

LONG CREEK RESEARCH NATURAL AREA¹

Western hemlock, western hemlock-western red cedar, and climax red alder stands on a south-exposed mountain slope in the northern Cascades of Washington.

Long Creek Research Natural Area was established on January 2, 1947, as an example of virgin western hemlock (*Tsuga heterophylla*) - western red-cedar (*Thuja plicata*) forest type. It complements Lake Twentytwo Research Natural Area, which is located on a north-facing mountainside 4 km. (2.5 miles) to the west. The 259-ha. (640-acre) tract is located in Snohomish County, Washington, and is administered by the Monte Cristo Ranger District (Granite Falls, Washington), Mount Baker National Forest. The natural area occupies the W1/2 of section 17 and E1/2 NE1/4, E1/2 SW1/4, and SE1/4 of section 18, T. 30 N., R. 9 E., Willamette meridian (fig. LC-1). It lies at 48°05' N. latitude and 121 °41' W. longitude.

ACCESS AND ACCOMMODATIONS

Access is via U.S. Highway 2 and State Highways 9 and 92 from Everett to Granite Falls and Forest Highway 7 to Verlot Ranger Station. Beyond the ranger station follow Forest Highway 7 east for 11.6 km. (7.2 miles) to Red Bridge Campground and turn left on Forest Road 3033. Beginning about 3.2 km. (2 miles) west of the junction, Road 3033

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.

skirts the southern (lower) and, eventually, the western boundaries of the research natural area. In the near future a road providing access to the eastern boundary will be built. There are no trails or roads within the natural area boundary.

The nearest commercial overnight accommodations are in Everett about 56 km. (35 miles) away, although food can be obtained at Verlot and Granite Falls. There are seven public campgrounds within 3 to 14 km. (2 to 9 miles) of the natural area.

ENVIRONMENT

The Long Creek Research Natural Area occupies a portion of the south slope of Wiley Ridge. Elevations range from 1,100 m. (3,600 ft.) above sea level near the top of the ridge to about 380 m. (1,250 ft.) at the foot of the ridge near the South Fork of the Stillaguamish River. Topography is steep to very steep and broken on the slopes to gentle and rolling in the southern third of the area where the toe-slope of the ridge merges with the river terrace. One permanent stream, as well as approximately two-thirds of the Long Creek drainage, is almost entirely within the natural area.

The natural area is located on sedimentary bedrock of Pre-Middle Jurassic age (Hunting et al. 1961). However, this bedrock is covered by stratified glacial out-wash of Pleistocene age on lower portions of the natural area. This out-wash is of two types a lower deposit of compact brown sands and gravels of glacial fluvial origin overlain by a deep deposit of blue-gray hard varved silt of glaciolacustrine origin.² The varved material con-

² Information from "Report on Slide on South-Fork Stillaguamish River at Gold Basin Forest Camp." Sept. :30, ID54, 10 p. Typewritten report by Shannon and Wilson, Consulting Engineers, Seattle, to State of Washington Department of Fisheries. (Copy on me Verlot Hanger Station, Granite Falls, Washington.)

sists of thin layers of silt, sand, and clay, horizontally bedded. Many of the beds are extremely unstable, especially when wet, resulting in slides and mudflows. The extensive mass land movements which characterize lower elevations in much of the natural area appear confined to this material.

A wet, cool, maritime climate characterizes the natural area. Annual precipitation is heavy and highly seasonal, although rain is not uncommon during the summer months, and summers are cool. Climatic data from the nearest weather bureau station (Darrington, Washington) about 19 km. (12 miles) northeast are as follows (U.S. Weather Bureau 1956, 1965). They probably approximate climatic conditions encountered at lower elevations in Long Creek Research Natural Area.

Mean annual temperature9.6°C. (49.4°F.)
Mean January temperature1.1°C. (33.9°F.)
Mean July temperature17.4°C. (63.3°F.)
Mean January minimum
temperature-3.2°C. (26.1°F.)
Mean July maximum temperature25.9°C. (78.7°F.)
Average annual precipitation ...2,045 mm. (80.51 in.)
June through August
precipitation154 mm. (6.06 in.)
Average annual snowfall120 cm. (47.4 in.)

Soils on the natural area have recently been mapped by U.S. Forest Service personnel as part of a soil survey of the Mount Baker National Forest (Snyder and Wade 1970). Soils on gently sloping terrain in the southern portion of the area are markedly unstable and are formed in deep glaciolacustrine deposits. These soils, classed as fine, mixed Andic Haplumbrepts, possess a brown silt loam to silty clay loam surface layer which grades into a slowly permeable silty clay subsoil at approximately 30 cm. (12 in.). On more steeply sloping terrain at intermediate elevations, mapped soils are coarse textured gravelly sandy loams over very deep deposits of very gravelly and cobbly sands. These are derived from marginal lake deposits and are classified as sandy, mixed Typic Ustifluent. In the northern section of the area, near Wiley Ridge, soils are derived from metasedimentary rocks and are classed as coarse loamy, mixed Typic Ferrosols. These soils have a dark reddish brown loam surface and are

underlain at about 55 cm. (22 in.) by dark yellowish brown very gravelly loam.

