix 2. These lists have been compiled from species lists from comparable sites in the western Oregon Cascades and not from sampling or observation within the RNA.

Many vertebrate and invertebrate species characteristic of old-growth forest, such as the northern spotted owl, doubtless occur within the Carolyn's Crown/Shafer Creek RNA. Although the habitats listed below are common in the western Cascade Range, the high diversity of habitats within proximity to one another in the RNA and adjacent Crabtree Area of Critical Environmental Concern very likely support a broad range of organisms, as yet unrecorded. Some of these habitat attributes include:

- Old-growth forest structure (e.g., large live trees, dead down trees in various stages of decomposition, and multilayered canopy with good vertical structure).
- Natural forest openings such as wet meadows, dry meadows, ridges, cliffs.

- Talus slopes.
- Diversity of aspects and elevations ranging from 853 to 1352 m.
- Diversity of lentic and lotic aquatic habitats including a deep lake (adjacent to RNA), shallow lake/wetland with emergent vegetation, springs, seeps, and intermittent and perennial streams with associated riparian vegetation.
- Relatively large area of contiguous, mostly undisturbed (by human activity) habitats.

Disturbance History

Although the old (600 to 900 years) stands compose a significant amount of the RNA, the majority of the area is in the 150 to 299 age class indicating that a stand replacement fire burned through a majority of the RNA within the past 300 years. Stand replacement fires did occur immediately south of the RNA in the mid to late 1800s. Similar stand structure within the southern part of the RNA suggests stand replacement fires extended at least into this portion of the RNA. Most of the few large trees occurring along upper slopes and ridgetops in the southern end of the western sidewall and eastern ridge have charred bark whereas the younger trees do not (Wilderman 1991).

Windthrow disturbance appears to be limited to individual trees and small groups.

Timber harvest and road building occurred in five patches totaling 20 ha. In some places, erosion, mass wasting, and obstruction of waterflow have been created by road building. However, the short-term effects from these activities appear to be localized. The Carolyn's Crown/Shafer Creek RNA is situated in a landscape that is predominantly industrial forest land. The RNA is somewhat of a "virtual island" in a sea of commercial forest. It is unclear what long-term effects this may have on ecological processes and conditions within the RNA.

Research History

Researchers from Oregon State University conducted ecological surveys from 1980 to 1985 (USDI BLM 1996). Permanent vegetation plots were established in 2002, and data are on file at the Salem District office of the Bureau of Land Management.

Maps and Aerial Photography

Maps applicable to Carolyn's Crown/Shafer Creek RNA: Topographic—Yellowstone Mountain 7.5 Minute 1:12,000 scale; North Santiam River, Oregon—USGS 1:100,000 scale, 1984; Salem District Eastside Recreation Map 1:31,680 scale, 1994.

English Equivalents

1 hectare (ha) = 2.47 acres (ac)
1 kilometer (km) = 0.62 miles (mi)
1 meter (m) = 3.28 feet (ft)
1 centimeter (cm) = 0.394 inch (in)

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Appendix 1

Table 3—Plant species list[a]

