UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

ESTABLISHMENT RECORD
FOR
PERRY CREEK RESEARCH NATURAL AREA
WITHIN MT. BAKER-SNOQUALMIE NATIONAL FOREST
SNOHOMISH COUNTY, WASHINGTON

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FOR

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Perry Creek Research Natural Area

Mt. Baker Snoqualmie National Forest

Snohomish County, Washington

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation and FSM 4063.41 5.e(3) in arriving at this recommendation.

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Establishment Record for

Perry Creek Research Natural Area

within Mt. Baker-Snoqualmie National Forest,

Snohomish County, Washington.

PREFACE

This establishment report is based largely on an original draft completed in December 1992 by

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The original report was completed under contract #40-05M6-2-0853 for the Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, WA. It is referred to in this document as Rolph and Agee (1992).

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ESTABLISHMENT RECORD FOR PERRY CREEK RESEARCH NATURAL AREA WITHIN MT. BAKER-SNOQUALMIE NATIONAL FOREST, SNOHOMISH COUNTY, WASHINGTON

INTRODUCTION

Perry Creek Research Natural Area (RNA) is located within a tributary drainage basin of the South Fork Stillaguamish River in central Snohomish County, Washington. The Stillaguamish River flows from the western flanks of the northern Cascade Mountain Range through lowland farming regions ending in Puget Sound. Perry Creek drains a particularly rugged high mountain area approximately 17 miles (27.4 km) west of the Cascade Crest. The extreme vertical relief of the Perry Creek basin has created a unique valley bottom habitat with a rich assemblage of uncommon and rare fern species. Perry Creek RNA encompasses most of the Perry Creek drainage basin, creating not only an opportunity for protecting the unique vegetation but also allowing for extensive scientific research and education possibilities.

Perry Creek RNA and surrounding lands are owned by the federal government and managed by the United States Department of Agriculture (USDA) Forest Service. Although mineral extraction and timber harvesting occur on National Forest and private lands nearby, recreation is currently the predominant land use activity in this area. Perry Creek RNA is located along the scenic Mountain Loop highway, a popular area for fishing, swimming, hiking, camping, and whitewater kayaking.

Land Management Planning

Recognition of the rich flora found within the Perry Creek basin has existed for many years and the results of periodic scientific field trips to the area have led to the area being proposed for RNA status. Botanical exploration of the Perry Creek basin began in the 1930's when a Seattle school teacher, John W. Thompson, became aware of the unique vegetation and collected numerous herbarium specimens. These initial collections whetted the curiosity of later scientists and naturalists who have periodically returned to the area (Kruckeberg 1976). Warren H. Wagner, Jr. and Arthur R. Kruckeberg visited Perry Creek in 1963 and discovered a new hybrid fern species, *Polystichum andersonii* X *P. munitum* (Wagner 1973). Wagner and T.M.C. Taylor then led a field trip to the area in 1969 during the Twelfth International Botanical Congress, exposing the site to other pteridologists (Kruckeberg 1976). Field trips to Perry Creek are now commonly led by many local botanical groups including the Washington Native Plant Society.

As the Perry Creek basin became more widely known as a botanically rich site, encouragement for its inclusion in the RNA network increased. In 1975, Dyrness et al. (1975) completed a report outlining RNA needs within the Pacific Northwest. Areas were recommended for RNA designation based on their feasibility and capacity to extend the coverage of the existing Western Cascade Province RNA network (11 RNA's) to include all 57 identified terrestrial, aquatic, and rare and endangered cells within the region. Perry Creek was listed as a high priority for RNA status to protect "a unique assemblage of rare fern species" (Dyrness et al. 1975). In his eloquent description of the Perry Creek "fernery" Kruckeberg (1976) called for its preservation as either a Botanical Area or a RNA, noting the close proximity and threat to the fern habitat of a late 1950's clearcut. The Timber Management Plan of 1963 has guided prior management of the Perry Creek basin. In this plan, significant acreage on the lower valley slopes adjacent to the Perry Creek falls were designated as timber management zones. In 1990, the preferred alternative in the Mt. Baker-Snoqualmie National Forest Management Plan proposes that 2066 acres (836 HA) be designated as the Perry Creek RNA (USDA 1990). Most recently, the proposed RNA has been included as part of Independence Late Successional Reserve (LSR), one of 53 reserves established in the April 13, 1994 Record of Decision (USDA,USDI 1994). The LSR system is expected to assist in maintaining a functional and interactive late-successional and old-growth forest ecosystem.

OBJECTIVES

The primary objective for establishment of Perry Creek RNA is to preserve and maintain a mosaic of forest, valley bottom, aquatic, and subalpine communities, including all native species and habitat components, in a condition reflecting as little human disturbance as possible. Spanning a wide elevation gradient, the proposed RNA contains a broad representation of habitats found along the western flanks of the Cascade Mountains. Of particular importance is the inclusion of extensive hardwood and talus vegetation communities found along the lower slopes and valley bottom areas within the Perry Creek drainage. The extent of such communities is unique within the Puget Sound basin. Moreover, these moist habitats contain a unique and rich assemblage of fern species, including several species recognized as sensitive or rare. RNA designation would provide legal protection of Perry Creek's biota while providing for educational use and scientific research opportunities (including long-term research) in topics such as vegetation dynamics, disturbance processes, microhabitat analysis, watershed management, landscape heterogeneity, and baseline monitoring.

JUSTIFICATION

The vegetation found within the Perry Creek RNA is quite distinctive when compared to other valley areas found along the western slopes of the Washington Cascades. In general, such valley bottom vegetation is highly predictable. The vegetation communities and particularly the diversity and richness of fern species in Perry Creek RNA are unique (Kruckeberg 1976). At least 31 different ferns and fern allies have been identified here (Table 1). The site is well known and considered exceptional amongst pteridologists.

In their analysis of the RNA network within the Pacific Northwest, Dyrness et al. (1975) list the addition of Perry Creek as a high priority. The presence of several rare fern species was identified as the justification for this recommendation. In addition, representation within RNAs of terrestrial vegetation cells containing mountain hemlock (*Tsuga mertensiana*) and Pacific silver fir (*Abies amabilis*) growing together in the same stands, Alaska-cedar (*Chamaecyparis nootkatensis*) in a subalpine forest, and heather (*Phyllodoce* spp.)/huckleberry (*Vaccinium* spp.) communities were found to be lacking within the northern portions of western Washington. Perry Creek RNA contains each of these vegetation types and therefore broadens the RNA network's coverage of terrestrial biological diversity within the region which is one of the objectives of the RNA system.

Besides its value as a botanical haven, the Perry Creek RNA would preserve suitable habitat for a wide range of wildlife including Threatened, Endangered, and Sensitive species (Tables 1,6,7,8). A diversity of habitats in a natural state may support current or future populations of the northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), grizzly bear (*Ursus arctos*), gray wolf (*Canus lupus*), tailed frog (*Ascaphus truei*), Cascades frog (*Rana cascadae*), anadromous fish species, and numerous other wildlife species.

PRINCIPAL DISTINGUISHING FEATURES

Although vascular plants within Perry Creek have been studied fairly extensively no formal inventory of other biological resources has been completed. Principal distinguishing features of Perry Creek RNA known at this time include the following:

1. A diverse and rich assemblage of fern species. In comparison to other valley areas along the western Cascade slopes, Perry Creek RNA harbors a unique assemblage of ferns and fern allies (Kruckeberg 1976, Table 1). Six of these fern species are currently considered rare, and are on the Regional Forester's Sensitive species list (Table 1).

2. A diverse and rich assemblage of cryptogams including the moss *Dendroalsia abietina*, which is unusual in Washington state. While most of the rare plants in the Stilliguamish drainage are more

common in British Columbia or Alaska, this moss is common in southwestern Oregon where it grows on canyon live oak (D. Wagner, personal communication).

3. Wildlife species regionally listed as Sensitive, Threatened or Endangered (State or Federal) may occur within the RNA (Tables 6,7,8) due to the proximity of several wilderness areas and the diversity of habitats remaining in a natural condition. Suitable habitat for many of these rare species is known to exist within the RNA although the presence of the species themselves has not been confirmed. The RNA has not yet been inventoried for these species.

4. Spotted owls and marbled murrelets have been found nesting adjacent to the RNA (Charles Vandemoer, personal communication). These birds in all likelihood utilize the forests of the RNA for foraging or as part of their home range. The RNA itself has not yet been inventoried for these species.

5. Presence of large old growth forest stands. Old growth Douglas-fir (*Pseudotsuga menziesii*)/western hemlock (*Tsuga heterophylla*), Pacific silver fir/western hemlock, and mountain hemlock forests can all be found within Perry Creek RNA . Significant portions of these forests are considered suitable habitat for the federally threatened northern spotted owl and marbled murrelet (USDA 1992).

6. Presence of seral hardwood and herbaceous communities. The extent of these seral communities in the valley bottom is uncommon (Kruckeberg 1976), being maintained in such a state through dynamic disturbance processes, principally snow avalanches. These communities contain a rich diversity of plant and animal species.

7. Presence of Alaska-cedar growing together with bigleaf maple (*Acer macrophyllum*) in valley bottom hardwood communities. Alaska cedar is particularly resistant to mechanical damage from snowfall, avalanches, and rockfall and often dominates in areas affected by these disturbances. The existence of Alaska cedar within hardwood communities composed of bigleaf maple is, however, quite uncommon.

8. Inclusion of almost the entire Perry Creek drainage basin, including over 3 miles of a free flowing class II stream and its associated tributaries in a largely natural, undisturbed condition.

9. Inclusion of several other aquatic types, including small subalpine ponds, wetlands, and waterfalls.

10. Presence of mountain goat (*Oreamnos americanus*) habitat. Mountain goats are considered by the U.S. Forest Service as an indicator species for big game winter range. Areas within Perry Creek RNA are considered suitable mountain goat habitat (USDA 1990).

11. Inclusion of particularly steep valley walls and cliffs which besides being visually spectacular are a cause of the unique microclimate (Kruckeberg 1976) and dynamic disturbance processes (debris flows, avalanches, rockfall) that are found within Perry Creek RNA.

LOCATION

Latitude and Longitude

The center of Perry Creek RNA is at a latitude of 48° 04' 30'' north and a longitude of 121° 28' 00'' west, located on the Darrington Ranger District of Mt. Baker-Snoqualmie National Forest.

Boundary

The legal boundary description for Perry Creek Research Natural Area has been officially prepared by the Forest Land Surveyor for the Mt. Baker-Snoqualmie National Forest (Table 2).

Area

The total area included within the Perry Creek RNA is 2328 acres (943 ha). The discrepancy in area between the 1990 Forest Plan (2066 acres, 836 ha, USDA 1990) and the preceding figure is the result of boundary modifications occurring as an accurate formal boundary is being delineated along the basin's watershed.

Elevation

Elevations range from 1900 ft (585 m) in the valley bottom adjacent to the Perry Creek trailhead, to 5836 ft (1779 m) at the summit of Twin Peaks, for an elevational difference within the RNA of 3936 ft (1212 m).

Access

Perry Creek RNA is approximately 23 miles (37 km) east of Granite Falls, Washington (Figure 1). From Interstate Route 5 near Everett, Washington, proceed 6 miles (9.7 km) east on U.S. Route 2 to the junction with State Route 9. Follow State Route 9 nine miles (14.5 km) north and then proceed east on State Route 92 to Granite Falls. Stay on State Route 92 through Granite Falls and continue 23 miles (37 km) east to the Perry Creek turnoff on Forest Road 4063, a gravel road (Figure 2). The Perry Creek trailhead is located at the end of FR 4063, 1 mile (1.6 km) from State Route 92. Assuming typical weather conditions, the trailhead is not accessible year round by automobile as the road may be snowed in from December until May. State route 92 is plowed up to Deer Creek, approximately 3 miles (4.8 km) west of the Perry Creek turnoff. Access to the trailhead during these months is by snow machine, ski, or snowshoe. Less direct, alternate routes may also be used to access the RNA.

Maps

Several different maps at a variety of scales are available with coverage of the Perry Creek area. The Washington State highway map (Figure 1) and the Mt. Baker-Snoqualmie National Forest Map (Figure 2) show the above access route to Perry Creek RNA. A more detailed coverage of the Perry Creek area is given in the Washington Atlas and Gazetteer (DeLorme Mapping 1988) including trails, contour lines, forest roads, and recreational sites at a scale of 1:150,000. For an accurate representation of the local landforms and trail locations, maps produced by Green Trails (Bellevue, Washington) and the United States Geological Survey are superior. Perry Creek RNA is found on Green Trails Map No. 111 (Sloan Peak) at a scale of 1:69,500, and the USGS Bedal Peak quadrangle at a scale of 1:24,000 (Figure 3)

AREA BY VEGETATION COVER TYPES

Vegetation in the Perry Creek RNA has been classified and mapped using three different approaches. These approaches (Figures 4,5,6) and some other commonly used vegetation classifications are listed by unit area in Table 3.

The preliminary vegetation map for the Perry Creek RNA was created (Rolph and Agee 1992) using aerial photographs (at a scale of 1:15,840 and 1:12,000) with limited field verification (Figure 4). Classification of vegetation polygons considered overstory vegetation and followed the cover type scheme used by Agee and Kertis (1986). This cover type classification considered all vegetation types (forested and non-forested) and the vegetation mapped by Agee and Kertis (1986) in the North Cascades was similar in composition to that found in Perry Creek.

Another way to describe vegetation is through a classification based on potential vegetation using the plant association as the basic unit (Henderson et al. 1992). Potential vegetation is the projected climax plant community that will occupy a site, given current climate and site conditions. There is no map for the plant associations of the Perry Creek drainage at this time but a map of plant association groups has been created from a model (Figure 5). The Plant Association Group (PAG) model groups plant associations which have similar floristic characteristics. The model was developed by the USFS Area Ecologist mainly

from moisture and temperature characteristics associated with climate and topography. In areas where topography is not strongly expressed, the PAG model may be off by one moisture class. The results have been field checked and show a high degree of accuracy, but care must be used in interpreting a single point on the ground since the model interprets broad vegetative patterns across the landscape and may be misleading at the microsite scale. The plant associations in each PAG are described in the Field Guide to the Forested Plant Associations of the Mt. Baker-Snoqualmie National Forest (Henderson et al. 1992).

A field reconnaissance of Perry Creek RNA was conducted under the direction of the Forest Botanist during the summer of 1993 (Potash, personal communication). The purpose of the survey was to document existing dominant vegetation and to create a comprehensive species list of known vascular plants. Polygons were delineated according to dominant vegetation type within each area (Figure 6).

Descriptions of each mapped vegetation cover type (Figure 4) following Agee and Kertis (1986), and how they relate to some other commonly used cover type classifications are as follows:

Western hemlock - These forests occur in the lower elevations of Perry Creek. Large western hemlock and Douglas-fir dominate the basal area of stands with western redder (*Thuja plicata*) being of secondary importance (Photo 1). Without disturbance, forests of this type would over time become dominated by western hemlock with western redcedar remaining as a less frequent member of the stand. Naturally occurring fires have created the forests we now see with large overstory Douglas-fir trees. This cover type corresponds with SAF type 230-Douglas-fir/western hemlock (Eyre 1980), 2-Cedar/hemlock/Douglas-fir of Kuchler (1964), and the *Tsuga heterophylla* Zone of Franklin and Dyrness (1988).

