Federal Research Natural Areas in Oregon and Washington A Guidebook for Scientists and Educators. 1972. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

PRINGLE FALLS RESEARCH NATURAL AREA[1]

A two-unit natural area containing ponderosa pine/bitterbrush and lodgepole pine/bitterbrush communities typical of the northern Mount Mazama pumice area in south-central Oregon.

The Pringle Falls Research Natural Area was established June 1936, to exemplify the topographically related mosaic of lodgepole pine *(Pinus contorta)* and ponderosa pine *(Pinus ponderosa)* forests characteristic of a large area of aerially-deposited Mount Mazama (Crater Lake) pumice in south-central Oregon. The 470-ha. (1, 160-acre) tract is located in Deschutes County, Oregon, and is administered by the Bend Ranger District (Bend, Oregon), Deschutes National Forest. It is also a part of the Pringle Falls Experimental Forest, a 4,477-ha. (11,055-acre) area maintained by the Pacific Northwest Forest and Range Experiment Station for research and demonstration of management techniques in ponderosa and lodgepole pine forests (Mowat 1954). The natural area is in two units. Unit 1, the western block, contains 227 ha. (560 acres) and includes nearly all of section 33T. 21 S., R. 9 E., Willamette meridian; and Unit 2, the eastern block, contains 243 ha. (600 acres) and encompasses most of section 35 and a small portion of section 34, T. 21 S., R. 9 E., Willamette meridian (fig. PR-l). Both units lie at approximately 43 °03' N. latitude and 121 °40' W. longitude.

[1] Description prepared by Dr. F. C. Hall, U.S. Department of Agriculture, Forest Service, Region 6, Portland, Oregon.

ACCESS AND ACCOMMODATIONS

The natural area is located approximately 57 km. (35 miles) southwest of Bend and approximately 18 km. (11 miles) northwest of Lapine and is approached via U.S. Highway 97 and Forest Service roads. Directions can be obtained at the Silviculture Laboratory or Ranger Station in Bend. Access to the area is good in the summer, but snow makes winter access difficult. In general, travel through the natural area is quite easy. Forest roads are all around the tracts and one traverses the east unit in an east-west direction (fig. PR-l). Several old trails provide access to major segments of both units (fig. PR-l). The high elevations at the northeast corner of the east unit can be reached via a logging road.

Public accommodations are available in Bend and Lapine; primitive campgrounds are available at the northern edge of the experimental forest and at Wickiup Reservoir 5 km. (3 miles) west of the area.

ENVIRONMENT

Topography and elevational range contrast on the two units of the natural area. Unit 1, the western block, is located on nearly flat topography with a total elevational range of 1,310 to 1,320 m. (4,290 to 4,310 ft.). Unit 2, the eastern block, varies from flat or rolling to relatively steep on some slopes (fig. PR-l). Elevations range from 1,310 to 1,470 m. (4,280 to 4,820 ft.).

Both tracts are located on a plateau upon which 3 to 12 dm. (2 to 5 ft.) of dacite pumice was aerially deposited following the eruption of Mount Mazama (now Crater Lake) 6,600 years ago. Bedrock in the area is mapped as basalt and basaltic andesite lavas of Pleistocene to Recent age (Williams 1957). Cruiser and Wampus Buttes, which

partially occupy the east unit, are basaltic cinder cones.

A modified continental climate prevails. Most precipitation occurs as snowfall 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 Wickiup Reservoir located 3 km. (2 miles) west of the tract are as follows (U.S. Weather Bureau 1965):

Mean annual temperature	5.7°C.	(42.3°F.)
Mean January temperature	−4.2°C.	(24.5°F.)
Mean July temperature	15.9°C.	(60.7°F.)
Mean January minimum temperature	−10.6°C.	(12.8°F.)
Mean July maximum temperature	26.8°C.	(80.3°F.)
Average annual precipitation	525 mm.	(20.7 in.)
June through August precipitation	58 mm.	(2.3 in.)

