

TURNBULL PINE RESEARCH NATURAL AREA¹

Ponderosa pine/bunchgrass savanna and
pothole lakes and ponds characteristic of
east central Washington.

The Turnbull Pine Research Natural Area was
established December 1966 to exemplify nearly
pristine ponderosa pine (*Pinus ponderosa*)
savanna at the transition from forest to grassland
and a series of free-water potholes characteristic
of the Channeled Scablands found on the basalt
plateau of east-central Washington. The 81-ha.
(200-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. The irregularly shaped tract is
located in section 25, T. 21 N., R. 43 E.,
Willamette meridian, at 47°27' N. latitude and
117°30' W. longitude (fig. TP-1).

ACCESS AND ACCOMMODATIONS

The natural area is located 2.5 km. (1.5 miles)
south of Cheney, Washington, along the Cheney-
Plaza County road which forms the tract's west
boundary. Access is excellent during the summer
and generally good during the winter. Public
accommodations are available at Cheney.

ENVIRONMENT

The Turnbull Pine Research Natural Area

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ranges from 685 to 715 m. (2,250 to 2,350 ft.) in
elevation. Topography is generally undulating to
rolling except around the pothole lakes which are
often surrounded by steep slopes or rock cliffs
(fig. TP-2).

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 are 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 was
probably never actually 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, about 29
km. (18 miles) north, 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 sometime
between 1955 and 1961, and complete infor-
mation is found in the Spokane County Soil
Survey (Donaldson and Giese 1968). Hesseltine
soils are predominant on the area with the major
portion mapped as Hesseltine very rocky
complex, 0- to 30-percent slopes. This mapping
unit includes from 25- to 50-percent

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basalt rock outcrops and unnamed very stony, very shallow soils, with the remainder being Hesseltine silt loam. Hesseltine silt loam is a dry upland soil with topsoil down to 4 dm. (16 in.) deep, underlain by coarse gravel and stones to a depth of up to 15 dm. (60 in.) over basalt bedrock. Minor areas of other Hesseltine-type soils also occur. The Hesseltine soils are typically forested. Soils in the meadows and around pothole borders are the Cocollala silty clay loam. This soil ranges up to 14 dm. (60 in.) deep and is formed in volcanic ash deposits mixed with silty alluvium. Highly organic Semiahmoo muck soils are found in the potholes (e.g., in fig. TP-2), which suggests natural pond succession and eutrophication.

BIOTA

Estimated areas by vegetation type are as follows:

Name	Area
Ponderosa pine forest	65 ha. (160 acres)
Grassland	8 ha. (20 acres)
Quaking aspen	4 ha. (10 acres)
Aquatic (kettle lakes and potholes) . .	4 ha. (10 acres)

The forest stands are assignable to SAF forest cover type 237, Interior Ponderosa Pine (Society of American Foresters 1954), and Kuchler's (1964) Type 11, Western Ponderosa Forest. The grasslands best fit Kuchler's Type 51, Wheatgrass-Bluegrass with some Type 50, Fescue-Wheatgrass. The kettle lakes and potholes with their associated meadow vegetation would probably fit Kuchler's Type 49, Tule Marshes. The natural area falls in a zone of ponderosa pine savanna where ponderosa forests gradually grade into Columbia Basin bunchgrass.

Ponderosa pine (*Pinus ponderosa*) forests may be divided into two community types:

Pinus ponderosa/Festuca idahoensis and *Pinus ponderosa/Symphoricarpos albus/Calamagrostis rubescens*. The *Pinus/Festuca* type is characteristic of convex topography and shallower soils. Pine crown cover varies from 20 to 40 percent; ground vegetation is generally dominated by Idaho fescue (*Festuca*

idahoensis) and bluebunch wheatgrass (*Agropyron spicatum*.), with *Bromus* spp., Sandberg bluegrass (*Poa sandbergii*), *Koeleria cristata*, *Potentilla glandulosa*, and *Erigeron* spp. (see fig. PN -2 in Pine Creek Research Natural Area description). They appear related to Daubenmire and Daubenmire's (1968) *Pinus ponderosa/Festuca idahoensis* Association.

The *Pinus/Symphoricarpos/Calamagrostis* community type is characteristic of lower concave microtopography and small swale bottoms (fig. TP-2). Pine crown cover varies from 35 to 50 percent. Ground vegetation is co-dominated by *Symphoricarpos albus* and pinegrass (*Calamagrostis rubescens*). Other important components are Idaho fescue, elk sedge (*Carex geyeri*), and *Fragaria virginiana* var. *platypetala*. This community does not clearly fit any of Daubenmire and Daubenmire's (1968) associations. It is probably a variant of their *Pinus ponderosa/Symphoricarpos albus* Association in which pinegrass is far more important than their classification recognizes. Variations in microtopography and soil depth seem related to these two forest communities.

