

# STETATTLE CREEK RESEARCH NATURAL AREA

Supplement No. 25<sup>1</sup>

James K. Agee and C. Robert Wasem<sup>2</sup>

The Research Natural Area described in this supplement is administered by the National Park Service, U.S. Department of the Interior. Research Natural Areas in National Parks or National Monuments are administered by the Superintendent of the park or monument. A scientist wishing to use one of the tracts should contact the Superintendent responsible and outline the proposed research.

Because of long involvement with scientific and educational use of National Parks and Monuments, the National Park Service has developed standard procedures for applications to use areas for research. A study proposal must be prepared by the principal investigators and approved by the Superintendent. National Park Service research biologists will assist in preparing proposals. Permits for collecting are necessary. There may be limitations on research activities.

Stetattle Creek Research Natural Area is part of a Federal system of such tracts established for research and educational purposes. Each Research Natural Area constitutes a site where 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 Federal system is outlined in "A Directory of the Research Natural Areas on Federal Lands of the United States of America."<sup>3</sup>

Of the 100 Federal Research Natural Areas established in Oregon and Washington, 45 are described in "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators" (see footnote 1). Supplements to the guidebook describe additions to the system.

The guiding principle in management of Research Natural Areas is to prevent unnatural encroachments or activities that directly or indirectly modify ecological processes. Logging and uncontrolled grazing are not allowed, for example, nor is public use that might impair scientific or educational values. Management practices necessary to maintain ecosystems may be allowed.

Federal Research Natural Areas provide a unique system of publicly owned and protected examples of undisturbed ecosystems where scientists can conduct 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, a scientist wishing to use a Research Natural Area is obligated to:

1. Obtain permission from the appropriate administering agency before using the area;<sup>4</sup>
2. Abide by the administering agency's regulations governing use, including specific limitations on the type of research, sampling methods, and other procedures; and
3. Inform the administering agency on progress of the research, published results, and disposition of collected materials.

<sup>1</sup> Supplement No. 25 to "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators," by Jerry F. Franklin, Frederick C. Hall, C.T. Dyrness, and Chris Maser (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1972. 498 p.).

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<sup>3</sup> Federal Committee on Ecological Reserves. 1977. A directory of the Research Natural Areas on Federal lands of the United States of America. Washington, DC: U.S. Department of Agriculture, Forest Service.

<sup>4</sup> Six agencies cooperate in this program in the Pacific Northwest: U.S. Department of Agriculture—Forest Service; U.S. Department of the Interior—Bureau of Land Management, Fish and Wildlife Service, and National Park Service; U.S. Department of Energy; and U.S. Department of Defense.



The purpose of these limitations is to:

1. Ensure that the scientific and educational values of the tract are not impaired;
2. Accumulate a documented body of knowledge about the tract; and
3. Avoid conflict between studies.

Research must be essentially nondestructive; destructive analysis of vegetation is generally not allowed, nor are studies requiring extensive modification of the forest floor or extensive excavation of soil. Collection of plant and animal specimens should be restricted to the minimum necessary to provide voucher specimens and other research needs. Under no circumstances may collecting significantly reduce populations of species. Collecting must also be carried out in accordance with applicable State and Federal agency regulations. Within these broad guidelines, appropriate uses of Research Natural Areas are determined by the administering agency.

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Supplement No. 1 to "Federal Research Natural Areas in Oregon and Washington: A Handbook for Scientists and Researchers" by James K. Agee, Portland, Oregon, U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1972, 109 p.

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# STETATTLE CREEK RESEARCH NATURAL AREA

A large watershed with several regionally important forest types, works of glaciers, large deep lakes, lakes of low productivity and high clarity, and rapidly flowing streams.

Stetattle Creek Research Natural Area (RNA) was established by the National Park Service in 1973 and expanded in 1980 to represent a large watershed with significant forest types, glacial features, lakes, and streams. The 5,605-ha area is in North Cascades National Park, Whatcom County, Washington. It is between 48° 42' and 48° 48' N. latitude and 121° 9' and 121° 16' W. longitude. It is bounded on the south by the demarcation between North Cascades National Park and Ross Lake National Recreation Area. The watershed crest is the boundary on all other sides.

The scientific data base in all disciplines is weak for the Stetattle Creek RNA. More botanical studies are available than are studies in other disciplines; most are reconnaissance studies, and only two are published in the refereed literature. More comprehensive research is encouraged in every discipline.

## Access and Accommodations

Stetattle Creek RNA is reached via Washington State Highway 20. Trailheads to the RNA begin at Diablo, which is about 30 km east of Marblemount or 100 km west of Winthrop (fig. 1). Two trails lead to the watershed. One begins in Diablo near where the road crosses Stetattle Creek and leads up the valley bottom. It proceeds up the valley for about 7 km where it gradually narrows and disappears. The second trail goes through a series of switchbacks up the ridge and is in the watershed but not the RNA for the first 3.5 km. It crosses into the Sourdough Creek drainage and leads to Sourdough Lookout. From the lookout, cross-country access is relatively easy to Sourdough Ridge, the eastern boundary of the RNA. A traverse from Sourdough Ridge to Elephant Butte is described by Tabor and Crowder (1968).

Accommodations are available at the Diablo Lake Resort, about 1 km north of the trailhead. A National Park Service campground, Colonial Creek, is on Highway 20 about 7 km southeast of Diablo; two other National Park Service campgrounds are in Newhalem, about 13 km west on Highway 20.

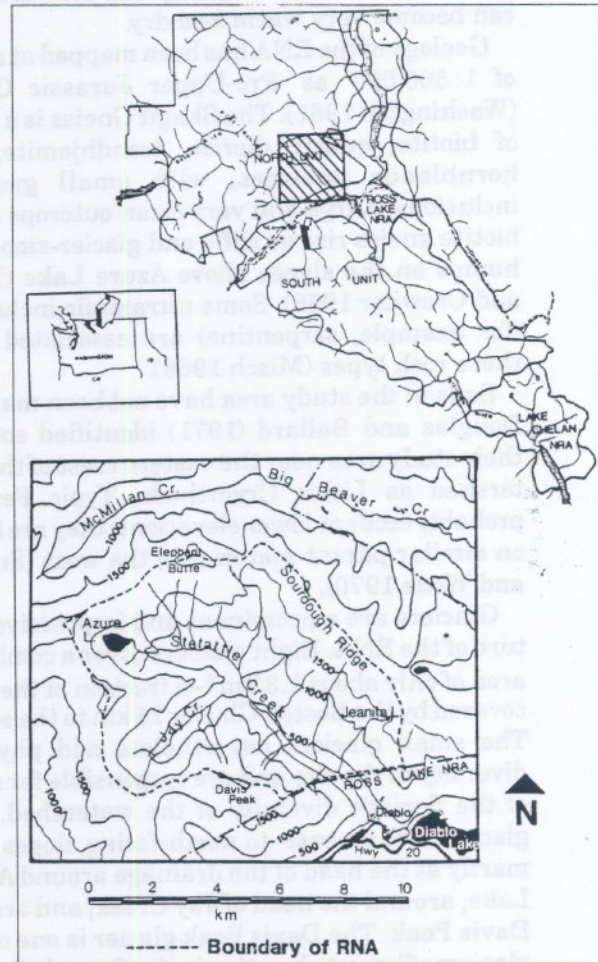


Figure 1—Location of Stetattle Creek Research Natural Area. Contours are in meters.

## Environment

Stetattle Creek RNA ranges from 350 m in elevation near the mouth of the creek to over 2400 m at McMillan Spire above Azure Lake. Topography is rugged, especially in the western portion of the watershed. Climatically, the area represents a transition between the moist coastal zone and drier interior zone (Wagstaff and Taylor 1980). No climatic stations are within the watershed; the nearest weather records are from Diablo, representing low-elevation areas, and



Mount Baker (Douglas and Ballard 1971), representing high-elevation areas (table 1). A wet, cool maritime climate prevails. Maximum precipitation occurs in December and January, primarily as snow. Lowest precipitation occurs in July and August. Summers are generally cool, but the southwest-facing slopes of the watershed can become very warm and dry.

