

## MILL CREEK RESEARCH NATURAL AREA<sup>1</sup>

Transitional area between forest and grassland with mosaic of Oregon white oak, ponderosa pine, Douglas-fir and bunchgrass communities on the east slope of northern Oregon's Cascade Range.

The Mill Creek Research Natural Area was established on August 16, 1971, to exemplify the community mosaic found at the forest-grassland transition on the east slope of the northern Oregon Cascade Range. It contains representative, relatively undisturbed stands of bunchgrasses, Oregon white oak (*Quercus garryana*) with an understory of grasses and sedges, and Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*). The 330-ha. (815-acre) tract is located in Wasco County, Oregon, and is administered by the Barlow Ranger District (Dufur, Oregon), Mount Hood National Forest. The irregularly shaped tract is located in portions of sections 4, 8, 9, 16, and 17, T. 1 S., R. 11 E., Willamette meridian, at 45°30' N. latitude, 121 °20' W. longitude (fig. ML-1).

### ACCESS AND ACCOMMODATIONS

Since this natural area lies within the Mill Creek drainage, the municipal watershed of the City of The Dalles, access is strictly controlled. It is necessary to obtain permission for entry and, possibly, a key from the Ranger District before entering the watershed, regardless of the approach route. This is in addition

<sup>1</sup> Description prepared by Dr. F. C. Hall, U.S. Department of Agriculture, Forest Service, Region 6, Portland, Oregon.

to obtaining permission to conduct research on the natural area itself.

The natural area is located about 27 km. (17 miles) west of Dufur, Oregon, and is approached by graveled county and National Forest roads. Dufur is 27 km. (17 miles) south of The Dalles on U.S. Highway 197. Access is good during the summer, but snow creates difficulties during the winter. Closest accommodations are in Dufur; developed forest camps are not convenient to the natural area.

### ENVIRONMENT

The Mill Creek Research Natural Area varies in elevation from 790 to 1,040 m. (2,600 to 3,410 ft.). It is located on the gently to steeply rolling lower foothills of the east slope of the Cascade Range.

Parent rocks are grey hard basalt to grey to dark grey andesites. The area was glaciated during the Wisconsin period.

A modified marine climate prevails. Most precipitation occurs as rain or snow during the cool, cloudy winter. Summers are warm, generally low in precipitation and largely cloudless. One to 3 months of drought are common. Winds are often strong, particularly during the winter since this area is located near the mouth of the Columbia Gorge. Climatic data from The Dalles, located along the Columbia River about 24 km. (15 miles) northeast and 700 to 800 m. below the tract are as follows (U.S. Weather Bureau 1965):'

Mean annual temperature	.....	12.4°C. (54.4°F.)
Mean January temperature	.....	1.1°C. (34.0°F.)
Mean July temperature	.....	23.2°C. (73.8°F.)
Mean January minimum temperature	.....	-2.5°C. (27.6°F.)
Mean July maximum temperature	.....	31.1°C. (88.0°F.)
Average annual precipitation	.....	349 mm. (14.1 in.)
June through August precipitation	.....	23.0 mm. (0.9 in.)
Average annual snowfall	.....	6.0 cm. (23.5 in.)

ML-1

Soils in The Dalles watershed were mapped in 1970 by Paul Shields and Loren D. Herman. Their map can be examined at the Mount Hood National Forest headquarters or at the Dufur Ranger Station. Soils range from very shallow, slightly plastic cobbly loams overlying well-fractured, dark grey, hard basalt to moderately deep, slightly plastic, greyish loamy fine sands overlying grey to dark grey andesite. These materials are well drained, of moderately rapid permeableness and have weak surface stability.

## BIOTA

Estimated areas by vegetation type are:

Name	Area
Forests of pole-sized Douglas-fir with mature ponderosa pine .....	166 ha. (410 acres)
Forests of Oregon white oak with mature ponderosa pine .....	126 ha. (310 acres)
Grassland .....	38 ha. (95 acres)
	330 ha. (815 acres)

The stands of Douglas-fir and ponderosa pine can be assigned to SAF forest cover type 214, Ponderosa Pine-Larch-Douglas-Fir (Society of American Foresters 1954), and Kuchler's (1964) Type 12, Douglas Fir Forest. The Oregon white oak stands with ponderosa pine can be assigned to SAF type 233, Oregon White Oak, and to Kuchler's Type 26, Oregon Oakwoods. The grassland areas can be assigned to Kuchler's Type 51, Wheatgrass-Bluegrass.

