

PINE CREEK RESEARCH NATURAL AREA¹

Ponderosa pine/bunchgrass on the
glacially eroded Channeled Scablands
of east-central Washington.

The Pine Creek Research Natural Area was established in December 1966 to exemplify relatively undisturbed savanna of ponderosa pine (*Pinus ponderosa*.) and bunch grasses found in the forest-grassland transition at the northeastern edge of eastern Washington's steppes. The 65-ha. (160-acre) tract is located in Spokane County, Washington, and is administered by the Turnbull National Wildlife Refuge (Route 3, Box 107, Cheney, Washington), Bureau of Sport Fisheries and Wildlife. It is a long and narrow tract located in section 5, T. 22 N., R. 42 E., Willamette meridian, at 47°25' N. latitude and 117°31' W. longitude (fig. PN-1).

ACCESS AND ACCOMMODATIONS

To reach the natural area, travel south from Cheney on the Cheney-Plaza county road for 6.4 km. (4 miles), then 3.2 km. (2 miles) east to the Refuge headquarters, where detailed directions will be provided. Access is excellent during the summer and good during the winter. Public accommodations are available in Cheney.

ENVIRONMENT

The Pine Creek Research Natural Area varies from 687 to 716 m. (2,250 to 2,350 ft.)

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in elevation. The undulating to rolling topography is typical of the eastern Washington Columbia Plateau.

The natural area is located on eastern Washington's well-known Channeled Scablands (Bretz 1959). The Columbia River basalts which characterize the entire Columbia Plateau provide the foundation of this landscape. An intricate network of drainage channels is carved into this bedrock and an overburden of loess. Glacial damming of the Columbia River by a lobe of the continental ice sheet is believed to have combined with successive massive floods released from glacially dammed lakes to produce the scablands. The natural area itself does not appear to have been directly glaciated.

A modified maritime 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. Climatic data from Spokane, located 29 km. (18 miles) northeast of the site are as follows (U.S. Weather Bureau 1965):

Mean annual temperature	.....	8.8°C. (47.8°F.)
Mean January temperature	.....	-3.7°C. (25.3°F.)
Mean July temperature	.....	21.4°C. (70.5°F.)
Mean January minimum temperature	.....	-7.7°C. (18.1°F.)
Mean July maximum temperature	.....	28.7°C. (83.7°F.)
Average annual precipitation	.....	437 mm. (17.2 in.)
June through August precipitation	.....	56 mm. (2.2 in.)
Average annual snowfall	.....	147 cm. (58.0 in.)

Soils in the area were mapped between 1955 and 1961. Complete information, using soil names and descriptions approved in 1965, is found in the Spokane County Soil Survey (Donaldson and Giese 1968). Nearly all of the soils in the natural area are mapped as Hesseltnie very rocky complex, 0- to 30percent slopes. This complex consists of from 25 to 50 percent of basalt rock outcrops and

unnamed very stony, very shallow soils. The remainder of the complex is Hesseltine silt loam, a dry upland soil with topsoil up to 4 dm. (16 inches) thick underlain by gravel deposits to a depth of up to 15 dm. (60 inches) and basalt bedrock. Small areas of Cocollala silty clay loam, a poorly drained meadow soil, are also present. Hesseltine-type soils are associated with forest communities and meadows with the Cocollala type. Semiahmoo muck is found in the potholes.

BIOTA

Estimated areas by community are as follows:

Name	Area
<i>Pinus ponderosa</i> / <i>Festuca</i>	
<i>idahoensis</i>	54 ha. (135 acres)
<i>Populus tremuloides</i> meadow.....	8 ha. (20 acres)
Kettle lakes and potholes	2 ha. (5 acres)

The *Pinus/Festuca* communities are probably assignable to SAF cover type 237, Interior Ponderosa Pine (Society of American Foresters 1954) and Kuchler's (1964) Type 11, Western Ponderosa Forest. The meadows with quaking aspen (*Populus tremuloides*) can probably be classified as SAF type 217, Aspen. The area falls within a zone of ponderosa pine savanna at the transition from closed forest to steppe vegetation (Daubenmire and Daubenmire 1968).

The ponderosa pine forest is characteristically rather open with 25- to 40-percent crown cover and ground vegetation dominated by Idaho fescue (*Festuca idahoensis*) and cheatgrass (*Bromus tectorum*.) (fig. PN -2). This plant community comprises 70 to 80 percent of the forested area. Other common understory species are *Bromus japonicus*, *B. commutatus*, *B. mollis*, *Koeleria cristata*, *Potentilla glandulosa*, *Erigeron* spp., and *Hieracium scouleri*. The soils typically are variable in depth with some areas exceeding 10 dm. (40 in.) and others where bedrock is exposed (fig. PN -2).