The principal soil in the area has been classified as the Lapine series (Tarrant 1947). The Lapine soil is loamy coarse sand, textured and derived from aerially deposited dacite pumice. It is well drained and occupies 2to 25-percent slopes. The pumice varies from 80 to 130 cm. (30 to 50 in.) in depth over buried soil profiles. A small area in the northern half of Unit 1, which is easily recognized by its grass dominated understory, is covered by the Wickiup soil series. The Wickiup is also a loamy coarse sand soil formed in aerially deposited dacite pumice. It differs from the Lapine by having a seasonally high water table. The Wickiup occurs on slopes of 0 to 5 percent and on pumice deposits ranging from 130 to 150 cm. (50 to 60 in.) in depth.

Wickiup Reservoir, located 3 km. (2 miles) above and to the west of the natural area, has apparently influenced the level of the water tables in this locality. Small ponds and lakes 0.5 to 1 km. (0.25 to 0.5 mile) west of Unit 1 have had water levels raised from 1 to 1.5 m. (3 to 5 ft.) since installation of the reservoir.

BIOTA

Estimated areas by plant community are:

Name	*Unit 1 Area*	*Unit 2 Area*
Pinus ponderosa/Purshia tridentata		79 ha. (195 acres)
Pinus ponderosa-Pinus contorta/Purshia tridentata		121 ha. (300 acres)
Pinus ponderosa-Pinus lambertiana/Ceanothus velutinus		26 ha. (65 acres)
Pinus contorta/Purshia tridentata	226 ha. (560 acres)	16 ha. (40 acres)

The distribution of community types, as defined by timber and ground vegetation type maps prepared in 1934, is illustrated in figure PR-2. Both *Pinus ponderosa/Purshia tridentata* and *Pinus ponderosa-Pinus contorta/Purshia tridentata* can be assigned to SAF forest cover type 237, Interior Ponderosa Pine (Society of American Foresters 1954), and Kuchler's (1964) Type 10, Ponderosa Pine Shrub Forest. *Pinus ponderosa-Pinus lambertiana/Ceanothus velutinus* communities could probably be assigned to SAF forest cover type 243, Ponderosa Pine-Sugar PineFir, and Kuchler's Type 5, Mixed Coniferous Forest. *Pinus contorta/Purshia tridentata* stands can be categorized as SAF forest cover type 218, Lodgepole Pine; Kuchler does not recognize lodgepole pine type. The natural area falls within a *Pinus ponderosa* Zone according to Dyrness and Youngberg (1966). The very recent, 6,600-year-old, pumice deposit has not weathered to produce zonal type soils; therefore it is difficult if not impractical to assign the area to a "climatic vegetation zone."

Unit 1, the western block, is completely dominated by pure or nearly pure lodgepole pine. Eighty to 90 percent of the area is characterized by lodgepole pine and bitterbrush *(Purshia tridentata)* with a sparse herbaceous cover composed of western needlegrass *(Stipa occidentalis),* Ross's sedge *(Carex rossii),* bottlebrush squirrel tail *(Sitanion hystrix),* and *Fragaria cuneifolia* (fig. PR-3). A lodgepole stand with strikingly different ground vegetation occurs in the northern half of the area (figs. PR-2 and PR-3): Here the ground vegetation is co-dominated by bitterbrush and Idaho fescue *(Festuca idahoensis)* with *Arctostaphylos uva-ursi, Achil-*

lea millefolilium, bottlebrush squirreltail, *Lnpinus latifolius,* and *Fragaria.* Youngberg and Dahms (1970) have described these communities, their soils, and forest productivity.

Unit 2, the eastern block, has minor amounts of pure lodgepole pine (fig. PR-2). Its undulating to rolling topography is associated with stands of ponderosa pine, bitterbrush, and western needlegrass (Dyrness and Youngberg 1966) (fig. PR-3). In some cases, particularly on concave lower slopes, lodgepole pine grows in association with ponderosa. Ponderosa pine and bitterbrush are the conspicuous overstory and ground vegetation dominants, respectively; in addition, Ross's sedge, western needlegrass, bottlebrush squirreltail, and, at times, *Arctostaphylos parryana* var. *pinetorum* are present. At higher elevations and on northerly slopes, sugar pine *(Pinus lambertiana)* and white fir *(Abies concolor)* become significant elements in the plant community. Associated with the increase in these tree species is a decrease in bitterbrush, an increase in *Arctostaphylos,* and occurrence of *Ceanothus velutinus.*

