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FEDERAL RESEARCH NATURAL AREAS IN OREGON AND WASHINGTON:

A Guidebook for Scientists and Educators

Brewer Spruce Research Natural Area

INTRODUCTION

The Research Natural Area described in this separate is administered by the Bureau of Land Management. Bureau of Land Management Research Natural Areas are administered by District Offices which are organizational subdivisions of their State offices. Scientists wishing to use these Research Natural Areas should contact the Bureau's State Director. At present, all of this agency's tracts are located in Oregon so the responsible individual is the Oregon State Director (Bureau of Land Management, P.O. Box 2965, Portland, Oregon 97208). The manager of the district in which the Research Natural Area is located will be informed of mutually agreed upon activities by the State Director. Nevertheless, a scientist should visit the administering District Office when beginning his studies and explain the nature, purpose, and duration of his activities if at all possible. Permission for brief observational visits to Research Natural Areas can be obtained from District Managers.

The Research Natural Area described within is a part of a Federal system of such tracts established for research and educational purposes. Each of these constitutes a site where some natural features are preserved for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide:

1. Baseline areas against which effects of human activities can be measured;
2. Sites for study of natural processes in undisturbed ecosystems; and
3. Gene pool preserves for all types of organisms, especially rare and endangered types.

The total Federal system is outlined in "A Directory of the Research Natural Areas on Federal Lands of the United States of America."¹ The 48 Federal Research Natural Areas in Oregon and Washington are described in "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators,"² along with details on management and use of such tracts: this description is a separate extracted from that guidebook.

The guiding principle in management of Research Natural Areas is to prevent unnatural encroachments, activities which directly or indirectly modify ecological processes on the tracts. Logging and uncontrolled grazing are not allowed, for example, nor is public use which threatens significant impairment of scientific or educational values. Management practices necessary for maintenance of the ecosystem may be allowed.

¹Federal Committee on Research Natural Areas. A directory of Research Natural Areas on Federal lands of the United States of America. Washington, D.C., Superintendent of Documents, 129 p., 1968.

²Jerry F. Franklin, Frederick C. Hall, C. T. Dyrness, and Chris Maser. Federal Research Natural Areas in Oregon and Washington: a guidebook for scientists and educators. USDA Forest Serv. Pac. Northwest Forest & Range Exp. Stn., 498 p., illus., 1972.

Federal Research Natural Areas provide a uniquely valuable system of publicly owned and protected examples of undisturbed ecosystems which are available to the scientist. He can conduct his research with minimal interference and reasonable assurance that investments in long-term studies will not be lost to logging, land development, or similar activities. In return, the scientist wishing to use a Research Natural Area has some obligations. He must:

1. Obtain permission from the appropriate administering agency before using the area;
2. Abide by the administering agency's regulations governing the use of the natural area including specific limitations on the type of research, sampling methods, etc. allowed; and
3. Inform the administering agency on the progress of the research, published results, and disposition of collected materials.

The purposes of these limitations are simple — to insure that the scientific and educational values on the tract are not impaired, to accumulate a documented body of knowledge about the tract, and to avoid conflict between new and old studies. Research on

Research Natural Areas must be essentially nondestructive in character; destructive analysis of vegetation is generally not allowed nor are studies requiring extensive forest floor modification or extensive soil excavation. Collection of plant and animal specimens should be restricted to the minimum necessary for provision of vouchers and other research needs and in no case to a degree which significantly reduces species population levels. Such collections must also be carried out in accordance with applicable State and Federal agency regulations. Within these broad guidelines, the appropriate uses of Research Natural Areas are determined on a case-by-case basis by the administering agency.

A scientist wishing to use a particular Research Natural Area must determine the administering agency,³ contact it regarding the proposed use, and obtain the necessary permission. Each agency differs slightly in its requirements.