Pacific silver fir - Pacific silver fir forests are found at mid-elevations (3000-4500 ft, 914-1372 m) in between the western hemlock and mountain hemlock cover types. Pacific silver fir consistently has the highest basal area within these stands. Other important species are Douglas-fir, western hemlock, and western redcedar at lower elevations, particularly in recently disturbed areas, and mountain hemlock at higher elevations (Photo 2). Alaska-cedar is frequently found within the Pacific silver fir cover type within Perry Creek, being most common in boulder fields or areas affected by snow avalanches where it may become the dominant species (Photo 3). The Pacific silver fir cover type corresponds with SAF type 226-Coastal true fir/hemlock (Eyre 1980), 3-Silver fir/Douglas-fir of Kuchler (1964), and the Abies amabilis Zone of Franklin and Dyrness (1988).

Mountain hemlock - The mountain hemlock cover type is found in the highest forest zones of Perry Creek (elev. 4500-5200 ft, 1372-1585 m). Here, basal area is dominated by mountain hemlock with Pacific silver fir and Alaska-cedar being less common (Photo 4). Corresponding cover types are; SAF 205-Mountain hemlock (Eyre 1980), 4-Fir/hemlock of Kuchler (1964), and the *Tsuga mertensiana* Zone of Franklin and Dyrness (1988).

Hardwood - Hardwood forests are relatively abundant in the lower valley bottom areas of Perry Creek. Bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*) are the principal tree species found growing with several small tree and shrub species including vine maple (*Acer circinatum*), Rocky Mountain maple (*Acer glabrum*), creek dogwood (*Cornus stolonifera*), and red elderberry (*Sambucus racemosa*). These communities exist in boulder fields, talus, and the creek bottom where disturbances have prevented the establishment of conifers (Photos 5,6). The hardwood cover type corresponds with SAF 221-Red alder (Eyre 1980) and none of the Kuchler (1964) types. Franklin and Dyrness (1988) recognize these talus communities as a special type within the *Tsuga heterophylla* Zone.

High shrub - High shrub communities are found throughout the Perry Creek basin mostly between 3000-5000 ft (914-1524 m). Species composition includes; Sitka alder (*Alnus sinuata*), vine maple, creek dogwood, thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), lady-fern (*Athyrium filix-femina*), and bracken fern (*Pteridium aquilinum*). These areas are

frequently disturbed by snow avalanches and rockfall (Photo 7). Franklin and Dyrness (1988) describe this vegetation as *Alnus sinuata* communities, a special type within the *Abies amabilis* Zone. There is no corresponding SAF (Eyre 1980) or Kuchler (1964) cover types.

Subalpine herb - This high elevation type is predominantly composed of various herbaceous species, red mountain-heather (*Phyllodoce empetriformis*), and *Vaccinium* spp.. Franklin and Dyrness (1988) classify this cover type as timberline and alpine vegetation while Kuchler (1964) uses alpine meadows and barren. There is no corresponding SAF (Eyre 1980) cover type.

Young - Young forests (here used to describe coniferous forests in early stages of stand development where tree canopies still maintain a predominantly single layered canopy) are found where recent disturbance has perpetuated a young condition or destroyed older coniferous forests. Most young forests within the Perry Creek basin are the result of snow avalanches with fire being a less frequent disturbance agent. Young stands are delineated on the vegetation map; however, their area is added to the cover of the probable late seral forest type of the site for area by cover type calculations (Table 3).

Rock - The rock cover type includes boulder fields and talus at all elevations.

Eighteen different Plant Association Groups are recognized within the RNA (Figure 5). Brief descriptions of the 6 most common Plant Association Groups follow. Refer to Henderson et al. (1992) for complete descriptions of each Plant Association that occurs within these groups.

Mesic Mountain Hemlock Big Huckleberry (*Tsuga mertensiana/Vaccinium membranaceum*) is the most common Plant Association Group in the RNA, accounting for almost 1/3 of the area. This PAG is indicated for the upper elevations throughout the RNA, just below the parkland. Plant associations in this group are characterized by cold, moderately dry to mesic sites with shallow, well drained soils and low timber productivity.

Dry Mountain Hemlock Big Huckleberry (*Tsuga mertensiana/Vaccinium membranaceum*) covers about 14% of the area, primarily on the southerly aspects at the upper elevations. This PAG is similar to the one above except that these areas tend to be colder and drier and therefore may include some species more tolerant of these conditions such as subalpine fir (*Abies lasiocarpa*).

Moist Silver Fir Alaska Huckleberry (*Abies amabilis/Vaccinium alaskense*) is the most common PAG on the Mt. Baker-Snoqualmie National Forest . This PAG comprises about 15% of the RNA and is mapped for the central part of the the valley bottom. This PAG occurs on cool, moist, often subirrigated sites where silver fir and western hemlock dominate the late successional stage.

Dry Silver Fir Alaska Huckleberry (*Abies amabilis/Vaccinium alaskense*) accounts for about 13% of the RNA and forms a band above the Silver Fir Moist Alaska Huckleberry. It is similar to the latter but generally includes some species more tolerant of drier sites, e.g. Douglas fir (*Pseudotsuga menziesii*) or Oregongrape (*Berberis nervosa*).

Parkland accounts for about 10% of the RNA, and occurs at the highest elevations, especially around the major peaks that occur along the RNA boundary. This PAG is defined as a mosaic of subalpine forest patches and meadows.

Moist Mountain Hemlock Alaska Huckleberry (*Tsuga mertensiana/Vaccinium alaskense*) accounts for about 8% of the RNA. This PAG is scattered at upper elevation in the RNA, more often on northerly aspects. It occurs on cold, moderately dry to wet sites with relatively deep, moist to wet soils.

Field surveys were conducted (by Potash and crews in 1993) to compile a species list and document exisiting dominant vegetation. Information was grouped into 36 different community types, which were then grouped into 14 broader categories (Figure 6). A complete list of the vascular plant species known to occur in each polygon is in the analysis file for this project. A brief description of the existing dominant vegetation follows.

1. Western Hemlock Forests with cliffs. These areas are dominated by *Tsuga heterophylla* forest, primarily old-growth stands. Some of the stands have *Thuja plicata* and/or *Pseudotsuga menziesii* . The understory indicator species are *Vaccinium alaskaense* and/or *Polystichum munitum*. Many areas of vertical cliffs. This type comprises about 1/5 ofthe RNA.

2. Silver Fir Forest with Alaska Yellow Cedar. These stands may be dominated by either *Abies amabilis*, *Chamaecyparis nootkatensis*, or *Tsuga heterophylla*; they are classified as silver fir zone in accordance with the plant association keys by Henderson et al. (1992).

3. Mountain Hemlock Forest. Large diameter mixed confier forest dominated by *Tsuga mertensiana*, *Abies amabilis*, and *Chamaecyparis nootkatensis* . The understory is comprised of *Vaccinium membranaceum* and *Menziesia ferruginea* in the forested areas, interspersed with *Phyllodoce empetriformis* meadows with some *Abies lasiocarpa* patches.

4. Subalpine Fir Forest. A small stand of *Abies lasiocarpa*.

5. Red Alder Woodland. Primarily lower elevation riparian areas dominated by *Alnus rubra*.

6. Maple Woodland. These deciduous woodlands interfinger with the red alder woodlands but grade up to higher elevations. The maples grow well on the boulder fields here. The dominant species are *Acer macrophyllum* and/or *Acer circinatum*, sometimes with *Alnus sinuata* and *Cornus stolonifera* in wetter sites. There are also pockets of open meadows dominated by *Athyrium filix-femina* and *Aruncus sylvester*.

7. Sitka Alder / Mountain Ash Shrubland. This is the dominant riparian vegetation in the upper part of the valley floor. These areas are comprised of *Alnus sinuata*, *Vaccinium alaskaense*, *Sorbus sitchensis*, *Rubus spectabilis*, and *Athyrium filix-femina* shrubland with some scattered individuals of stunted *Tsuga mertensiana*. In some areas *Valeriana sitchensis* is an important component of the herb layer.

8. Mosaic: Higher Elevation Closed Forest, Parkland, Talus, and Cliffs. As the name implies, these areas consist of a spotty patchwork of different community types and accounts for over 1/3 of the Perry Creek RNA. The patches of mixed conifer closed forests vary in tree species composition but are primarily dominated by large *Tsuga mertensiana*, *Abies amabilis*, and *Chamaecyparis nootkatensis*, with *Vaccinium membranaceum* and *Menziesia ferruginea* in the understory. The closed forests form patches or fingers within a parkland, which is comprised small islands of trees, shrub fields dominated by *Vaccinium membranaceum*, *Sorbus sitchensis*, *Phyllodoce empetriformis*, and *Vaccinium deliciosum*, herb-rich meadows, talus/scree slopes, and vertical cliffs.

9. Herb Rich Meadows with Patches of Mountain Hemlock Forest: Herb-rich meadows with *Valeriana sitchensis*, *Veratrum viride*, *Pteridium aquilinum*, *Arnica latifolia*, and *Spiraea densiflora*; with *Alnus sinuata* in the drainages. Within the meadows are some small islands of *Chamaecyparis nootkatensis* with *Rubus lasiococcus* understory. Between the meadows are patches of forest dominated by *Tsuga mertensiana*.

10. Ladyfern Meadows: These meadows are codominated by *Athyrium distentifolium* and *Vaccinium deliciosum* or by *Athyrium distentifolium* and *Carex spectabilis* .

11. Juniper Meadows: These are small but distinct areas, dominated by *Juniperus communis* and *Polygonum bistortoides.*

12. Talus, Cliff, and Red Heather Meadows: Rock scree and cliff areas with *Phyllodoce empetriformis* meadows, often codominated by *Vaccinium deliciosum.*

13. Avalanche Chutes: Deep, extensive drainages with a variety of species, in the *Tsuga mertensiana* zone but lacking closed forests because of repeated avalanche activity.

14. Rock: Sheer cliffs, talus slopes, giant boulder fields, with sparse vegetation (*Valeriana sitchensis* and *Aruncus sylvester*).

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

Extreme ruggedness characterizes the entire Perry Creek drainage basin. Year round snowmelt feeds numerous class III and IV streams flowing from steep valley walls to intersect with Perry Creek, a class II stream (USDA 1990). The topography of this basin is dramatic (Photo 8). Cliff walls are commonplace, accentuating a vertical relief of 3936 ft. (1212 m) within the RNA. Although both north and south slopes are steep in this east-west oriented basin, an elevational gradient from the valley bottom to rim as great as 3303 ft. (1007 m) in 8/10 of a mile (1.3 km) exists on the steeper southern slope. Such relief promotes cascading waterfalls, rockfall, snow avalanches, and debris flows (Photo 9) which act synergistically to create and maintain a valley bottom composed predominantly of boulder fields and rocky talus. Deep incisions in the valley walls also result from these disturbances (Photo 10). In summary, the Perry Creek drainage basin is steep and rugged with great vertical relief where frequent disturbances produce unstable physical conditions and maintain a rocky valley bottom substrate.

Climatic Conditions

Areas in Washington State west of the Cascade Mountains are dominated by a relatively mild maritime climate. The summer months are typically cool and dry while winters are mild and wet (Franklin and Dyrness 1973). These conditions exist due to the location and intensity of Pacific High and Aleutian Low pressure systems. During the spring and summer months the low pressure cell weakens, moving north of the Aleutian Islands allowing a high pressure cell to spread over the northern Pacific Ocean. Air circulation around the Pacific High pressure system brings a westerly or northwesterly flow of cool, dry air to western Washington. In the fall and winter months the low pressure system moves south from the Aleutian Islands and intensifies as the Pacific High system also moves south. A prevailing southwesterly or westerly flow of air results from the circulation of air around these two systems. This air flow tends to be of a similar temperature to the ocean and quite moist (NOAA 1985). Subsequent orographic uplifting of the moist air along the western Cascade Mountains, where Perry Creek is located, brings heavy precipitation to this area between the months of October and March.

Perry Creek RNA is an east-west oriented valley and as such may receive heavier precipitation than nearby areas. Moist air from the west rises and is constrained as the valley narrows at higher elevations (NOAA 1985). The nearest weather station with precipitation records is Big Four (elev. 1748 ft, 533 m), approximately 1/2 mile (.8 km) southwest from the Perry Creek trailhead, where 142.47 inches (361.9 cm) of precipitation fall annually. At Big Four, December is the wettest month with 22.13 inches (56.2 cm) of precipitation while August is the driest with 2.98 inches (7.6 cm). The average winter snowfall at similar elevations to Perry Creek along the western Cascade Mountains ranges between 266 inches (675.6 cm; data from Scenic, WA, elev. 2224 ft, 678 m) and 467 inches (1186.2 cm; data from Stevens Pass, WA, elev. 4085 ft, 1245 m). Snowfall may be closer to 600 inches (1524 cm) or greater annually in the higher elevations of Perry Creek (NOAA 1985). Inferences must be made concerning the air temperature conditions for the Perry Creek area as data from nearby weather stations of a similar elevation are not available. In Silverton (5 miles, 8 km west of Perry Creek, elev. 1500 ft, 457 m) the

average January temperature is 33°F (~0°C) while the average July temperature is 61.2°F (16.2°C). At Stevens Pass (elev. 4085 ft, 1245 m) average January and July temperatures are 23.4°F (-4.8°C) and 56.3°F (13.5°C) respectively (Table 4).

DESCRIPTION OF VALUES

Flora

The first known botanical study of Perry Creek RNA was by John W. Thompson, who did some collecting in the 1930's; his specimens can be found in The University of Washington Herbarium (Kruckeberg 1976). Seven ecology plots (numbers 4647-48, 4020-23, 2001), where vegetative information was collected, have been sampled within Perry Creek RNA by Jan Henderson, a U.S. Forest Service ecologist. Using data collected in over 2000 ecology plots, Henderson et al. (1992) produced a guide to the forested plant associations within the Mt. Baker-Snoqualmie National Forest that contains keys to the plant associations within western hemlock, Pacific silver fir, and mountain hemlock forest series. Subsequently, a model was developed to map groups of related plant associations on the Mt. Baker-Snoqualmie National Forest. A thorough and well used guide to the vegetation of Washington and Oregon was produced in 1973 by Franklin and Dyrness (1988). Information gathered by Agee and Kertis (1986) for the North Cascades National Park complex is pertinent to this site as the ecological conditions appear quite similar. An extensive field survey was conducted by Laura Potash, a U.S. Forest Service Botanist, in 1993 after the first draft of this report was completed in order to compile a more complete species list and document existing dominant vegetation. The information given in the following description of the flora found in Perry Creek RNA is gathered largely from the above sources, descriptions by Kruckeberg (1976), and notes taken pursuant to field work conducted by Rolph and Agee (1992).

