

## SISTER ROCKS RESEARCH NATURAL AREA<sup>1</sup>

Pacific silver fir stands on a mountain ridgetop of Eocene-Oligocene volcanics in the Washington Cascade Range.

The Sister Rocks Research Natural Area was established on September 5, 1967. It exemplifies Pacific silver fir (*Abies amabilis*) stands as they occur on mountain slopes and ridgetops in older (Eocene-Oligocene) volcanic portions of the Cascade Range. The 87ha. (215-acre) tract is located in Skamania County, Washington, and is administered by the Wind River Ranger District (Carson, Washington), Gifford Pinchot National Forest. The tract occupies portions of sections 2, 3, 10, and 11, T. 5 N., R. 6 E., Willamette meridian (fig. SR-1), based upon natural features and locations of Roads N63 (on the west) and N63J (proposed, on the north). It lies at 45°56' N. latitude and 122°03' W. longitude.

### ACCESS AND ACCOMMODATIONS

Access to the vicinity is easiest from the south via the Columbia River (U.S. Highway 830), Carson, and the Wind River valley (Forest Roads 30, N73, N64, and N63); it can also be approached from the west via Amboy and Forest Roads N56, N54, and N58. Forest Trail 155 begins at the northern point of the natural area and extends its entire length

(fig. SR-1). The trail provides access to central and southern portions of the tract and bounding roads (existing and planned) to the remainder. At present, eastern portions are least accessible.

The nearest commercial accommodations are in Stevenson, Washington, about 40 km. (25 miles) away, or occasionally, in Cougar. However, there are several improved forest camps in the adjacent Wind River valley.

### ENVIRONMENT

The Sister Rocks Research Natural Area occupies a broad, north-trending ridgetop. Slopes are generally gentle to moderate (20 to 30-percent) except along the lower margins of the area where steeper (60- to 80-percent) slopes occur. Elevations range from about 1,100 to 1,280 m. (3,600 to 4,200 ft.).

Geologically, the natural area is simple. Underlying bedrock is composed of Eocene-Oligocene volcanics, predominantly andesitic in character (Hunting et al. 1961). Included within the overburden are elements of various Pleistocene and/or Recent volcanic ash and pumice falls, some of the ejecta forming distinct layers.

The climate is wet and cold. Precipitation is seasonal, peaking during winter months and reaching low levels during the summer period. Much of the winter precipitation occurs as snow and accumulates in snowpacks which probably attain maximum depths of 2 to 3 m. (70 to 120 in.) based on a nearby snowcourse at Oldman Pass (U.S. Soil Conservation Service n.d.). The following climatic data are from the Wind River weather station, which is about 19 km. (12 miles) southeast of and 600 m. (2,000 ft.) below the natural area (U.S. Weather Bureau 1965):

Mean annual temperature	.....	8.7°C. (47.8°F.)
Mean January temperature	.....	0.0°C. (32.0°F.)
Mean July temperature	.....	17.5°C. (63.5°F.)

SR-1

**This file was created by scanning the printed publication. Text errors identified by the software have been corrected; however, some errors may remain.**

<sup>1</sup> Description prepared by Dr. J. F. Franklin, U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Forestry Sciences Laboratory, Corvallis, Oregon.

Mean January minimum  
 temperature . . . . . -3.7°C. (25.3°F.)  
 Mean July maximum temperature . . . 26.9°C. (80.5°F.)  
 Average annual precipitation . . . 2,528 mm. (99.51 in.)  
 June through August  
 precipitation . . . . . 119 mm. (4.67 in.)

Temperatures are undoubtedly considerably lower and precipitation somewhat higher on the natural area.

Soils in the natural area are generally podzolic with distinctive A2-B2 sequences; they have not been mapped or classified into series, however. A typical profile from the center of the tract had the following horizon sequence: O1 and O2, 6 to 0 cm.; A2, 0 to 3 cm.; IIA1b, 3 to 6 cm.; IIB2b, 6 to 11 cm.; and IIB3b, 11 cm. plus. The A2 has developed in Mount St. Helens "W" pumice which is about 450 years in age (Crandell 1969); the buried profile was developed from andesite and scoria.<sup>2</sup>

## BIOTA

All 87 ha. (215 acres) of the Sister Rocks Research Natural Area are classified as SAF cover type 226, Pacific Silver Fir-Hemlock (Society of American Foresters 1954). The area falls within Kuchler's (1964) Types 33 or 4 (Silver Fir-Douglas Fir or Fir-Hemlock Forest) and the *Abies amabilis* Zone of Franklin and Dyrness (1969).