Geology of the RNA has been mapped at a scale of 1:500,000 as Pre-Upper Jurassic Gneiss (Washington 1961). The Skagit Gneiss is a blend of biotite, quartz diorite, trondhjemite, and hornblende gneisses, with small granitic inclusions. Large and very clean outcrops of the biotite gneiss rise as cliffs and glacier-smoothed humps on the slopes above Azure Lake (Tabor and Crowder 1968). Some ultramafic inclusions (for example, serpentine) are associated with these rock types (Misch 1966).

Soils in the study area have not been mapped; Douglas and Ballard (1971) identified soils in their study area near the eastern crest of the watershed as Lithic Cryorthods. Typic Ferrosols probably occur at lower elevations; they are found on similar parent material to the west (Snyder and Wade 1970).

Glaciers are a prominent and impressive feature of the RNA. Eight glaciers cover a combined area of only about 1.3 km<sup>2</sup>—a fraction of the area covered by the Boston Glacier 25 km to the south. The small glaciers nevertheless add physical diversity to the site and are responsible for some of the floristic diversity of the watershed. The glaciers are on east- to north-facing slopes, primarily at the head of the drainage around Azure Lake, around the head of Jay Creek, and around Davis Peak. The Davis Peak glacier is one of the glaciers of lowest elevation in the Cascade Range.

There are 43.2 km of streams, including 8 km of Stetattle Creek, within the RNA. Basic water-quality data are available for Bucket, Camp, Dayo, and Sourdough Creeks. Water quality in Stetattle Creek has been monitored frequently since early 1978 and intermittently before then by the North Cascades National Park biological staff; these data are available in park files at Sedro Woolley. The U.S. Geological Survey has operated a water-stage recorder in the creek continuously since 1933. The maximum recorded discharge is 243 m<sup>3</sup>/sec on 26 November 1949;

the minimum recorded discharge is 0.255 m<sup>3</sup>/sec on 9-11 November 1936. Mean stream discharge over the period of record is 5.268 m<sup>3</sup>/sec.

The Stetattle Creek RNA contains three standing (lentic) bodies of water. All are subalpine, and all were formed by glacial scouring action. An unnamed pond (MP-8) lies at the head of Torrent Creek at 1566 m in elevation on the southeast slopes of Elephant Butte. Neither the creek nor the pond has been studied.

Jeanita Lake is a small, shallow, mud-bottomed pond lying in a small, glacial cirque basin at 1946 m in elevation on the west side of Sourdough Mountain. Data from 22 soundings show that it has a maximum depth of 2.5 m and a mean depth of 1.48 m. The Secchi-disk can be seen as it rests on the bottom in all areas of the lake. In the initial survey in August 1973 by the park staff, the lake was homothermous (not thermally stratified). Near-neutral pH, low alkalinity, hardness, conductivity values, and low turbidities all indicate that Jeanita Lake is oligotrophic (table 2), which is typical of many other lakes and ponds of the northern Cascade Range. Variations in pH, alkalinity, hardness, and conductivity readings at different times of year are caused by snowmelt in the basin and ice melting from the lake surface.

Azure Lake is a large subalpine lake at 1237 m in elevation. It occupies an exceptionally deep glacial cirque basin at the southeastern corner of the Picket Range (fig. 2). It has a maximum depth of 105 m, and is the second deepest natural lake known within North Cascades National Park. Several small glaciers still cling to steep cirque walls and add a slightly milky quality to the lake water during extremely warm periods in mid to late summer. Thermal stratification was not present during an August 1980 survey by park staff. At that time, the surface water temperature was 11 °C and gradually went down to 3.8 °C at the 30-m depth. In an August 1983 survey, a shallow thermocline was present at a depth between 0.5 and 1.5 m, with little thermal stratification in the rest of the water column. Melting ice on the lake surface even in late August each year probably ensures a homothermous water column. The water of Azure Lake is extremely oligotrophic with low values of pH, alkalinity, hardness, calcium, and electrical conductivity (table 2).



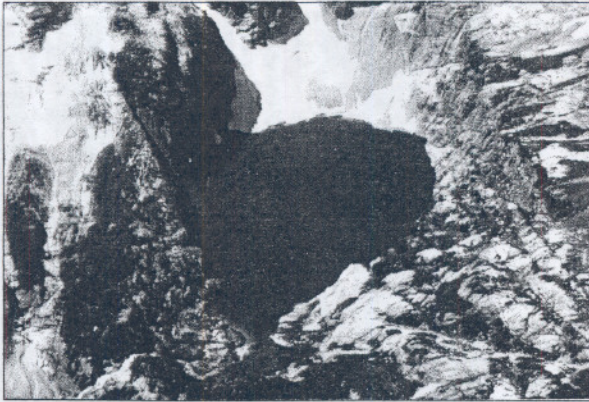


Figure 2—Aerial view of Azure Lake, Stetattle Creek Research Natural Area. The terrain and vegetation are characteristic of much of the upper watershed.

## Biota

Stetattle Creek is in a transitional geographic location and has a mix of coastal and interior vegetation types. Partial floras of the watershed are given by Wagstaff and Taylor (1980), who surveyed the lowland and montane portions, and by Douglas and Ballard (1971), who intensively studied a localized subalpine/alpine community. Plant lists based on these studies are included here (tables 3 and 4).

Three maps of vegetation type have been prepared for the area. Wagstaff and Taylor (1980) identified six general community types based on dominants: (1) cliff-talus-scrub, (2) vine maple-Sitka alder-willow (*Acer circinatum*-*Alnus sinuata*-*Salix* spp.), (3) subalpine fir/mountain hemlock (*Abies lasiocarpa*/*Tsuga mertensiana*), (4) Pacific silver fir/western hemlock (*Abies amabilis*/*Tsuga heterophylla*), (5) Douglas-fir (*Pseudotsuga menziesii*), and (6) lodgepole pine (*Pinus contorta*). The National Park Service, Denver Service Center, Remote Sensing Section (now known as the Geographic Information Systems Field Unit, or GISFU), adapted this classification for a photointerpreted and more specific vegetation map (Waggoner n.d.). The types were essentially the same, except that cliff-talus-scrub was divided into several categories: cliff-talus-scrub, alpine, and subalpine, which included scattered tree clump forests. A third vegetation map (Agee and others 1985) was based on LANDSAT data combined with terrain and precipita-

tion information. This cover-type map was produced for an area of 850,000 ha including and surrounding the park. The Stetattle Creek RNA contains representatives of all but one (ponderosa pine [*Pinus ponderosa*]) of the major vegetation types of the park, illustrating the transitional nature of vegetation in the RNA. Major cover types are Douglas-fir (which includes lodgepole pine), subalpine fir, whitebark pine/subalpine larch (*Pinus albicaulis*/*Larix lyallii*), mountain hemlock, Pacific silver fir, western hemlock, hardwood forest, lowland herbaceous, high shrub, subalpine herbaceous, and heather meadow.

Küchler's (1964) map of potential natural vegetation shows the RNA as being totally in type 15, western spruce-fir forest (*Picea-Abies*). In fact, several other types are dominant, including Küchler's type 2, cedar-hemlock-Douglas-fir forest (*Thuja-Tsuga-Pseudotsuga*); type 3, silver fir-Douglas-fir forest (*Abies-Pseudotsuga*); and type 52, alpine meadows and barrens (*Agrostis*, *Carex*, *Festuca*, *Poa*). The following Society of American Foresters cover types (Eyre 1980) occur in the RNA: mountain hemlock (205), red alder (221), western hemlock (224), coastal true fir-hemlock (226), and Douglas-fir-western hemlock (230). Although no habitat-type classification has been completed specifically for the RNA, 28 forested plant associations listed for the park complex by Agee and others (1985) are likely present in the area (table 5).