³There are five agencies cooperating in this program in the Pacific Northwest: Forest Service in the U.S. Department of Agriculture; Bureau of Land Management, Bureau of Sport Fisheries and Wildlife, and the National Park Service in the U.S. Department of Interior; and the Atomic Energy Commission.

BREWER SPRUCE RESEARCH NATURAL AREA¹

**A mixed conifer type with abundant
Brewer spruce and associated brush-
fields on a rugged ridgetop in the
Siskiyou Mountains.**

The Brewer Spruce Research Natural Area was established on January 29, 1965. It exemplifies a high-elevation, mixed conifer type containing large amounts of Brewer spruce (*Picea breweriana*) and associated brush-fields as they occur on mountain ridgetops in southwestern Oregon's Siskiyou Mountains. The 85-ha. (210-acre) area is located in Josephine County, Oregon, and is administered by the Medford District (Medford, Oregon), Bureau of Land Management (BLM). Administratively, it lies within the Deer Creek planning unit of the Applegate Resource Management Area. The tract occupies the N1/2 NW1/4 SW1/4 and SW1/4 NW1/4 SW1/4 of section 5, and the NE1/4 SE1/4, SW1/4 SW1/4, S1/2 NW1/4 SE1/4, SE1/4 NE1/4 SW1/4, SE1/4 SW1/4, and S1/2 of lot 7 in section 6, T. 39 S., R. 6 W., Willamette meridian. It lies at 42°12' N. latitude and 123°28' W. longitude.

ACCESS AND ACCOMMODATIONS

The area is accessible from the west (U.S. Highway 199 to the Illinois River Valley) via BLM's Deer Creek Access Road (No. 38-7-13); it can also be approached from the east via Williams and BLM's Cedar Flat Road (No.

39-5-6). These roads join at the intersection with the BLM's Rabbit Lake Road (No. 39-6-9), which passes within 91 m. (300 ft.) of the northern boundary of the natural area (fig. BP-1). Although an abandoned trail crosses the southwestern portion of the area, it is now very difficult to follow and foot travel through the area is slow and tedious.

The closest commercial accommodations are located in Cave Junction, about 16 km. (10 miles) to the southwest. Numerous and varied accommodations are also available in Grants Pass, situated about 49 km. (30 miles) to the north.

ENVIRONMENT

The Brewer Spruce Research Natural Area occupies the summit of a small mountain peak (Little Grayback Peak, elevation 1,861 m. or 5,445 ft.) and the crest of a downward-trending ridge extending in a northeasterly direction (fig. BP-2). With the exception of two small saddles located near the east and west boundaries, the area is extremely rugged, with steep slopes and numerous rock outcrops. Most of the steeply sloping portion has a northerly aspect. Elevations range from about 1,250 to 1,645 m. (4,100 to 5,400 ft.). A small cirque-like basin contains a small, shallow pond named Rabbit Lake.

The entire area is underlain by metavolcanic rocks of the Applegate Group (Wells, Hotz, and Cater 1949). These rocks were laid down during the Triassic period. In the natural area they are apparently largely metamorphosed andesites and basalts.

The climate is warm-temperate with hot, dry summers and cool, moist winters. Much of the winter precipitation occurs as snow. Cumulative winter snowpacks may exceed 3 m. (10 ft.) and they are not completely melted until midsummer. The following climatic data are from the Williams weather station, which is about 14 km. (9 miles) east

¹ Description prepared by Dr. C. T. Dyrness, U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Forestry Sciences Laboratory, Corvallis, Oregon.

of and 915 m. (3,000 ft.) below the natural area (Whittaker 1960, U.S. Weather Bureau 1965):

Mean annual temperature11.1°C. (52.0°F.)
Mean January temperature3.7°C. (38.7°F.)
Mean July temperature19.4°C. (66.9°F.)
Extreme minimum temperature ...-16.0°C. (3.0°F.)
Extreme maximum temperature ...42.0°C. (108.0°F.)
Average annual precipitation ..957 mm. (37.69 in.)
June through August
precipitation32 mm. (1.24 in.)