Scientific name	Common name
Coniferous trees	
Abies amabilis (Dougl. ex Loud.) Dougl. ex Forbes	Pacific silver fir
Abies grandis (Dougl. ex D. Don) Lindl.	Grand fir
Abies lasiocarpa (Hook.) Nutt.	Subalpine fir
Abies procera Rehd.	Noble fir
Chamaecyparis nootkatensis (D. Don) Spach	Alaska yellow-cedar
Pinus monticola Dougl. ex D. Don	Western white pine
Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir
Taxus brevifolia Nutt.	Pacific yew
Thuja plicata Donn ex D. Don	Western redcedar
Tsuga heterophylla (Raf.) Sarg.	Western hemlock
Tsuga mertensiana (Bong.) Carr.	Mountain hemlock
Deciduous trees (>8m tall)	
Alnus rubra Bong.	Red alder
Alnus sinuata (Regel) Rydb.	Sitka alder
Castanopsis chrysophylla (Dougl. ex Hook.) A. DC.	Golden chinquapin
Tall shrubs (2m-8m tall)	
Acer circinatum Pursh	Vine maple
Acer glabrum Torr. var. *douglasii* (Hook.) Dippel	Douglas maple
Amelanchier alnifolia (Nutt.) Nutt. ex M. Roemer	Saskatoon serviceberry
Amelanchier alnifolia (Nutt.) Nutt. ex M. Roemer var. *semiintegrifolia* (Hook.) C.L.	Saskatoon serviceberry
Cornus nuttallii Audubon ex Torr. & Gray	Pacific dogwood
Holodiscus discolor (Pursh) Maxim.	Oceanspray
Physocarpus capitatus (Pursh) Kuntze	Pacific ninebark
Rhododendron macrophyllum D. Don ex G. Don	Pacific rhododendron
Salix sp. L.	Willow
Salix sitchensis Sanson ex Bong.	Sitka willow
Sambucus cerulea Raf.	Blue elderberry
Sambucus racemosa L.	Red elderberry
Sambucus racemosa L. var. *arborescens* (Torr. & Gray) Gray	Red elderberry
Sorbus sitchensis M. Roemer	Sitka mountain-ash
Medium shrubs (0.5m-2m tall)	
Aruncus sylvester Kostel.	Goatsbeard
Gaultheria shallon Pursh	Salal
Juniperus communis L.	Common juniper
Menziesia ferruginea Sm.	Fool's huckleberry
Oplopanax horridus Miq.	Devilsclub
Paxistima myrsinites (Pursh) Raf.	Oregon boxwood
Ribes bracteosum Dougl. ex Hook.	Stink currant
Ribes lacustre (Pers.) Poir.	Prickly currant
Ribes sanguineum Pursh	Redflower currant
Rosa sp. L.	Rose
Rosa gymnocarpa Nutt.	Baldhip rose
Rubus idaeus L.	Red raspberry
Rubus lasiococcus Gray	Dwarf bramble
Rubus parviflorus Nutt.	Thimbleberry
Rubus spectabilis Pursh	Salmonberry
Spiraea pyramidata Greene	Pyramid spirea
Vaccinium alaskense T.J. Howell	Alaska huckleberry
Vaccinium membranaceum Dougl. ex Torr.	Big huckleberry

Table 3—Plant species list (continued)