Community descriptions are incomplete for the watershed. Because of the various definitions of community types, community descriptions of different types from various studies probably overlap. Some general descriptions of communities (fig. 3) can be made from the classification of Agee and others (1985). The Douglas-fir cover type encompasses a broad midslope band across the eastern portion of the watershed, and Douglas-fir is the likely potential vegetation. *Gaultheria shallon* is the dominant understory species; associated species are *Spiraea betulifolia*, *Pachistima myrsinites*, *Pteridium aquilinum*, and *Chimaphila umbellata* (Douglas 1971, Larson 1972). Density of Douglas-fir may be over 1000 stems per ha on these sites (Greene and Klopsch, n.d.). On recently burned and perhaps drier sites, lodgepole pine assumes importance in the overstory. Dense stands of



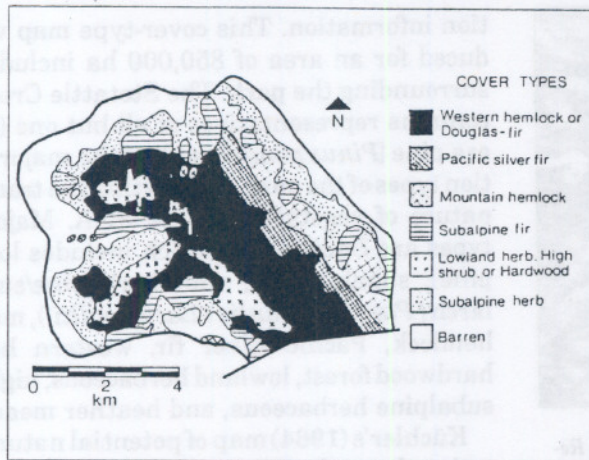


Figure 3—Vegetation cover types of the Stetattle Creek Research Natural Area. Types are generalized from Agee and others (1985).

lodgepole pine occur (fig. 4) with *Holodiscus discolor*, *Gaultheria shallon*, *Vaccinium* spp., and *Pteridium aquilinum* in the understory. Density of lodgepole pine may exceed 3000 stems per ha in such stands (Greene and Klopsch, n.d.).

The western hemlock cover type is on lower slopes in the southern portion of the watershed. This cover type is dominated by Douglas-fir in the overstory, with western hemlock and western redcedar (*Thuja plicata*) assuming dominance in older stands (fig. 5). The latter two species can comprise more than 75 percent of tree density (Greene and Klopsch, n.d.). Basal area averages about 50 m<sup>2</sup>/ha, with over half in Douglas-fir. Understory dominants in the bottomland portion of this cover type are *Acer circinatum*, *Oplopanax horridum*, *Polystichum munitum*, and *Vaccinium* spp. (Agee and others 1985, Douglas 1971). In the drier upland portion of this cover type, overstory dominants are the same but understory dominants are *Gaultheria shallon*, *Berberis nervosa*, and *Vaccinium* spp. (Agee and others 1985, Douglas 1971).

The Pacific silver fir cover type is found along midslopes in the upper watershed and along valley bottoms. Some forests are estimated to be 650-750 years old where this type grades into the western hemlock cover type. Douglas-fir dominants of that age are beginning to die and be replaced by Pacific silver fir. Up to 85 percent of the regeneration is also Pacific silver fir (Greene and Klopsch, n.d.). Understory species



Figure 4—Interior of a fire-generated *Pinus contorta*/*Gaultheria shallon* community on a dry southwest-facing slope at 450 m elevation. *Pseudotsuga menziesii* regeneration is present in the understory along with *Pteridium aquilinum*.

include *Vaccinium* spp., *Clintonia uniflora*, *Linnaea borealis*, *Goodyera oblongifolia*, and *Cornus canadensis* (Agee and others 1985, Wagstaff and Taylor 1980).

Subalpine forests in the Stetattle Creek RNA appear to be quite diverse; in some areas, the subalpine fir cover type occurs, but in others the mountain hemlock cover type is dominant. At the highest elevations, scattered whitebark pine co-exist with subalpine fir. This community is part of the whitebark pine/subalpine larch cover type. Because of the rocky slopes and disturbance from avalanche and fire, these forests generally have very open canopies with shrubs and herbs dominating the openings (fig. 6). Douglas and Ballard (1971) described a krummholz treeline community with subalpine fir and mountain hemlock as the dominant tree species; Alaska cedar





Figure 5—Interior of a *Tsuga heterophylla*/*Gaultheria shallon* community on a low-elevation, southwest-facing slope. Other shrubs present are *Vaccinium* spp. and *Berberis nervosa*.

(*Chamaecyparis nootkatensis*) and whitebark pine were less important tree species. Major shrub dominants were *Vaccinium deliciosum* and *Phyllodoce empetriformis*.

Hardwood forest is not well represented in the RNA; limited amounts dominated by *Alnus rubra* occur in the bottoms of creeks.

The high-shrub cover type is well developed in the western portion of the watershed, particularly below snowfields where avalanches have occurred repeatedly. The avalanche chutes remain moist much of the year and usually have slopes exceeding 30 percent. A tree layer is usually absent. The shrub-layer dominants (with relative constancy from the high-shrub cover type of Agee and others [1985]) are *Alnus sinuata* (51), *Rubus parviflorus* (51), *Acer circinatum* (40), *Pachistima myrsinites* (40), *Amelanchier alnifolia* (26), *Sorbus sitchensis* (26), *Cornus stolonifera* (21), *Rubus spectabilis* (13), *Salix* spp. (13), and *Vaccinium membranaceum* (7). Herb-layer dominants and constancies are *Pteridium aquilinum* (37), *Epilobium angustifolium* (23), *Athyrium filix-femina* (16), *Veratrum* spp. (15), and *Smilacina* spp. (13).

The lowland herb community is intermixed at low elevation with the high-shrub cover type. It



Figure 6—A view from Sourdough Ridge towards Azure Lake, with McMillan Spire above the lake. Jay Creek is to the left, and Elephant Butte is off the photo to the right. The Sourdough Ridge area is a fairly dry subalpine /alpine area with *Tsuga mertensiana* and *Abies lasiocarpa*. Patches of *Phyllodoce empetriformis* and *Carex nigricans* will emerge in areas with late snowmelt.

contains many of the same herb-layer dominants as the high-shrub type plus some drier habitat herbs: *Achillea lanulosa*, *Anaphalis margaritacea*, and *Fragaria virginiana*.

The subalpine-herb cover type is common on the south-facing slopes of Jay Creek, below Elephant Butte, and along Sourdough Ridge. Common species in the wetter portions of these communities include *Sedum oregonum*, *Phlox diffusa*, and *Selaginella wallacei*. The drier portions include *Penstemon serrulatus*, *Saxifraga ferruginea*, and *Epilobium angustifolium* (Wagstaff and Taylor 1980). Heather meadows are found near the ridgetops and include *Vaccinium deliciosum*, *Phyllodoce empetriformis*, *Cassiope mertensiana*, *Carex rossii*, and *Antennaria lanata* (Douglas and Ballard 1971). Subalpine and alpine plant communities identified in the area (Douglas and Bliss 1977) are listed in table 6.

Three special-interest species exist in the RNA (Wagstaff and Taylor 1980). *Luina serpentina* occurs in a rocky area along Stetattle Creek, probably reflecting the presence of serpentine soil. *Carex macrochaeta* was previously unknown from Washington, although it occurs in British Columbia and Oregon. *Hemitomes congestum*, found in moist Pacific silver fir communities, is a nongreen ericad considered rare in Washington.

No mammal or bird surveys are known for the Stetattle Creek RNA. Tentative lists of such species for the nearby Boston Glacier RNA (Wiberg



and McKee 1978) and Pyramid Lake RNA (Zobel and Wasem 1979) may help anticipate species likely to be found in the Stetattle Creek RNA (tables 7 and 8).

Although the grizzly bear (*Ursus horribilis*) and wolf (*Canis lupis*) are not on the mammal list, infrequent sightings made in the North Cascades area suggest the possibility of their presence in the Stetattle Creek RNA. Many wildlife observations are on file at park headquarters.

Fish populations are not known from Sourdough, Camp Dayo, and Bucket Creeks or in the unnamed pond. The main channel of Stetattle Creek contains introduced populations of rainbow trout (*Salmo gairdneri* Richardson), intermontane cutthroat trout (*Salmo clarki* Richardson), and their hybrids. The cutthroat and hybrids are confined to the lower third of Stetattle Creek. Trout were first introduced to upper Stetattle Creek above the falls barrier as early as 1920. Native fishes, such as the Dolly Varden char (*Salvelinus malma* Walbaum), probably also inhabit lower Stetattle Creek.

