

WOLF CREEK RESEARCH NATURAL AREA¹

Bitterbrush - bunchgrass communities on granitic soils located along the lower east slope of the northern Washington Cascade Range.

The Wolf Creek Research Natural Area was established February 1969 as an example of the bitterbrush (*Purshia tridentata*) bunchgrass vegetation which occurs on granitic soils at low elevations on the east slope of the Washington Cascades. This vegetation type is important as winter range for big game animals. The 61-ha. (150-acre) tract is located in Okanogan County, Washington, and is administered by the Winthrop Ranger District (Winthrop, Washington), Okanogan National Forest. It is rectangular in shape; the east, north, and west edges are partly fenced and follow surveyed section lines and its south edge borders Wolf Creek (fig. WW-1). It is located in the N1/2 of section 1, T. 34 N., R. 20 E., Willamette meridian, at 48°30' N. latitude and 120°15' W. longitude.

ACCESS AND ACCOMMODATIONS

A blacktop and gravel road terminates approximately 0.4 km. (0.25 mile) from the area adjacent to a ranch headquarters and about 8 km. (5 miles) west of Winthrop, Washington. Wolf Creek Trail, which starts at the road end, bisects the lower third of the natural area. Directions should be obtained at the Winthrop Ranger Station. Access is

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excellent during summer and often easy during the winter due to limited snow accumulations. Public accommodations are available in Winthrop.

ENVIRONMENT

The Wolf Creek Research Natural Area is located in steep rolling foothills of the Cascade Range. It ranges in elevation from 792 to 975 m. (2,600 to 3,200 ft.). Topography varies from gentle and rolling to steep; between the ridgetop at the north boundary and steep slopes adjacent to Wolf Creek along the south boundary are a series of small benches. Slope direction is southerly. Most of the parent rocks are granite or granodiorite with some sedimentary types at lower elevations.

A largely continental climate prevails. Most precipitation occurs as snow during the cool, cloudy winters. Summers are warm, low in precipitation, and largely cloudless. Two to 3 months of drought are common. Climatic data from Winthrop, located in a valley 8 km. (5 miles) to the southeast, are as follows (U.S. Weather Bureau 1965):

Mean annual temperature	.....	7.1°C. (44.8°F.)
Mean January temperature	.....	-7.5°C. (18.4°F.)
Mean July temperature	.....	20.1°C. (68.2°F.)
Mean January minimum temperature	.....	-13.1°C. (8.4°F.)
Mean July maximum temperature	..	30.5°C. (87.0°F.)
Average annual precipitation	....	368 mm. (14.5 in.)
June through August precipitation	.....	58 mm. (2.3 in.)

Soils in the area have not been mapped. cursory examination suggests they are generally colluvial Regosols (Entisols) with little profile development. Sand to pea-size granitic gravel is common, some aerially deposited volcanic ash is present, and the soils generally have a sandy loam to loam texture. The small areas of forest appear to occur on Gray Wooded soil types.

WW-1

BIOTA

Estimated areas by major community types are:

Name	Area
<i>Purshia tridentata</i> / <i>Agropyron inerme</i> - <i>Festuca idahoensis</i>	32 ha. (80 acres)
<i>Pinus ponderosa</i> / <i>Purshia tridentata</i> / <i>Festuca idahoensis</i>	16 ha. (40 acres)
<i>Pinus ponderosa</i> - <i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> / <i>Agropyron inerme</i>	8 ha. (20 acres)

The *Purshia*/*Agropyron* - *Festuca* community type could probably be assigned to Kuchler's (1964) Type 55, Sagebrush Steppe. The *Pinus*/*Purshia*/*Agropyron* community type is assignable to SAF cover type 237, Interior Ponderosa Pine (Society of American Foresters 1954), and Kuchler's Type 10, Ponderosa Shrub Forest. *Pinus -pseudotsuga*/*Symphoricarpos*/*Agropyron* communities could be assigned to SAF forest cover type 214, Ponderosa Pine - Larch - Douglas-Fir, and Kuchler's Type 12, Douglas Fir Forest. The area falls within a forested zone but is largely devoid of trees due to soil factors and slope aspect.

The *Purshia tridentata*/*Agropyron inerme* *Festuca idahoensis* stands are characteristically dominated by beardless bluebunch wheatgrass (*Agropyron inerme*) and bitterbrush with some Idaho fescue (*Festuca idahoensis*), *Balsamorhiza sigittata*, Sandberg bluegrass (*Poa sandbergii*), and very scattered ponderosa pine (*Pinus ponderosa*) (fig. WW -2). This community type occurs from reasonably level benches to steep southerly slopes, some of which exceed 100 percent. The type can be related to either the *Purshia*/*Festuca* or *Purshia*/*Agropyron* types described by Daubenmire (1970).