Scientific name	Common name
Vaccinium ovalifolium Sm.	Oval-leaf huckleberry
Vaccinium ovatum Pursh	Evergreen huckleberry
Vaccinium parvifolium Sm.	Red huckleberry
Low shrubs (<0.5m tall)	
Arctostaphylos columbiana Piper	Hairy manzanita
Arctostaphylos nevadensis Gray	Pinemat manzanita
Arctostaphylos uva-ursi (L.) Spreng.	Kinnikinnick
Gaultheria ovatifolia Gray	Slender wintergreen
Mahonia nervosa (Pursh) Nutt.	Dwarf Oregon grape
Rubus pedatus Sm.	Five-leaved blackberry
Rubus ursinus Cham. & Schlecht.	Trailing blackberry
Symphoricarpos mollis Nutt.	Trailing snowberry
Vaccinium uligonosum L.	Bog huckleberry
Ferns and allies	
Adiantum pedatum L.	Maidenhair fern
Athyrium filix-femina (L.) Roth	Ladyfern
Anemone oregana Gray var. *felix* (M.E. Peck) C.L. Hitchc.	Bog anemone
Blechnum spicant (L.) Sm.	Deer fern
Cheilanthes gracillima D.C. Eat.	Lace lipfern
Cryptogramma crispa (L.) R. Br. ex Hook. var. *sitchensis* (Rupr.) C. Christens.	Parsley-fern
Dryopteris austriaca (Jacq.) Woynar	Mountain woodfern
Equisetum telmateia Ehrh.	Giant horsetail
Gymnocarpium dryopteris (L.) Newman	Oakfern
Lycopodium clavatum L.	Ground pine
Lycopodium sitchense Rupr.	Alaskan clubmoss
Polypodium glycyrrhiza D.C. Eat.	Licorice fern
Polystichum andersonii Hopkins	Anderson's shieldfern
Polystichum munitum (Kalfuss) K. Presl	Western swordfern
Pteridium aquilinum (L.) Kuhn	Brackenfern
Selaginella densa Rydb.	Selaginella
Woodsia scopulina D.C. Eat.	Woodsia
Herbs	
Achillea millefolium L.	Yarrow
Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper	Western yarrow
Achlys triphylla (Sm.) D.C.	Vanillaleaf
Adenocaulon bicolor Hook.	Pathfinder
Agoseris sp. Raf.	Agoseris
Allium crenulatum Wieg.	Olympic onion
Anaphalis margaritacea (L.) Benth.	Pearly everlasting
Anemone deltoidea Hook.	Windflower
Anemone lyallii Britt.	Lyall's anemone
Anemone oregana Gray	Oregon anemone
Antennaria racemosa Hook.	Raceme pussytoes
Arnica amplexicaulis Nutt.	Clasping arnica
Arnica latifolia Bong.	Mountain arnica
Asarum caudatum Lindl.	Wildginger
Boykinia major Gray	Mountain boykinia
Boykinia occidentalis Torr. & Gray	Slender boykinia
Calochortus elegans Pursh	Northwestern mariposa lily
Calochortus subalpinus Piper	Mariposa lily
Calochortus uniflorus Hook. & Arn.	Monterey mariposa lily

Table 3—Plant species list (continued)

Scientific name	Common name
Calypso bulbosa (L.) Oakes	Fairy slipper
Caltha biflora D.C.	Twin-flowered marshmarigold
Camassia quamash (Pursh) Greene	Common camas
Campanula scouleri Hook. ex A. DC.	Scouler's harebell
Chimaphila menziesii (R. Br. ex D. Don) Spreng.	Little prince's pine
Chimaphila umbellata (L.) W. Bart.	Pipsissewa
Cimicifuga Wernischeck sp.	Bugbane
Cirsium sp. P. Mill.	Thistle
Claytonia sibirica L.	Candyflower
Clintonia uniflora (Menzies ex J.A. & J.H. Schultes) Kunth	Queencup beadlily
Collomia debilis (S. Wats.) Greene	Alpine collomia
Coptis laciniata Gray	Oregon goldthread
Corallorrhiza maculata Raf. (Raf.)	Spotted coralroot
Cornus canadensis L.	Bunchberry dogwood
Dicentra formosa (Haw.) Walp.	Bleeding heart
Disporum Salisb. ex D. Don sp.	Fairybells
Disporum hookeri (Torr.) Nichols	Hooker's fairy-lanterns
Dodecatheon jeffreyi Van Houtte	Jeffrey's shootingstar
Epilobium sp. L.	Willow-herb
Epilobium angustifolium L.	Fireweed
Eriophyllum lanatum (Pursh) Forbes	Oregon sunshine
Erythronium grandiflorum Pursh	Yellow fawnlily
Erythronium montanum S. Wats.	Avalanche-lily
Fragaria vesca L.	Woodland strawberry
Galium sp. L.	Bedstraw
Goodyera oblongifolia Raf.	Rattlesnake plantain
Habenaria dilatata (Pursh) Hook.	White bog orchid
Heuchera sp. L.	Alumroot
Heuchera micrantha Dougl. ex Lindl.	Small-flowered alumroot
Heuchera micrantha Dougl. ex Lindl. var. *diversifolia* (Rydb.) Rosendall, Butters & Lakela	Alumroot
Hieracium albiflorum Hook.	Hawkweed
Hydrophyllum tenuipes Heller	Waterleaf
Hypericum anagalloides Cham. & Schlect.	Bog St. Johnswort
Hypericum perforatum L.	St. Johnswort, Klamath weed
Iris tenax Dougl. ex Lindl.	Oregon iris
Isopyrum hallii Gray	Hall's isopyrum
Lilium sp. L.	Lily
Leucanthemum vulgare Lam.	Oxeye daisy
Lilium columbianum hort. ex Baker	Tiger lily
Lilium washingtonianum Kellogg	Shasta lily
Linnaea borealis L.	Twinflower
Listera caurina Piper	Northwest listeria
Listera cordata (L.) R. Br. ex A. & F.	Heartleaf twayblade
Lomatium sp. Raf.	Lomatium
Lomatium hallii (S. Wats.) Coult. & Rose	Hall's lomatium
Lupinus latifolius Lindl. ex J.G. Agardh	Broadleaf lupine
Lysichiton americanus Hulten & St. John	Skunkcabbage
Maianthemum dilatatum (Wood) A. Nels. & J.F. Macbr.	False lily of the valley
Maianthemum racemosum (L.) Link ssp. *amplexicaule* (Nutt.) LaFrankie	False solomonseal
Maianthemum stellatum (L.) Link	Starry false solomonseal
Menyanthes trifoliata L.	Buckbean

