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

BULL RUN RESEARCH NATURAL AREA[1]

Mixed stands of noble fir, Pacific silver fir, western hemlock and Douglas-fir on the slopes of a cirque in the Oregon Cascade Range.

The Bull Run Research Natural Area was established on April 8, 1966. It exemplifies the mixed true fir *(Abies* spp.), hemlock *(Tsuga* spp.), and Douglas-fir *(Pseudotsuga menziesii)* forests found at middle elevations in central portions of the Cascade Range. The 146-ha. (361-acre) tract is located in Clackamas County, Oregon, and is administered by the Columbia Gorge Ranger District (Springdale, Oregon), Mount Hood National Forest. The natural area lies immediately west of the Cascade Range divide at the head of the Bull Run drainage and on the eastern slope of Sentinel Peak and northern slope of Hiyu Mountain (fig. BR-l). It occupies portions of sections 27 and 34, T. 1 S., R. 8 E., Willamette meridian. Major bounding features are an old firebreak along the northeast and east, the 1,000-m. (3,280-ft.) contour on the west, and a rockslide on the northwest (fig. BR-l). The natural area lies at 45°26' N. latitude and 121 °49' W. longitude.

ACCESS AND ACCOMMODA TIONS

Since this natural area lies within the Bull Run watershed, the municipal water supply for Portland, access is strictly controlled. It is necessary to obtain an entry permit and, possibly, a key from the Ranger District before entering the watershed, regardless of the approach route. This is in addition to obtaining permission to conduct research on the natural area itself.

Access to this natural area is either by foot or by boat. The simplest approach is probably by about 0.4 km. (0.25 mile) of unmaintained trail from the top of Hiyu Mountain. This trail drops about 180 m. (600 ft.) down the old firebreak on the north slope of the mountain before reaching the natural area. The summit of Hiyu Mountain is best reached via Forest Roads N12 (Lolo Pass road) and S10 from Zigzag on U.S. Highway 26, a distance of about 25 km. (16 miles). The other approach is by boat from the lower (western) end of Bull Run Lake. This can be reached either from the Sandy area via Forest Road S10 or from Zigzag via Forest Roads N12 and S10. If repeated visits are planned, heavy research equipment is involved, or the lower or northern portions of the natural area are of most interest, the lake approach is recommended. Boat rentals are not available.

The nearest commercial accommodations are at Rhododendron and along adjacent portions of U.S. Highway 26. Developed forest campgrounds are also found in this area and along the Lolo Pass road (Forest Road NI2).

ENVIRONMENT

The Bull Run Research Natural Area is located on mountain slopes in a cirque adjacent to the crest of the Cascade Range (fig. BR-3). Topography is generally steep, with slopes commonly 30 to 60 percent in the southern half and in excess of 60 percent in the northern half of the area. Relatively gentle slopes and benches occupy limited area. Springs are common in middle and lower portions of the natural area, and streams have cut sharp, steep-walled canyons in several locations. Limited areas of rock slides (talus) are present (fig. BR-3). Elevations range from 1,000 to 1,370 m. (3,280 to 4,500 ft.).

[1]Description prepared by Dr. J. F. Franklin, U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Forestry Sciences Laboratory, Corvallis, Oregon.

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Vulcanism and glaciation have been the primary geologic processes within the natural area. Bedrock is composed primarily of basalts and andesites belonging to the Cascade Andesite formation[2] and Pliocene-Pleistocene in age (Peck 1961). Pleistocene glaciation affected almost the entire Bull Run drainage, and at least two glacial advances are evident. Bull Run Lake itself lies behind a classical example of a terminal moraine. Compacted glacial till is present in several locations.

The climate of the natural area is cool and wet. Total precipitation, measured nearby at the outlet of Bull Run Lake, averaged 3,125 mm. (123 in.) between 1961 and 1967[3]. Summers are relatively dry (about 200 mm. or 8 in.) in July through September. The bulk of the precipitation occurs during the winter months, and much of this accumulates in snowpacks which probably attain maximum depths of 2 to 3 m. (6 to 9 ft.) on the average. Temperature data are not available for the area, and the nearest climatic station (U .S. Weather Bureau 1965) is at low elevation in the foothills about 29 km. (18 miles) to the west at the Portland Water Bureau's Headworks.