Bunchgrass communities dominate steep to moderately steep southeast slopes and many ridge tops (fig. ML-2). These openings are characterized by bluebunch wheatgrass (*Agropyron spicatum*), arrowleaf balsamroot (*Balsamorhiza sagittata*), Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa sandbergii*), with some needlegrass (*Stipa* spp.) and cheatgrass brome (*Bromus tectorum*). These communities appear similar to those described for Daubenmire's (1970) *Agropyron spicatum-Poa secunda* habitat type, lithosolic phase, but apparently include more arrowleaf balsamroot.

Oregon white oak-grass communities and stringers of the Douglas-fir-ponderosa pine forest tend to form a complex pattern with the shallow soil grassland openings. Two kinds of the Oregon white oak stands can be distinguished: those dominated by smaller trees 10-cm. (4-in.) or less d.b.h. and those dominated by trees 15-cm. (6-in.) or more d.b.h., the latter including scattered ponderosa pine. Small diameter oak stands have a crown cover of 30 to 50 percent. Ground vegetation is dominated by *Elymus glaucus* with abundant *Symphoricarpos albus*, elk sedge (*Carex geyeri*), and various forbs. Oak stands of larger diameter trees have a crown cover of 20 to 30 percent and the oaks tend to occur in groups or clumps. Ground vegetation is dominated by elk sedge with bitterbrush (*Purshia tridentata*) and some *Amelanchier arnifolia*, needlegrasses, and bluebunch wheatgrass. In these areas, bluebunch wheatgrass tends to assume a rhizomatous habit. In general, Oregon white oak stands are located on southeast and southerly slopes from ridgetops to the drainage bottom.

Stands dominated by Douglas-fir and ponderosa pine occur in swales and areas of deeper soil and on east and northeast slopes. Most ponderosa pine is mature to over-mature and is generally over 50-em. (20-in.) d.b.h., and 40 m. (120 feet) in height. The Douglas-fir is much younger and varies in diameter from 12- to 40-cm. (5- to 16-in.) d.b.h. Occasional grand fir (*Abies grandis*) and western larch (*Larix occidentalis*) are present. Ground vegetation is dominated by *Symphoricarpos albus*, elk sedge, occasional *Holodiscus discolor*, *Arnica cordifolia*, *Hieracium* spp., *Fragaria* spp., and other forbs.

A list of mammals believed to utilize the natural area as residents or transients is presented in table ML-1. Mule deer (*Odocoileus hemionus*) use the area as fall, winter, and spring range. Wild turkeys (*Meleagris merriami*) have been introduced in this area.

## HISTORY OF DISTURBANCE

Fire scars on ponderosa pine indicate that ground fires periodically burned the area

prior to initiation of fire control programs; three to five wildfires are recorded in these scars. Some logging in the area occurred in the late 1800's. The area was also grazed, sometimes heavily, by domestic livestock prior to classification of the area as municipal watershed. No logging or grazing has been carried out for the past 60 years. The cheatgrass brome on a few of the steep south-facing grasslands suggests that vegetation was altered by grazing to at least some extent.

## RESEARCH

No research is known on the area. It provides numerous interesting opportunities to study relationships between flora, fauna, plant communities, and environment within a mosaic of contiguous but very different kinds of vegetation-bunchgrass, Oregon white oak, and mixed conifer stands-in an area at the forest-grassland transition.

## MAPS AND AERIAL PHOTOGRAPHS

Special maps applicable to the natural area include: *Topography* - 7.5' Five Mile Butte, Oregon (scale 1: 24,000), and 15' White Salmon, Oregon - Washington (scale 1: 62,500) quadrangles issued by the U.S. Geological Survey in 1962 and 1967, respectively; and *geology* - *Geologic Map of Oregon West of the 121st Meridian*, scale 1:500,000 (Peck

1961). Either the District Ranger (Barlow District) or Forest Supervisor (Mount Hood National Forest, Portland, Oregon) can provide details on the most recent aerial photo coverage and forest type maps for the area.