Microtopographic swales within the forested area are dominated by ponderosa pine

with a crown cover of 30 to 60 percent and ground vegetation clearly dominated by pine-grass (*Calamagrostis rubescens*) with some Idaho fescue and *Stipa occidentalis*, occasional *Symphoricarpos albus*, *Potentilla*, and *Arctostaphylos uva-ursi*. Soils in these microtopographic swales generally consist of a layer of aerially deposited volcanic ash over glacial outwash.

The *Pinus/ Festuca* communities are correlated with Daubenmire's *Pinus ponderosa/ Festuca idahoensis* habitat type, and the *Pinus/Calamagrostis* stands might be considered disjunct variants of his *Pseudotsuga menziesii/Calamagrostis rubescens* habitat type (Daubenmire and Daubenmire 1968).

In a portion of the southern half of the natural area, stone polygons surround areas of deeper soil on which occasional ponderosa pine may be found. The non-forested plant community found there is presently dominated by dense stands of cheatgrass on deeper soil and very sparse cheatgrass on stony soils. At least five species of lichens grow on the exposed rocks. This plant community is probably closely related to the lithosolic phase of Daubenmire's (1970) *Agropyron spicatum/ Poa sandbergii* habitat type.

Much of the quaking aspen meadow occurs as a border type or ecotonal vegetation along the edges of meadows or swamps (fig. PN -2).

A portion of the area classed as kettle lakes and potholes is covered by moist meadows dominated by *Phalaris arundinacea* along with some *Deschampsia caespitosa* (fig. PN-2). Most potholes in this natural area have standing water for most of the growing season and are dominated by *Scirpusvalidus* and/or *Scirpus acutus* (fig. PN -2). Because of the high water table and high organic matter content of the soil, probably Semiahmoo muck (Donaldson and Giese 1968), few other plants are found in these potholes. They are commonly bordered by the aspen meadow community.

Animals believed to utilize the natural area as residents or transients are listed in table PN-I. A rather complete list of resident and migratory fauna can be obtained from the Refuge Manager.

HISTORY OF DISTURBANCE

Fire scars on ponderosa pine indicate ground fires periodically burned through the area prior to initiation of fire control programs.

This area has not been grazed, logged, or otherwise disturbed since establishment of the Refuge in 1937. However, stumps clearly show that much of the old-growth ponderosa pine was removed many years ago.

The presence and often dominance of cheat-grass and Japanese brome in many stands also suggest that heavy livestock use prior to Refuge establishment has affected the vegetation, particularly in the more open plant communities; consequently, the area must be considered disturbed by livestock grazing. No other serious disturbances are known.

RESEARCH

Some research on the Pine Creek Research Natural Area is being conducted by ecology students at Eastern Washington State College, Cheney, Washington. Information on these investigations may be obtained from the Refuge Manager or from the Biology Department at Eastern Washington State College.

Voucher specimens of some bird and animal species and most plant species are available at Refuge Headquarters for inspection.

The natural area provides interesting research opportunities on (1) natural development of plant communities without land treatment measures, a situation nearly impossible to find in this locality; (2) elevations of the interface between forest communities and non-forest, moist or wet marsh communities; and (3) evaluation of faunal activity in a natural plant community lacking current human disturbance.

MAPS AND AERIAL PHOTOGRAPHS

No special topographic or geologic maps which are sufficiently detailed to be useful are known for the natural area. The Wildlife

Refuge Manager (Turnbull National Wildlife Refuge, Cheney, Washington) can provide details on the most recent aerial photo coverage of the area.

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Table PN-1. — Tentative list of mammals for Pine Creek Research Natural Area