Jeanita Lake had a small population of adult golden trout (*Salmo aguabonita* Jordan) at the time of the initial National Park Service survey in 1973. These fish were survivors of a planting in September 1968. Trout are presently absent from Jeanita Lake, and the only other vertebrate in the lake is an undetermined species of salamander. Rainbow trout were introduced as early as 1938 into Azure Lake, a naturally fishless lake. Golden trout were introduced in 1961. Recent studies suggest trout are now absent from the lake, probably because of a lack of spawning habitat, which precludes natural recruitment.

## Disturbance

Natural disturbances have played a major role in the distribution of plant communities in the Stetattle Creek RNA. Snow avalanches and wild-fires are the most widespread agents; wind is probably important on a smaller scale. Snow avalanches are apparently common below the glaciers and snowfields and along the steeper tributary creeks (fig. 7). Shrubfields along Jay Creek and along much of Stetattle Creek are

runout zones for the avalanches.

Fires have occurred in the past in Stetattle Creek RNA. The oldest forest stands in the watershed appear to date from a fire 650-700 years ago. Douglas (1971) notes a fire that occurred about 1855 in the lower portions of the watershed. Larson (1972) studied lodgepole pine stands that were established after fires occurred around 1889, 1916, and 1931; this is based on the ages of the oldest trees on his sample plots. The 1889 fire may be the area represented in one of Darius Kinsey's historic photographs, taken about 1900 (Bohn and Petschek 1978). The photograph shows recently burned terrain (10-15 years old?) and was labeled "Sourdough Wilderness, Skagit River." The caption notes that "the trail crossed over Sourdough Ridge at middle skyline" (Bohn and Petschek 1978), which places the location in or near the eastern boundary of the RNA. This area is also shown as burned and not restocked on an 1898 forest inventory map (Ayres 1898). Douglas and Ballard (1971) studied a subalpine/alpine fire that occurred about 1940. Fires of natural origin have continued to occur and are now allowed to burn under prescribed conditions. No recent fires of human origin are recorded. In 1984, the 5-ha Bucket Creek Fire burned under observation from August 5 to August 25 when rain extinguished it (Allen 1985).

## Research

Most research use of the Stetattle Creek RNA has been associated with the plant communities. Larson (1972) studied the dynamics of a lodgepole pine community over a broad area including parts of lower Stetattle Creek. Douglas and Ballard (1971) studied the effects of fire in a subalpine/alpine area in the northeastern portion of the watershed. Douglas and Bliss (1977) included Stetattle Creek in their detailed study of alpine communities of the North Cascades. Wagstaff and Taylor (1980) surveyed the flora of the watershed. No intensive studies are known of the geology, soils, climate, glaciology, mammals, birds, amphibians, or reptiles. The park biological staff is currently monitoring the area for peregrine falcons (*Falco peregrinus*).



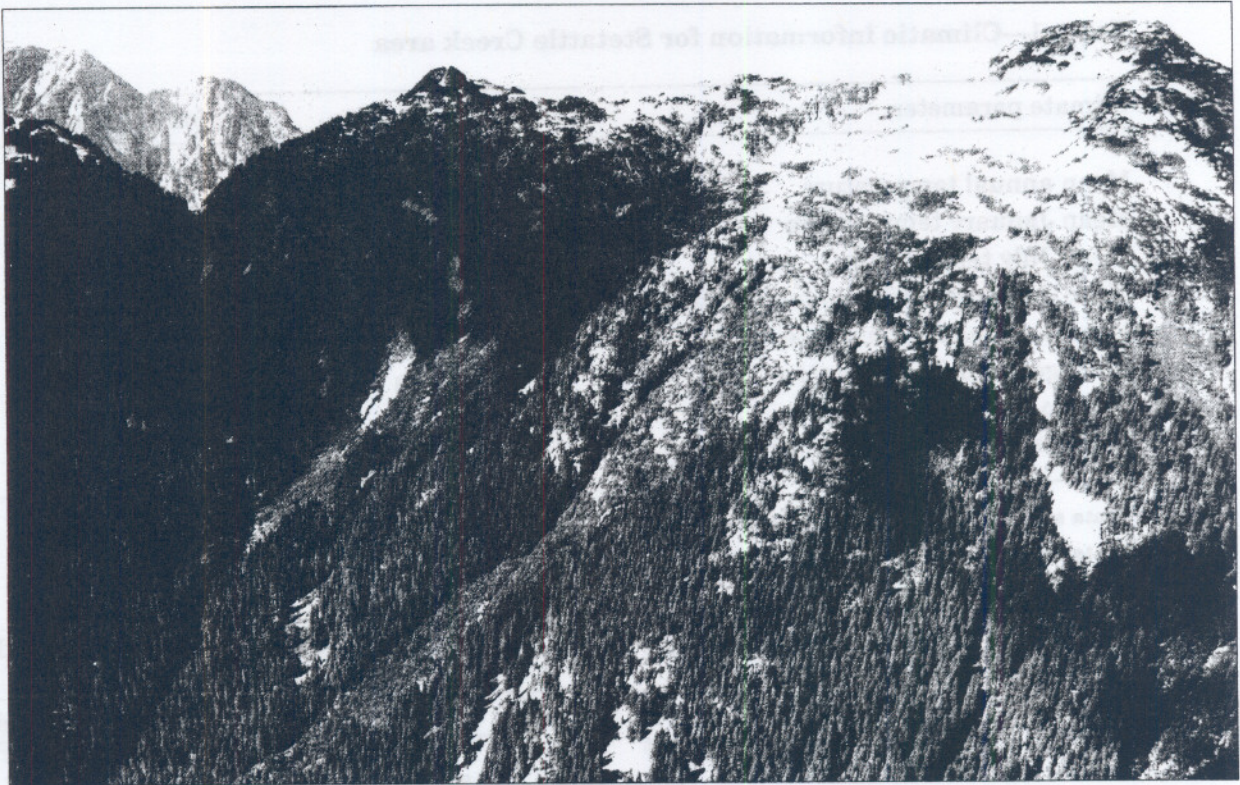


Figure 7—Avalanches are common in the steep terrain of the Stetattle Creek Research Natural Area. Avalanches, representing one type of disturbance, often act as fuel breaks for naturally occurring forest fires, another common disturbance in the area.

The Stetattle Creek RNA provides an excellent example of a transitional mix of typical east-side and west-side vegetation. From its diverse floristics and variety of disturbance factors, the Stetattle Creek RNA has good potential for interesting research. The major drawback is accessibility, if places other than the lower valley bottom or Sourdough Ridge are to be visited.

#### Maps and Aerial Photographs

Topographic maps applicable to the area include 7.5-minute Diablo Dam (1963) and Mount Prophet (1969), Washington, quadrangles, scale 1:24,000; 15-minute Marblemount and Mount Challenger, Washington, quadrangles, scale 1:62,500, both issued in 1953; and the North Cascades National Park map (1974), scale 1:100,000. All are issued by the U.S. Geological

Survey. A geologic map is available at a scale of 1:500,000 (Washington 1961). Vegetation maps by Waggoner (n.d., but prepared in 1980) at 1:24,000, Wagstaff and Taylor (1980) at about 1:50,000, and Agee and others (1985) at about 1:105,000 are available.



**Table 1—Climatic information for Stetattle Creek area**

Climate parameter	Diablo Dam <sup>a</sup>	Mount Baker <sup>b</sup>
Mean annual temperature	9.10 °C	4.5 °C
Mean January temperature	- 0.17 °C	—
Mean July temperature	18.33 °C	12.2 °C
Mean January minimum temperature	- 3.17 °C	—
Mean July maximum temperature	25.50 °C	—
Average annual precipitation	181.6 cm	279 cm
June to August precipitation	11.8 cm	29 cm
Mean annual snowfall (depth)	177.0 cm	—

<sup>a</sup> Data are from Wiberg and McKee (1978).