## LITERATURE CITED

Daubenmire, R.

1970. Steppe vegetation of Washington. Wash. Agric. Exp. Stn. Tech. Bull. 62, 131 p., illus.

Kuchler, A. W.

1964. Manual to accompany the map of potential natural vegetation of the conterminous United States. Am. Geogr. Soc. Spec. Publ. 36, various paging, illus.

Peck, Dallas L.

1961. Geologic map of Oregon west of the 121st meridian. U.S. Geol. Surv. Misc. Geol. Invest. Map 1-325.

Society of American Foresters

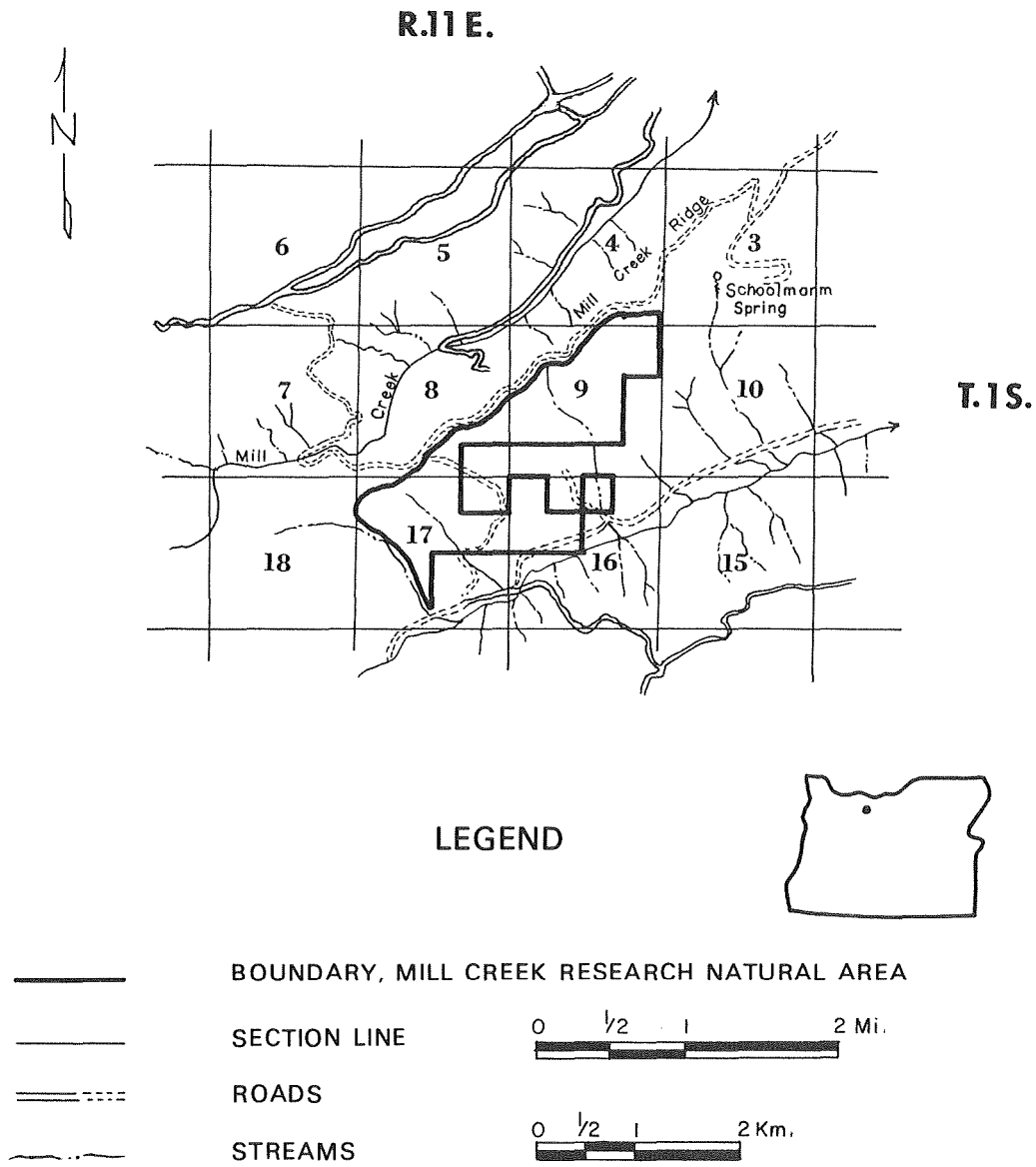
1954. Forest cover types of North America (exclusive of Mexico). 67 p., illus. Washington, D.C.