Temperatures are undoubtedly considerably lower and precipitation somewhat higher on the natural area.

Very little is known about the soils of the area. Steepness of the terrain and high frequency of rock outcrops indicate most soils are undoubtedly shallow and immature with high stone contents. A profile examination near the southwestern corner of the area disclosed a regosolic soil containing about 60 percent stones, with a dark brown, silt loam surface horizon.

BIOTA

It is difficult to place the Brewer Spruce Research Natural Area within a single vegetation zone. In fact, it contains elements of three vegetation zones defined by Franklin and Dyrness (1969) for southwestern Oregon: the Mixed Conifer, *Abies concolor*, and *Abies magnifica shastensis* Zones. The area includes Küchler's (1964) Types 5, Mixed Conifer Forest (*Abies-Pinus-Pseudotsuga*), and 34, Montane Chaparral (*Arctostaphylos-Castanopsis-Ceanothus*). The forest stands appear to be a mixture of SAF cover types 207 (Red Fir) and 211 (White Fir) with possibly some areas classifiable as cover type 243 (Ponderosa Pine-Sugar Pine-Fir) (Society of American Foresters 1954).

At least 10 different coniferous tree species grow in the natural area. The most common of these are: Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), Brewer spruce (fig. BP-2), Shasta red fir (*Abies magnifica* var. *shastensis*), western white pine (*Pinus monticola*), Pacific yew (*Taxus brevifolia*), and Port-Orford-cedar (*Chamaecyparis*

lawsoniana). Coniferous tree species more limited in distribution include sugar pine (*Pinus lambertiana*), knobcone pine (*Pinus attenuata*), and incense-cedar (*Libocedrus decurrens*). Another outstanding feature of the area is the rather extensive brushfields. The Bureau of Land Management estimates that only about 60 percent of the area is forested, 25 percent is brushfield, and the remaining 15 percent is made up of bare rock outcrops and talus.

Most of the older (200- to 300-year-old or more) forest stands in the area are very open with a total overstory coverage of only 25 to 30 percent (fig. BP-2). Brewer spruce and Douglas-fir are generally codominant in the overstory; minor amounts of western white pine may also be present. Tree regeneration in some locations is dominated by Port-Orford-cedar saplings which have a stunted appearance, probably due to heavy snow loads. In most areas, however, both Shasta red fir and Brewer spruce appear to be reproducing successfully, each with about 5-percent reproduction coverage in a typical stand. Western white pine and Douglas-fir are also scattered individually through the understory. The most abundant understory shrub is *Vaccinium membranaceum*. Other more scattered shrubs include *Amelanchier pallida*, *Arctostaphylos patula* and *A. nevadensis*, *Ceanothus prostratus*, *Castanopsis chrysophylla*, *Berberis nervosa*, *Rosa gymnocarpa*, and Pacific yew. Typical herbaceous species in these open timber stands include *Achlys triphylla*, *Chimaphila umbellata*, *Pedicularis racemosa*, *Hieracium albiflorum*, *Xerophyllum tenax*, *Senecio triangularis*, and *Pyrola secunda*.

The Brewer spruce-Shasta fir stand just southeast of and above Rabbit Lake probably contains the best specimens of Brewer spruce in the area. Scattered large individuals range up to about 1-m. (3-ft.) d.b.h. The understory is dominated by thickets of sapling-sized Port-Orford-cedar, although both Brewer spruce and Shasta fir are apparently reproducing successfully.