Table 3—Plant species list (continued)

Scientific name	Common name
Mertensia sp. Roth	Bluebells
Mimulus alsinoides Dougl. ex Booth.	Chickweed monkeyflower
Mitella pentandra Hook.	Fivestamen miterwort
Monotropa hypopithys L.	Pinesap
Montia parvifolia (Moc. ex DC.) Greene	Littleleaf montia
Mycelis muralis (L.) Durmort.	Wall-lettuce
Nothochelone nemorosa (Dougl. ex Lindl.) Straw	Woodland beardtongue
Orobanche sp. L.	Broomrape
Orthilia secunda (L.) House	Sidebells wintergreen
Osmorhiza occidentalis (Nutt. ex Torr. & Gray) Torr.	Western sweetroot
Oxalis oregana Nutt.	Oregon oxalis
Parnassia fimbriata Koenig var. *hoodiana* C.L. Hitchc.	Fringed grass of parnassus
Pedicularis racemosa Dougl. ex Benth.	Leafy lousewort
Penstemon sp. Schmidel.	Penstemon
Penstemon cardwellii T.J. Howell	Cardwell's penstemon
Penstemon davidsonii Greene	Davidson's penstemon
Penstemon serrulatus Menzies ex Sm.	Cascade penstemon
Petasites frigidus (L.) Fries	Coltsfoot
Phlox adsurgens Torr. ex Gray	Periwinkle phlox
Phlox diffusa Benth. var. *longistylis* Wherry	Spreading phlox
Potentilla paradoxa Nutt.	Paradoxical cinquefoil
Pyrola sp. L.	Wintergreen
Pyrola asarifolia Michx.	Liverleaf wintergreen
Pyrola picta Sm.	Whiteveined pyrola
Ranunculus populago Greene	Mountain buttercup
Sagittaria latifolia Willd.	Common arrowhead
Saxifraga ferruginea Graham	Rusty saxifrage
Saxifraga mertensiana Bong.	Merten's saxifrage
Saxifraga occidentalis S. Wats. var. *allenii* (Small) C.L. Hitchc.	Allen's western saxifrage
Saxifraga rufidula (Small) Macoun	Rustyhair saxifrage
Scoliopus hallii S. Wats.	Fetid adderstongue
Sedum sp. L.	Stonecrop
Sedum oreganum Nutt.	Oregon stonecrop
Sedum spathulifolium Hook.	Spatula-leaf stonecrop
Senecio triangularis	Triangle-leaf groundsel
Stachys chamissonis Benth. var. *cooleyae* (Heller) G. Mulligan & D. Munro	Cooley's hedgenettle
Streptopus sp. Michx.	Twisted-stalk
Synthyris reniformis (Dougl. ex Benth.) Benth.	Snow-queen
Thalictrum sp. L.	Meadowrue
Tiarella trifoliata L.	Coolwort foamflower
Tofieldia glutinosa (Michx.) Pers.	Sticky tofieldia
Tolmiea menziesii (Pursh) Torr. & Gray	Youth on age
Trautvetteria caroliniensis (Walt.) Vail	False bugbane
Trientalis europaea L. ssp. *arctica* (Fisch. ex Hook.) Hulten	Arctic starflower
Trillium ovatum Pursh	Pacific trillium
Valeriana scouleri Rydb.	Scouler's valerian
Vancouveria hexandra (Hook.) Morr. & Dec.	Inside-out-flower
Veratrum viride Ait.	False hellebore
Viola sp. L.	Violet
Viola glabella Nutt.	Stream violet
Viola macloskeyi Lloyd	Macloskey's violet