Pacific silver fir dominates the natural area, frequently occurring in pure stands (fig. SR-2). Western hemlock (*Tsuga heterophylla*) is the most common associate (fig. SR-2). Douglas-fir (*Pseudotsuga menziesii*) is nearly absent at higher elevations but becomes occasional to common in some lower slope stands; on local type maps, there are 24 ha. (59 acres) on which Douglas-fir is a major component. Noble fir (*Abies procera*) is also scattered through the area, and the presence of snags and stumps of this species suggests it was once more common. Noble fir, mountain hemlock (*Tsuga mertensiana*), and lodgepole pine (*Pinus contorta*) occur

with Pacific silver fir in a young stand at the southern edge of the natural area; this small segment is part of a larger area (outside the natural area) which was burned by a wildfire in 1902 (fig. SR-2).

Pacific silver firs in the natural area are typically 65- to 100-cm. (25- to 40-in.) d.b.h. and 36 to 43 m. (120 to 140 ft.) tall. Stem analyses of similar Pacific silver firs growing nearby suggest a wide range of ages, with 250 to 350 years most common.:

Pacific silver fir is clearly the climax tree species throughout the natural area, based upon size class distributions and reproductive success. Consequently, pure, uneven-aged Pacific silver fir stands are the hypothetical climax here, and much of the area already approximates this structure and composition. Douglas-fir and noble fir occur only as large, old individuals; in many areas, they are present as dead or dying specimens or as stumps and down logs. The relatively tolerant western hemlock is likewise failing to reproduce in significant numbers and is primarily represented by old, over-mature specimens.

Based upon Franklin's (1966) classification of the subalpine forests in this part of the Cascade Range, there are three major community types within the natural area: The *Abies amabilis*/*Streptopus curvipes* (*Erythronium montanum* phase) and *Abies amabilis*/*Vaccinium alaskaense* Associations, and an *Abies procera*/*Xerophyllum tenax* community. The *Abies amabilis*/*Streptopus curvipes* Association is most common in the central portion of the natural area. This community has well-developed shrub and herb layers. *Vaccinium ovalifolium*, *V. alaskaense*, *V. membranaceum*, and *Menziesia ferruginea* are the dominant shrubs. The abundant herbs include *Tiarella unifoliata*, *Rubus pedatus*, *R. lasiococcus*, *Clintonia uniflora*, *Erythronium montanum*, *Streptopus curvipes*, and *Cornus canadensis*. *Rhytidiopsis robusta*, *Brachythecium velutinum*, and *Dicranum*

<sup>2</sup> Unpublished data provided by Dr. H. W. Smith, Agronomy Department, Washington State University, Pullman.

<sup>3</sup> Unpublished data provided by Mr. F. R. Herman and on file at U.S. Forest Service, Forestry Sciences Laboratory, Corvallis, Oregon.

*fuscescens* are the most common mosses. The *Abies amabilis/Vaccinium alaskaense* Association is typical along the lower margins of the area. *Vaccinium alaskaense*, *V. membranaceum*, *Cornus canadensis*, *Berberis nervosa*, *Xerophyllum tenax*, *Chimaphila umbellata*, and *Rhytidiopsis robusta* are common constituents. The *Abies procera/Xerophyllum tenax* community is a pioneer type which characterizes the small area of 50-yearold burn found at the southern margin of the natural area. *Xerophyllum tenax* and *Vaccinium membranaceum* are the most abundant understory plants.

Mammals believed to utilize the natural area as residents or transients are listed in table SR-1.

## HISTORY OF DISTURBANCE

Road construction has caused, and will continue to cause, some disturbance along the margins of the natural area and, in connection with clear-cutting of adjacent lands, will produce some edge effects. However, most of the area is free of human disturbance except for the trail. The trail is used occasionally by hikers, berry pickers, and hunters. There is no evidence that wildfires have occurred within the natural area for several centuries outside of the strip of 1902 burn which was included to provide a contrast with the oldgrowth stands.

## RESEARCH

The Sister Rocks Research Natural Area has been used as a sampling site for studies of subalpine forests and soils in the southern Washington Cascade Range (Franklin 1966) and for a study of characteristics and distribution of Recent pumice and ash falls.<sup>4</sup>

This natural area is particularly valuable as a site for studies of the ecology of Pacific silver fir, offering a variety of stand types and conditions, including pure stands and a recently burned area.