BIOTA

Estimated areas by SAF forest types (Society of American Foresters 1954), as determined from the most recent type map available, are:

No.	Name	Area
224	Western Hemlock	162 ha. (400 acres)
227	Western Red-cedar - Western Hemlock	40 ha. (100 acres)
230	Douglas-Fir - Western Hemlock	40 ha. (100 acres)
221	Red Alder	16 ha. (40 acres)

Vegetation types present, according to Kuchler's (1964) classification, would include: Type 2, Cedar - Hemlock - Douglas - Fir Forest; Type 3, Silver Fir - Douglas Fir Forest; and Type 25, Alder-Ash Forest. The natural area is mainly within the *Tsuga heterophylla* Zone (Franklin and Dyrness 1969).

Stands dominated by western hemlock cover the bulk of the natural area (fig. LC-2), but the age, structure, understory composition, number, and species of associated conifers vary greatly from site to site. On the slopes are stands of western hemlock mixed with varying proportions of western red cedar and scattered Douglas-fir (*Pseudotsuga menziesii*) and Pacific silver fir (*Abies amabilis*). Western hemlock is the major climax species, and many small openings are choked with dense hemlock reproduction (fig. LC-2). Hemlocks in one of the stands examined were about 175 years in age, 60-cm. (24-in.) d.b.h. (maximum 81-cm. or 32-in.), and 38 m. (125 ft.) in height. The understory can be typified by *Vaccinium alaskaense*, *Blechnum spicant*, and *Hylocomium splendens*. Other species commonly present include *Vaccinium ovalifolium*, *V. parvifolium*, *Cornus canadensis*, *Clintonia uniflora*, *Polystichum munitum*, and *Rubus pedatus*.

On some benches and the upper slopes of the natural area, mixed stands of Pacific silver fir and western hemlock are encountered in which the silver fir appears to be the major climax species. The understory is dominated

by *Rhytidiopsis robusta*, *Vaccinium alaskaense*, *Rubus pedatus*, *Cornus canadensis*, *Clintonia uniflora*., and *Blechnum spicant*. In one of these stands the 90- to 120-cm. (3to 4-ft.) diameter and 61-m. (200-ft.) tall hemlocks and silver firs were estimated (from borings) to be over 400 years old.

Within the natural area are large old-growth Douglas-fir 180- to 200-cm. (70- to 80-in.) d.b.h. (fig. LC-2). They are concentrated in the northeast corner of the tract and on drier sites, e.g., around the steep slopes and cliffs in section 18. In the latter location the Douglas-fir is associated with an understory distinguished by the occurrence of *Berberis nervosa*, *Gaultheria shallon*, *Acer circinatum*, *Eurhynchium oreganum*, *Linnaea borealis*, and Pacific yew (*Taxus brevifolia*). Western hemlock is the major climax species.

Around streams, seeps, and similar moist habitats, a community dominated by large western red cedar and a dense understory of *Oplopanax horridum*, *Athyrium filix-femina*, *Blechnum spicant*, and many other herbs may be encountered. Very large red-cedars are sometimes encountered on these sites.

A series of interesting red alder (*Alnus rubra*)-dominated communities are found on the unstable glacial deposits in the southern half of the natural area. The area appears to be a mosaic of stands of varying age and size depending upon when the last slump or landslide took place. Associated with the alder is black cottonwood (*Populus trichocarpa*), bigleaf maple (*Acer macrophyllum*.), and Sitka spruce (*Picea sitchensis*). The understory includes species of *Petasites*, *Equisetum*, *Stachys*, *Gallium*, and *Carex*.; *Rubus spectabilis*, *R. ursinus*, *Oplopanax horridum*, and *Polystichum munitum*; and the rank growth obscures innumerable holes and erosion channels in the substrate. Older stands of red alder, Sitka spruce, bigleaf maple, and western red cedar are developing on small areas where the land surfaces have been stable for 30 to 50 years (fig. LC-2). Near the southern edge of the natural area a stand of stunted red alder, willow (*Salix*; sp.), and dense *Scirpus* sp. has developed on alluvial deposits of the eroded glacial silts.