An area of young, dense white fir occurs near the western boundary. Although the stand is dominantly 90- to 100-year-old white

fir, significant amounts of Shasta red fir and western white pine are also present in the overstory. Tree regeneration consists of scattered white fir and western white pine. The shrub layer has about 15-percent *Berberis nervosa* cover, with lesser amounts of Pacific yew, *Castanopsis chrysophylla*, *Amelanchier pallida*, *Holodiscus discolor*, and *Rosa gymnocarpa*. The herb layer has low coverage; some of the principal species are several grasses, *Chimaphila umbellata*, *Arenaria macrophylla*, *Trientalis latifolia*, *Osmorhiza chilensis*, *Synthyris reniformis*, *Arnica latifolia*, *Disporum hookeri*, *Trillium ovatum*, *Dicentra formosa*, *Anemone deltoidea*, and *Polystichum munitum*.

Extensive tracts of extremely dense, tall (3-m. or 10-ft.) shrubs with only very scattered tree cover occur on steep north and northwest-facing slopes adjacent to rock outcrops. The hardy, isolated trees dotting these shrub communities are usually white fir, Shasta red fir, Brewer spruce, and, occasionally, western white pine. The dominant shrub species is generally Pacific yew, which sometimes forms almost impenetrable thickets. Other shrubs which may be important components of the stand include *Acer glabrum* var. *torreyi*, *Holodiscus discolor*, *Corylus cornuta* var. *californica*, *Quercus vaccinifolia*, *Amelanchier pallida*, and *Rubus parviflorus*. On similar sites, which perhaps have been more recently disturbed by fire, are scattered young trees with *Vaccinium membranaceum* and *Xerophyllum tenax* as the principal understory.

Low (about 1-m. or 3-ft.) brushfields are rather extensive in southeastern and southwestern portions of the natural area in section 6 (fig. BP-2). The most important contributions to the dense shrub cover are *Arctostaphylos patula* and *Quercus vaccinifolia*. Other shrub species of more scattered occurrence include *Ceanothus velutinus*, *Holodiscus discolor*, *Corylus cornuta* var. *californica*, *Quercus garryana* var. *breweri*, and *Quercus chrysolepis*.

The 1/4-ha. (0.5-acre) Rabbit Lake constitutes an interesting aquatic habitat in the natural area (fig. BP-2). Snowmelt apparently supplies the water for this shallow pond. Out-

flow occurs only during the spring and by late summer the shoreline has receded considerably. Although the pond is too shallow to support fish, it undoubtedly serves as a habitat for amphibians. The area near the shoreline supported the following plant species which were not observed elsewhere: *Veratrum californicum*, *Ribes lacustre*, *Salix* sp., *Clin-tonia unifoliata*, *Tiarella unifoliata*, and *Linnæa borealis* ssp. *longiflora*.

Resident and transient mammals believed to utilize the natural area are listed in table BP-1.

HISTORY OF DISTURBANCE

There is no evidence of recent fires within the Brewer Spruce Research Natural Area. However, the area has probably been repeatedly burned in the more distant past.

Human disturbances chiefly involve several clearcut areas logged in 1964. These extend into the natural area in two locations along the northern boundary. The total clearcut area within the boundaries of the natural area is estimated to be less than 4 ha. (10 acres).

Some of the developments planned for the area may result in some additional disturbance. The Bureau of Land Management plans to reconstruct approximately 0.8 km. (0.5 mile) of foot trail within the natural area. This trail will be a segment of a 15-km. (9-mile) scenic trail. A spur trail, lying outside the natural area, is proposed from the end of the Rabbit Lake Road in section 6 to an intersection with the main scenic trail in the SW1/4 of section 6. Plans also call for installation of plant identification signs for 30 to 40 of the most common species within the natural area.

RESEARCH

No research is presently being conducted within the natural area. Although both Whitaker (1960) and Waring (1969) studied forest ecology in nearby areas, neither is known to have included the Brewer Spruce Research Natural Area in his investigations.

MAPS AND AERIAL PHOTOGRAPHS

Maps applicable to the natural area are: *Topography* — 15' Oregon Caves, Oregon quadrangle, scale 1:62,500, issued by the U.S. Geological Survey in 1954; and *geology* — *Preliminary Geologic Map of Southwestern Oregon*, scale 1:500,000 (Wells 1955) and *Geologic Map of Oregon West of the 121st Meridian*, scale 1:500,000 (Peck 1961).