Table 3—Plant species list (continued)

Scientific name	Common name
Viola palustris L.	Marsh violet
Viola sempervirens Greene	Redwoods violet
Xerophyllum tenax (Pursh) Nutt.	Beargrass
Grasses, sedges, and rushes	
Aira sp. L.	Hairgrass
Carex mertensii Prescott ex Bong.	Merten's sedge
Carex obnupta Bailey	Slough sedge
Juncus ensifolius Wikstr.	Swordleaf rush
Luzula campestris (L.) DC. var. *congesta* (Thuill.) E. Mey.	Field woodrush
Luzula parviflora (Ehrh.) Desv.	Millet woodrush
Schoenplectus americanus (Pers.) Volk. ex Schinz. & R. Keller	American bulrush
Bryophytes[b]	
SPHAGNOPSIDA:	
Sphagnum spp. L.	
Sphagnum squarrosum Crome	
ANDREAEOPSIDA:	
Andreaea alpestris (Thed.) Schimp.	
Andreaea schofieldiana B. Murr.	
MNIOPSIDA:	
Antitrichia curtipendula (Hedw.) Brid.	
Aulacomnium androgynum (Hedw.) Schwaegr.	
Brachythecium frigidum (C. Müll.) Besch.	
Bryum gemmascens Kindb.	
Buxbaumia piperi Best	
Dicranum pallidisetum (Bail. in Holz.) Irel.	
Dicranum scoparium Hedw.	
Drepanocladus aduncus (Hedw.) Warnst.	
Dryptodon patens (Hedw.) Brid.	
Fontinalis howellii Ren. & Card.	
Grimmia tenerrima Ren. & Card.	
Grimmia trichophylla Grev.	
Hypnum circinale Hook.	
Leucolepis acanthoneuron (Schwaegr.) Lindb.	
Oligotrichum aligerum Mitt.	
Plagiomnium insigne (Mitt.) T. Kop.	
Plagiothecium denticulatum (Hedw.) Schimp. in B.S.G.	
Plagiothecium piliferum (Sw. ex Hartm.) Schimp. in B.S.G.	
Pogonatum contortum (Brid.) Lesq.	
Polytrichastrum alpinum (Hedw.) G.L. Sm.	
Polytrichum juniperinum Hedw.	
Racomitrium heterostichum (Hedw.) Brid.	
Rhizomnium glabrescens (Kindb.) T. Kop.	
Rhizomnium magnifolium (Horik.) T. Kop.	
Rhytidiadelphus loreus (Hedw.) Warnst.	
Rhytidiadelphus subpinnatus (Hedw.) Warnst.	
Rhytidiopsis robusta (Hook.) Broth.	
Tortula ruralis (Hedw.) Gaertn. et al.	
Thamnobryum neckeroides (Hook.) Lawt.	
HEPATICOPSIDA:[c]	
Barbilophozia hatcheri (A. Evans) Loeske	
Blepharostoma trichophyllum (L.) Dumort.	