Perry Creek RNA contains many rare and regionally Sensitive plant species (Table 1). The best known and studied group of plants from this site are the ferns and fern allies. Periodic field work by pteridologists beginning in the 1930's (Slater 1969, Wagner 1973, Kruckeberg 1976, Alverson 1985) has produced some detailed knowledge on this group of species. Thirty known species of ferns and fern allies occur within the Perry Creek RNA. Of these, 6 are on the USFS Regional Forester's Sensitive Species List (USDA 1991). Many of the other vascular plant species are rare or unusual (Table 5). In addition, the RNA has a very rich diversity of mosses and lichens. A species list of bryophytes from collections of made in 1993 is currently being verified (Lesher, personal communication). The variety of habitats and unique environmental conditions are likely the cause of such a rich flora.

The predominant fern habitat (Figure 7) is found in valley bottom areas where disturbance forces and climatic conditions have produced unique micro-environments (Kruckeberg 1976). Avalanches, rockfall, and debris flows have created a rocky, talus substrate where seral hardwood, deciduous shrub, herbaceous, and moss communities are found. As succession proceeds these communities would typically be replaced by a coniferous forest composed of western hemlock or Pacific silver fir. Stochastic and sometimes frequent disturbance from avalanches, debris flows, and rockfall perpetuates the existence of these communities by damaging or killing the existing vegetation and further developing the rocky substrate (Franklin and Dyrness 1988). Conifers are probably not able to invade the talus areas due to the chronic disturbances, lack of mineral soil, greater water drainage, and summer drought conditions found in these areas. Such conditions are more acceptable to deciduous and herbaceous species.

Plant communities found on talus substrates may be differentiated due to variations in disturbance frequency, substrate size and moisture availability (Kruckeberg 1976). Hardwood communities are mainly composed of bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*). Mixtures of shrubs, herbs, and mosses occur in the understory. Deciduous shrub communities seem to exist where disturbance is more frequent and are composed of vine maple (*Acer circinatum*), Rocky Mountain maple (*Acer glabrum*), redosier dogwood (*Cornus sericia* ssp. *sericia*), red alder, red elderberry (Sambucus racemosa), and many associated ferns. Several botanists have also reported a Rocky Mountain maple X vine maple hybrid in these talus communities (David Wagner, unpublished information). Areas of even more frequent disturbance on wet talus are composed of herbaceous species and small shrubs: bracken fern (*Pteridium aquilinum*), lady fern (*Athyrium filix-femina*), fireweed (*Epilobium angustifolium*), thimbleberry (*Rubus parviflora*), salmonberry (*Rubus spectabilis*), and devils club

(*Oplopanax horridum*). Moss and bare rock communities predominate on large rock or boulder substrates where disturbance is probably most frequent. On more gradual talus where soil development has been greater, Alaska cedar (*Chamaecyparis nootkaensis*) and subalpine fir (*Abies lasiocarpa*) is often found growing with bigleaf maple - a very unusual combination. Douglas-fir (*Pseudotsuga menziesii*) and Pacific silver fir (*Abies amabilis*) are less common. The rare and diverse fern species are found growing in the understories within all of these talus communities (Figure 7).

Other vegetation communities within Perry Creek RNA are more typical of these mountain environments. Coniferous forest dominates the basin with species composition being largely determined by elevation, exposure, and disturbance history. In lower elevations within the western hemlock cover type (Agee & Kertis 1986) or *Tsuga heterophylla* Zone (Franklin & Dyrness 1988) the effects of historic fires are evident in old growth forests of Douglas-fir, western hemlock (*Tsuga heterophylla*), and western redcedar (*Thuja plicata*). It appears that a high intensity stand replacement fire may have burned the area approximately 450 years ago; Douglas-fir and western redcedar re-establishment followed. A later fire, possibly 240 years ago, left a few remaining older Douglas-fir and western redcedar trees. Younger age classes in the stand are now dominated by western hemlock with some western redcedar. A similar scenario seems to have occurred along the south facing slope above Perry Creek falls within the Pacific silver fir cover type (Agee & Kertis 1986) or *Abies amabilis* Zone (Franklin & Dyrness 1988). Here, a stand replacement fire may have burned the area approximately 600 years ago with Douglas-fir re-establishing following the fire. The stand is now composed of large shade tolerant Pacific silver fir and western hemlock growing under a now sparse and decreasing overstory of Douglas-fir. This forest, between 3000 and 4500 feet elevation (914-1372 m), corresponds to the *Abies amabilis/Vaccinium alaskaense* association of Henderson et al. (1992). At midslope a more recent fire burned a 5 acre (2 ha) area between 1900 and 1915. This area has regenerated with Pacific silver fir, western hemlock, and Alaska yellowcedar. Forests of the higher elevation mountain hemlock cover type (Agee & Kertis 1986) or *Tsuga mertensiana* Zone (Franklin & Dyrness 1988) have as yet not been studied although we presume the stands exhibit high similarity to other forests of this type in the region with mixtures of mountain hemlock, Pacific silver fir, and Alaska cedar having an understory dominated by various huckleberries (*Vaccinium* spp.) (Henderson et al. 1992). Several areas along the rim of the basin are covered with young mountain hemlock (*Tsuga mertensiana*) saplings that appear to have established during historic warmer periods when snow loading and avalanche activity may have been less severe (Photo 4, Brubaker 1988).

Nonforested communities exist in areas where disturbance frequency is high or harsh environmental conditions are the norm. Avalanche tracks are a common occurrence within Perry Creek RNA. Such areas are vegetated with species adapted to chronic winter snow creep; Sitka alder, vine maple, Alaska yellowcedar, salmonberry, with various other shrubs, ferns, and herbs. These higher elevation deciduous communities with Sitka alder (*Alnus sinuata*) are placed within the high shrub cover type similar to Agee and Kertis (1986) while lower elevation deciduous communities with bigleaf maple, red alder, and Rocky Mountain maple have been categorized as a hardwood cover type in Figure 4. Subalpine and alpine plant communities are extensive in the higher elevations with the species composition most likely of high similarity to other mountain areas within the region (Douglas and Bliss 1977).

In summary, the diversity of plant communities in Perry Creek RNA are largely a consequence of the environmental conditions and a dynamic history of disturbance. Many forms of disturbance have been identified, all having significant effects on vegetation development: avalanches, fire, wind, rockfall, and debris flows. Of these, small avalanches seem to occur most frequently with larger avalanches being more stochastic in nature. Fires in this region of Washington can be characterized as infrequent (fire return interval of <750 years) stand replacement fires with lightning as the major source of ignition (Agee 1991). Wind events and debris flows are both infrequent events while rockfall probably occurs somewhat regularly. These forces of disturbance, acting synergistically with local microclimates, create the unusual conditions favoring the rich valley bottom talus communities with their incredible fern diversity.

Fauna

A comprehensive inventory of the fauna within Perry Creek RNA has not been completed. The following information is based on information given in reports describing species suspected in this mountainous region (Agee and Wasem 1987, USDI 1992), limited field work, knowledge of local U.S. Forest Service biologists (Tom Mendenhall, Charles Vandemoer, Phyllis Reed, personal communications), and information from the South Fork Upper Stilliguamish Watershed Analysis (USDA Forest Service 1995). Species of particular concern include those listed as Threatened, Endangered, or Sensitive (State and Federal), and those used by the U.S. Forest Service as management indicator species. Perry Creek provides habitat that is suitable for many of these wildlife species; including, the northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), pileated woodpecker (*Dryocopus pileatus*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), marten (*Martes americana*), mountain goat (*Oreamnos americanus*), and several species of bats, amphibians, and salmonid fishes (Tables 6,7,8). Little is known on the biology and current geographic distribution of many of these species.

The northern spotted owl is currently listed as Threatened by the U.S. Fish and Wildlife Service. Suitable habitat for this species is described as predominantly old growth coniferous forest in the Western Hemlock Zone and lower Silver Fir Zone, with high canopy coverage, large snags, and presence of coarse woody debris (USDI 1992). The Darrington District of the U.S. Forest Service surveyed for spotted owls in the lower Perry Creek drainage during 1991 and 1992. A pair was located in both years and reproduction was confirmed. While the nest was located outside of the proposed RNA (less than 1/4 mile, 0.4 km), the expected home range and foraging area include portions of the RNA (Phyllis Reed, personal communication).

Perry Creek RNA is within the Independence Late Successional Reserve (LSR), one of 53 reserves established in the April 13, 1994 Record of Decision (USDA,USDI 1994). This LSR encompasses the national forest watersheds of the South Fork Stilliguamish River and portions of the Sauk River. The LSR system is expected to assist in maintaining a functional and interactive late-successional and old-growth forest ecosystem. LSRs are to be managed to protect and enhance habitat conditions for late-successional species such as spotted owl and marbled murrelet. The LSR system, in conjunction with wilderness designation, is expected to meet or exceed the conservation measures for federal lands in the Final Draft Recovery Plan for the Northern Spotted Owl (Volume I, 2-72 FSEIS, USDA, USDI 1994). The proposed critical habitat for marbled murrelets is concurrent with the LSR boundary designations, and includes the Perry Creek RNA.

The marbled murrelet was recently designated as a federally Threatened species. Recovery plans for the species have not been formulated. Marbled murrelet nests have been reported in nearby areas along the South Fork Stillaguamish River and high murrelet activity was detected in the lower Perry Creek drainage during 1992 surveys (Charles Vandemoer, personal communication). Murrelets are suspected to exist within the Perry Creek RNA as suitable habitat is available.

Pileated woodpeckers are currently identified as an management indicator species for old growth forest habitat by the U.S. Forest Service (USDA 1990). As suitable old growth forest habitat is present within the RNA, this species most likely occurs within the drainage.

The grizzly bear is federally listed as a Threatened species and the gray wolf as Endangered. Although presence within the Perry Creek RNA is unconfirmed, the area is considered as suitable habitat and falls within the boundaries of a designated evaluation area for the grizzly bear (Almack et al. 1991). A decision whether or not to designate the North Cascades as a grizzly bear recovery area is forthcoming (USFWS 1992). Wolves have been sporadically seen throughout the North Cascades and Perry Creek's proximity to several wilderness areas suggests the RNA may contain suitable habitat for this species. Recovery plans for the gray wolf have not been formulated.

Of the other mammalian species suspected from Perry Creek RNA (Table 6) none are formally listed as Threatened or Endangered, although many are listed as Candidate species, Sensitive species, or species of concern by the U.S. Fish and Wildlife Service or Washington state. The mountain goat has been designated a management indicator species by the U.S. Forest Service for big game range (USDA 1990). Areas within Perry Creek are designated as suitable mountain goat habitat offering both summer and

winter range for this species (USDA 1990). Another designated management indicator species, the marten, is also expected to exist within the old growth forests of Perry Creek.

Many species of bats, amphibians, and salmonid fish whose populations are of concern may be found within the RNA (Table 8). Townsend's big-eared bats (*Plecotus townsendii*) roost in caves and such habitat is likely to occur in this rugged, rocky basin. Both the tailed frog (*Ascaphus truei*) and spotted frog (*Rana pretiosa*) prefer streamside habitat adjacent to old growth forests (USDI 1992). This habitat type is not abundant along Perry Creek but does occur and the pristine-like nature of the valley may benefit these species. Critically low salmonid fish populations are of particular concern throughout the Pacific Northwest (Nehlsen et al. 1991). Since the building of a fish ladder near the town of Granite Falls in the 1960's, limited populations of anadromous fish have been spawning within the South Fork Stillaguamish River and Perry Creek drainages (Tom Mendenhall, personal communication). Future fish surveys will prove useful in determining the population levels of spring chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*Oncorhynchus nerka*), and summer steelhead trout (*Oncorhynchus mykiss*) in Perry Creek. Management philosophies and guidelines for these anadromous species will need to be formulated as they cannot truly be considered as native to Perry Creek or the RNA. Due to the diversity of vegetation communities and aquatic habitat found in the Perry Creek basin a high animal species richness can be expected. Future inventories will prove useful in characterizing the fauna of this RNA.

Geology

A knowledge of Perry Creek's geologic history is important when trying to understand the basin's existing geomorphology, predict future conditions, and evaluate management options. Extrusive igneous rock is the predominant bedrock type within Perry Creek basin (USGS 1966, Snyder & Wade 1970). These rocks were deposited during episodes of volcanic activity in the Tertiary period and Mesozoic era (40-150 million years ago) and are composed of basalt, andesite, rhyolite, and diabase flows broken up by beds of tuff and sedimentary rocks. Such rock types are typically gray to black, moderately hard, fine textured, and characteristically highly fractured into random fracture systems (Snyder & Wade 1970). This latter feature has led to the formation of steep, highly dissected, unstable drainages, and the existence of rocky valley bottom substrates. During the Pliocene epoch (13 million years ago) the Cascade region, at that time a plateau, were uplifted and subsequently eroded to resemble the mountains we see today. Heavy glaciation occurred throughout the North Cascades and Perry Creek area with current landforms (U-shaped valleys, cirques) being largely the result of glacial erosion in the Pleistocene epoch (<2.5 million years ago; USGS 1966). Erosion continues today, perpetuating the instability and ruggedness of the Perry Creek basin.

Soils

Soils of the Perry Creek area can be characterized as deep glacial, deep glacial lake-deposited, deep residual, or shallow residual. These soil categories exist in a complex mosaic of interfingering units due to past glaciation events, and more recent mass wasting and erosion (Snyder & Wade 1970). Snyder and Wade (1970) provide a complete description and mapping of the soils within the northern portion of the Mt. Baker-Snoqualmie National Forest. The following descriptions of the soil units found within the Perry Creek RNA (Figure 8) are taken from Snyder and Wade (1970); the reader is directed to that reference for a more detailed account.

005 - This soil unit, predominantly talus slopes devoid of soil layers, is found in the valley floor. Stability ranges from stable to unstable with mass movement often occurring as rockfall and debris slides. Human activity may increase the potential for mass movement. Being rocky and unstable the unit is not well suited for roads, timber production, or recreational development, and only moderately suitable for trails.

045 - This soil unit, found in the high elevations along the southern RNA boundary, is composed of a very shallow, non-plastic, alpine meadow soil derived from bedrock. Erosion potential is

very severe due to an absence of soil structure. The soil layer is a yellowish brown to dark brown, very fine sandy loam, 6 to 30 inches (15-76 cm) thick over bedrock. Vegetation cover is limited to sedges, grasses, and small shrubs. These soils are subjected to heavy precipitation, snowmelt, freeze and thaw, and high winds. Erosion potential is increased following disturbance; either of human or natural cause. Heavy foot and horse traffic can be particularly damaging.

038 - This soil unit, found in the trailhead area at the lowest elevations, is a deep non-plastic soil derived from glacial till and drift. The 6 to 24 inch (15-61 cm) soil surface layer is a dark yellowish to dark brown gravelly sandy loam with a weak fine subangular blocky structure. A deep subsoil layer (~10 ft, 3 m thick) is composed of a weak to moderately compact dark gray to yellowish brown very gravelly loamy sand. Bedrock exists below the subsoil layer. The soil is moderately well drained and supports forests of Douglas-fir, western hemlock, and western redcedar. Steep slopes are unstable and susceptible to debris slides.

090 - This soil unit is found throughout the basin as a component within the **905**, **910**, and **920** units. A mixture of andesite, basalt, and dacite rock outcrops interbedded with rhyolite, sedimentary rock, and soil forms the unit. Such soils are typically found on ridgecrests and steep sideslopes where debris slides and rockfall are possible.