<sup>b</sup> Data are from Douglas and Ballard (1971).

**Table 2—Physical characteristics of Jeanita and Azure Lakes for three sampling dates**

Characteristic	Unit of measure	Jeanita Lake			Azure Lake		
		8/17-18 1973	7/7 1977	7/12 1979	8/19 1980	8/19 1980	8/19 1983
Sample depth	meters	0.25	0.25	0.25	0.25	30.0	.25
Water temperature	°C	12.6	14.1	10.0	11.2	3.8	8.5
pH		7.4	7.05	6.75	6.40	6.20	6.50
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	18.5	13.75	9.85	1.25	1.50	2.75
Total hardness	mg/L CaCO <sub>3</sub>	15.83	14.34	11.38	3.16	4.96	2.67
Calcium hardness	mg/L CaCO <sub>3</sub>	12.50	11.16	7.49	2.55	4.47	2.33
Calcium	mg/L	5.00	4.46	3.00	1.02	1.79	.93
Electrical conductivity	µs/cm	39.5	31.1	18.5	7.4	13.3	8.3
Dissolved O <sub>2</sub>	mg/L	9.0	9.4	—	9.4	9.0	10.0
Dissolved O <sub>2</sub>	percent saturation	101	109	—	101	—	78
Free CO <sub>2</sub>	mg/L	1.17	1.95	2.78	.79	1.50	1.38
Turbidity	N.T.U. <sup>a</sup>	—	.27	.18	.55	.32	.55
Secchi-disk visibility	m	2.5	2.5	2.5	5.3	—	9.8

<sup>a</sup> Nephelometric turbidity unit.

Source: Wasem unpublished data.



Table 3—Vascular plants in the Stettattle Creek Research Natural Area

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Abies amabilis</i> (Dougl.) Forbes	Pacific silver fir	3,4,5
<i>Abies lasiocarpa</i> (Hook.) Nutt.	Subalpine fir	4
<i>Acer circinatum</i> Pursh	Vine maple	2,3,4
<i>Acer macrophyllum</i> Pursh	Big-leaf maple	2,4
<i>Achillea millefolium</i> L. var. <i>lanulosa</i>	Yarrow	1,2
<i>Adiantum pedatum</i> L.	Maidenhair fern	2
<i>Agoseris aurantiaca</i> (Hook.) Greene var. <i>aurantiaca</i>	Orange agoseris	1
<i>Agrostis exarata</i> Trin. ssp. <i>exarata</i>	Spike bentgrass	2
<i>Agrostis scabra</i> Willd.	Winter bentgrass	1
<i>Alnus rubra</i> Bong.	Red alder	2
<i>Alnus sinuata</i> (Regel) Rydb.	Sitka alder	2
<i>Anaphalis margaritacea</i> (L.) B. & H.	Common pearly-everlasting	1-4
<i>Antennaria alpina</i> (L.) Gaertn.	Alpine pussy-toes	1
<i>Antennaria lanata</i> (Hook.) Greene	Woolly pussy-toes	1
<i>Antennaria racemosa</i> Hook.	Raceme pussy-toes	1
<i>Aquilegia formosa</i> Fisch.	Red columbine	2
<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Kinnikinnick	1
<i>Arenaria capillaris</i> Poir. var. <i>americana</i> (Mag.) Davis	Mountain sandwort	1
<i>Arnica amplexicaulis</i> Nutt. var. <i>amplexicaulis</i>	Clasping arnica	2
<i>Arnica diversifolia</i> Greene	Sticky arnica	2
<i>Arnica latifolia</i> Bong. var. <i>latifolia</i>	Mountain arnica	2
<i>Aruncus sylvestris</i> Kostel	Sylvan goatsbeard	2
<i>Asarum caudatum</i> Lindl.	Wild ginger	4
<i>Asplenium trichomanes</i> L.	Maidenhair spleenwort	3
<i>Aster foliaceus</i> Lindl.: var. <i>canbyi</i> Gray var. <i>foliaceus</i> var. <i>parryi</i> (Eat.) Gray	Leafy-bract aster	2 2 2
<i>Aster modestus</i> Lindl.	Few-flowered aster	2
<i>Athyrium filix-femina</i> (L.) Roth.	Lady-fern	2,3,4
<i>Berberis nervosa</i> Pursh	Dull Oregon grape	5,6

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Blechnum spicant</i> (L.) Roth.	Deer-fern	3,4
<i>Calamagrostis canadensis</i> (Michx.) Beauv.		
var. <i>acuminata</i> Vasey	Bluejoint reedgrass	2
<i>Campanula rotundifolia</i> L.	Scotch bellflower	1,2
<i>Carex brunnescens</i> (Pers.) Poir.	Brownish sedge	2
<i>Carex deweyana</i> Schw.	Dewey's sedge	2
<i>Carex lenticularis</i> Michx. var. <i>lenticularis</i>		2
<i>Carex macrochaeta</i> C.A. Mey.	Large-awn sedge	2
<i>Carex mertensii</i> Prescott	Mertens' sedge	2
<i>Carex nigricans</i> Retz.	Black alpine sedge	1
<i>Carex phaeocephala</i> Piper	Dunhead sedge	1
<i>Carex rossii</i> Boott	Ross sedge	1
<i>Carex scirpoidea</i> Michx. var. <i>stenochlaena</i> Holm	Canadian single-spike sedge	2
<i>Carex spectabilis</i> Dewey	Showy sedge	1,2
<i>Cassiope mertensiana</i> (Bong.) G. Don var. <i>mertensiana</i>	Mertens' mountain heather	1
<i>Castilleja hispida</i> Benth. var. <i>hispida</i>	Harsh paintbrush	2
<i>Castilleja miniata</i> Dougl.	Scarlet paintbrush	2
<i>Chamaecyparis nootkatensis</i> (D. Don) Spach	Alaska cedar	2,3
<i>Chimaphila menziesii</i> (R. Br.) Spreng.	Little prince's-pine	5
<i>Chimaphila umbellata</i> (L.) Bart.	Prince's-pine	5
<i>Circaea alpina</i> L.	Enchanter's nightshade	2,4
<i>Cirsium edule</i> Nutt.	Indian thistle	1,2,3
<i>Cladothamnus pyroliflorus</i> Bong	Copper-bush	2
<i>Clintonia uniflora</i> (Schult.) Kunth.	Queen's cup	3,4
<i>Cornus canadensis</i> L.	Bunchberry dogwood	4
<i>Cornus stolonifera</i> Michx. var. <i>occidentalis</i> (T. & G.) Hitchc.	Creek dogwood	2
<i>Corallorhiza maculata</i> Raf.	Pacific coral-root	4,5
<i>Cryptogramma crista</i> (L.) R. Br.	Rock-brake	4
<i>Deschampsia elongata</i> (Hook.) Munro	Slender hairgrass	2

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Deschampsia atropurpurea</i> (Wahl.) Scheele		
var. <i>latifolia</i> (Hook.) Scribn.	Mountain hairgrass	1
<i>Dicentra formosa</i> (Andr.) Walp.	Pacific bleedingheart	4
<i>Disporum hookeri</i> (Torr.) Nicholson	Hooker fairy-bell	4
<i>Dryopteris austriaca</i> (Jacq.) Woyнар	Mountain wood-fern	2,4
<i>Elymus glaucus</i> Buckl. var. <i>breviaristatus</i> Davy	Blue wildrye	2
<i>Empetrum nigrum</i> L.	Crowberry	1
<i>Epilobium alpinum</i> L.: var. <i>lactiflorum</i> (Hausskn.) Hitchc.	Alpine willow-herb	1
var. <i>alpinum</i>		1
<i>Erigeron aureus</i> Greene	Golden fleabane	1
<i>Erigeron peregrinus</i> (Pursh) Greene		
ssp. <i>callianthemus</i> (Greene) Cronq.:	Subalpine daisy	
var. <i>angustifolius</i> (Gray) Cronq.		2
var. <i>eucallianthemus</i> Cronq.		2
var. <i>scaposus</i> (T. & G.) Cronq.		1
<i>Eriophyllum lanatum</i> (Pursh) Forbes		
var. <i>lanatum</i>	Common eriophyllum	1,2
<i>Fragaria vesca</i> L. var. <i>bracteata</i> (Heller) Davis	Woods strawberry	2
<i>Fragaria virginiana</i> Duchesne var. <i>platypetala</i> (Rydb.) Hall	Broadpetal strawberry	2
<i>Galium triflorum</i> Michx.	Sweetscented bedstraw	2,3
<i>Gaultheria ovatifolia</i> Gray	Slender wintergreen	6
<i>Gaultheria shallon</i> Pursh	Salal	5
<i>Glyceria elata</i> (Nash) Jones	Mannagrass	2
<i>Gymnocarpium dryopteris</i> (L.) Newm.	Oak-fern	2,4
<i>Habenaria dilatata</i> (Pursh) Hook. var. <i>leucostachys</i> (Lindl.) Ames	White bog-orchid	2
<i>Heracleum lanatum</i> Michx.	Cow-parsnip	2
<i>Heuchera glabra</i> Wildl.	Smooth alumroot	1