Soils in the natural area have been mapped (fig. BR-2) and described as part of a general soil survey of the Bull Run drainage.[4] They are Podzols developed in glacial till and are classified into two tentative soil series Jackpot and Last Chance. The Jackpot soil is the more productive and usually contains an indurated till layer. A generalized profile description is as follows:

01 and 02	4 to 0 cm.	Organic matter.
A2	0 to 4 cm.	Black (moist color) silt loam with very fine granular structure, pH 4.6.
A31	4 to 15 cm.	Very dark brown gravelly silt loam with weak, fine, subangular blocky structure, pH 4.6.
A32	15 to 32 cm.	Very dark brown gravelly silt loam with weak, fine and medium subangular blocky structure, pH 4.8.
B2	32 to 53 cm.	Dark brown, stony, gravelly light clay loam with weak, fine subangular blocky structure, 50 percent stone volume, pH 5.0.

A typical Last Chance profile is generally more strongly podzolized:

01 and 02	5 to 0 cm.	Organic matter.
A2	0 to 4 cm.	Gray and dark gray (moist color) sandy loam with weak, coarse platy to massive structure, pH 4.2.
B2ir	4 to 15 cm.	Dark brown and dark reddish brown, stony, gravelly loam, massive to very weak, fine su bangular blocky structure, 30 percent stones and 45 percent gravel, pH 4.4.
B3	15 to 25 cm.	Brown to dark brown, stony, gravelly loam, massive, 30 percent stones and 45 percent gravel, pH 4.6.
C	25 to 70 cm.	Brown, stony gravelly loam, pH 4.8.
D	70 to 160 cm.	Brown, stony gravelly loam, pH 5.0.

The D horizon mayor may not be present, and A2 horizons vary from 1 to 8 cm. in thickness. Bedrock may lie 1 to 65 m. or more below the morainal deposits in the case of either soil series.

BIOTA

All 146 ha. (361 acres) of the Bull Run Research Natural Area are classified as SAF cover type 226, Pacific Silver Fir-Hemlock (Society of American Foresters 1954). The area falls within Kuchler's (1964) Types 3 or 4 (Silver Fir-Douglas Fir or Fir-Hemlock Forest) and the *Abies amabilis* Zone of Franklin and Dyrness (1969).

Forest stands in the natural area are a mixture of noble fir *(Abies procera),* Pacific silver fir *(Abies amabilis),* western hemlock *(Tsuga heterophylla),* and Douglas-fir. The first three

[2]Information from "Interim Soil Survey Report of the Bull Run Watershed Portion of the Bull Run Sandy Soil Survey Area," by F. R. Stephens. lfJ62. Typewritten inservice report, 65 p., illus. USDA Forest Service, Region 6, Portland, Oregon.

[3]Unpublished data provided by J. Rothacher, U.S. Forest Service, Forestry Sciences Laboratory, Corvallis,Oregon.

[4]See footnote 2.

species are common throughout the entire natural area, while Douglas-fir tends to be only a minor component or absent in the stands above 1,100 m. (3,600 ft.). Mountain hemlock *(Tsuga mertensiana)* occurs at higher elevations. The forests in the area are all old growth with an estimated age in excess of 250 years. The largest trees in the stand are generally noble fir (fig. BR-3) and Douglasfir, followed by western hemlock and Pacific silver fir, in that order. Mensurational data are not available, but dominant trees on better sites are often 90- to 130-cm. (35- to 50-in.) d.b.h. and over 45 m. (150 ft.) tall.

Size and age class distributions indicate Pacific silver fir is the major climax species throughout the natural area. Pacific silver fir seedlings, saplings, and poles are by far the most numerous in the stands. Western hemlock appears to be either intermediate successionally or a minor climax species on some sites. Douglas-fir and noble fir are clearly pioneer species and are gradually being eliminated by mortality.

Two major plant communities are common within the natural area[5] which probably belong to the *Abies amabilis/Streptopus curvipes* and *Abies amabilis/Vaccinium alaskaense* Associations (Franklin 1966). The *Abies amabilis/Streptopus curvipes* Association typifies the more productive sites and Jackpot soil series. The dense, herbaceous understory includes *Vancouveria hexandra, Streptopus curvipes, Achlys triphylla, Asarum caudatum,* and *Oplopanax horridum.* The *Abies amabilis/Vaccinium alaskaense* Association is found on poorer sites and Last Chance soils. *Vaccinium alaskaense, V. membranaceum, Menziesia ferruginea, Cornus canadensis, Xerophyllum tenax,* and *Gaultheria ovatifolia* are common understory plants. The presence of *Rhododendron macrophyllum* contrasts with its absence in similar *Abies amabilis/ Vaccinium alaskaense* communities north of the Columbia River in the Washington Cascade Range.

Mammals believed to occur as either residents or transients within the natural area are listed in table BR-I. The ruffed grouse *(Bonasa umbellus)* is an important resident gamebird.

Specialized habitats within the natural area include spring and seep areas, the several permanent streams, and open talus or rock slides (fig. BR-3).