091 and **092** - These two soil units are very similar with both being found throughout the basin as components of the **910** and **920** soil units. **091** and **092** units are shallow, non-plastic to slightly plastic soils derived from andesite, basalt, or dacite with interbeds of rhyolite and sedimentary rock. Surface soils are dark yellowish brown to brown thin gravelly loams with a fine subangular blocky structure. Subsoil layers are dark brown to pale brown gravelly loam with 50-70% angular gravel and cobbles by volume. Unit **091** soils are found on steep, smooth, slightly dissected slopes where soil surface layers are 6-24 inches (15-61 cm) thick and subsoil layers 16-48 inches (41-122 cm) thick. Unit **092** soils are on very steep, highly dissected sideslopes with thinner surface and subsoil layers of 6-18 inches (14-46 cm) and 12-18 inches (30-46 cm) thick respectively. Extrusive igneous bedrock occurs beneath the soil layers of both units.

Soils of units **905**, **910**, and **920** are complexes of the soil units described above.

905 - This soil unit, found in the higher elevation areas of the basin, is composed of 50% soil unit **090**, 25% unit **045**, and 25% unit **005**.

910 - This soil unit, found in the northeast and southwest portions of the basin, is composed of 60% soil unit **091**, and 40% unit **090**.

920 - This soil unit, found in the mid-elevations throughout the basin, is composed of 60% soil unit **092**, and 40% unit **090**.

Lands

All lands within the proposed Perry Creek RNA are under federal ownership and jurisdiction of the United States Department of Agriculture, Mt. Baker-Snoqualmie National Forest. National Forest lands completely surround the RNA and there are no outstanding rights to the area.

Cultural

A survey of the cultural resources within the proposed Perry Creek RNA has not been completed. However, three sites are suspected to occur in the vicinity of Perry Creek; two mining sites, and a possible historic cabin near the trailhead. As these sites have not been inventoried their exact locations and cultural value are yet to be determined (Jan L. Hollenbeck, personal communication). A general description of the

cultural resources found within Mt. Baker-Snoqualmie National Forest was completed in cooperation with recent forest planning efforts (Hollenbeck 1987).

Aquatic

The Perry Creek RNA encompasses most of a drainage basin and remains in a natural condition (Figure 7). Within this basin flow many Class III and IV streams which join to form Perry Creek, a Class II stream (USDA 1990). In addition to streams, the RNA includes a few small subalpine ponds, wetland areas, and cascading waterfalls. The biotic diversity found in these aquatic areas is largely unknown although fish surveys of Perry Creek have been completed in the past and future surveys are planned (Tom Mendenhall, personal communication).

IMPACTS AND POSSIBLE CONFLICTS

Mineral Resources

No mineral resources are known from the Perry Creek basin although the presence of two mining sites indicate historic mining activity. The success of these mining attempts and the miner's identity is unknown. No patented mining claims exist within the boundaries of the proposed RNA (Walt Dortch, personal communication). Following establishment of the RNA, a request will be made to the United States Bureau of Land Management to withdraw Perry Creek from mineral entry.

Grazing

Livestock grazing does not occur within Perry Creek RNA and therefore the establishment of the RNA would have no effect on this management activity. Grazing will be prohibited (USDA 1990).

Timber

Approximately 250 acres (101 ha) of mature and old growth forest within the western hemlock and Pacific silver fir zones are suitable for timber harvest in Perry Creek RNA. The extremely rugged topography of the basin with rocky areas, cliffs, and active slumping makes timber harvest by traditional methods difficult. With establishment of the RNA logging and wood-gathering would be prohibited (USDA 1990).

Watershed Values

Establishment of the Perry Creek RNA, with a boundary encompassing the entire drainage basin can only have a positive effect on the watershed values of the area. The South Fork Stillaguamish River is a popular fishing location and the protection of one of its tributary basins will help assure the continued maintenance of the river's ecological integrity.

Recreational Values

Recreational values within Perry Creek RNA focus on use of the existing trail, which currently extends from the end of the road up the valley bottom, continuing to the alpine areas on the valley's north slope where it ends (approx. 4 miles, 6.4 km). Day use of this trail may be quite heavy (USDA 1990) but even heavier use may be limited by the lack of overnight camping sites and the terminal nature of the trail. Although somewhat in conflict with the principles of an RNA, the existing trail with its current level of use seems to cause little immediate impact to critical valley bottom talus vegetation communities. However, an increase in the use of the trail may result in significant impacts to these communities and the rare species found within them. Construction of a loop trail within the upper Perry Creek watershed was at one time listed as a possible project (USDA 1990). The implications of this proposal are beyond the scope of this establishment report and this project is no longer being actively considered. If this proposal ever

becomes an issue in the future it will require full public involvement in an environmental assessment and/or forest plan amendment.

Wildlife and Plant Values

The Perry Creek RNA should maintain the viability of plant and wildlife populations in this area. As stated previously in this report, many rare and Sensitive plant species are located within the Perry Creek basin. Establishment of an RNA limits activities which may conflict with maintaining the viability of these species and their habitat, helping assure their continued existence. Clearcut timber harvests have approached the lower boundary of the RNA and further harvests may alter local microclimates and species composition (Figure 7). Old growth forests within Perry Creek RNA provide habitat suitable for the federally Threatened northern spotted owl, marbled murrelet, grizzly bear, and Endangered gray wolf. Both summer and winter mountain goat habitat is abundant and many other Sensitive wildlife species are suspected in the basin. The diversity and quality of vegetation communities found in Perry Creek provide habitat for a wide array of wildlife species and the protection of these habitats and the ecological processes which create them will help maintain these species. Lastly, Perry Creek RNA is geographically located between three congressionally designated wilderness areas. As a protected enclave, the RNA may be regionally significant, acting as a habitat link or stepping stone between these wilderness areas for dispersal and migration of plant and animal species, hence aiding in the preservation of regional populations or metapopulations (Noss and Harris 1987, Thomas et al. 1990, USDI 1992).

Special Management Area Values

Perry Creek RNA does not affect any currently designated Special Management Areas. A portion of the basin is under consideration by the U.S. Fish and Wildlife Service as a proposed Designated Conservation Area (DCA) for the northern spotted owl (USDI 1992). Approximately 30 acres (12 ha) in the southwest corner of the RNA (Nicole Luce, personal communication) is included within DCA number WD-26W. Establishment of the RNA is compatible with future management of this area for the federally Threatened owl. As yet, Perry Creek has not been designated as an official recovery area for other Threatened or Endangered species.

Transportation Plans

No roads are planned to be built within the proposed Perry Creek RNA and future road building would be prohibited following RNA establishment. This policy will not affect forest wide transportation plans as areas adjacent to Perry Creek are to be managed as semi-primitive, non-motorized areas according to the 1990 Mt. Baker-Snoqualmie Forest Plan (USDA 1990). The existing Perry Creek trail will be maintained and it is recommended that no additional trails be built (Rolph and Agee 1992).

MANAGEMENT PRESCRIPTION

Vegetation Management

Vegetation management of the Perry Creek RNA will follow the guidelines outlined for RNA's in the Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (USDA 1990). Under these guidelines human intervention and impacts within the RNA will be minimized or eliminated as appropriate to maintain the natural ecological processes of the area. In the Perry Creek RNA these natural processes are critical for the maintenance of deciduous communities in the valley bottom talus and boulder fields. It is these communities that harbor a rich diversity of fern species. The forest plan allows for various levels of fire suppression. Fire, although infrequent in the Perry Creek basin, has been an important disturbance factor in the past, helping maintain certain communities and species. Allowing naturally ignited fires to burn in the future under defined environmental conditions will help preserve the integrity of these ecosystems. Monitoring of trailside fern populations and other vegetation within the talus communities is encouraged to ascertain whether trail use is having an impact on these communities.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of Perry Creek RNA will be the responsibility of the Mt. Baker-Snoqualmie National Forest. The Darrington Ranger District has direct responsibility.

Requests to conduct research within the RNA should be directed to the Director of the Pacific Northwest Research Station who is responsible for any studies or research conducted in the area. Research proposals will be evaluated by the Station Director upon receipt and all research activities are then coordinated with the District Ranger. All plant and animal specimens collected in the course of RNA research will be appropriately preserved and maintained within local universities or federal museums as approved by the Station Director. Collecting of specimens must be carried out in accordance with applicable State and Federal agency regulations.

Copies and updates of the Perry Creek RNA establishment record will be maintained in each of the following offices:

Regional Forester, Pacific Northwest Region, Portland, Oregon
Forest Supervisor, Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, Washington
District Ranger, Darrington Ranger District, Darrington, Washington
Pacific Northwest Research Station, Corvallis, Oregon

ARCHIVING

The Pacific Northwest Research Station will be responsible for maintaining a research data file for the Perry Creek RNA. The RNA database is located at the Forestry Sciences Lab in Corvallis, Oregon as part of Oregon State University Forest Science Databank. This file will include studies conducted on the RNA, lists of plant and animal species and communities found within the RNA, and lists of museum and herbarium specimens collected from the RNA.

Other descriptive data will be stored on computer databases maintained at the offices of the Mt. Baker-Snoqualmie National Forest (Mountlake Terrace, Washington) and the Pacific Northwest Regional office (Portland, Oregon).

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Table 1. Ferns and fern allies currently known from Perry Creek Research Natural Area. [1]

Family Scientific name[2]	Common name	List[3]
Selaginellaceae		
Selaginella wallacei Hieron.	Wallace's spike-moss	
Lycopodiaceae		
Lycopodium clavatum L.	Elk-moss	
Lycopodium miyoshianum Makino		
Lycopodium selago L.	Fir clubmoss	
Lycopodium sitchense Rupr.	Sitka clubmoss	
Ophioglossaceae		
Botrychium lanceolatum (Gmel.) Angstr.	Lance-leaved grape-fern	*
Botrychium lunaria (L.) Swartz	Moonwort	*
Botrychium minganense Victorin	Mingan moonwort	*
Botrychium montanum W.H. Wagner	Mountain moonwort	*
Botrychium multifidum (Gmel.) Trevis	Leathery grape-fern	
Botrychium pinnatum H. St. John	Northern grape-fern	*
Botrychium simplex E. Hitchc.	Little grape-fern	*
Botrychium virginianum (L.) Swartz	Virginia grape-fern	
Polypodiaceae		
Adiantum aleuticum (Rupr.) C.A. Paris	Western maidenhair fern	
Asplenium trichomanes L.	Maidenhair spleenwort	
Asplenium trichimanes-ramosum L.	Green spleenwort	
Athyrium filix-femina (L.) Roth.	Lady fern	
Blechnum spicant (L.) Roth.	Deer fern	
Cryptogramma acrostichoides R.Br.	Rock-brake	
Cystopteris fragilis (L.) Bernh.	Brittle bladder-fern	
Dryopteris expansa		
(K. Presl) Fraser-Jenkins & Jermy	Spreading woodfern	
Dryopteris filix-mas (L.) Schott	Male fern	
Gymnocarpium disjuctum (Rupr.) Ching.	Pacific oakfern	
Polypodium amorphum Suksdorf	Irregular polypody	
Polypodium glycyrrhiza D.C. Eat.	Licorice-fern	
Polystichum andersonii Hopkins	Anderson's sword fern	
Polystichum lonchitis (L.) Roth.	Mountain holly-fern	
Polystichum munitum (Kaulf.) Presl	Common sword-fern	
Pteridium aquilinum (L.) Kuhn.	Bracken	
Thelypteris quelpaertensis (H.Christ) Ching	Mountain fern	
Phegopteris connectilis (Michaux) Watt	Beechfern	

[1] Adapted from Kruckeberg (1976), Alverson (1983), and D. Wagner (personal communication).

[2] Hitchcock and Cronquist (1973) or as updated in Hickman (1993), Morin (1993), or Kartesz (1994). Final authority for botanical nomenclature within the United States Department of Agriculture is Kartesz (1994).

[3] Currently on the Regional Forester's Sensitive Species List (1991).

Table 2. Legal boundary description for Perry Creek Research Natural Area.

All bearings and distances shown in the following description are based on the Universal Transverse Mercator coordinate grid system. The approximate courses of the area boundaries are identified in this description. Where the boundary is described as following a topographic feature, the actual location of the feature will control the approximate course of that part of said boundary. Unless specified in the description, calls to a stream, watercourse, or draw, shall be the thread of said stream, watercourse, or draw, and calls to a ridge or divide shall be to the crest. Section, Township, and Range lines, and Section corners established by the United States Public Lands Survey, shall determine the actual location of those portions of the boundary so described.

Quad Sheet Name	Angle Point	Bearing	Distance feet (meters)	Description
Bedal	1			Beginning at the summit of Stilliguamish Peak, map elevation 5650 feet, Latitude 48°05'34" North, Longitude 121°29'12" West. Situated within the NE 1/4 of Section 14, T.30 N., R.10 E., W.M. UTM grid coordinates Zone 10 X=612690.120 Y=5327502.500.
		N42°56'14"E	475.03 ft. 144.79m	
		N58°45'39"E	117.26 ft. 35.67m	
		N72°01'07"E	196.62 ft. 59.93m	
		S65°25'18"E	433.82ft. 132.23m	
		N70°06'16"E	91.60ft. 27.92m	
		N41°04'57"E	430.90ft. 131.34m	Along the crest of the divide between Perry Creek and Pemmican Lake
		N64°03'37"E	446.25ft. 136.02m	
		S67°36'51"E	142.12ft. 43.32m	
		S80°40'30"W	323.95ft. 98.74m	
	10			A saddle on the crest of divide between Perry Creek and Pemmican Lake, thence ascend along said divide.
		N71°22'03"E	1016.59ft. 309.86m	Along the divide between Perry Creek and Pemmican Lake.
		N52°09'42"E	72.21ft. 22.01m	
		N73°53'46"E	224.73ft. 68.50m	
	13			A saddle on said divide.
		N54°41'28"E	105.02ft. 32.01m	

	N32°37'37"E	208.40ft. 63.52m	Ascending said divide.
	N57°07'49"E	136.02ft. 41.46m	
	S59°33'45"E	135.99ft. 41.45m	
18			A prominent summit on divide between Perry Creek, Shake Creek, and Pemmican Lake, map elevation 5523 feet..
	S19°09'27"E	46.88ft. 14.29m	
	S03°14'57"W	376.24ft. 114.68m	Descending said summit.
	S19°09'27"E	46.88ft. 14.29m	
	S38°56'22"E	236.22ft. 72.00m	
22			A saddle on the divide between Shake Creek and Perry Creek..
	S11°43'25"E	236.22ft. 72.00m	Ascending said divide.
	S44°05'45"E	276.37ft. 84.24m	
24			An unnamed summit on said divide, map elevation 5443 feet.
	S27°25'24"E	97.93ft. 29.85m	
	S15°16'38"E	119.03ft. 36.28m	
	S02°14'14"W	246.26ft. 75.06m	
	S19°35'35"E	137.56ft. 41.93m	Descending and ascending along said divide.
	S40°12'41"E	298.55ft. 91.00m	
	S68°09'38"E	110.23ft. 33.60m	
	N67°35'12"E	357.08ft. 108.84m	
	S78°39'20"E	266.86ft. 81.34m	
32			A summit on said divide, map elevation 5420 feet.
	S29°45'19"E	181.40ft. 55.29m	
	N86°45'06"E	28.94ft. 8.82m	
	S49°40'51"E	154.66ft. 47.14m	

	S82°34'35"E	190.45ft. 58.05m	
	S71°01'59"E	292.71ft. 89.22m	Ascending and descending along said divide.
	S82°50'32"E	92.16ft. 28.09m	
	S83°44'18"E	345.93ft. 105.44m	
	S65°41'10"E	95.64ft. 29.15m	
	S65°21'47"E	338.41ft. 103.15m	
	N87°36'00"E	665.97ft. 202.99m	
42			A saddle on said divide, thence continuing along said divide, ascending a shoulder of Mt. Forgotten.
	S80°58'40"E	104.59ft. 31.88m	
	S80°06'22"E	57.28ft. 17.46m	Ascending said divide.
	S52°33'04"E	277.88ft. 84.70m	
	S63°01'02"E	213.32ft. 65.02m	
	S74°03'17"E	197.04ft. 60.06m	
	N82°23'11"E	247.63ft. 75.48m	
	N58°09'30"E	286.05ft. 87.19m	
	N84°54'19"E	203.18ft. 61.93m	Ascending said divide.
	N58°45'39"E	117.03ft. 35.67m	
	N28°26'32"E	498.12ft. 151.83m	
	N11°23'33"E	133.86ft. 40.80m	
53			A summit on the shoulder of Mt. Forgotten, map elevation 5396 feet. Thence descend along divide between Swift Creek and Perry Creek, to a saddle on said divide.
	N90°00'00"E	28.90ft. 8.81m	
	S50°14'41"E	287.30ft. 87.57m	
	S18°15'46"E	196.91ft. 60.02m	Descending along said divide.