The District Manager (Medford District), Bureau of Land Management, can provide details on the most recent aerial photo coverage and any forest type maps which may be available for the area.

LITERATURE CITED

- Franklin, Jerry F., and C. T. Dyrness
1969. Vegetation of Oregon and Washington. USDA Forest Serv. Res. Pap. PNW-80, 216 p., illus. Pac. Northwest Forest & Range Exp. Stn., Portland, Oreg.
- Küchler, 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 I-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, Oregon. Climatography of the United States 86-31, 96 p. illus.
- Waring, R. H.
1969. Forest plants of the eastern Siskiyou: their environmental and vegetational distribution. Northwest Sci. 43: 1-17, illus.
- Wells, Francis G.
1955. Preliminary geologic map of southwestern Oregon west of meridian 122° west and south of parallel 43° north. U.S. Geol. Surv. Miner. Invest. Field Stud. Map MF38.
- Preston E. Hotz, and Fred W. Cater, Jr.
1949. Preliminary description of the geology of the Kerby quadrangle, Oregon. Oreg. Dep. Geol. & Miner. Ind., Bull. 40, 23 p.
- Whittaker, R. H.
1960. Vegetation of the Siskiyou Mountains, Oregon and California. Ecol. Monogr. 30: 279-338, illus.

Table BP-1. — Tentative list of mammals for the Brewer Spruce Research Natural Area

Order	Scientific name	Common name
Insectivora	<i>Neurotrichus gibbsi</i>	shrew mole
	<i>Scapanus latimanus</i>	broad-footed mole
	<i>Scapanus townsendi</i>	Townsend mole
	<i>Sorex bendirii</i>	marsh shrew
	<i>Sorex trowbridgii</i>	Trowbridge shrew
	<i>Sorex vagrans</i>	wandering shrew
Chiroptera	<i>Antrozous pallidus</i>	pallid bat
	<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 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
	<i>Lepus americanus</i>	snowshoe hare
Lagomorpha	<i>Aplodontia rufa</i>	mountain beaver
Rodentia	<i>Arborimus longicaudus</i>	red tree vole
	<i>Clethrionomys californicus</i>	California 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>Microtus oregoni</i>	Oregon or creeping vole
	<i>Microtus townsendi</i>	Townsend vole
	<i>Neotoma cinerea</i>	bushy-tailed wood rat
	<i>Peromyscus maniculatus</i>	deer mouse
	<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>Bassariscus astutus</i>	ringtail or miner's cat
	<i>Canis latrans</i>	coyote
	<i>Canis lupus</i>	wolf
	<i>Felis concolor</i>	mountain lion or cougar
	<i>Gulo luscus</i>	wolverine
	<i>Lynx rufus</i>	bobcat
	<i>Martes americana</i>	marten
	<i>Martes pennanti</i>	fisher
	<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>Spilogale putorius</i>	spotted skunk or civet cat
	<i>Ursus americanus</i>	black bear
	<i>Vulpes fulva</i>	red fox
Artiodactyla	<i>Cervus canadensis</i>	wapiti or elk
	<i>Odocoileus h. columbianus</i>	black-tailed deer