Table 3—Plant species list (continued)

Scientific name	Common name
Calypogeia fissa (L.) Raddi	
Cephalozia bicuspidata (L.) Dumort.	
Conocephalum conicum (L.) Dumort.	
Diplophyllum obtusifolium (Hook.) Dumort.	
Gymnomitrion obtusum (Lindb.) Pears.	
Gyrothyra underwoodiana M. Howe	
Lepidozia reptans (L.) Dumort.	
Lophozia incisa (Schrad.) Dumort.	
Lophozia ventricosa (Dicks.) Dumort.	
Marsupella bolanderi (Austin) Underw.	
Pellia neesiana (Gottsche.) Limpr.	
Pogonatum contortum (Brid.) Lesq.	
Porella cordaeana (Huebener) Moore	
Ptilidium californicum (Austin) Pearson	
Radula bolanderi Gottsche	
Scapania americana Müll. Frib.	
Scapania subalpina (Nees) Dumort.	
Lichens[d]	
Alectoria sarmentosa (Ach.) Ach.	
Arthroraphis citronella (Ach.) Poelt.	
Bacidia sabuletorum (Schreber) Lettau	
Baeomyces rufus (Hudson) Rebent.	
Bryoria fuscescens (Gyelnik) Brodo & D. Hawksw.	
Bryoria pikei Brodo & D. Hawksw.	
Caloplaca chrysodeta (Vainio ex Rasanen) Dombr.	
Cavernularia hultenii Degel.	
Cladina rangiferina (L.) Nyl.	
Cladonia spp. P. Browne	
Cladonia bellidiflora (Ach.) Schaerer	
Cladonia carneola (Fr.) Fr.	
Cladonia chlorophaea (Florke ex Sommerf.) Sprengel	
Cladonia coniocraea Auct.	
Cladonia ecmocyna Leighton	
Cladonia fimbriata (L.) Fr.	
Cladonia macrophyllodes Nyl.	
Cladonia ochrochlora Florke	
Cladonia squamosa Hoffm.	
Cladonia subsquamosa Krempelh.	
Cladonia transcendens (Vainio) Vainio	
Cyphelium inquinans (Sm.) Trevisan	
Cystocoleus ebeneus (Dillwyn) Thwaites	
Dermatocarpon reticulatum H. Magn.	
Diploschistes scruposus (Schreber) Norman	
Ephebe sp. Fr.	
Epilichen scabrosus (Ach.) Clem. ex Hafellner	
Evernia prunastri (L.) Ach.	
Fuscopannaria saubinetii (Mont.) P.M. Jorg.	
Hypogymnia sp. (Nyl.) Nyl.	
Hypogymnia apinnata Goward & McCune	
Hypogymnia enteromorpha (Ach.) Nyl.	
Hypogymnia imshaugii Krog	
Hypogymnia inactiva (Krog) Ohlsson	
Hypogymnia physodes (L.) Nyl.	

Table 3—Plant species list (continued)