The *Pinus ponderosa*/*Purshia tridentata*/*Festuca idahoensis* community is a very open type characterized by a 15- to 25- percent crown cover of ponderosa pine and a shift in understory dominance from beardless bluebunch wheatgrass to Idaho fescue (fig. WW -2). This community is characteristic of gentler slopes on upper portions of the tract. Pine growth is slow, even in saplings and poles (fig. WW -2), suggesting limited forest productivity

and savanna conditions (Daubenmire 1970).

The forest community of ponderosa pine and Douglas-fir (*Pseudotsuga menziesii*) seems reasonably representative of climatic climax plant community potentials in this area. The stands have overstories dominated by ponderosa pine, but tree reproduction is mostly Douglas-fir. Ground vegetation is co-dominated by *Symphoricarpos albus* and beardless bluebunch wheatgrass. Numerous ponderosa pine are fire-scarred at their bases. Moderately low basal areas (20.5 sq. m. per ha. or 80 sq. ft. per acre) and slow diameter growth of trees suggest limited forest growth potential.

The area is important winter range for mule deer (*Odocoileus hemionus*). In general they move off the tract sufficiently early in the spring to prevent grazing damage to grasses. Other mammals believed to utilize the tract as residents or transients are listed in table WW -1.

HISTORY OF DISTURBANCE

Fire scars on ponderosa pine indicate ground fires periodically burned the area prior to initiation of fire control programs in 1910. Lack of dominant old-growth fir in the forest area further suggests all portions of the tract have burned at some time. Sufficient grass volume is present on the grassland to carry a fire so one should assume it has burned.

The Wolf Creek Research Natural Area has been used as livestock range since about 1900, primarily for cattle. Heavy overgrazing occurred in the late 1930's and early 1940's and caused a change of vegetation composition. However, in 1948, initiation of the grazing season was changed to June 1, by which time native forage has dried sufficiently that it is low in livestock palatability and is not damaged by light use. Presently, livestock pass through the area annually on their way to higher elevation ranges. Vegetative indicators suggest that an upward trend in range condition has persisted over the past 15 years.

Some trees were removed from east portions of the area 5 to 8 years ago, and logging has recently taken place adjacent to and above the area on State-owned land. No further

logging will be allowed, and timber harvest on adjacent lands should have no impact on the bitterbrush - wheatgrass communities.

RESEARCH

No research is known to be in progress on the Wolf Creek Research Natural Area. The area provides interesting opportunities to study: (1) effects of winter-game use on palatable shrub-bunchgrass vegetation; and (2) biomass productivity in relation to soils and topography in three closely related and intergrading plant communities developed under a single macroclimate.

MAPS AND AERIAL PHOTOGRAPHS

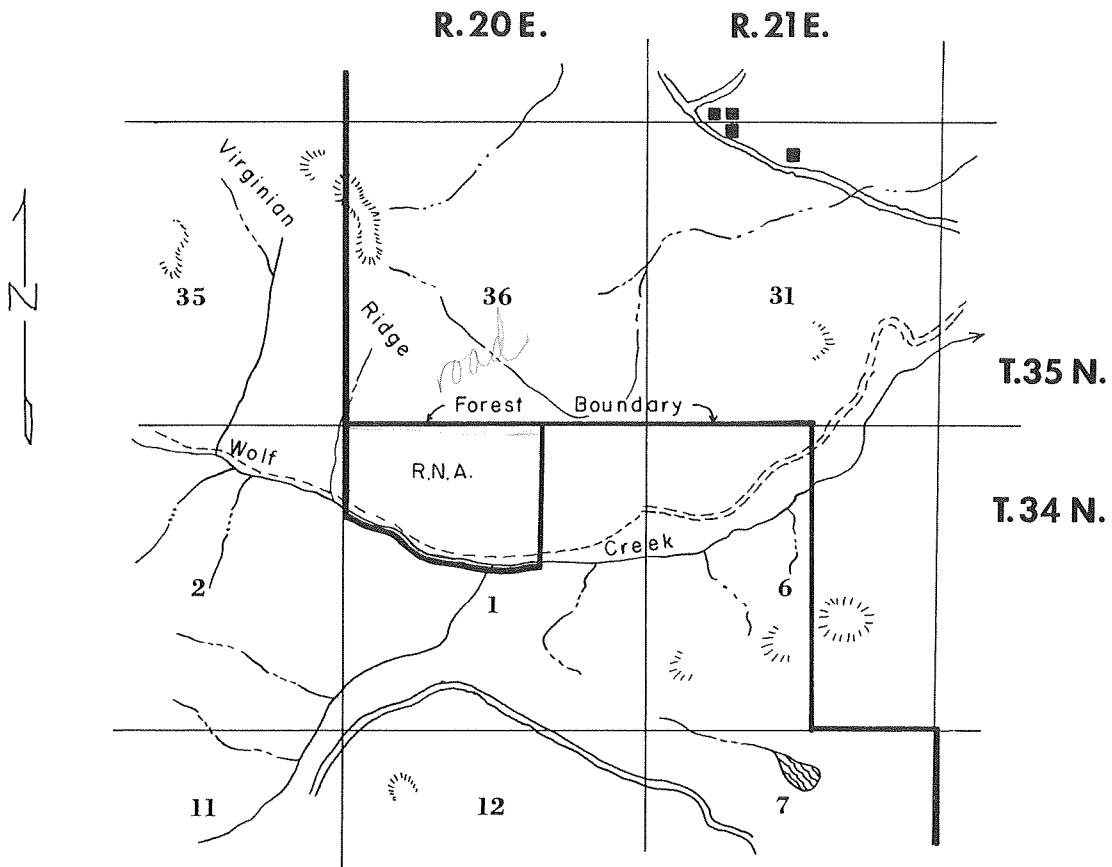
No special topographic or geologic maps are available for the natural area which are sufficiently detailed to be useful. Either the District Ranger (Winthrop Ranger District) or Forest Supervisor (Okanogan National Forest, Okanogan, Washington) can provide details on the most recent aerial photo coverage of the area.