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Hieracium albiflorum</i> Hook.	White-flowered hawkweed	2
<i>Hieracium gracile</i> Hook.	Slender hawkweed	1
<i>Hypericum anagalloides</i> C. & S.	Bog St. John's-wort	2
<i>Hypopitys monotropa</i> Crantz.	Fringed pinesap	4,5
<i>Juncus ensifolius</i> Wikst. var. <i>ensifolius</i>	Dagger-leaf rush	2
<i>Juncus parryi</i> Engelm.	Parry's rush	1
<i>Juniperus communis</i> L. var. <i>montana</i> Ait.	Mountain juniper	1
<i>Lactuca muralis</i> (L.) Fresen.	Wall lettuce	4
<i>Lilium columbianum</i> Hanson	Tiger lily	2
<i>Linnaea borealis</i> L. var. <i>pectinata</i> (Pursh) Kuntze.	Twinflower	4,5
	Partridgefoot	1
<i>Luina serpentina</i> Cronq.	Colonial luina	2
<i>Lupinus latifolius</i> Agardh: var. <i>latifolius</i>	Broadleaf lupine	2
var. <i>subalpinus</i> (Piper & Robins.) Smith		1
<i>Luzula campestris</i> (L.) DC. var. <i>multiflora</i> (Ehrh.) Celak.	Field woodrush	1
<i>Luzula piperi</i> (Cov.) Jones	Piper's woodrush	1
<i>Lycopodium sitchense</i> Rupr.	Alaska clubmoss	1
<i>Menziesia ferruginea</i> Smith. var. <i>ferruginea</i>	Fool's huckleberry	3,4,5
<i>Mimulus lewisii</i> Pursh	Lewis' monkey-flower	2
<i>Mimulus moschatus</i> Dougl. var. <i>moschatus</i>	Musk-flower monkey-flower	2
<i>Mimulus tilingii</i> Regel var. <i>caespitosa</i> (Greene) Grant	Large mountain monkey-flower	2
<i>Mitella breweri</i> Gray	Brewer's mitrewort	1
<i>Montia parvifolia</i> (Moc.) Greene var. <i>parvifolia</i>	Littleleaf montia	2
<i>Montia sibirica</i> (L.) Howell var. <i>sibirica</i>	Western springbeauty	2
<i>Oplopanax horridum</i> (Smith) Mig.	Devil's club	2,4
<i>Oxyria digyna</i> (L.) Hill.	Mountain sorrel	1
<i>Pachystima myrsinites</i> (Pursh) Raf.	Mountain-box	5,6
<i>Pedicularis racemosa</i> Dougl. var. <i>racemosa</i>	Leafy lousewort	1

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Penstemon davidsonii</i> Greene var. <i>menziesii</i> (Keck) Cronq.	Davidson's penstemon	1
<i>Penstemon procerus</i> Dougl. var. <i>tolmiei</i> (Hook.) Cronq.	Tiny-bloom penstemon	1
<i>Penstemon serrulatus</i> Menzies	Coast penstemon	1
<i>Phleum alpinum</i> L.	Alpine timothy	1,3
<i>Phlox diffusa</i> Benth.	Spreading phlox	1
<i>Phyllodoce empetriformis</i> (Sw.) D. Don	Red mountain-heath	1
<i>Physocarpus capitatus</i> (Pursh) Kuntze	Pacific ninebark	2,4
<i>Pinus albicaulis</i> Engelm.	White bark pine	1
<i>Pinus contorta</i> Dougl.	Lodgepole pine	5,6
<i>Poa sandbergii</i> Vasey	Sandberg's bluegrass	1
<i>Polygonum nuttallii</i> Small	Nuttall's knotweed	1
<i>Polypodium glycyrrhiza</i> D.C. Eat.	Licorice-fern	4
<i>Polystichum munitum</i> (Kaulf.) Presl var. <i>munitum</i>	Common sword-fern	1,3-5
<i>Prenanthes alata</i> (Hook.) D. Dietr.	Western rattlesnake-root	2
<i>Prunella vulgaris</i> L.	Self-heal	2
<i>Pseudotsuga menziesii</i> (Mirbel) Franco	Douglas-fir	4,5
<i>Pteridium aquilinum</i> (L.) Kuhn.	Bracken	2,4-6
<i>Pyrola asarifolia</i> Michx	Wintergreen	4,5
<i>Pyrola secunda</i> L. var. <i>secunda</i>	One-sided wintergreen	4,5
<i>Rhododendron albiflorum</i> Hook.	White rhododendron	2,3,4
<i>Ribes bracteosum</i> Dougl.	Stink currant	2
<i>Ribes howellii</i> Greene	Mapleleaf currant	1
<i>Ribes lacustre</i> (Pers.) Poir.	Swamp gooseberry	1
<i>Romanzoffia sitchensis</i> Bong.	Sitka mistmaiden	1,2,3
<i>Rosa gymnocarpa</i> Nutt.	Baldhip rose	1,2,3
<i>Rosa nutkana</i> Presl	Nootka rose	2,4
<i>Rubus idaeus</i> L. var. <i>gracilipes</i> Jones	Red raspberry	1,3
<i>Rubus leucodermis</i> Dougl.	Black raspberry	3,4
<i>Rubus parviflorus</i> Nutt.	Thimbleberry	2,3,4
<i>Rubus pedatus</i> J.E. Smith	Fiveleaved bramble	3,4
<i>Rubus spectabilis</i> Pursh	Salmonberry	2,3,4
<i>Salix sitchensis</i> Sanson	Sitka willow	2

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Sambucus racemosa</i> L. var. <i>arborescens</i> (T. & G.) Gray	Red elderberry	2,4
<i>Saxifraga bronchialis</i> L. var. <i>austromontana</i> (Wieg.) Jones	Matted saxifrage	1
<i>Saxifraga ferruginea</i> Grah.: var. <i>ferruginea</i>	Rusty saxifrage	1,3
var. <i>macounii</i> Engl. & Irmsch.		1
<i>Sedum oreganum</i> Nutt	Oregon stonecrop	1
<i>Selaginella wallacei</i> Hieron.	Wallace's selaginella	1
<i>Senecio triangularis</i> Hook. var. <i>angustifolius</i> G.N. Jones	Arrowleaf groundsel	2
<i>Sibbaldia procumbens</i> L.	Creeping sibbaldia	1
<i>Sorbus sitchensis</i> Roemer var. <i>grayi</i> (Wenzig) Hitchc	Sitka mountain-ash	2
<i>Spiraea douglasii</i> Hook. var. <i>douglasii</i>	Douglas' spiraea	2
<i>Stellaria crispa</i> Cham. & Schlecht.	Crisped starwort	1
<i>Streptopus amplexifolius</i> (L.) DC. var. <i>americanus</i> Schult.	Clasping-leaved twisted-stalk	4
<i>Streptopus roseus</i> Michx.	Rosy twisted-stalk	4
<i>Symphoricarpos albus</i> (L.) Blake var. <i>laevigatus</i> Fern.	Common snowberry	4,5
<i>Taxus brevifolia</i> Nutt.	Western yew	4,5
<i>Tellima grandiflora</i> (Pursh) Dougl.	Fringecup	2,4
<i>Thelypteris phegopteris</i> (L.) Slosson	Beechfern	2
<i>Thuja plicata</i> Donn.	Western redcedar	3,4,5
<i>Tiarella trifoliata</i> L. var. <i>unifoliata</i> (Hook.) Kurtz.	Coolwort foamflower	2,3,4
<i>Tofieldia glutinosa</i> (Michx.) Pers. var. <i>brevistyla</i> (Hitchc.) Hitchc.	Sticky tofieldia	2,4
<i>Tolmiea menziesii</i> (Pursh) T. & G.	Youth-on-age	2
<i>Trillium ovatum</i> Pursh	White trillium	4
<i>Trisetum cernuum</i> Trin.	Nodding trisetum	2
<i>Trisetum spicatum</i> (L.) Richter	Spike trisetum	1
<i>Tsuga heterophylla</i> (Raf.) Sarg.	Western hemlock	4,5

See footnotes at end of table.