Scientific name	Common name
Hypogymnia rugosa (G. Merr.) L. Pike	
Hypogymnia tubulosa (Schaerer) Hav.	
Lecanora sp. Ach.	
Lecanora circumborealis Brodo & Vitik.	
Lecanora semitensis Tuck.	
Lobaria oregana (Tuck.) Mull. Arg.	
Mycobilimbia berengeriana (A. Massal.) Hafellner & V. Wirth	
Mycoblastus sanguinarius (L.) Norman	
Mycocalicium subtile (Pers.) Szat.	
Nephroma bellum (Sprengel) Tuck.	
Nodobryoria oregana (Tuck.) Common & Brodo	
Ochrolechia oregonensis H. Magn.	
Omphalina umbellifera (L.:Fr.) Quelet	
Parmelia saxatilis (L.) Ach.	
Parmelia sulcata Taylor	
Parmeliopsis hyperopta (Ach.) Arnold	
Peltigera membranacea (Ach.) Nyl.	
Peltigera neopolydactyla (Gyelnik) Gyelnik	
Phaeocalicium compressulum (Nyl. ex Szat.) A.F.W. Schmidt	
Pilophorus acicularis (Ach.) Th. Fr.	
Pilophorus clavatus Th. Fr.	
Pilophorus nigricaulis Sato	
Placopsis gelida (L.) Lindsay	
Platismatia sp. Culb. & Culb.	
Platismatia glauca (L.) Culb. & Culb.	
Platismatia herrei (Imshaug) Culb. & Culb.	
Platismatia norvegica (Lynge) Culb. & Culb.	
Platismatia stenophylla (Tuck.) Culb. & Culb.	
Porpidia thomsonii Gowan	
Pseudocyphellaria anomala Brodo & Aht.	
Pseudocyphellaria crocata (L.) Vainio	
Pseudocyphellaria rainierensis Imshaug	
Psoroma hypnorum (Vahl) Gray	
Sphaerophorus globosus (Hudson) Vainio var. *gracilis* (Müll. Arg.) Zahlbr.	
Stereocaulon sasakii Zahlbr. var. *tomentosoides* Lamb	
Stereocaulon sp. Hoffm.	
Stereocaulon sterile (Savicz) Lamb ex Krog	
Sticta fuliginosa (Hoffm.) Ach.	
Sticta limbata (Sm.) Ach.	
Trapeliopsis granulosa (Hoffm.) Lumbsch	
Tuckermannopsis chlorophylla (Willd.) Hale	
Tuckermannopsis orbata (Nyl.) M.J. Lai	
Tuckermannopsis subalpina (Imshaug) Karnfelt	
Umbilicaria polyrrhiza (L.) Fr.	
Usnea spp. Dill. ex Adans.	
Usnea longissima Ach.	
Usnea scabrata Nyl.	
Xylographa vitiligo (Ach.) J.R. Laundon	

[a]Nomenclature taken from U.S. Department of Agriculture, Natural Resource Conservation Service (2002). The PLANTS database Web site http://plants.usda.gov.
[b]Field specimens identified by Christy (2003). Nomenclature follows Anderson (1990).
[c]Field specimens identified by Christy (2003). Nomenclature follows Stotler and Crandall-Stotler (1977).
[d]Nomenclature taken from Esslinger (1997).

Appendix 2

Reptiles, amphibians, birds, and mammals expected to use Carolyn's Crown/ Shafer Creek Research Natural Area

Table 4—Reptiles and amphibians[a]

Order	Scientific name	Common name
Caudata	*Ambystoma gracile*	Northwest salamander
	Aneides ferreus	Clouded salamander
	Batrachoseps wrighti	Oregon slender salamander
	Dicamptodon tenebrosus	Pacific giant salamander
	Ensatina eschscholtzi	Ensatina
	Plethodon dunni	Dunn's salamander
	Rhyacotriton cascadae	Cascade torrent salamander
	Taricha granulosa	Rough-skinned salamander
Anura	*Ascaphus truei*	Tailed frog
	Pseudacris regilla	Pacific tree frog
	Rana aurora	Red-legged frog
	Rana cascadae	Cascade frog
	Elgaria coerulea	Northern alligator lizard
Squamata	*Charina bottae*	Rubber boa
	Thamnophis ordinoides	Northwestern garter snake
	Thamnophis sirtalis	Common garter snake

[a]Adapted from Greene and Franklin (1987). Supplemented by data from USDI BLM (2001). Faunal nomenclature taken from Johnson and O'Neil (2001).