Mule deer *(Odocoileus hemionus)* and Rocky Mountain elk *(Cervus canadensis)* use the area as spring-summer and fall range. Other mammals believed to utilize the area as residents or transients are listed in table PR-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 (fig. PR-3); general fires are indicated in 1605, 1672, 1716, 1731, 1769, 1788, 1823, 1855, 1871, and 1886. Lack of dominant oldgrowth fir in the presence of abundant fir reproduction further suggests most portions of the ponderosa forest have burned at some time. In many cases, charred trees and logs are in evidence in lodgepole pine communities suggesting fire also has occurred in these areas.

Domestic sheep apparently grazed the area at one time on their way to high elevation pasture. Utilization has been scant to light, and consequently, the vegetation can be considered unaltered by livestock use. Game use tends to be moderate with noticeable but apparently not detrimental utilization of bitterbrush. No other significant disturbance is known.

RESEARC H

Since the natural area is a part of the Pringle Falls Experimental Forest, a great deal of research has been and is being conducted on the tract. Two fenced areas were established in each block about 1934 providing 8 ha. (20 acres) in the east unit and 6 ha. (15 acres) in the west unit from which grazing has been excluded for about 35 years (fig. PR-2). These plots contain permanent points which have been photographed at least twice. The two plots in the eastern unit (plots 27 and 28) are also sites where periodic measurements are made of forest growth and mortality. Between 1938 and 1948, annual gross increment of ponderosa pine averaged 1.65 cu. m. per ha. per year (118 bd. ft. per acre per year) and mortality averaged 0.70 cu. m. per ha. (50 bd. ft. per acre) resulting in a net growth of 0.95 cu. m. per ha. per year (68 bd. ft. per acre per year). Most mortality was caused by western pine barkbeetle *(Dendroctonus ponderosae).* A portion of the natural area has also been used as a baseline data source in studies of the epidemiology of tree-killing insects, including the bark beetle, by the now-defunct Bureau of Entomology and Plant Quarantine.

Baseline population levels of several bird and mammal species are also being studied on both units of the Pringle Falls Research Natural Area.[2] This is part of a larger, long-term eastern Oregon study utilizing several other Research Natural Areas representing different vegetation types. At present the research involves estimating breeding bird populations based upon weekly early morning censuses during the bird breeding season within a gridded area.

[2] Research by Mr. Jay S. Gashwiler, Wildlife Research Biologist, Bureau of Sport Fisheries and Wildlife, P. O. Box 1208, Bend, Oregon.

The natural area provides interesting opportunities to study: (1) biomass productivity in relation to soil and topographic factors; (2) forest succession since initiation of fire control practices; and (3) undisturbed forest in comparison with similar tracts on the experimental forest which have been carefully managed under controlled experimental conditions. The natural area also provides a benchmark site for studies of undisturbed vegetation over the range of south-central Oregon's pumice plateau area; Pringle Falls, Goodlow Mountain, Bluejay, and Metolius Research Natural Areas span the Mount Mazama pumice deposits from south to north.

Pringle Falls Research Natural Area is also a part of the Pringle Falls Experimental Forest, which is similar in forest type and environment. The possibility exists of using other parts of the experimental forest for work involving destructive sampling or manipulation and using the natural area as a control.

MAPS AND AERIAL PHOTOGRAPHS

Several special maps covering the natural area were prepared by Civilian Conservation Corps crews during the 1930's and are on file at the Pacific Northwest Forest and Range Experiment Station's headquarters in Portland or Silviculture Laboratory in Bend. Most of the maps have a scale of 4 inch equals 1 mile. Included are a topographic map with a 10-foot contour interval and maps of timber types, timber size classes, tree reproduction density and species, and ground cover. Data from a timber cruise of the natural area conducted at the same time are also on file.

The District Ranger (Bend Ranger District), the Project Leader (Silviculture Laboratory, Bend), or Forest Supervisor (Deschutes National Forest, Bend, Oregon) can provide details on the most recent aerial photo coverage of the area.