Table 3—Vascular plants in the Stetattle Creek Research Natural Area (continued)

Scientific name <sup>a</sup>	Common name	Community type <sup>b</sup>
<i>Tsuga mertensiana</i> (Bong.) Carr.	Mountain hemlock	3,4
<i>Urtica dioica</i> L.		
ssp. <i>gracilis</i> (Ait.) Seland		
var. <i>lyallii</i> (Wats.) Hitchc.	Lyall nettle	2
<i>Vaccinium alaskaense</i> Howell	Alaska blueberry	4,5
<i>Vaccinium deliciosum</i> Piper	Blue-leaf huckleberry	1
<i>Vaccinium membranaceum</i> Dougl.	Thin-leaved blueberry	3,4
<i>Vaccinium ovalifolium</i> Smith	Early blueberry	2,3,4
<i>Vaccinium parvifolium</i> Smith	Red blueberry	4,5,6
<i>Valeriana sitchensis</i> Bong	Mountain heliotrope	1,2,3
<i>Veratrum viride</i> Ait.	American false hellebore	2,3,4
<i>Viola</i> L. spp.	Violet	1

<sup>a</sup> Species nomenclature from Hitchcock and Cronquist (1973).

<sup>b</sup> Community type adapted from Wagstaff and Taylor (1980):

1 = cliff/ talus/ scree/ meadow; 2 = heterogeneous shrub; 3 = mountain hemlock/subalpine fir;

4 = silver fir/western hemlock; 5 = Douglas-fir; 6 = lodgepole pine.

Sources: Douglas and Ballard 1971, Wagstaff and Taylor 1980.

Table 4—Partial list of mosses and lichens in Stetattle Creek Research Natural Area

Mosses	Lichens
<i>Bryum creberrimum</i>	<i>Cetraria islandica</i>
<i>Bryum sandbergii</i>	<i>Cladonia bellidiflora</i>
<i>Dicranum fuscescens</i>	<i>Cladonia chlorophaea</i>
<i>Dicranum</i> spp.	<i>Cladonia mitis</i>
<i>Lescurea radicata</i>	<i>Cladonia subsquamosa</i>
<i>Pohlia nutans</i>	<i>Lecidea granulosa</i>
<i>Pohlia</i> spp.	<i>Peltigera</i> spp.
<i>Polytrichadelphus lyallii</i>	<i>Peltigera canina</i> var. <i>spuria</i> f. <i>sorediata</i>
<i>Polytrichum juniperinum</i>	<i>Stereocaulon</i> spp.
<i>Polytrichum piliferum</i>	<i>Stereocaulon alpinum</i>
<i>Ptilidium californicum</i>	
<i>Rhacomitrium sudeticum</i>	
<i>Rhacomitrium canescens</i>	
var. <i>ericoides</i>	

Source: Douglas and Ballard (1971).



**Table 5—Tentative list of forested plant associations in Stetattle Creek Research Natural Area**

Series	Associations
<i>Pseudotsuga menziesii</i>	<i>Arctostaphylos uva-ursi</i> <i>Pachistima myrsinites</i> <i>Vaccinium</i> spp. <i>Berberis nervosa</i> - <i>Gaultheria shallon</i>
<i>Abies lasiocarpa</i>	<i>Pachistima myrsinites</i> <i>Vaccinium</i> spp. <i>Phyllodoce empetriformis</i>
<i>Abies lasiocarpa</i> - <i>Pinus albicaulis</i>	<i>Vaccinium</i> spp.
<i>Tsuga mertensiana</i>	<i>Vaccinium membranaceum</i> <i>Rhododendron albiflorum</i> <i>Vaccinium alaskaense</i> <i>Menziesia ferruginea</i> <i>Phyllodoce empetriformis</i> - <i>Vaccinium deliciosum</i>
<i>Abies amabilis</i>	<i>Oplopanax horridum</i> <i>Vaccinium membranaceum</i> <i>Vaccinium membranaceum</i> - <i>Pachistima myrsinites</i> <i>Vaccinium alaskaense</i> <i>Rhododendron albiflorum</i> <i>Menziesia ferruginea</i> <i>Rubus lasiococcus</i>
<i>Tsuga heterophylla</i>	<i>Gaultheria shallon</i> <i>Berberis nervosa</i> <i>Pachistima myrsinites</i> <i>Vaccinium</i> spp. <i>Acer circinatum</i> <i>Polystichum munitum</i> <i>Oplopanax horridum</i>
<i>Tsuga heterophylla</i> - <i>Thuja plicata</i>	<i>Pachistima myrsinites</i> - <i>Berberis nervosa</i>

Source: Data are selected from Agee and others (1985).



Table 6—Alpine and high subalpine plant communities likely to be found in the Stetattle Creek Research Natural Area

Plant community	Elevation range	Aspect	Number of species
--- Meters ---			
<i>Carex spectabilis</i>	1750-2175	South	61
<i>Saxifraga tolmiei-Luzula piperi</i>	1750-2100	South	18
<i>Carex nigricans</i>	1750-2100	All	28
<i>Empetrum nigrum</i>	1750-2100	Southwest	61
<i>Lupinus latifolius</i>	1750-2150	South	56
<i>Cassiope mertensiana</i>	1750-2150	South	56
<i>Carex phaeocephala</i>	1850-2400	All	101
<i>Phyllodoce empetriformis</i>	1750-2150	All	56
<i>Phyllodoce glanduliflora</i>	1800-2400	All	82
<i>Arctostaphylos uva-ursi</i>	1750-2250	South	61
<i>Salix nivalis</i>	1900-2400	South	82
<i>Salix canadensis</i>	1900-2400	All	79

Source: Douglas and Ballard (1977).



**Table 7—Tentative list of mammals using the Stetattle Creek Research Natural Area as residents or transients**

Order	Scientific name	Common name
Insectivora	<i>Neurotrichus gibbsi</i>	Shrew-mole
	<i>Scapanus orarius</i>	Coast mole
	<i>Sorex bendirei</i>	Pacific water shrew
	<i>Sorex cinereus</i>	Masked shrew
	<i>Sorex palustris</i>	Water shrew
	<i>Sorex trowbridgei</i>	Trowbridge's shrew
	<i>Sorex vagrans</i>	Vagrant shrew
Chiroptera	<i>Eptesicus fuscus</i>	Big brown bat
	<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 lucifugus</i>	Little brown myotis
	<i>Myotis yumanensis</i>	Yuma myotis
Lagomorpha	<i>Lepus americanus</i>	Snowshoe rabbit
	<i>Ochotona princeps</i>	Pika
Rodentia	<i>Aplodontia rufa</i>	Mountain beaver
	<i>Clethrionomys gapperi</i>	Gapper's red-backed mouse
	<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 caligata</i>	Hoary marmot
	<i>Microtus longicaudus</i>	Long-tailed vole
	<i>Microtus oregoni</i>	Creeping vole
	<i>Microtus richardsoni</i>	Water vole
	<i>Neotoma cinerea</i>	Bushy-tailed wood rat
	<i>Ondatra zibethica</i>	Muskrat
	<i>Peromyscus maniculatus</i>	Deer mouse
	<i>Phenacomys intermedius</i>	Heather vole
	<i>Spermophilus saturatus</i>	Cascade golden-mantled ground squirrel
	<i>Synaptomys borealis</i>	Northern bog lemming
	<i>Tamiasciurus douglasi</i>	Douglas squirrel
<i>Tamiasciurus hudsonicus</i>	Red squirrel	
<i>Zapus trinotatus</i>	Pacific jumping mouse	