Order	Scientific name	Common name
Insectivora	<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 lucifugus</i>	little brown myotis
	<i>Myotis subulatus</i>	small-footed myotis
	<i>Myotis yumanensis</i>	Yuma myotis
	<i>Pipistrellus hesperus</i>	western pipistrel
	<i>Plecotus townsendi</i>	Townsend big-eared bat
Lagomorpha	<i>Lepus californicus</i>	black-tailed jack rabbit
	<i>Sylvilagus nuttalli</i>	mountain cottontail
Rodentia	<i>Erethizon dorsatum</i>	porcupine
	<i>Eutamias amoenus</i>	yellow-pine chipmunk
	<i>Glaucomys sabrinus</i>	northern flying squirrel
	<i>Marmota flaviventris</i>	yellow-bellied marmot
	<i>Microtus longicaudus</i>	long-tailed vole
	<i>Microtus montanus</i>	mountain vole
	<i>Microtus pennsylvanicus</i>	meadow vole
	<i>Neotoma cinerea</i>	bushy-tailed wood rat
	<i>Onychomys leucogaster</i>	northern grasshopper mouse
	<i>Perognathus parvus</i>	Great Basin pocket mouse
	<i>Peromyscus maniculatus</i>	deer mouse
	<i>Reithrodontomys megalotis</i>	western harvest mouse
	<i>Spermophilus columbianus</i>	Columbian ground squirrel
	<i>Tamiasciurus hudsonicus</i>	red squirrel
	<i>Thomomys talpoides</i>	northern pocket gopher
Carnivora	<i>Canis latrans</i>	coyote
	<i>Lynx rufus</i>	bobcat
	<i>Mephitis mephitis</i>	striped skunk
	<i>Mustela frenata</i>	long-tailed weasel
	<i>Taxidea taxus</i>	badger
Artiodactyla	<i>Odocoileus virginianus</i>	white-tailed deer

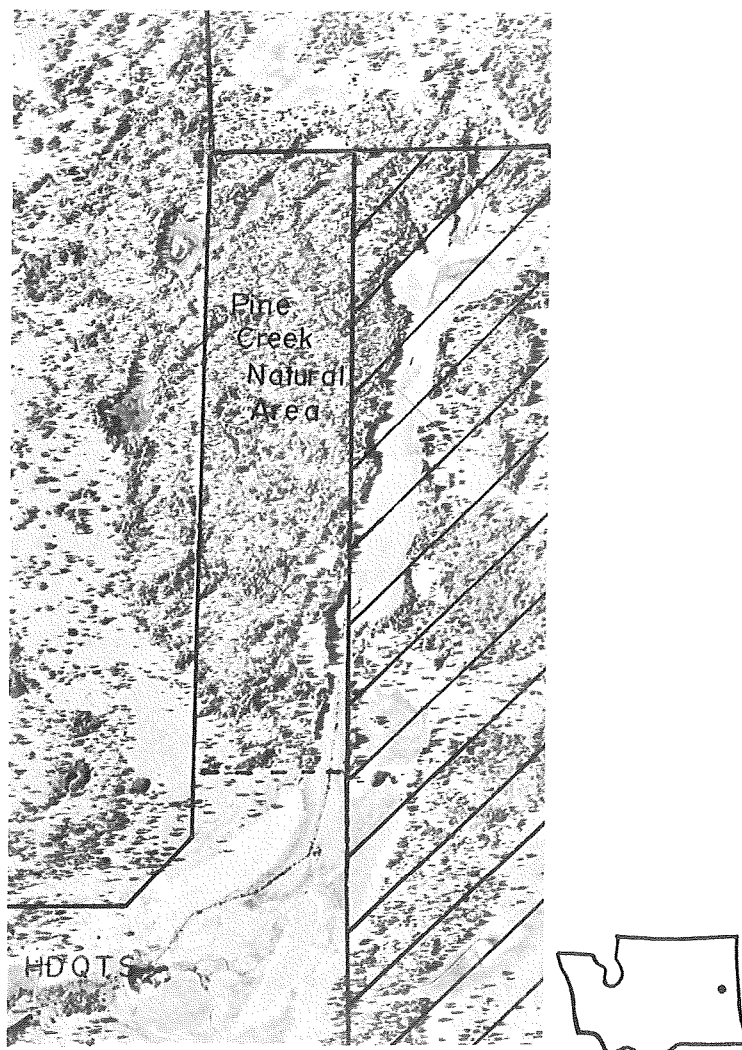


Figure PN-1.—Pine Creek Research Natural Area,
Spokane County, Washington.

1/2 MILE

Figure PN-2.-Communities in the Pine Creek Research Natural Area.

Upper left: *Pinus ponderosa*/*Festuca idahoensis* stands with some cheatgrass are the most common community on gently mounded uplands; note exposed bedrock in background. Upper right: Network of very stony soil surrounding mounds of deep soil; mounds are dominated by cheatgrass; rocky areas support at least five species of lichen. Lower left: Moist meadow at the southeast edge of the natural area dominated by *Phalaris arundinacea*. Lower right: *Scirpus* marsh near center of the tract which has seasonal standing water; quaking aspen occurs along the edges.