Red alder appears to be the likely climax species throughout most of this area. Constant disturbance of the land surface due to mass soil movements and erosion perpetuates the alder and prevents the stands from developing beyond this successional stage.

Mammals believed to utilize the natural area are listed in table LC-1.

Except for the stream sides and unstable land surfaces associated with the glacial deposits, no specialized habitats are known within the natural area.

HISTORY OF DISTURBANCE

There is no evidence of recent fires or human disturbance within the Long Creek Research Natural Area, although a small structure is shown in the SW1/4 of section 17 on the U.S. Geological Survey map of the Silverton Quadrangle. A small farm once existed adjacent to the southern boundary and National Forest lands adjacent to the west, south, and east boundaries are in process of being logged.

RESEARCH

No research is presently being conducted on the natural area. The mosaic of communities and environments on the unstable till deposits appears to offer unique research opportunities, perhaps even of geomorphologic phenomena.

MAPS AND AERIAL PHOTOGRAPHS

Special maps applicable to the natural area include: *Topography* - 15' Silverton, Washington quadrangle, scale 1: 62,500, issued by the U.S. Geological Survey in 1957; and *geology* - *Geologic Map of Washington*, scale 1:500,000 (Hunting et al. 1961). Either the District Ranger (Monte Cristo Ranger District) or Forest Supervisor (Mount Baker National Forest, Bellingham, Washington) can provide details on the most recent aerial photo coverage and forest type maps for the area.

LITERATURE CITED

- Franklin, Jerry F., and C. T. Dyrness
1969. Vegetation of Oregon and Washington. USDA Forest Servo Res. Pap. PNW-80, 216 p., illus. Pac. Northwest Forest & Range Exp. Stn., Portland, Oreg.
- Huntting, Marshall T., W. A. G. Bennett, Vaughan E. Livingston, Jr., and Wayne S. Moen
1961. Geologic map of Washington. Wash. Dep. Conserv., Div. Mines & Geol.
- 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.
- Snyder, Robert V., and John M. Wade
1970. Mt. Baker National Forest soil resource inventory. 267 p. plus atlas of maps and interpretive tables. Northwest Reg., USDA Forest Servo
- Society of American Foresters
1954. Forest cover types of North America (exclusive of Mexico). 67 p., illus. Washington, D.C.
- U.S. Weather Bureau
1956. Climatic summary of the United States - supplement for 1931 through 1952, Washington. Climatography of the United States 11-39, 79 p., illus.
-
1965. Climatic summary of the United States - supplement for 1951 through 1960, Washington. Climatography of the United States 86-39, 92 p., illus.

Table LC-1. — Tentative list of mammals for Long Creek Research Natural Area

Order	Scientific name	Common name
Insectivora	<i>Neurotrichus gibbsi</i>	shrew mole
	<i>Scapanus orarius</i>	coast mole
	<i>Scapanus townsendi</i>	Townsend mole
	<i>Sorex bendirii</i>	marsh shrew
	<i>Sorex cinereus</i>	masked shrew
	<i>Sorex obscurus</i>	dusky shrew
	<i>Sorex palustris</i>	northern water shrew
	<i>Sorex trowbridgii</i>	Trowbridge shrew
	<i>Sorex vagrans</i>	wandering shrew
	<i>Eptesicus fuscus</i>	big brown bat
Chiroptera	<i>Lasionycteris noctivagans</i>	silver-haired bat
	<i>Lasiurus cinereus</i>	hoary bat
	<i>Myotis californicus</i>	California myotis
	<i>Myotis evotis</i>	long-eared myotis
	<i>Myotis keeni</i>	Keen myotis
	<i>Myotis lucifugus</i>	little brown 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
Rodentia	<i>Aplodontia rufa</i>	mountain beaver
	<i>Castor canadensis</i>	beaver
	<i>Clethrionomys gapperi</i>	Gapper red-backed vole
	<i>Eutamias townsendi</i>	Townsend chipmunk
	<i>Glaucomys sabrinus</i>	northern flying squirrel
	<i>Microtus longicaudus</i>	long-tailed vole
	<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>Tamiasciurus douglasi</i>	chickaree
	<i>Zapus trinotatus</i>	Pacific jumping mouse
	<i>Canis latrans</i>	coyote
	<i>Felis concolor</i>	mountain lion or cougar
	<i>Lynx rufus</i>	bobcat
Carnivora	<i>Martes americana</i>	marten
	<i>Mustela erminea</i>	short-tailed weasel or ermine
	<i>Mustela frenata</i>	long-tailed weasel
	<i>Mustela vison</i>	mink
	<i>Spilogale putorius</i>	spotted skunk or civet cat
	<i>Ursus americanus</i>	black bear
	<i>Cervus canadensis</i>	wapiti or elk
Artiodactyla	<i>Odocoileus h. columbianus</i>	black-tailed deer