HISTORY OF DISTURBANCE

The natural area is essentially free of any human disturbance. Minor disturbances due to transient fishermen, hunters, hikers, etc. are, and will continue to be, absent due to the strict control over access to the Bull Run drainage. The bounding firebreak has regenerated with young trees, and any minor edge effects it has caused should decline rapidly in the future.

The natural area also appears to have been free of significant natural disturbances, such as wildfire in recent decades.

RESEARC H

There is no history of research in Bull Run Research Natural Area except in connection with the general soil survey.

The natural area is particularly valuable as a site for studies of the mixed stands typical of the transition zone between temperate and subalpine forests. Two contrasting soil and community types can be compared within the tract. Specialized areas available for study include the aquatic and semiaquatic habitats and rock slides; these may be of special interest for zoological studies.

MAPS AND AERIAL PHOTOGRAPHS

Special maps applicable to the natural area include: *Topography* - 7.5' Bull Run Lake, Oregon quadrangle, scale 1 :24,000, issued by the U.S. Geological Survey in 1962; and *geology - Geologic Map of Oregon West of the 121st Meridian,* scale 1:500,000 (Peck 1961). Either the District Ranger (Columbia Gorge Ranger District) or Forest Supervisor (Mount Hood National Forest, Portland, Oregon) can provide details on the most recent aerial photo coverage and forest type maps for the area.

[5]See footnote 2.

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Table BR-1. — Tentative list of mammals for the Bull Run Research Natural Area

Order	Scientific name	Common name
Insectivora	*Neürotrichus gibbsi*	shrew mole
	Scapanus orarius	coast mole
	Scapanus townsendi	Townsend mole
	Sorex bendirii	marsh shrew
	Sorex palustris	northern water shrew
	Sorex trowbridgii	Trowbridge shrew
	Sorex vagrans	Yaquina 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 americanus*	snowshoe hare
	Ochotona princeps	pika
Rodentia	*Aplodontia rufa*	mountain beaver
	Arborimus albipes	white-footed vole
	Arborimus longicaudus	red tree vole
	Clethrionomys californicus	California red-backed vole
	Erethizon dorsatum	porcupine
	Eutamias amoenus	yellow-pine chipmunk
	Eutamias townsendi	Townsend chipmunk
	Glaucomys sabrinus	northern flying squirrel
	Microtus longicaudus	long-tailed vole
	Microtus oregoni	Oregon or creeping vole
	Microtus richardsoni	Richardson vole
	Microtus townsendi	Townsend vole
	Neotoma cinerea	bushy-tailed wood rat
	Peromyscus maniculatus	deer mouse
	Phenacomys intermedius	heather vole
	Tamiasciurus douglasi	chickaree
	Zapus trinotatus	Pacific jumping mouse
Carnivora	*Canis latrans*	coyote
	Canis lupus	wolf
	Felis concolor	mountain lion or cougar
	Gulo luscus	wolverine
	Lynx rufus	bobcat
	Martes americana	marten
	Martes pennanti	fisher
	Mustela erminea	short-tailed weasel or ermine
	Mustela frenata	long-tailed weasel
	Mustela vison	mink
	Procyon lotor	raccoon
	Spilogale putorius	spotted skunk or civet cat
	Ursus americanus	black bear
	Vulpes fulva	red fox
Artiodactyla	*Cervus canadensis*	wapiti or elk
	Odocoileus h. hemionus	mule deer