	S01°09'29"E	303.54ft. 92.52m	
	S25°22'14"W	194.26ft. 59.21m	
	S02°56'26"W	156.03ft. 47.56m	
59			A saddle on the divide between Swift Creek and Perry Creek, thence continue along said divide.
	S02°58'04"W	249.66ft. 76.10m	
	S13°47'00"E	133.43ft. 40.67m	
	S50°21'23"E	133.69ft. 40.75m	
	S09°19'43"W	397.30ft. 121.10m	Ascending along said divide.
63			A summit on said divide, map elevation 5172 feet, thence continue along said divide.
	S06°53'16"E	290.81ft. 88.64m	
	S25°00'47"E	143.01ft. 43.59m	
	S55°00'02"E	188.74ft. 57.53m	
	S55°00'29"E	80.08ft. 24.41m	Ascending and descending along said divide, through a saddle.
	S73°04'29"E	563.48ft. 171.75m	
	S54°23'12"E	216.93ft. 66.12m	
69			A minor summit on said divide, between Swift Creek and Perry Creek, map elevation 4965 feet, thence continue along said divide.
	S67°39'18"E	168.72ft. 51.29m	
	S67°09'59"E	84.55ft. 25.77m	
	S19°49'06"E	90.68ft. 27.64m	
	S40°12'31"E	298.55ft. 91.00m	Ascending and descending along said divide, through a saddle.
	S67°44'36"E	220.90ft. 67.33m	
	S50°14'41"E	287.30ft. 87.57m	
	S56°42'43"E	842.84ft. 256.90m	

	S10°32'19"E	88.42ft. 26.95m	
	S62°32'26"E	181.43ft. 55.30m	
	S46°38'12"E	40.61ft. 12.38m	
	S01°00'53"E	57.41ft. 17.50m	
80			A secondary summit on the northerly shoulder of Twin Peaks, approximate map elevation 5480 feet, forming the head of the divide between Perry Creek, Swift Creek, and an unnamed creek tributary to the South Fork of the Sauk River, flowing Easterly through the North 1/2 of Section 20, T30N, R11E W.M.
	S69°08'18"W	46.06ft. 14.04m	
	S29°49'56"W	421.68ft. 128.53m	
	S21°13'24"W	265.71ft. 80.99m	
	S33°56'22"W	478.50ft. 145.85m	Descending and ascending along said divide, toward the easterly summit of Twin Peaks.
	S18°44'48"W	169.78ft. 51.75m	
	S01°12'03"W	1056.65ft. 322.07m	
	S16°22'25"E	165.84ft. 50.55m	
87			The easterly summit of Twin Peaks, map elevation 5836 feet.
	S82°14'16"W	510.10ft. 155.48m	
	S68°34'08"W	246.91ft. 75.26m	Along the summit of Twin Peaks.
	S88°55'00"W	86.74ft. 26.44m	
90			The westerly summit of Twin Peaks, approximate map elevation 5825 feet.
	N63°02'28"W	213.48ft. 65.07m	
	N52°50'49"W	350.39ft. 106.80m	Along the crest of divide between Buck Creek and Perry Creek, toward a saddle.
	N86°24'15"W	523.09ft. 159.44m	
	N69°02'25"W	77.95ft. 23.76m	
	N62°32'09"W	181.40ft. 55.29m	

95			A saddle at the head of Buck Creek, on the divide between Buck Creek and Perry Creek.
	N53°10'00"W	257.21ft. 78.40m	
	N52°01'42"W	298.62ft. 91.02m	Ascending along said divide.
	N15°11'09"W	59.48ft. 18.13m	
98			A summit on the divide between Buck Creek and Perry Creek, approximate map elevation 5240 feet.
	S74°47'32"W	656.62ft. 200.14m	
	S53°31'15"W	124.15ft. 37.84m	Descending along said divide.
	S73°53'36"W	224.73ft. 68.50m	
	N84°58'37"W	131.13ft. 39.97m	
102			A saddle on the divide between Buck Creek and Perry Creek.
	N33°05'34"W	137.07ft. 41.78m	Ascending along said divide.
	N72°47'02"W	182.90ft. 55.75m	
104			A minor summit on the duvide between Buck Creek and Perry Creek.
	S53°22'32"W	497.70ft. 151.70m	Descending and ascending along said divide, through a saddle.
	N85°09'09"W	407.64ft. 124.25m	
106			A secondary summit of Dickerman Mountain, on the divide between Buck Creek and Perry Creek, map elevation 5628 feet.
	S39°40'48"W	287.76ft. 87.71m	
	S15°46'39"W	347.73ft. 105.99m	
	S32°22'40"W	104.89ft. 31.97m	
	S54°28'08"W	333.07ft. 101.52m	Descending and ascending along said divide.
	S71°28'28"W	242.65ft. 73.96m	
	S62°20'51"W	420.60ft. 128.20m	
	S79°41'23"W	366.60ft. 111.74m	
	S57°10'04"W	136.15ft. 41.50m	

	S45°55'55"W	830.21ft. 253.05m	
	S86°49'46"W	545.72ft. 166.34m	
115A			The summit of Dickerman Mountain, map elevation 5723 feet.
	S86°49'46"W	699.99ft. 213.36m	Along the crest of Dickerman Mountain.
116			A point on the crest of Dickerman Mountain, thence descending a ridge crest.
	S43°51'11"W	122.83ft. 37.44m	
	S12°52"30"W	58.89ft. 17.95m	
	S86°46'38"W	29.17ft. 8.89m	
	S41°12'12"W	429.52ft. 130.92m	
	S87°50'26"W	43.54ft. 13.27m	
	S55°57'15"W	586.01ft. 178.62m	Descending a shoulder of Dickerman Mountain.
	S84°22'11"W	551.76ft. 168.18m	
	S43°52'30"W	81.92ft. 24.97m	
	S80°57'38"W	219.26ft. 66.83m	
	S88°55'00"W	86.74ft. 26.44m	
	N66°48'05"W	174.90ft. 53.31m	
	N52°01'42"W	298.62ft. 91.02m	
	N79°02'45"W	207.18ft. 63.15m	
129			An unnamed minor summit on shoulder of Dickerman Mountain, map elevation 4780 feet.
	S88°52'50"W	419.81ft. 127.96m	
	N87°24'42"W	72.64ft. 22.14m	
	N86°45'39"W	493.53ft. 150.43m	
	N84°08'03"W	481.52ft. 146.77m	Descending a divide between two watercourses.

	N46°38'12"W	40.62ft. 12.38m	
	N78°13'51"W	386.02ft. 117.66m	
	N86°45'41"W	377.46ft. 115.05m	
	S86°06'07"W	120.67ft. 36.78m	
137			A point on the divide between said two watercourses, at the 2700 foot contour, thence through a series of Angle Points.
	N52°10'18"W	264.79ft. 80.71m	
	S82°39'34"W	372.34ft. 113.49m	
	N03°28'26"W	514.40ft. 156.79m	
	N38°40'11"W	439.10ft. 133.84m	A series of Angle Points.
	N01°10'16"W	741.62ft. 226.05m	
	N58°16'46"W	489.82ft. 149.30m	
	N22°49'45"W	222.47ft. 67.81m	An Angle Point.
151			An Angle Point, lying on the 2540 foot contour, on a spur ridge east of Stilliguamish Peak.
	N12°50'57"E	424.01ft. 129.24m	
	N59°03'48"E	165.91ft. 50.57m	
	N35°54'11"E	204.52ft. 62.34m	
	N57°49'44"E	120.14ft. 36.62m	
	N17°08'00"E	298.68ft. 91.04m	
	N33°37'01"E	228.51ft. 69.65m	
	N15°17'18"E	664.92ft. 202.67m	Ascending said spur ridge.
	N29°31'10"E	84.84ft. 25.86m	
	N01°30'50"E	505.41ft. 154.05m	
	N01°30'02"E	116.50ft. 35.51m	

	N07°24'13"E	292.78ft. 89.24m	
	N27°41'48"E	150.06ft. 45.74m	
	N03°13'30"E	189.60ft. 57.59m	
	N33°51'34"W	187.66ft. 57.20m	
	N24°46'36"W	252.95ft. 77.10m	Ascending said spur ridge.
	N08°43'33"W	219.06ft. 66.77m	
167			A secondary unnamed summit of Stilliguamish Peak, map elevation 5351 feet, lying on the divide between Perry Creek and Beaver Creek, thence continue along said divide along the crest of Stilliguamish Peak.
	N01°10'03"W	260.89ft. 79.52m	
	N13°12'49"W	207.25ft. 63.17m	
	N33°52'03"W	241.00ft. 73.46m	
	N15°07'43"W	239.60ft. 73.03m	
	N02°39'03"E	651.93ft. 198.71m	Along the crest of Stilliguamish Peak.
	N09°26'38"E	236.15ft. 71.98m	
	N04°04'26"W	565.74ft. 172.44m	
	N38°37'02"E	172.14ft. 52.47m	
	N38°50'42"E	166.40ft. 50.72m	
176			An unnamed secondary summit of Stilliguamish Peak, map elevation 5442 feet, at the head of the divide between Perry Creek, Beaver Creek, and South Fork of Falls Creek, thence along said divide between Perry Creek and South Fork of Falls Creek, along the crest of Stilliguamish Peak.
	S52°12'20"E	390.81ft. 119.12m	
	S61°48'49"E	149.34ft. 45.52m	
	S77°17'32"E	298.29ft. 90.92m	Descending along said divide.
	S86°13'34"E	174.48ft. 53.18m	
	N37°22'47"E	92.91ft. 28.32m	

	N01°08'45"W	173.92ft. 53.01m	
182			A saddle on the crest of Stilliguamish Peak, thence continue ascent of Stilliguamish Peak to the named summit.
	N61°23'51"E	407.77ft. 124.29m	
	N74°51'12"E	238.58ft. 72.72m	
	N04°04'26"W	565.74ft. 172.44m	Ascending along said divide, toward summit of Stilliguamish Peak.
	N38°37'02"E	172.14ft. 52.47m	
	N38°50'42"E	166.40ft. 50.72m	
187			The summit of Stilliguamish Peak, and the Point of Beginning.

Containing 2345.03 acres (949.025 hectares), more or less.

PERRY CREEK RESEARCH NATURAL AREA

The above written description accurately depicts, to the best of my ability, that parcel of land intended for use as a Research Natural Area.

Forrest Shoemaker

Forrest Shoemaker
FOREST LAND SURVEYOR

8 July 1997
DATE

FORREST B. SHOEMAKER
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES

Table 3. Vegetation cover types for Perry Creek RNA by various authors.

Vegetation Cover Types (Agee & Kertis 1986)	Acres	Hectares
Western hemlock	92	38
Pacific silver fir	806	327
Mountain hemlock	539	219
Hardwood	112	46
High shrub	263	107
Subalpine herb	233	95
Rock	283	115
Total	2328	942
SAF Forest Cover Types (Eyre 1980)		
205 Mountain Hemlock	539	219
221 Red alder	112	45
226 Coastal true Fir/Hemlock	806	327
230 Douglas fir/Western hemlock	92	37
Other	779	315
Total	2328	942
Kuchler (1964) potential natural vegetation		
2 Cedar/hemlock/Douglas-fir	92	37
3 Silver fir/Douglas-fir	806	327
4 Fir/hemlock	539	219
52 Alpine meadows and barren	516	209
Other	375	155
Total	2328	942
Franklin and Dyrness (1988) natural vegetation zones		
Tsuga heterophylla Zone	204	84
Abies amabilis Zone	1069	434
Tsuga mertensiana Zone	539	219
Timberline and alpine vegetation	233	95
Rock and talus	283	115
Total	2328	942
Henderson et al. (1992) Plant Association Groups		
Western Hemlock Dry Salal-Beargrass	22	9
Western hemlock Mesic Salal-Oregongrape	37	15
Western Hemlock Mesic Swordfern	59	24
Western hemlock Moist Swordfern	8	3
Silver Fir Dry Alaska Huckleberry	308	125
Silver Fir Mesic Salal-Oregongrape	12	5
Silver Fir Moist Alaska Huckleberry	332	134
Silver Fir Wet Shrub	8	3
Mountain Hemlock Dry Big Huckleberry	327	132
Mountain Hemlock Mesic Big Huckleberry	691	280
Mountain Hemlock Red Heather-Blueleaf Huckleberry	35	14
Mountain Hemlock Moist Alaska Huckleberry	192	78
Mountain Hemlock Wet Shrub	6	2

Non-Forest Cold	4	2
Non-Forest Mesic	2	1
Non-Forest Dry	48	19
Parkland	224	91
Undesignated	12	5
Total	2328	942

Potash (1993) Existing Dominant Vegetation		
Western Hemlock Forests with Cliffs	396	160
Silver Fir Forest with Alaska Yellow Cedar	200	81
Mountain Hemlock Forest	64	26
Subalpine Fir Forest	3	1
Red Alder Woodland	47	19
Maple Woodland	149	60
Sitka Alder / Mountain Ash Shrubland	49	20
Mosaic: Higher Elevation Closed Forest, Parkland, Talus, and Cliffs	830	336
Herb Rich Meadows with Patches of Mountain Hemlock Forest	272	110
Ladyfern Meadows	16	7
Juniper Meadows	4	2
Talus, Cliff, and Red Heather Meadows	155	63
Avalanche Chutes	24	10
Rock	117	47
Total	2328	942