Table 5—Birds[a]

Order	Scientific name	Common name
Falconiformes	*Accipiter cooperii*	Cooper's hawk
	Accipiter gentilis	Northern goshawk
	Accipiter striatus	Sharp-shinned hawk
	Buteo jamaicensis	Red-tailed hawk
	Cathartes aura	Turkey vulture
Galliformes	*Bonasa umbellus*	Ruffed grouse
	Dendragapus obscurus	Blue grouse
Columbiformes	*Columba fasciata*	Band-tailed pigeon
	Zenaida macroura	Mourning dove
Strigiformes	*Aegolius acadicus*	Northern saw-whet owl
	Bubo virginianus	Great-horned owl
	Glaucidium gnoma	Northern pygmy owl
	Strix occidentalis	Spotted owl
Caprimulgiformes	*Chordeiles minor*	Common nighthawk
Apodiformes	*Chaetura vauxi*	Vaux's swift
	Selasphorus rufus	Rufous hummingbird
Piciformes	*Colaptes auratus*	Northern red-shafted flicker
	Dryocopus pileatus	Pileated woodpecker
	Picoides pubescens	Downy woodpecker
	Picoides villosus	Hairy woodpecker
	Sphyrapicus ruber	Red-breasted sapsucker
Passeriformes	*Bombycilla cedrorum*	Cedar waxwing
	Carduelis pinus	Pine siskin
	Carduelis tristis	American goldfinch
	Catharus guttatus	Hermit thrush
	Catharus ustulatus	Swainson's thrush
	Certhia americana	Brown creeper

Table 5—Birds (continued)

Order	Scientific name	Common name
	Cinclus mexicanus	American dipper
	Contopus cooperi	Olive-sided flycatcher
	Contopus sordidulus	Western wood-pewee
	Corvus corax	Common raven
	Cyanocitta stelleri	Steller's jay
	Dendroica coronata	Yellow-rumped warbler
	Dendroica nigrescens	Black-throated gray warbler
	Dendroica occidentalis	Hermit warbler
	Dendroica townsendi	Townsend's warbler
	Empidonax difficilis	Pacific-slope flycatcher
	Empidonax hammondii	Hammond's flycatcher
	Empidonax traillii	Willow flycatcher
	Geothlypis trichas	Common yellowthroat
	Hesperiphona vespertina	Evening grosbeak
	Ixoreus naevius	Varied thrush
	Junco hyemalis	Dark-eyed junco
	Leucosticte tephrocotis	Gray-crowned rosy finch
	Loxia curvirostra	Red crossbill
	Melospiza melodia	Song sparrow
	Myadestes townsendi	Townsend's solitaire
	Nucifraga columbiana	Clark's nutcracker
	Oporornis tolmiei	MacGillivray's warbler
	Passerella iliaca	Fox sparrow
	Perisoreus canadensis	Gray jay
	Pheucticus melanocephalus	Black-headed grosbeak
	Pipilo maculatus	Spotted towhee
	Piranga ludoviciana	Western tanager
	Poecile atricapilla	Black-capped chickadee
	Poecile rufescens	Chestnut-backed chickadee
	Regulus calendula	Ruby-crowned kinglet
	Regulus satrapa	Golden-crowned kinglet
	Sialia mexicana	Western bluebird
	Spizella passerina	Chipping sparrow
	Sitta canadensis	Red-breasted nuthatch
	Sturnus vulgaris	European starling
	Tachycineta bicolor	Tree swallow
	Tachycineta thalassina	Violet-green swallow
	Troglodytes troglodytes	Winter wren
	Turdus migratorius	American robin
	Vermivora celata	Orange-crowned warbler
	Vireo gilvus	Warbling vireo
	Vireo plumbeus	Plumbeous vireo
	Wilsonia pusilla	Wilson's warbler
	Zonotrichia leucophrys	White-crowned sparrow

[a]Adapted from Greene and Franklin (1987). Supplemented by data from USDI BLM (2001). Faunal nomenclature taken from Johnson and O'Neil (2001).

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

Pacific Northwest Research Station

Web site	http://www.fs.fed.us/pnw
Telephone	(503) 808-2592
Publication requests	(503) 808-2138
FAX	(503) 808-2130
E-mail	pnw_pnwpubs@fs.fed.us
Mailing address	Publications Distribution Pacific Northwest Research Station P.O. Box 3890 Portland, OR 97208-3890

U.S. Department of Agriculture
Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, OR 97208-3890