LITERATURE CITED

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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.
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1954. Forest cover types of North America (exclusive of Mexico). 67 p., illus. Washington, D.C.
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1965. Climatic summary of the United States - supplement for 1951 through 1960, Washington. Climatography of the United States 86-39, 92 p., illus.







Table WW-1. — Tentative list of mammals for Wolf Creek Research Natural Area

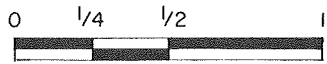
Order	Scientific name	Common name	
Insectivora	<i>Sorex cinereus</i>	masked shrew	
	<i>Sorex obscurus</i>	dusky shrew	
	<i>Sorex palustris</i>	northern water shrew	
	<i>Sorex vagrans</i>	wandering shrew	
	<i>Antrozous pallidus</i>	pallid bat	
Chiroptera	<i>Eptesicus fuscus</i>	big brown bat	
	<i>Lasionycteris noctivagans</i>	silver-haired bat	
	<i>Lasiurus borealis</i>	red 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 thysanodes</i>	fringed 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
		<i>Lepus californicus</i>	black-tailed jack rabbit
		<i>Lepus townsendi</i>	white-tailed jack rabbit
		<i>Ochotona princeps</i>	pika
<i>Sylvilagus nuttalli</i>		mountain cottontail	
Rodentia	<i>Castor canadensis</i>	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>Marmota flaviventris</i>	yellow-bellied marmot	
	<i>Microtus longicaudus</i>	long-tailed vole	
	<i>Microtus montanus</i>	mountain vole	
	<i>Microtus oregoni</i>	Oregon or creeping vole	
	<i>Microtus richardsoni</i>	Richardson vole	
	<i>Neotoma cinerea</i>	bushy-tailed wood rat	
	<i>Perognathus parvus</i>	Great Basin pocket mouse	
	<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 princeps</i>	western jumping mouse	
	<i>Zapus trinotatus</i>	Pacific jumping mouse	
	Carnivora	<i>Canis latrans</i>	coyote
		<i>Felis concolor</i>	mountain lion or cougar
<i>Gulo luscus</i>		wolverine	
<i>Lynx canadensis</i>		Canadian lynx	
<i>Lynx rufus</i>		bobcat	
<i>Martes americana</i>		marten	
<i>Mephitis mephitis</i>		striped skunk	
<i>Mustela erminea</i>		short-tailed weasel or ermine	
<i>Mustela frenata</i>		long-tailed weasel	
<i>Mustela vison</i>		mink	
<i>Procyon lotor</i>		raccoon	
<i>Taxidea taxus</i>		badger	
<i>Ursus americanus</i>		black bear	
Artiodactyla	<i>Vulpes fulva</i>	red fox	
	<i>Cervus canadensis</i>	wapiti or elk	
	<i>Odocoileus h. hemionus</i>	mule deer	



LEGEND



-  BOUNDARY, WOLF CREEK RESEARCH NATURAL AREA
 -  ROADS
 -  SECTION LINE
 -  STREAMS
 -  TRAIL
 -  BUILDINGS
- 0 1/4 1/2 1 Mi.



0 1/4 1/2 1 Km.

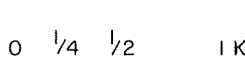


Figure WW-1.- Wolf Creek Research Natural Area, Okanogan County, Washington.

Figure WW-2.-Communities of Wolf Creek Research Natural Area. Upper left: Community of bitterbrush and beardless bluebunch wheatgrass with occasional ponderosa pine and forbs growing on a bench. Upper right: Community dominated by beardless bluebunch wheatgrass with some bitterbrush and occasional ponderosa pine growing on steep south slope. Lower left: Open ponderosa pine/bitterbrush/Idaho fescue community growing on an upper slope bench. Lower right: This ponderosa pine-Douglas-fir community growing on deeper soil and steep slopes probably represents the typical zonal forest community.