Table 4. Average weather data from selected locations in the Perry Creek area. Length of record is noted below the data table.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
PRECIPITATION (inches)													
Everett	4.5	3.6	3.3	2.4	2.3	2.3	0.9	1.1	2.0	3.5	4.6	4.6	35.2
Gran. Falls	7.1	5.2	5.9	5.0	4.3	3.6	1.7	1.8	3.8	5.7	7.7	7.9	59.4
Big Four	18.6	13.0	16.5	9.2	8.1	8.2	3.3	3.0	8.5	12.2	19.8	22.1	142.5
SNOWFALL (inches)													
Gran. Falls	3.6	3.0	2.5	0.3						T	0.7	1.0	11.1
Scenic	62.3	59.0	49.8	14.7	1.6				0.2	2.6	22.8	53.7	266.7
Stev. Pass	100	78.4	74.4	30.8	9.9	.6			0.5	18.6	62.1	91.2	466.9
TEMPERATURE (°F)													
Everett													
max.	44.7	48.1	52.6	58.8	64.2	68.1	72.4	71.7	67.4	59.8	51.2	47.0	58.8
min.	32.5	33.9	36.5	40.4	45.1	49.7	52.3	51.9	48.3	43.7	37.6	35.5	42.3
mean	38.6	41.0	44.6	49.6	54.7	58.9	62.4	61.8	57.9	51.8	44.4	41.2	50.6
Stevens Pass													
max.	28.7	33.3	37.4	44.8	51.1	58.3	67.9	66.4	61.6	49.1	36.3	31.0	47.2
min.	18.0	21.3	22.7	28.6	33.7	39.6	44.6	44.8	40.9	34.8	25.7	21.2	31.3
mean	23.4	27.3	30.1	36.7	42.4	49.0	56.3	55.6	51.3	42.0	31.0	27.1	39.3

Weather Station	Length of Record	Data Source
Everett	1931-1960	(NOAA 1985)
Stevens Pass (Stev. Pass)	1939-1964	(NOAA 1985)
Scenic	1948-1970	NOAA library microfilm files, Seattle, WA
Granite Falls (Gran. Falls)		(Washington State University 1966)
Big Four		(Washington State University 1966)

Table 5. Documented vascular plants (and a few cryptogams) of the Perry Creek Research Natural Area [1]

Scientific name [2]	Common name [3]
Abies amabilis (Dougl.) Forbes	Pacific silver fir
Abies lasiocarpa (Hook.) Nutt.	Subalpine fir
Acer circinatum Pursh	Vine maple
Acer glabrum Torr.	Rocky Mountain maple
Acer macrophyllum Pursh	Big-leaf maple
Achillea millefolium L.	Commom Yarrow
Actaea rubra (Ait.) Willd.	Baneberry
Adenocaulon bicolor Hook.	American trailplant
Adiantum aleueticum (Rupr.) C.A. Paris [4]	Western maidenhair fern
Agrostis variabilis Rydb.	Mountain bentgrass
Alnus rubra Bong.	Red alder
Alnus viridis (Vill.) Lam. & DC. ssp. *sinuata* (Regel) A.& D. Love [5]	Sitka Alder
Antennaria lanata (Hook.) Greene	Woolly pussytoes
Antennaria rosea Greene	Rosy pussytoes
Aquilegia formosa Fisch.	Red columbine
Arabis furcata S. Wats.	Columbia Gorge rockcress
Arctostaphylos uva-ursi (L.) Spreng.	Kinnikinnick
Arenaria macrophylla Hook.	Bigleaf sandwort
Areneria rubella (Wahlenb.) J.E. Smith	Reddish sandwort
Arnica latifolia Bong.	Mountain arnica
Arnica mollis Hook.	Hairy arnica
Aruncus dioicus (Walt.) Fern. [6]	Bride's feathers
Asarum caudatum Lindl.	Wild ginger
Asplenium trichomanes L.	Maidenhair spleenwort
Asplenium trichomanes-ramosum L. [7]	Green spleenwort
Athyrium americanum (Butters) Maxon [8]	Alpine ladyfern
Athyrium filix-femina (L.) Roth.	Lady-fern
Blechnum spicant (L.) Roth.	Deer-fern
Botrychium lanceolatum (Gmel.)Angstr.	Lance-leaved grape-fern
Botrychium lunaria (L.) Swartz	Moonwort
Botrychium minganense Victorin	Victorin's grape-fern
Botrychium montanum W.H. Wagner	Mountain Moonwort
Botrychium multifidum (Gmel.) Trevis	Leathery grape-fern
Botrychium pinnatum H. St. John	Northern grape-fern
Botrychium simplex E. Hitchc.	Little grape-fern
Botrychium virginianum (L.) Swartz	Virginia grape-fern
Boykinia occidentalis Torr. & Gray [9]	Coastal brookfoam
Caltha leptosepala DC. ssp. *howellii* (Huth) P.G. Sm. [10]	Howell's marshmarigold
Campanula lasiocarpa Cham.	Mountain harebell
Campanula rotundifolia L.	Scotch bellflower
Cardamine sp. (white)	Bittercress
Carex aurea Nutt.	Golden sedge
Carex deweyana Schw.	Dewey's sedge
Carex lenticularis Michx.	Tufted sedge
Carex lenticularis Michx. var. *limnophila* (Holm) Cronq. [11]	Lakeshore sedge
Carex mertensii Prescott	Merten's sedge
Carex nigricans C.A. Mey.	Black alpine sedge

Carex pachystachya Cham. ex Steud.	Chamisso sedge
Carex spectabilis Dewey	Showy sedge
Cassiope mertensiana (Bong.) D. Don	White mountain heather
Castilleja rupicola Piper ex Fern.	Cliff Indian paintbrush
Cerastium arvense L.	Field chickweed
Chamaecyparis nootkatensis (D.Don) Spach	Alaska yellowcedar
Circaea alpina L.	Enchanter's nightshade
Cirsium edule Nutt.	Indian thistle
Elliottia pyroliflorus (Bong.) S.W. Brim & P.F. Stevens [12]	Copper-bush
Claytonia sibirica L.	Siberian springbeauty
Claytonia sp.	Springbeauty
Clintonia uniflora (Schult.) Kunth.	Queen's cup
Corallorrhiza mertensiana Bong.	Pacific coralroot
Cornus canadensis L.	Bunchberry
Cornus sericea L. ssp. *sericea* L. [13]	Red osier dogwood
Cryptogramma acrostichoides R. Br. [14]	Rock-brake
Cystopteris fragilis (L.) Bernh.	Brittle bladder-fern
Dendroalsia abietina	
Dicentra formosa (Andr.) Walp.	Pacific bleedingheart
Disporum hookeri (Torr.) Nicholson	Hooker fairy-bell
Dryopteris expansa (K. Presl) Fraser-Jenkins & Jermy [15]	Spreading woodfern
Dryopteris filix-mas (L.) Schott	Male fern
Elmera racemosa (S. Wats.) Rydb.	Yellow coralbells
Elymus glaucus Buckl.	Blue wildrye
Epilobium luteum Pursh	Yellow willowherb
Eriogonum umbellatum Torr. [16]	Sulphur wildbuckwheat
Epilobium anagallidifolium Lam. [17]	Alpine willowherb
Epilobium angustifolium L.	Fireweed
Epilobium ciliatum Raf. ssp. *watsonii* (Barbey) Hoch & Raven [18]	Northern willowherb
Epilobium lactiflorum Hausskn. [19]	Milkflower willowweed
Erigeron aureus Greene	Golden fleabane
Erigeron perigrinus (Pursh) Greene	Subalpine daisy
Festuca occidentalis Hook.	Western fescue
Fragaria vesca L.	Woods strawberry
Frangula purshiana (DC.) Cooper [20]	Pursh's buckthorn
Galium aparine L.	Stickywilly
Galium oreganum Britt.	Oregon bedstraw
Geum triflorum Pursh	Prairiesmoke
Gaultheria shallon Pursh	Salal
Goodyera oblongifolia Raf.	Western Rattlesnake-plantain
Gymnocarpium disjunctum (Rupr.) Ching [21]	Pacific oak-fern
Heracleum maximum Bartr. [22]	Common cow-parsnip
Heuchera glabra Wildl.	Smooth alumroot
Heuchera micrantha Dougl. ex Lindl. var. *diversifolia* (Rydb.) Rosen., Butt., & Lak.	Crevice alumroot
Hieracium albiflorum Hook.	White hawkweed
Hieracium gracile Hook.	Slender hawkweed
Holodiscus discolor (Pursh) Maxim.	Oceanspray
Huperzia chinensis (Christ) Czern. [23]	Chinese clubmoss
Huperzia selago (L.) Bernh. ex Mart. & Schrank [24]	Fir clubmoss
Hypericum anagalloides C. & S.	Bog St. John's-wort

Hypogymnia enteromorpha	
Hypogymnia inactiva	
Juncus drummondii E. Mey.	
var. *subtriflorus* (E. Mey.) C.L. Hitchc.	Threeflower rush
Juncus mertensianus Bong.	Mertens' rush
Juncus parryi (?) Engelm.	Parry's rush
Juniperus communis L.	Common juniper
Leptarrhena pyrolifolia (D. Don) R. Br. ex Ser.	Fireleaf leptarrhena
Lilium columbianum Hanson	Tiger lily
Linnaea borealis L.	Twinflower
Listera cordata (L.) R. Br. ex Ait. f.	Heartleaf twayblade
Lobaria hallii	
Lobaria pulmonaria	
Lomatium martindalei (Coult. & Rose) Coult. & Rose	Cascade desertparsley
Luetkea pectinata (Pursh) Kuntze	Partridgefoot
Luina hypoleuca Benth.	Littleleaf silverback
Lupinus latifolius Agardh.	Broadleaf lupine
Lupinus arcticus S. Wats. ssp. *subalpinus* (Piper & B.L. Robins.) D. Dunn [25]	Subalpine lupine
Luzula divaricata S. Wats.	Forked woodrush
Luzula glabrata (Hoppe ex Rostk.) Desv. var. *hitchcockii* (?) (Hamet-Ahti) Dorn [26]	Hitchcock's smooth woodrush
Luzula parviflora (Ehrh.) Desv.	Smallflowered woodrush
Luzula piperi (Coville) M.E. Jones	Piper's woodrush
Lycopodium clavatum L.	Elk-moss
Lycopodium miyoshianum Makino	
Lycopodium selago L.	Fir clubmoss
Lycopodium sitchense Rupr.	Sitka clubmoss
Mahonia nervosa (Pursh) Nutt. var. *nervosa* (Pursh) Nutt. [27]	Cascade Oregongrape
Maianthemum dilatatum (Wood) Nels. & Macbr.	False lily-of-the-valley
Maianthemum racemosum (L.) Link [28]	Feathery false Solomon's seal
Maianthemum stellatum (L.) Link [29]	Starry false Solomon's seal
Melica smithii (Porter ex Gray) Vasey	Smith's melicgrass
Melica subulata (Griseb.) Scribn.	Alaska oniongrass
Menziesia ferruginea Smith.	Fool's huckleberry
Mimulus guttatus DC.	Seep monkeyflower
Mimulus lewisii Pursh	Lewis' monkey-flower
Minuartia rubella (Wahlenb.) Hiern [30]	Beautiful sandwort
Mitella breweri Gray	Brewer's mitrewort
Mitella pentandra Hook.	Fivestamen miterwort
Moehringia macrophylla (Hook.) Fenzl [31]	Largeleaf sandwort
Orthilia secunda (L.) House [32]	Sidebells wintergreen
Monotropa hypopithys L. [33]	Pinesap
Montia parvifolia (Moc.) Greene	Littleleaf montia
Montia parvifolia (Moc. ex DC.) Greene ssp. *flagellaris* (Bong.) Ferris [34]	Littleleaf miners lettuce
Montia siberica (L.) Howell	Western springbeauty
Oplopanax horridus Miq. [35]	Devil's club
Oxyria digyna (L.) Hill	Alpine mountainsorrel
Paxistima myrsinites (Pursh) Raf. [36]	Mountain-box
Pedicularis bracteosa Benth.	Bracted lousewort
Pedicularis groenlandica Retz.	Elephanthead lousewort
Pedicularis ornithorhyncha Benth.	Ducksbill lousewort

Penstemon davidsonii Greene	
var. *menziesii* (Keck) Cronq.	Menzies' penstemon
Penstemon serrulatus Menzies	Coast penstemon
Petasites frigidus (L.) Fries	
var. *nivalis* (Greene) Cronq.	Arctic sweet coltsfoot
Phacelia hastata Dougl. ex Lehm.	Silverleaf phacelia
Phacelia sericea (Graham) Gray	Silky phacelia
Phegopteris connectilis (Michaux) Watt [37]	Beechfern
Phleum alpinum L.	Alpine timothy
Phlox diffusa Benth.	Spreading phlox
Phyllodoce empetriformis (Sw.) D. Don	Red mountain-heather
Pinguicula macroceras Link [38]	California butterwort
Plantago aristata Michx.	Largebracted plantain
Platanthera sp.	Bog orchid
Poa secunda (?) J. Presl [39]	Sandberg bluegrass
Poa stenantha Trin.	Northern bluegrass
Poa trivialis (?) L.	Rough bluegrass
Polygonum bistortoides Pursh	American bistort
Polygonum newberryi Small	Newberry's knotweed
Polypodium glycyrrhiza D.C. Eat.	Licorice-fern
Polypodium amorphum Suksdorf [40]	Irregular polypody
Polypodium glycyrrhiza D.C. Eat.	Licorice-fern
Polystichum andersonii Hopkins	Anderson's sword-fern
Polystichum lonchitis (L.) Roth.	Mountain holly-fern
Polystichum munitum (Kaulf.) Presl	Common sword-fern
Polytrichum juniperinum Hedw.	Juniper polytrichum moss
Porella navicularis	
Pentaphylloides floribunda (Pursh) A. Love [41]	Shrubby cinquefoil
Prenanthes alata (Hook.) D. Dietr.	Western rattlesnake-root
Prunella vulgaris L.	Self-heal
Pseudotsuga menziesii (Mirbel) Franco	Douglas-fir
Pteridium aquilinum (L.) Kuhn.	Bracken fern
Pyrola asarifolia Michx	Wintergreen
Ranunculus repens L.	Creeping buttercup
Rhacomitrium elongatum	
Ribes bracteosum Dougl.	Stink currant
Ribes lacustre (Pers.) Poir.	Swamp gooseberry
Romanzoffia sitchensis Bong.	Sitka mistmaiden
Rosa gymnocarpa Nutt.	Baldhip rose
Rubus lasiococcus Gray	Roughfruit berry
Rubus leucodermis Dougl	Black raspberry
Rubus parviflorus Nutt.	Thimbleberry
Rubus pedatus J.E. Smith	Fiveleaved bramble
Rubus spectabilis Pursh	Salmonberry
Sagina saginoides (L.) Karst.	Arctic pearlwort
Salix scouleriana Barratt ex Hook.	Scouler's willow
Sambucus racemosa L.	Red elderberry
Saussurea americana D.C. Eat.	American saussurea
Saxifraga nelsoniana D. Don	
ssp. *cascadensis* (Calder & Savile) Hulten [42]	Cascade saxifrage
Saxifraga odontoloma Piper [43]	Brook saxifrage
Saxifraga bronchialis L.	Matted saxifrage
Saxifraga ferruginea Grah.	Rusty saxifrage
Sedum oreganum Nutt	Oregon stonecrop