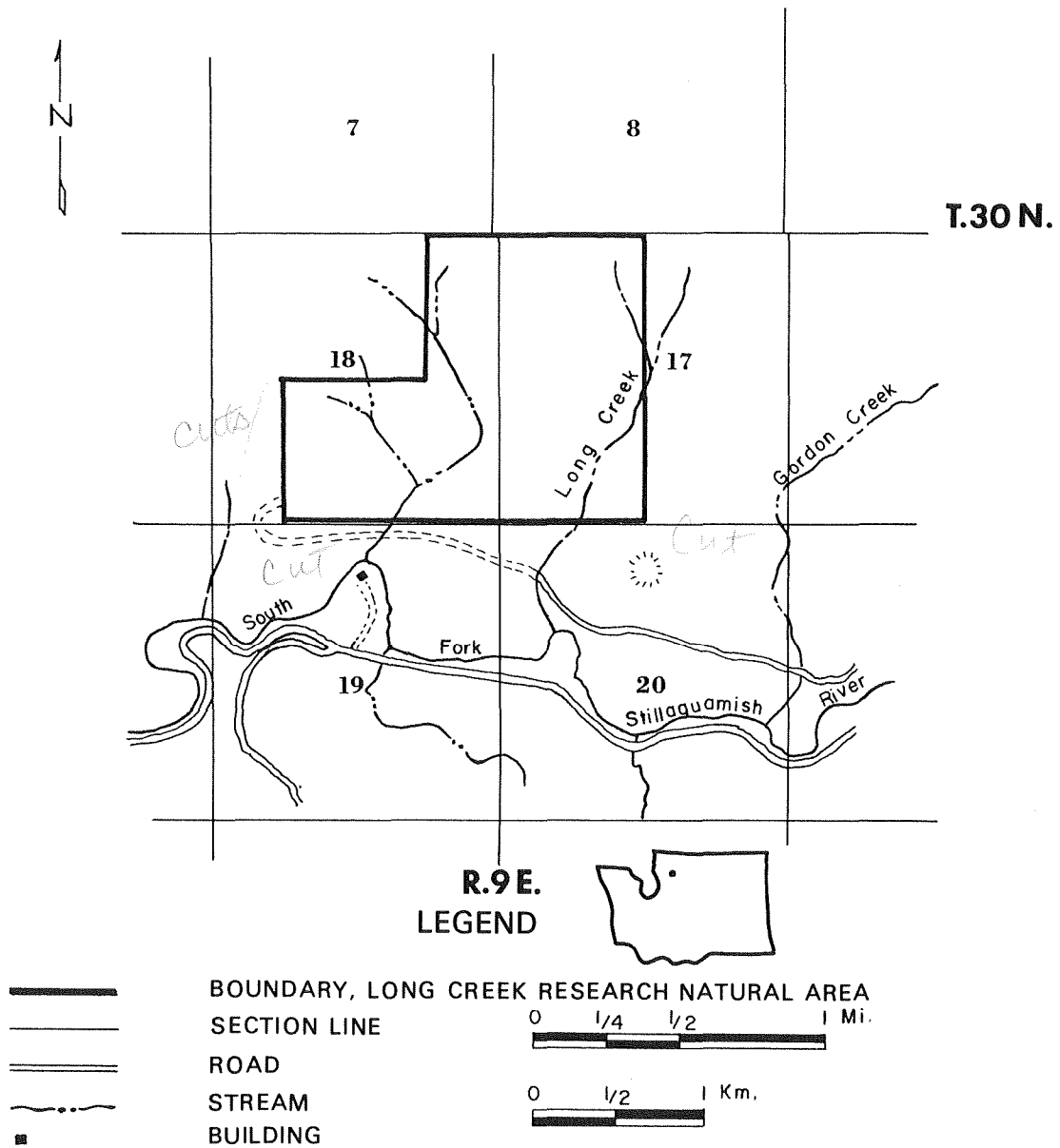


Figure LC-1.- Long Creek Research Natural Area,
Snohomish County, Washington.

*Figure L C-2. -Communities of the Long Creek Research Natural Area. Upper left: Typical stand of western hemlock averaging 45- to 70-cm. d.b.h. Upper right: Stand of red alder, Sitka spruce, bigleaf maple, and *Polystichum munitum* developed on portion of unstable glacio-lacustrine sediments at lower elevations. Lower left: Small opening in mature forest of western hemlock occupied by dense reproduction of western hemlock and small amounts of Pacific silver fir and western red-cedar. Lower right: Group of large, old-growth Douglas-firs averaging 175- to 200-cm. d.b.h.*