## MAPS AND AERIAL PHOTOGRAPHS

Special maps applicable to the natural area include: *Topography-15* Lookout Mountain, Washington quadrangle, scale 1: 62,500, issued by the U.S. Geological Survey in 1953; and *geology-Geologic Map of Washington*, scale 1:500,000 (Hunting et al. 1961). Either the District Ranger (Wind River Ranger District) or Forest Supervisor (Gifford Pinchot National Forest, Vancouver, Washington) can provide details on the most recent aerial photo coverage and forest type maps for the area.

<sup>4</sup> Research by Dr. H. W. Smith, Agronomy Department, Washington State University, Pullman.

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**Table SR-1. — Tentative list of mammals for Sister Rocks Research Natural Area**

Order	Scientific name	Common name
Insectivora	<i>Neurotrichus gibbsi</i>	shrew mole
	<i>Scapanus orarius</i>	coast mole
	<i>Sorex obscurus</i>	dusky shrew
	<i>Sorex trowbridgii</i>	Trowbridge shrew
	<i>Sorex vagrans</i>	wandering shrew
Chiroptera	<i>Eptesicus fuscus</i>	big brown bat
	<i>Lasionycteris noctivagans</i>	silver-haired bat
	<i>Lasiurus cinereus</i>	hoary bat
	<i>Myotis californicus</i>	California myotis
	<i>Myotis evotis</i>	long-eared myotis
	<i>Myotis lucifugus</i>	little brown myotis
	<i>Myotis volans</i>	long-legged myotis
	<i>Myotis yumanensis</i>	Yuma myotis
	<i>Plecotus townsendi</i>	Townsend big-eared bat
Lagomorpha	<i>Lepus americanus</i>	snowshoe hare
Rodentia	<i>Aplodontia rufa</i>	mountain beaver
	<i>Clethrionomys gapperi</i>	Gapper red-backed vole
	<i>Erethizon dorsatum</i>	porcupine
	<i>Eutamias amoenus</i>	yellow-pine chipmunk
	<i>Eutamias townsendi</i>	Townsend chipmunk
	<i>Glaucomys sabrinus</i>	northern flying squirrel
	<i>Microtus longicaudus</i>	long-tailed vole
	<i>Microtus oregoni</i>	Oregon or creeping vole
	<i>Neotoma cinerea</i>	bushy-tailed wood rat
	<i>Peromyscus maniculatus</i>	deer mouse
	<i>Phenacomys intermedius</i>	heather vole
	<i>Spermophilus saturatus</i>	Cascades mantled ground squirrel
	<i>Tamiasciurus douglasi</i>	chickaree
	<i>Thomomys talpoides</i>	northern pocket gopher
	<i>Zapus trinotatus</i>	Pacific jumping mouse
Carnivora	<i>Canis latrans</i>	coyote
	<i>Felis concolor</i>	mountain lion or cougar
	<i>Lynx rufus</i>	bobcat
	<i>Martes americana</i>	marten
	<i>Mustela erminea</i>	short-tailed weasel or ermine
	<i>Mustela frenata</i>	long-tailed weasel
	<i>Spilogale putorius</i>	spotted skunk or civet cat
	<i>Ursus americanus</i>	black bear
	<i>Vulpes fulva</i>	red fox
Artiodactyla	<i>Cervus canadensis</i>	wapiti or elk
	<i>Odocoileus h. columbianus</i>	black-tailed deer