Sedum spathulifolium Hook.	Broadleaf stonecrop
Selaginella wallacei Heiron.	Wallace's spike-moss
Silene parryi (S. Wats.) C.L. Hitchc. & Maguire	Parry's silene
Silene seelyi Morton & J.W. Thompson	Seely's catchfly
Silene suksdorfii B.L. Robins.	Suksdorf's silene
Solidago multiradiata Ait. var. *scopulorum* Gray	Manyray goldenrod
Sorbus sitchensis Roemer	Sitka mountain-ash
Spiraea splendens Baumann ex K. Koch var. *splendens* [44]	Mountain spirea
Stachys ciliata Epling [45]	Great hedgenettle
Stenanthium occidentale Gray	Western stenanthium
Streptopus amplexifolius (L.) DC.	Clasping-leaved twisted-stalk
Streptopus roseus Michx.	Rosy twisted-stalk
Symphoricarpos hesperius G.N. Jones [46]	Trailing snowberry
Taraxacum officinale G.H. Weber ex Wiggers	Common dandelion
Taxus brevifolia Nutt.	Pacific yew
Tellima grandiflora (Pursh) Dougl.	Fringecup
Thalictrum occidentale Gray	Western meadowrue
Thelypteris quelpaertensis (Christ) Ching [47]	Queensveil maiden fern
Thuja plicata Donn	Western redcedar
Tiarella trifoliata L. var. *trifoliata*	Threeleaf foamflower
Tiarella trifoliata var. *unifoliata* (Hook.) Kurtz.	Coolwort foamflower
Tofieldia glutinosa (Michx.) Pers.	Sticky tofieldia
Tolmiea menziesii (Pursh) T. & G.	Youth-on-age
Trifolium repens L.	White clover
Trillium ovatum Pursh	White trillium
Trimorpha acris (L.) Nesom [48]	Bitter boreal daisy
Trisetum cernuum Trin.	Nodding oatgrass
var. *canescens* (Buckl.) Beal [49]	Tall oatgrass
Trisetum spicatum (L.) Richter	Spike trisetum
Tsuga heterophylla (Raf.) Sarg.	Western hemlock
Tsuga mertensiana (Bong.) Carr	Mountain hemlock
Urtica dioica L.	Stinging nettle
Vaccinium deliciosum Piper	Blue-leaf huckleberry
Vaccinium membranaceum Dougl.	Thin-leaved blueberry
Vaccinium ovalifolium Smith [50]	Early blueberry
Vaccinium parviflolium Sm.	Red huckleberry
Vahlodea atropurpurea (Wahlenb.) Fries ex Hartman [51]	Mountain hairgrass
Valeriana sitchensis Bong.	Mountain heliotrope
Veratrum viride Ait.	American false hellebore
Veronica serpyllifolia L. ssp. *serpyllifolia* L.	Thymeleaf speedwell
Veronica wormskjoldii Roemer & J.A. Schultes	American alpine speedwell
Viola glabella Nutt.	Pioneer violet
Viola sempervirens Greene	Evergreen violet

[1] Based on species lists from Kruckeberg (1976), Alverson (1983), D. Wagner (personal communication), USFS ecology crews as per Henderson et al. (1992), Mt. Baker-Snoqualmie Botany Program database from field surveys by Potash and crews in 1993 and Delapp in 1994 (personal communication).

Table 5. Continued.
Documented vascular plants of Perry Creek RNA. [1]

[2,3] Hitchcock and Cronquist (1973) or as updated in Hickman (1993), Morin (1993), or Kartesz (1994). Tree names as per Little (1979). Final authority for botanical nomenclature within the United States Department of Agriculture is Kartesz (1994). For synonyms, see below.

? = Scientific names followed by question mark means that the idenitfication is probable but not 100% certain because the specimen was not in optimal condition for keying.

Synonomy. Because so many scientific names have recently been changed, the following list provides a cross-reference to the species names as they appear in Hitchcock and Cronquist (1973).
[4] *Adiantum pedatum*, [5] *Alnus sinuata*, [6] *Aruncus sylvester*, [7] *Asplenium viride*, [8] *Athyrium distentifolium*, [9] *Boykinia elata*, [10] *Caltha biflora*, [11] *Carex limnophila*, [12] *Cladothamnus pyroliflorus*, [13] *Cornus stolonifera*, [14] *Cryptogramma crispa*, [15] *Dryopteris austriaca*, [16] *Polygonum umbellatum*, [17] *Epilobium alpinum*, [18] *Epilobium watsonii*, [19] *Epilobium alpinum* var. *lactiflorum*, [20] *Rhamnus purshiana*, [21] Gymnocarpium dryopteris, [22] *Heracleum lanatum*, [23] *Lycopodium miyoshianum*, [24] *Lycopodium selago*, [25] *Lupinus latifolius* var. *subalpinus*, [26] *Luzula hitchcockii*, [27] *Berberis nervosa*, [28] *Smilacina racemosa*, [29] *Smilacina stellata*, [30] *Arenaria rubella*, [31] *Arenaria macrophylla*, [32] *Pyrola secunda*, [33] *Hypopitys monotropa*, [34] *Montia parvifolia* var. *flagellaris*, [35] *Oplopanax horridum*, [36] *Pachystima myrsinites*, [37] *Thelypteris phegopteris*, [38] *Pinguicula vulgaris*, [39] *Poa gracillima*, [40] *Polypodium montense*, [41] *Potentilla fruiticosa*, [42] *Saxifraga punctata*, [43] *Saxifraga arguta*, [44] *Spiraea densiflora*, [45] *Stachys cooleyae*, [46] *Symphoricarpos mollis*, [47] *Thelypteris limbosperma*, [48] *Erigeron acris*, [49] *Trisetum canescens*, [50] *Vaccinium alaskaense* (subsumed into *V. ovalifolium*), [51] *Deschampsia atropurpurea*.

Table 6. List of mammals with suitable habitat within Perry Creek Research Natural Area; either as residents or transient species[1].

Order Scientific name	Common name	WA[2]	Fed[3]
Insectivora			
Neurotrichus gibbsi	Shrew-mole		
Scapanus orarius	Coast mole		
Sorex bendirei	Pacific water shrew	M	
Sorex cinereus	Masked shrew		
Sorex palustris	Water shrew		
Sorex trowbridgei	Trowbridge's shrew		
Sorex vagrans	Vagrant shrew		
Chiroptera			
Eptesicus fuscus	Big brown bat		
Lasionycteris noctivagans	Silver-haired bat		
Lasiurus cinereus	Hoary bat		
Myotis californicus	California myotis		
Myotis evotis	Long-eared myotis	M	
Myotis lucifugus	Little brown myotis		
Myotis yumanensis	Yuma myotis		
Plecotus townsendii	Townsend's big-eared bat	C	
Lagomorpha			
Lepus americanus	Snowshoe rabbit		
Ochotona princeps	Pika		
Rodentia			
Aplodontia rufa	Mountain beaver		
Erethizon dorsatum	Porcupine		
Eutamius amoenus	Yellow pine chipmunk		
Eutamius townsendi	Townsend chipmunk		
Glaucomys sabrinus	Northern flying squirrel		
Marmota caligata	Hoary marmot		
Microtus longicaudus	Long-tailed vole		
Microtus oregoni	Creeping vole		
Microtus richardsoni	Water vole		
Neotoma cinerea	Bushy-tailed woodrat		
Ondatra zibethica	Muskrat		
Peromyscus maniculatus	Deer mouse		
Phenacomys intermedius	Heather vole		
Spermophilus saturatus	Cascade golden-mantled ground squirrel		
Tamiasciurus douglasi	Douglas squirrel		
Tamiasciurus hudsonicus	Red squirrel		
Zapus trinotatus	Pacific jumping mouse		
Carnivora			
Canis latrans	Coyote		
Canis lupus	Gray wolf	E	E
Felis concolor	Mountain lion		
Gulo gulo	Wolverine	M	C2

Lynx rufus	Bobcat		
Martes americana	Marten		
Martes pennanti	Fisher	S	C2
Spilogale putorius	Spotted skunk		
Mustela erminea	Ermine		
Mustela frenata	Long-tailed weasel		
Mustela vison	Mink		
Procyon lotor	Raccoon		
Ursus americana	Black bear		
Ursus arctos	Grizzly bear	E	T
Vulpes fulva	Red fox		
Artiodactyla			
Odocoileus hemionus	Mule deer		
Oreamnos americanus	Mountain goat		

[1] Species list adapted from Agee and Wasem (1987). Inventories have not been performed.

[2] E = Endangered, C = Candidate S = Sensitive, M = Monitor, Washington Department of Wildlife (1991).

[3] E = Endangered, C2 = category 2 Candidate, United States Department of the Interior, USFWS (1991 and 1992).

Table 7. List of birds with suspected presence within the Perry Creek Research Natural Area as suitable habitat exists[1].

Scientific name[2]	Common name	WA[3]	Fed[4]
Accipiter cooperii	Cooper's hawk		
Accipiter gentilis	Northern goshawk	C	
Accipiter striatus	Sharp-shinned hawk		
Actitis macularia	Spotted sandpiper		
Aegolius acadicus	Northern saw-whet owl		
Anthus spinoletta	Water pipit		
Aquila chrysaetos	Golden eagle	C	
Ardea herodias	Great blue heron		
Asio otus	Long eared owl		
Bombycilla cedrorum	Cedar waxwing		
Bombycilla garrula	Bohemian waxwing		
Bonasa umbellus	Ruffed grouse		
Brachyramphus marmoratus	Marbled murrelet	C	T
Bubo virginianus	Great horned owl		
Buteo jamaicensis	Red-tailed hawk		
Carpodacus purpureus	Purple finch		
Catharus guttatus	Hermit thrush		
Catharus ustulatus	Swainson's thrush		
Certhia familiaris	Brown creeper		
Chaetura vauxi	Vaux's swift	C	
Chordeiles minor	Common nighthawk		
Cinclus mexicanus	American dipper		
Circus cyaneus	Northern harrier		
Colaptes auratus	Northern flicker		
Columba fasciata	Band-tailed pigeon		
Contopus borealis	Olive-sided flycatcher		
Contopus sordidulus	Western wood peewee		
Corvus brachyrhynchos	American crow		
Corvus corax	Common raven		
Cyanocitta stelleri	Steller's jay		
Cypseloides niger	Black swift	M	
Dendragapus obscurus	Blue grouse		
Dendroica coronata	Yellow-rumped warbler		
Dendroica nigrescens	Black-throated gray warbler		
Dendroica petechia	Yellow warbler		
Dendroica townsendi	Townsend's warbler		
Dryocopus pileatus	Pileated woodpecker	C	
Dumetella carolinensis	Catbird		
Empidonax difficilis	Western flycatcher		
Empidonax hammondii	Hammond's flycatcher		
Empidonax oberholseri	Dusky flycatcher		
Empidonax traillii	Willow flycatcher		
Falco columbarius	Merlin	M	
Falco peregrinus	Peregrine falcon	E	E
Falco sparverius	American kestrel		
Glaucidium gnoma	Pygmy owl		
Hesperiphona vespertina	Evening grosbeak		

Hylocichla ustulata	Swainson's thrush		
Ixoreus naevius	Varied thrush		
Junco hyemalis	Dark-eyed junco		
Lagopus leucurus	White-tailed ptarmigan		
Leucosticte tephrocotis	Gray-crowned rosy finch		
Loxia curvirostra	Red crossbill		
Loxia leucoptera	White-winged crossbill		
Melospiza lincolnii	Lincoln's sparrow		
Myadestes townsendi	Townsend's solitaire		
Nucifraga columbiana	Clark's nutcracker		
Oporornis tolmiei	MacGillivray's warbler		
Otus kennicottii	Western screech-owl		
Parus atricapillus	Black-capped chickadee		
Parus gambeli	Mountain chickadee		
Parus rufescens	Chestnut-backed chickadee		
Passerella iliaca	Fox sparrow		
Passerina amoena	Lazuli bunting		
Perisoreus canadensis	Gray jay		
Petrochelidon pyrrhonata	Cliff swallow		
Pheucticus melanocephalus	Black-headed grosbeak		
Picoides pubescens	Downy woodpecker		
Picoides villosus	Hairy woodpecker		
Pinicola enucleator	Pine grosbeak		
Pipilo erythrophthalmus	Rufous-sided towhee		
Piranga ludoviciana	Western tanager		
Regulus calendula	Ruby-crowned kinglet		
Regulus satrapa	Golden-crowned kinglet		
Selasphorus rufus	Rufous hummingbird		
Sialia currucoides	Mountain bluebird		
Sitta canadensis	Red-breasted nuthatch		
Sphyrapicus varius	Red-breasted sapsucker		
Spinus pinus	Pine siskin		
Stelgidopteryx serripennis	Northern rough-winged swallow		
Stellula calliope	Calliope hummingbird		
Strix occidentalis caurina	Northern spotted owl	E	T
Strix varia	Barred owl	M	
Tachycineta bicolor	Tree swallow		
Tachycineta thalassina	Violet-green swallow		
Thryomanes bewickii	Bewick's wren		
Troglodytes troglodytes	Winter wren		
Turdus migratorius	American robin		
Vermivora celata	Orange-crowned warbler		
Vermivora ruficapilla	Nashville warbler		
Vireo gilvus	Warbling vireo		
Vireo olivaceus	Red-eyed vireo		
Vireo solitarius	Solitary vireo		
Wilsonia pusilla	Wilson's warbler		
Zonotrichia leucophrys	White-crowned sparrow		

[1] Species list adapted from Agee and Wasem (1987), and from field observations. Inventories have not been performed.
[2] Peterson (1990).
[3] E = Endangered, C = Candidate, M = Monitor, Washington Department of Wildlife (1991).
[4] E = Endangered, T = Threatened, United States Department of the Interior, USF&WS (1991).

Table 8. Amphibians that may exist within Perry Creek Research Natural Area as suitable habitat is present[1].