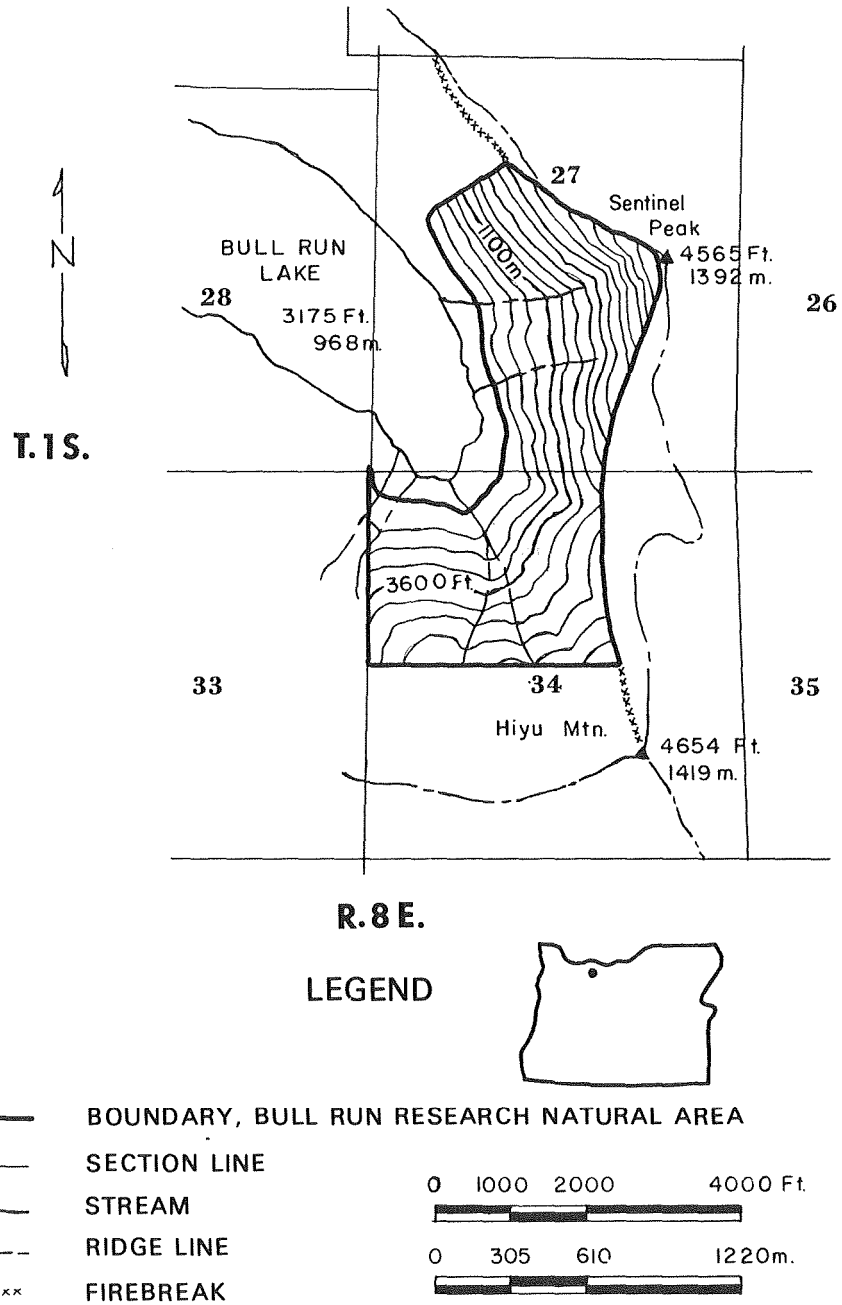
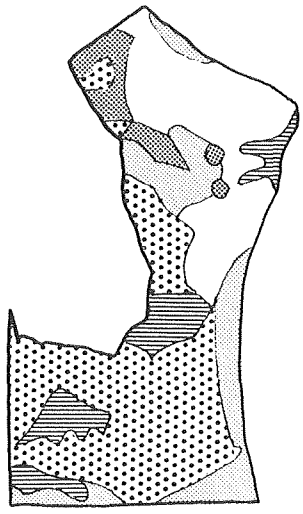
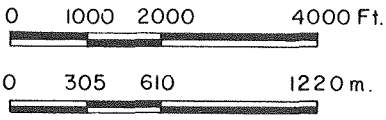


Figure BR-1.– **Bull Run Research Natural Area, Clackamas County, Oregon.**





LEGEND

LAST CHANCE SOIL SERIES
PODZOLS FORMED IN GLACIAL DEPOSITS ON 0-TO 60-PERCENT SLOPES

LAST CHANCE SOIL SERIES
PODZOLS FORMED IN GLACIAL DEPOSITS ON SLOPES OVER 60 PERCENT, INCLUSIONS OF SENTINEL (BROWN PODZOLS) SOIL SERIES LIKELY

JACKPOT SOIL SERIES
WEAKLY DEVELOPED PODZOLS FORMED IN MORAINAL DEPOSITS

ROCK RUBBLE LAND
TALUS AND BOULDERY MORAINAL MATERIAL DEVOID OF SOIL

GLACIAL PLUCKED LAND
ROCK OUTCROPS AND TALUS, SOME WITH SMALL AMOUNTS OF SOIL BUT LACKING MORAINAL DEPOSITS

Figure BR-2.– Soil type map for Bull Run Research Natural Area.

Figure BR-3.-Views of the Bull Run Research Natural Area.

Upper left: Mixed forest of true firs, Douglas-fir, and western hemlock in the center of the natural area viewed across a small rock slide. Upper right: Old firebreak and forest at the edge of the natural area (right) looking south to the summit of the Hiyu Mountain. Lower left: Natural area and environs as seen from the summit of Hiyu Mountain; the firebreak on the right forms the eastern boundary and the rock slide near the center of the picture the northern boundary. Lower right: Typical specimen of old-growth noble fir about 1 DO-em. (40-in.) d.b.h. growing in the natural area.