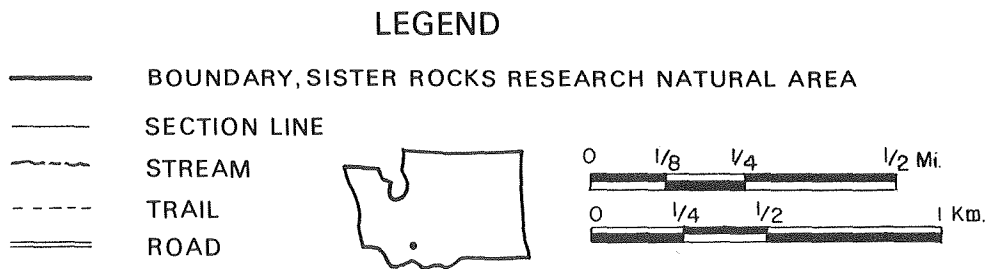
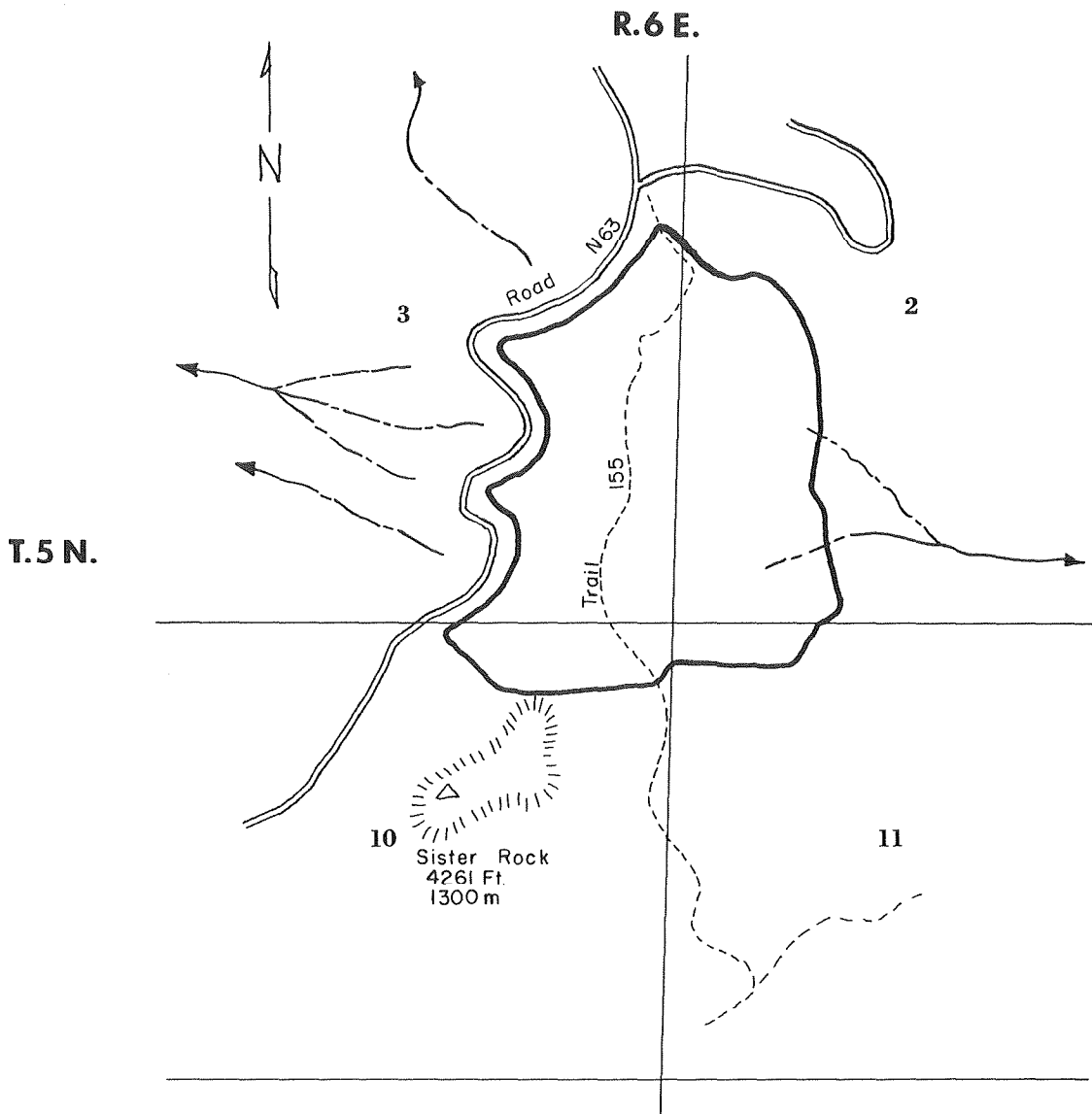


Figure SR-1.- Sister Rocks Research Natural Area,  
Skamania County, Washington.

*Figure SR-2.-Communities of the Sister Rocks Research Natural Area. Upper left: Pure stand of Pacific silver fir with dense reproduction 0.5 to 1 m. tall. Upper right: Mixed stand of Pacific silver fir and western hemlock, the latter represented only by large, over-mature specimens. Lower left: Noble fir/Xerophyllum tenax community growing on area burned by wildfire in 1902 and located at the southern edge of the natural area. Lower right: Mixed stand of Pacific silver fir, Douglas-fir, and western hemlock with abundant seedlings, saplings, and poles of Pacific silver fir.*