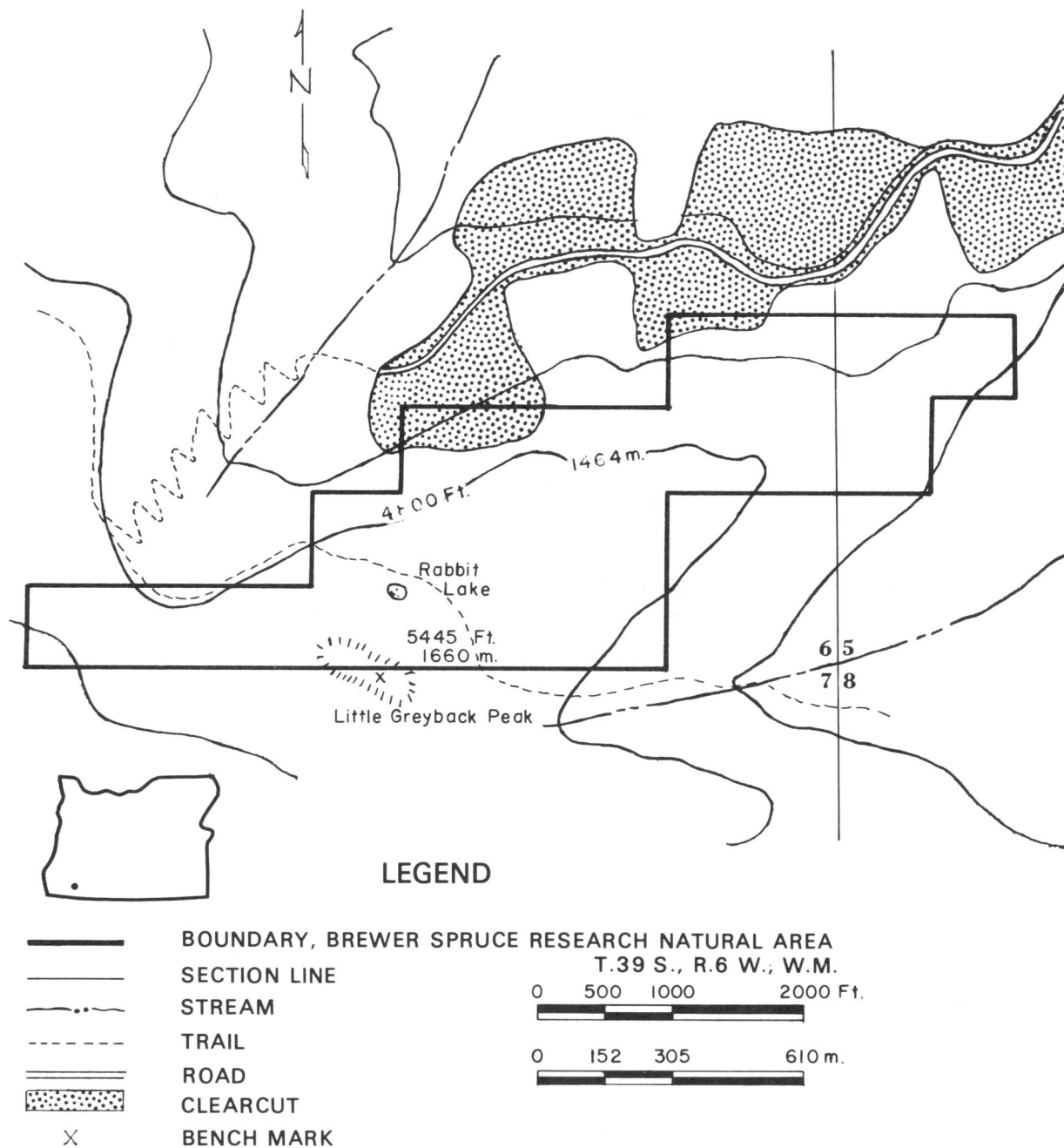


Figure BP-1.— Brewer Spruce Research Natural Area,
Josephine County, Oregon.

Figure BP-2.—Communities in the Brewer Spruce Research Natural Area. Upper left: Rugged slopes of Little Gray-back Peak viewed from the southwestern corner of the natural area. Upper right: Typical Brewer spruce crown. Lower left: Rabbit Lake in late summer. Lower right: Scattered Brewer spruce, white fir, Shasta red fir, and western white pine with a typical brushfield in the background.