**Table 7—Tentative list of mammals using the Stetattle Creek Research Natural Area as residents or transients (continued)**

Order	Scientific name	Common name
Carnivora	<i>Canis latrans</i>	Coyote
	<i>Felis concolor</i>	Mountain lion
	<i>Gulo luscus</i>	Wolverine
	<i>Lynx canadensis</i>	Lynx
	<i>Lynx rufus</i>	Bobcat
	<i>Martes americana</i>	Marten
	<i>Martes pennanti</i>	Fisher
	<i>Mephitis mephitis</i>	Striped skunk
	<i>Mustela erminea</i>	Ermine
	<i>Mustela frenata</i>	Long-tailed weasel
	<i>Mustela vison</i>	Mink
	<i>Procyon lotor</i>	Raccoon
	<i>Ursus americanus</i>	Black bear
Artiodactyla	<i>Vulpes fulva</i>	Red fox
	<i>Cervus elaphus</i>	Elk
	<i>Odocoileus hemionus</i>	Mule deer
	<i>Odocoileus hemionus columbianus</i>	Black-tailed deer
	<i>Oreamnos americanus</i>	Mountain goat

Source: Data adapted from Wiberg and McKee (1978) and Zobel and Wasem (1979)



Table 8—Tentative list of birds using the Stetattle Creek Research Natural Area

Scientific name	Common name
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Accipiter gentilis</i>	Northern goshawk
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Actitis macularia</i>	Spotted sandpiper
<i>Aegolius acadicus</i>	Northern saw-whet owl
<i>Anthus spinoletta</i>	Water pipit
<i>Aquila chrysaetos</i>	Golden eagle
<i>Ardea herodias</i>	Great blue heron
<i>Asio otus</i>	Long-eared owl
<i>Bombycilla cedrorum</i>	Cedar waxwing
<i>Bombycilla garrula</i>	Bohemian waxwing
<i>Bonasa umbellus</i>	Ruffed grouse
<i>Bubo virginianus</i>	Great horned owl
<i>Buteo lagopus</i>	Rough-legged hawk
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Carpodacus purpureus</i>	Purple finch
<i>Certhia familiaris</i>	Brown creeper
<i>Chaetura vauxi</i>	Vaux's swift
<i>Chordeiles minor</i>	Common nighthawk
<i>Cinclus mexicanus</i>	American dipper
<i>Circus cyaneus</i>	Northern harrier
<i>Colaptes auratus</i>	Yellow-shafted flicker
<i>Columba fasciata</i>	Band-tailed pigeon
<i>Contopus borealis</i>	Olive-sided flycatcher
<i>Contopus sordidulus</i>	Western wood peewee
<i>Corvus brachyrhynchos</i>	American crow
<i>Corvus corax</i>	Common raven
<i>Cyanocitta stelleri</i>	Steller's jay
<i>Cypseloides niger</i>	Black swift
<i>Dendragapus obscurus</i>	Blue grouse
<i>Dendroica coronata</i>	Myrtle warbler
<i>Dendroica nigrescens</i>	Black-throated gray warbler
<i>Dendroica petechia</i>	Yellow warbler
<i>Dendroica townsendi</i>	Townsend's warbler
<i>Dryocopus pileatus</i>	Pileated woodpecker
<i>Dumetella carolinensis</i>	Catbird
<i>Empidonax difficilis</i>	Western flycatcher
<i>Empidonax hammondii</i>	Hammond's flycatcher



Table 8—Tentative list of birds using the Stetattle Creek Research Natural Area (continued)

Scientific name	Common name
<i>Empidonax oberholseri</i>	Dusky flycatcher
<i>Empidonax traillii</i>	Trail's flycatcher
<i>Falco columbarius</i>	Merlin
<i>Falco peregrinus</i>	Peregrine falcon
<i>Falco sparverius</i>	American kestrel
<i>Glaucidium gnoma</i>	Pygmy owl
<i>Haliaeetus leucocephalus</i>	Bald eagle
<i>Hesperiphona vespertina</i>	Evening grosbeak
<i>Hylocichla guttata</i>	Hermit thrush
<i>Hylocichla ustulata</i>	Swainson's thrush
<i>Ixoreus naevius</i>	Varied thrush
<i>Junco hyemalis</i>	Dark-eyed junco
<i>Lagopus leucurus</i>	White-tailed ptarmigan
<i>Leucosticte tephrocotis</i>	Gray-crowned rosy finch
<i>Loxia curvirostra</i>	Red crossbill
<i>Loxia leucoptera</i>	White-winged crossbill
<i>Melospiza melodia</i>	Song sparrow
<i>Melospiza lincolni</i>	Lincoln's sparrow
<i>Mergus merganser</i>	Common merganser
<i>Myadestes townsendi</i>	Townsend's solitaire
<i>Nucifraga columbiana</i>	Clark's nutcracker
<i>Oporornis tolmiei</i>	MacGillivray's warbler
<i>Otus asio</i>	Screech owl
<i>Parus atricapillus</i>	Black-capped chickadee
<i>Parus gambeli</i>	Mountain chickadee
<i>Parus rufescens</i>	Chestnut-backed chickadee
<i>Passerculus sandwichensis</i>	Savannah sparrow
<i>Passerella iliaca</i>	Fox sparrow
<i>Passerina amoena</i>	Lazuli bunting
<i>Perisoreus canadensis</i>	Gray jay
<i>Petrochelidon pyrrhonata</i>	Cliff swallow
<i>Pheucticus melanocephalus</i>	Black-headed grosbeak
<i>Picoides pubescens</i>	Downy woodpecker
<i>Picoides tridactylus</i>	Three-toed woodpecker
<i>Picoides villosus</i>	Hairy woodpecker
<i>Pinicola enucleator</i>	Pine grosbeak
<i>Pipilo erythrophthalmus</i>	Rufous-sided towhee
<i>Piranga ludoviciana</i>	Western tanager



**Table 8—Tentative list of birds using the Stetattle Creek Research Natural Area (continued)**

Scientific name	Common name
<i>Regulus calendula</i>	Ruby-crowned kinglet
<i>Regulus satrapa</i>	Golden-crowned kinglet
<i>Selasphorus rufus</i>	Rufous hummingbird
<i>Sialia currucoides</i>	Mountain bluebird
<i>Sitta canadensis</i>	Red-breasted nuthatch
<i>Sphyrapicus varius</i>	Red-breasted sapsucker
<i>Spinus pinus</i>	Pine siskin
<i>Spizella passerina</i>	Chipping sparrow
<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow
<i>Stellula calliope</i>	Calliope hummingbird
<i>Strix occidentalis</i>	Spotted owl
<i>Strix varia</i>	Barred owl
<i>Tachycineta bicolor</i>	Tree swallow
<i>Tachycineta thalassina</i>	Violet-green swallow
<i>Thryomanes bewickii</i>	Bewick's wren
<i>Troglodytes troglodytes</i>	Winter wren
<i>Turdus migratorius</i>	American robin
<i>Tyrannus verticalis</i>	Western kingbird
<i>Vermivora celata</i>	Orange-crowned warbler
<i>Vermivora ruficapilla</i>	Nashville warbler
<i>Vireo gilvus</i>	Warbling vireo
<i>Vireo olivaceus</i>	Red-eyed vireo
<i>Vireo solitarius</i>	Solitary vireo
<i>Wilsonia pusilla</i>	Wilson's warbler
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow
<i>Zonotrichia leucophrys</i>	White-crowned sparrow

Source: Data adapted from Wiberg and McKee (1978) and Zobel and Wasem (1979).



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