U.S. Weather Bureau

1965. Climatic summary of the United States-supplement for 1951 through 1960, Washington. Climatography of the United States 96-39, 92 p., illus.

**Table ML-1. — Tentative list of mammals for Mill Creek Research Natural Area**

Order	Scientific name	Common name	
Insectivora	<i>Neurotrichus gibbsi</i>	shrew mole	
	<i>Scapanus orarius</i>	coast mole	
	<i>Sorex bendirii</i>	marsh shrew	
	<i>Sorex obscurus</i>	dusky shrew	
	<i>Sorex palustris</i>	northern water shrew	
	<i>Sorex trowbridgii</i>	Trowbridge shrew	
	<i>Sorex vagrans</i>	wandering shrew	
Chiroptera	<i>Eptesicus fuscus</i>	big brown bat	
	<i>Lasiorycteris noctivagans</i>	silver-haired bat	
	<i>Lasiurus cinereus</i>	hoary bat	
	<i>Myotis californicus</i>	California myotis	
	<i>Myotis lucifugus</i>	little brown 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 californicus</i>	California red-backed vole	
	<i>Erethizon dorsatum</i>	popcupine	
	<i>Eutamias amoenus</i>	yellow-pine chipmunk	
	<i>Eutamias townsendi</i>	Townsend chipmunk	
	<i>Glaucomys sabrinus</i>	northern flying squirrel	
	<i>Marmota flaviventris</i>	yellow-bellied marmot	
	<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>Sciurus griseus</i>	western gray squirrel	
	<i>Spermophilus lateralis</i>	mantled ground squirrel	
	<i>Tamiasciurus douglasi</i>	chickaree	
	<i>Thomomys mazama</i>	Mazama 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>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	
Artiodactyla	<i>Cervus canadensis</i>	wapiti or elk	
	<i>Odocoileus h. hemionus</i>	mule deer	



*Figure ML-1.*— Mill Creek Research Natural Area,  
Wasco County, Oregon.

*Figure ML-2.*-Plant communities in the Mill Creek Research Natural Area. Upper left: Horizontal view showing natural grassland of bunchgrasses and arrowleaf balsamroot in the foreground and forest of small size Oregon white oak and *Elymus glaucus* in the middle-ground with stringers of the Douglas-fir-ponderosa pine forest. The mosaic pattern of plant communities is directly related to soil characteristics; shallower soils support the grasslands. Upper right: View from a community of bunchgrass and arrowleaf balsamroot across the Mill Creek watershed showing an Oregon white oak and elk sedge stand, with occasional mature ponderosa pine, and the upper edge of Douglas-fir-ponderosa pine stand. Center left: Small Douglas-fir with *Elymus glaucus*, *Symphoricarpos albus*, elk sedge, and forbs as ground vegetation. Center right: Larger, clumped Oregon oak with occasional mature ponderosa pine and ground vegetation dominated by elk sedge and some bitterbrush, *Amelanchier alnifolia*, needlegrass, and bluebunch wheatgrass. Lower left: Pole-sized stand dominated by Douglas-fir with occasional old-growth ponderosa pine and ground vegetation of *Symphoricarpos albus*, elk sedge, and forbs. This community is characteristic of ridges with deeper soil and east to northeast slopes. Lower right: Cove community of Douglas-fir and ponderosa pine with *Symphoricarpos albus*, *Holodiscus discolor*, sedge and forbs.