LITERATURE CITED

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Table PR-1. — Tentative list of mammals for Pringle Falls Research Natural Area

Order	Scientific name	Common name
Insectivora	*Sorex palustris*	northern water shrew
	Sorex vagrans	wandering shrew
Chiroptera	*Eptesicus fuscus*	big brown bat
	Lasionycteris noctivagans	silver-haired bat
	Lasiurus borealis	red bat
	Lasiurus cinereus	hoary bat
	Myotis californicus	California myotis
	Myotis evotis	long-eared myotis
	Myotis lucifugus	little brown myotis
	Myotis thysanodes	fringed myotis
	Myotis volans	long-legged myotis
	Myotis yumanensis	Yuma myotis
	Plecotus townsendi	Townsend big-eared bat
Lagomorpha	*Lepus californicus*	black-tailed jack rabbit
	Sylvilagus nuttalli	mountain cottontail
Rodentia	*Castor canadensis*	beaver
	Erethizon dorsatum	porcupine
	**Eutamias amoenus*	yellow-pine chipmunk
	Glaucomys sabrinus	northern flying squirrel
	Microtus longicaudus	long-tailed vole
	Microtus montanus	mountain vole
	Neotoma cinerea	bushy-tailed wood rat
	**Peromyscus maniculatus*	deer mouse
	**Sciurus griseus*	western gray squirrel
	**Spermophilus lateralis*	mantled ground squirrel
	**Tamiasciurus douglasi*	chickaree
	**Thomomys mazama*	Mazama pocket gopher
	Zapus trinotatus	Pacific jumping mouse
Carnivora	*Canis latrans*	coyote
	Felis concolor	mountain lion or cougar
	Lutra canadensis	river otter
	Lynx rufus	bobcat
	Martes americana	marten
	Mephitis mephitis	striped skunk
	Mustela frenata	long-tailed weasel
	Mustela vison	mink
	Procyon lotor	raccoon
	Spilogale putorius	spotted skunk or civet cat
	**Taxidea taxus*	badger
	Urocyon cinereoargenteus	gray fox
	Ursus americanus	black bear
	Vulpes fulva	red fox
Artiodactyla	**Cervus canadensis*	wapiti or elk
	**Odocoileus h. hemionus*	mule deer

* Habitation verified by sign, sighting, or collection.