Quaking aspen (*Populus tremuloides*) communities occasionally occur in small meadows (fig. TP-2) and as stringers around lakes and meadows. Quaking aspen is clearly dominant. Associated vegetation is *Symphoricarpos albus*, *Solidago* spp., thinleaf alder (*Alnus tenuifolia*), water birch (*Betula occidentalis*), and *Cornus stolonifera*.

The grasslands generally occur on convex surfaces of the gentle, undulating topography and appear associated with shallow soils (fig. TP-2). Other than very occasional ponderosa pine, they are dominated by bluebunch wheatgrass, Idaho fescue, and *Bromus* spp. on deeper soils. On shallower soils they are dominated by Sandberg bluegrass and *Bromus* spp. with some Idaho fescue and bluebunch wheatgrass.

The 4 ha. (10 acres) of kettle and pothole lakes are characterized by free-water ponds which retain their water all season long and which are surrounded by gradations from very wet to moderately moist meadow vegetation

(fig. TP-2). Western yellow pond lily (*Nuphar polysepalus*) often colonizes free-water areas. Ponds are often edged by wet meadows characterized by tule (*Scirpus accutus* and/or *S. validus*) with occasional colonies of cattails (*Typha latifolia*). Where moisture and free water are less abundant, the tule grades into moist meadow dominated by *Phalaris arundinacea*, which is often associated with *Deschampsia caespitosa*. Most pothole lakes are surrounded by rock ledges or steep slopes from 10 to 25 feet high (fig. TP-2).

Mammals believed to utilize the natural area as residents or transients are listed in table TP-1. A list of resident and transitory birds can be obtained from the Refuge Manager.

HISTORY OF DISTURBANCE

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

RESEARCH

Some research is being conducted by ecology students at nearby Eastern Washington State College, Cheney, Washington. Information may be obtained from the Refuge Manager or from the Biology Department of Eastern Washington State College. Voucher specimens of some birds and animals and most plant species are available for inspection at Refuge Headquarters.

The natural area provides unique opportunities to study: (1) the ecology of pothole lakes and their associated meadow vegetation

under undisturbed conditions; (2) interfaces between dry upland non-forested vegetation and forested vegetation on slopes and between forest and meadow and meadow and free water; (3) relationships of faunal species distribution to vegetation over these extremely variable environmental conditions; and (4) aquatic communities.

MAPS AND AERIAL PHOTOGRAPHS

No special topographic or geologic maps are available for the natural area which are sufficiently detailed to be useful. The Refuge Manager (Turnbull National Wildlife Refuge, Cheney, Washington) can provide details on the most recent aerial photo coverage of the area.

Since refuge establishment in 1937, grazing, tree cutting, and other disturbances have been prohibited on the original 20 ha. (50 acres) of this natural area (the northwestern corner of the present tract). The natural area was expanded to 81 ha. (200 acres) in 1968 and the 61-ha. (150-acre) addition had received some light use by cattle each year between 1937 and 1968. The old-growth ponderosa pine was logged prior to Refuge establishment, and present forest stands are sapling and pole sized with occasional larger trees. Domestic livestock also used the area, sometimes heavily, prior to Refuge establishment. The abundance of *Bromus* spp. suggests livestock overuse produced some modification of ground vegetation.

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Table TP-1. — Tentative list of mammals for Turnbull Pine 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
	<i>Lepus californicus</i>	black-tailed jack rabbit
Lagomorpha	<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>Ondatra zibethicus</i>	muskrat
	<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
	<i>Canis latrans</i>	coyote
	<i>Lynx rufus</i>	bobcat
Carnivora	<i>Mephitis mephitis</i>	striped skunk
	<i>Mustela frenata</i>	long-tailed weasel
	<i>Taxidea taxus</i>	badger
	<i>Odocoileus h. hemionus</i>	mule deer
Artiodactyla	<i>Odocoileus virginianus</i>	white-tailed deer



Figure TP-1.- Turnbull Pine Research Natural Area,
Spokane County, Washington.

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1/2 MILE

Figure TP-2.-Natural features of the Turnbull Pine Research Natural Area. Upper left: Common forest community of ponderosa pine, *Symphoricarpos albus*, and pinegrass with some Idaho fescue and elk sedge. Upper right: Dry meadow of *Agrostis alba* and *Phleum pratense* and quaking aspen meadow with *Symphoricarpos*, *Solidago*, and thin leaf alder. Lower left: Common community on top of gentle "biscuits," *Bromus* spp. on shallow soil. Lower right: Free water pond and adjacent tule meadow; rock rim around the pond is typical.