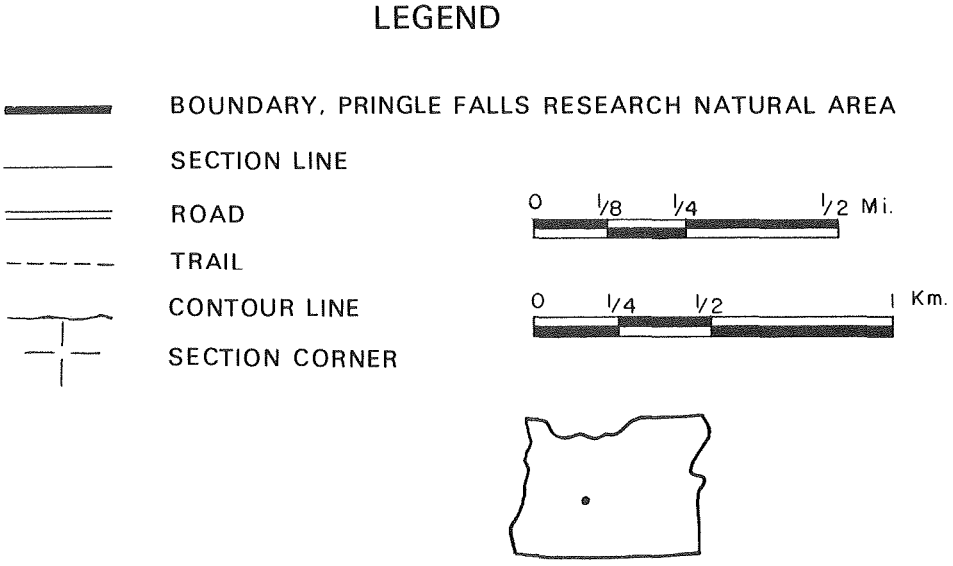
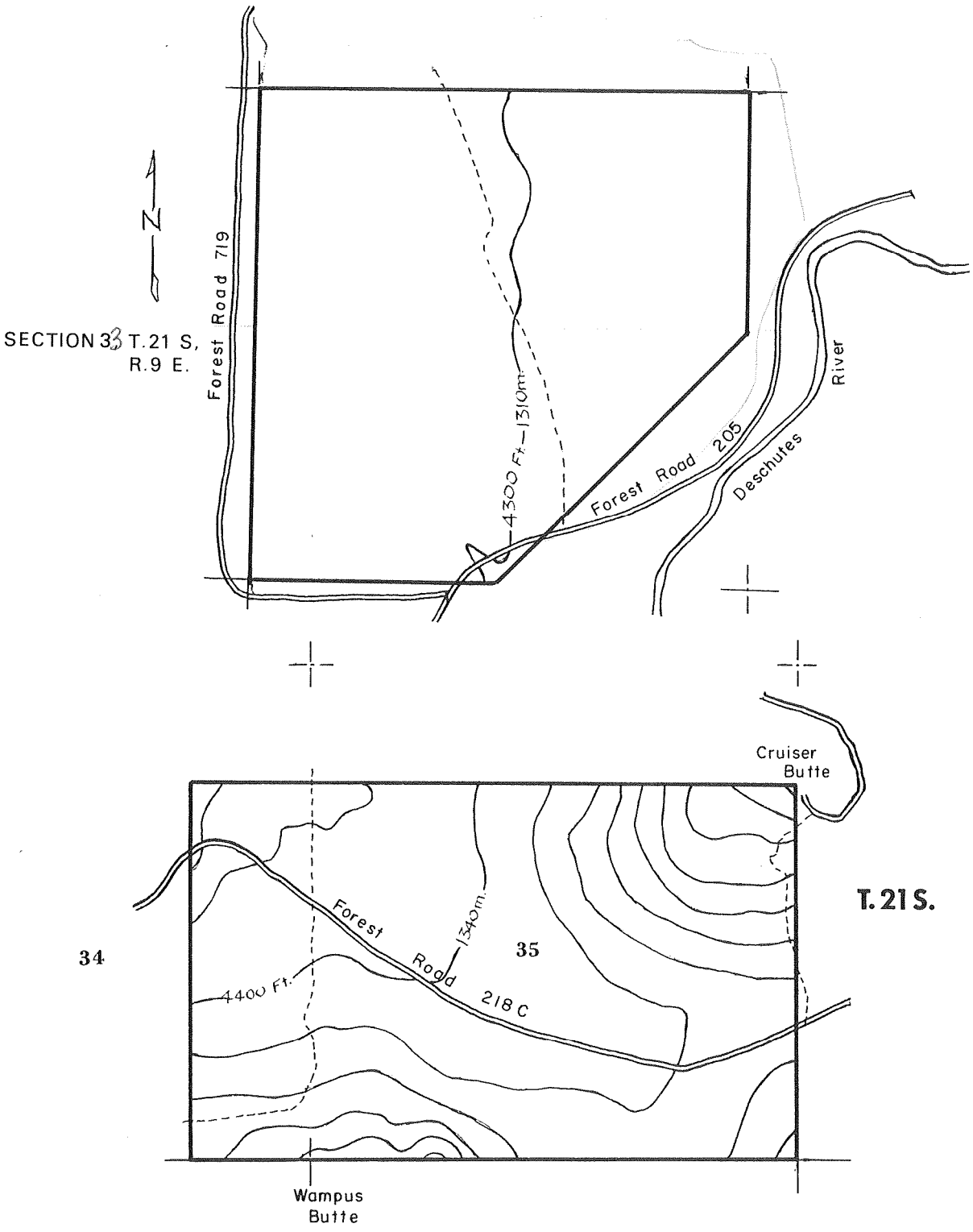


Figure PR-1.– Pringle Falls Research Natural Area, Deschutes County, Oregon. Upper area is the west block and the lower area is the east block. (20-foot contour intervals.)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SECTION 33 T. 21 S., R. 9 E.
Forest Road 719
4300 Ft.
1310m.
Forest Road 205
Deschutes River
Cruiser Butte
Forest Road 218 C
1340m.
4400 Ft.
34
35
T. 21 S.
Wampus Butte
R. 9 E.

LEGEND

Pinus contorta / GRASS

Pinus cortorta / Purshia tridentata

Pinus ponderosa – P. contorta / Purshia tridentata

Pinus ponderosa / Purshia tridentata

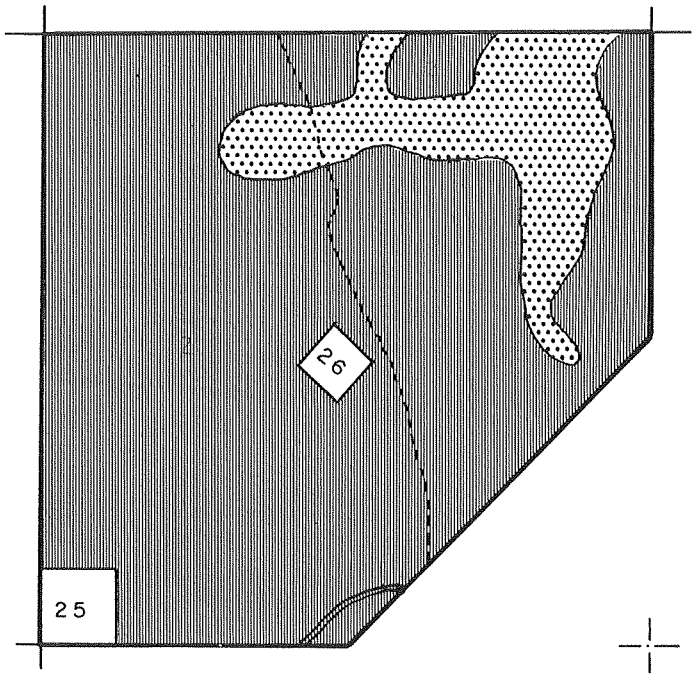
Pinus ponderosa – P. contorta / Ceanothus velutinus

Pinus ponderosa / Ceanothus velutinus

Pinus ponderosa – P. lambertiana / Ceanothus velutinus

ECOLOGICAL STUDY PLOTS

Figure PR-2.– Distribution of forest community types on the Pringle Falls Research Natural Area (from 1934 timber and ground vegetation type maps).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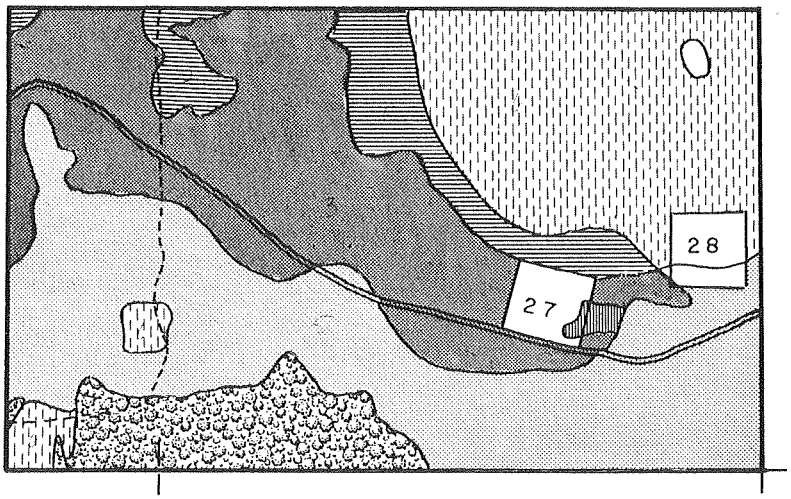
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27

Figure PR-3.-Communities of the Pringle Falls Research Natural Area. Top: Ponderosa pine, bitterbrush, and western needlegrass stand typical of the east block; note fire scar on tree nearest the meter board. Lower left: Stand of lodgepole pine, bitterbrush, and western needlegrass typical of the west block. Lower right: Stand of lodgepole pine, bitterbrush, and Idaho fescue typically found on finer textured soils.