Family Scientific name[1]	Common name	WA[2]	Fed[3]
Ambystomatidae			
Ambystoma gracile	Northwestern salamander		
Ambystoma macrodactylum	Western long-toed salamander		
Dicamptodontidae			
Dicamptodon ensatus	Pacific giant salamander		
Salamandridae			
Taricha granulosa	Rough-skinned newt		
Ascaphidae			
Ascaphus truei	Tailed frog	C	
Bufonidae			
Bufo boreas	Western toad		
Hylidae			
Hyla regilla	Pacific treefrog		
Ranidae			
Rana aurora	Northern red-legged frog		
Rana cascadae	Cascades frog		
Rana pretiosa	Spotted frog	C	P

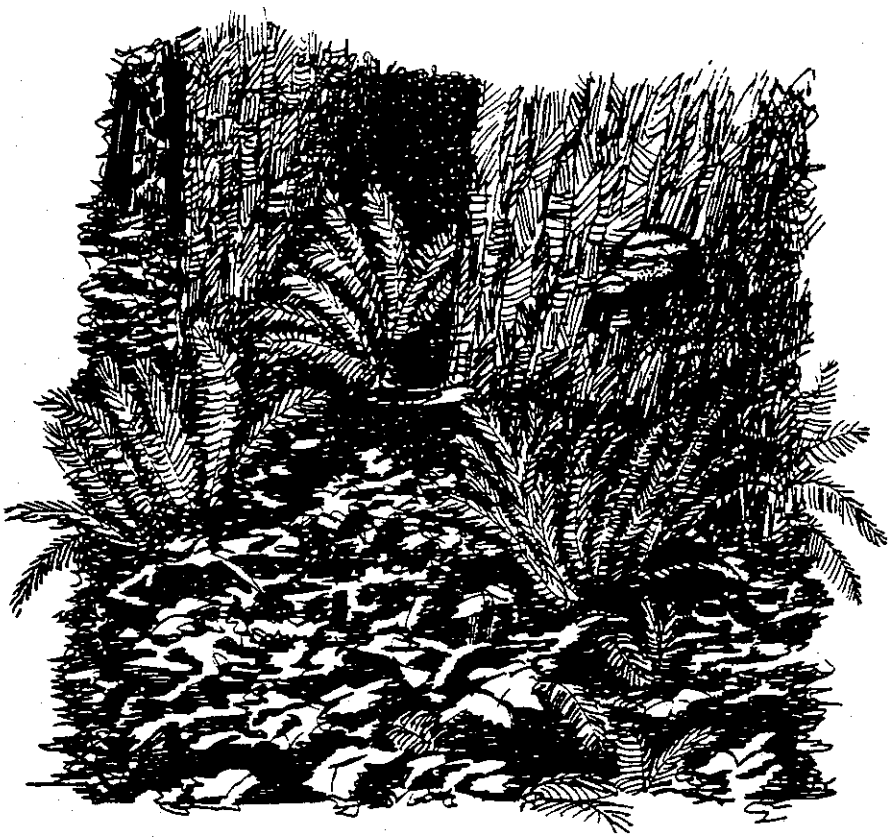
[1] Adapted from the habitat descriptions in Stebbins (1985) and USDI (1992). Inventories have not been performed.

[2] C = candidate, Washington Department of Wildlife (1991).

[3] P = petition for listing, United States Department of Interior (1992).

Perry Creek Research Natural Area

Environmental Assessment for Formal Establishment



March 1997

Mt. Baker-Snoqualmie National Forest
Pacific Northwest Region
USDA Forest Service

CHAPTER I - PURPOSE AND NEED

The Proposed Action

The proposed action is the establishment of the Perry Creek Research Natural Area (RNA). The Perry Creek area has long been recognized by the scientific community; it was recommended for RNA status in the Land and Resource Management Plan for the Mt. Baker Snoqualmie National Forest (USDA).

Purpose and Need

The purpose of establishing Perry Creek as a Research Natural Area is to preserve and maintain the unique assemblage of rare fern species under the national Research Natural Area system. Additional ecosystems found in Perry Creek and identified as cells (or ecosystems) that are needed to be represented and protected by an RNA are: Alaska cedar (in stand with mountain hemlock and subalpine fir) and heather-huckleberry community (USDA Forest Service, 1990).

The need, as stated in Research Natural Area needs in the Pacific Northwest (Dyrness et al, 1975), is to extend the coverage of the existing Western Cascade Province RNA network. Perry Creek was listed as a high priority for RNA status to protect "a unique assemblage of rare fern species" (Ibid). The site is well known and considered exceptional among pteridologists. In addition, Perry Creek contains representation of vegetation cells containing mountain hemlock and Pacific silver fir growing together in the same stands, Alaska-cedar in a subalpine forest (growing together with bigleaf maple), and heather/huckleberry communities -- all lacking within the northern portions of western Washington in the RNA system. Establishment of Perry Creek RNA, which contains each of these vegetation types, would broaden the RNA network's coverage of terrestrial biological diversity within the region, one of the objectives of the RNA system (Rolph and Agee, 1992).

An Establishment Record for Perry Creek has been prepared (Potash, 1996, unsigned), according to Forest Service Manual 4063. It was submitted to the Director, Pacific NW Research Station for concurrence and forwarding to the Regional Forester (the responsible official). However, though the report was deemed "...an outstanding piece of work," it cannot be signed, establishing Perry Creek RNA until the required environmental assessment is completed. There is a need to move ahead with this analysis and establish Perry Creek as part of the national system before this report becomes dated.

Location

The recommended Perry Creek RNA is located in the Darrington Ranger District, in the Perry Creek subwatershed, part of Upper Reach of the South Fork Stillaguamish River Watershed, Snohomish County, Washington. Refer to Figure I-1, on the following page. It is approximately 2,348 acres in size. Perry Creek is nestled between Stillaguamish Peak and Mt. Dickerman, T.30N., R.10 and 11E. It is easily accessible from the Mountain Loop Scenic Byway (State Route 92), via Forest Road 4063. At the end of this short road is an old log-landing site, with some parking space and the trailhead for Perry Creek trail #711. Refer to Figure I-2, on page I-3.

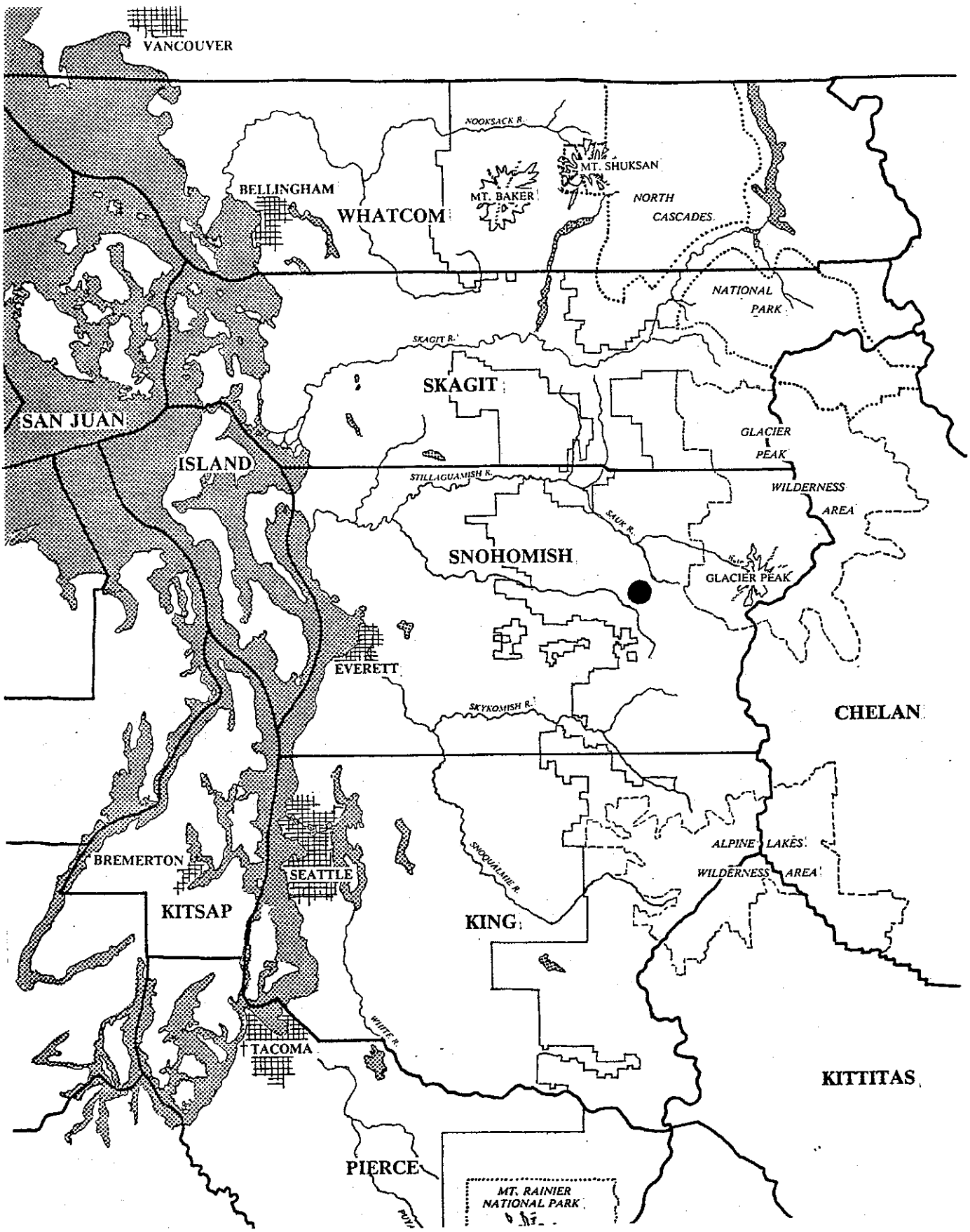
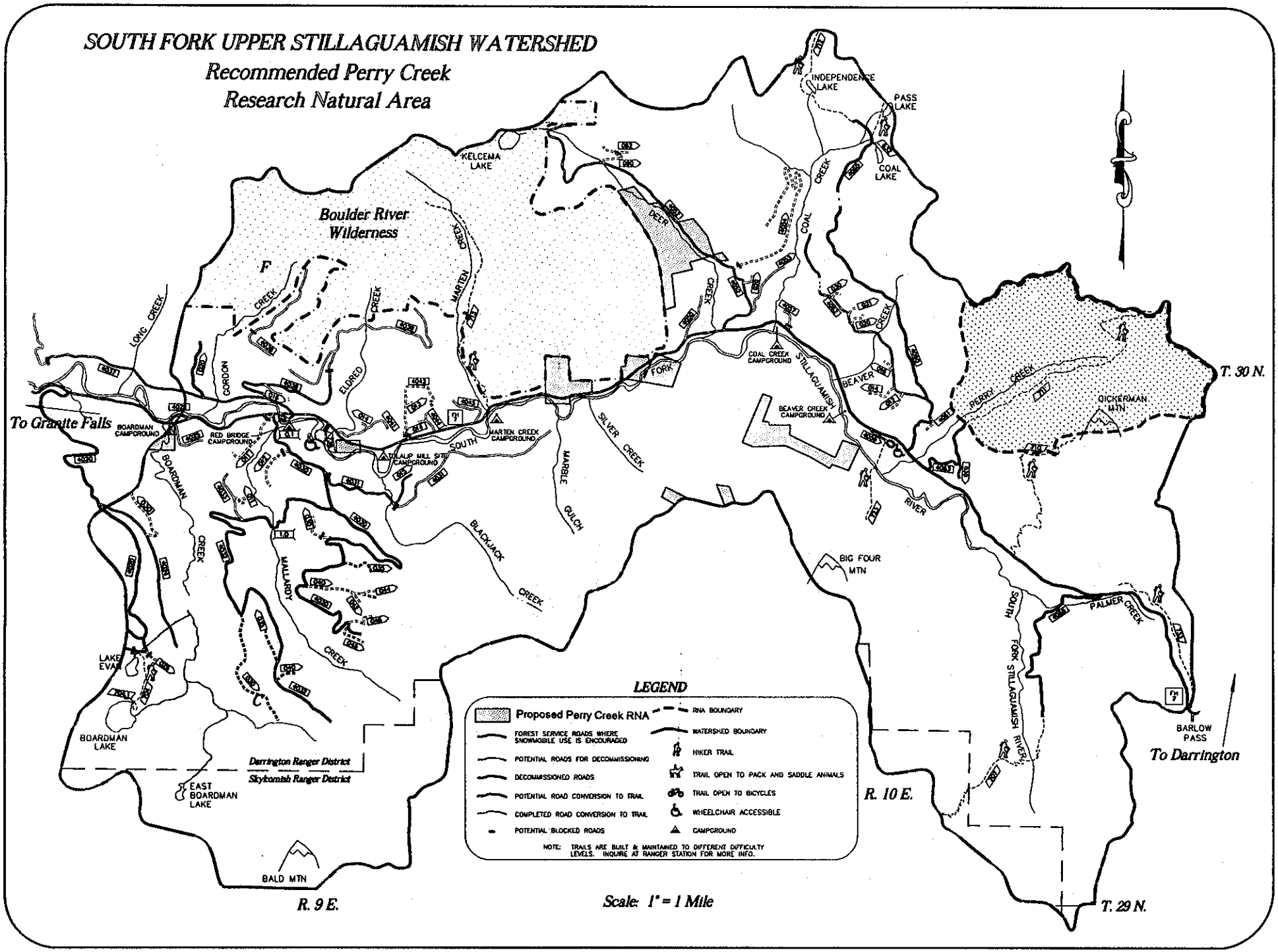


Figure I-1 Vicinity Map - Perry Creek Research Natural Area

Figure I-2


SOUTH FORK UPPER STILLAGUAMISH WATERSHED
Recommended Perry Creek
Research Natural Area
Boulder River Wilderness
KELCEMA LAKE
INDEPENDENCE LAKE
PASS LAKE
COAL LAKE
COAL CREEK
DEER CREEK
MARTEN CREEK
LONG CREEK
GORDON CREEK
ELDRED CREEK
To Granite Falls
BOARDMAN CAMPGROUND
RED BRIDGE CAMPGROUND
BOARDMAN CREEK
MALLARDY CREEK
PULALIP MILL SITE CAMPGROUND
SOUTH FORK
MARTEN CREEK CAMPGROUND
SILVER CREEK
MARBLE GULCH
BLACKJACK CREEK
COAL CREEK CAMPGROUND
STILLAGUAMISH RIVER
BEAVER CREEK
BEAVER CREEK CAMPGROUND
PERRY CREEK
QUICKERMAN MTN
T. 30 N.
BIG FOUR MTN
SOUTH FORK STILLAGUAMISH RIVER
PALMER CREEK
BARLOW PASS
To Darrington
LAKE EVAN
BOARDMAN LAKE
EAST BOARDMAN LAKE
Darrington Ranger District
Skykomish Ranger District
BALD MTN
R. 9 E.
R. 10 E.
T. 29 N.
Scale: 1" = 1 Mile
LEGEND
Proposed Perry Creek RNA
RNA BOUNDARY
FOREST SERVICE ROADS WHERE SNOWMOBILE USE IS ENCOURAGED
WATERSHED BOUNDARY
POTENTIAL ROADS FOR DECOMMISSIONING
HIKER TRAIL
DECOMMISSIONED ROADS
TRAIL OPEN TO PACK AND SADDLE ANIMALS
POTENTIAL ROAD CONVERSION TO TRAIL
TRAIL OPEN TO BICYCLES
COMPLETED ROAD CONVERSION TO TRAIL
WHEELCHAIR ACCESSIBLE
POTENTIAL BLOCKED ROADS
CAMPGROUND
NOTE: TRAILS ARE BUILT & MAINTAINED TO DIFFERENT DIFFICULTY LEVELS. INQUIRE AT RANGER STATION FOR MORE INFO.

Background Information

Research Natural Areas and Their Establishment

Research natural areas (RNA's) are part of a national network of field ecological areas designated for research and education. They aid in maintaining biological diversity on forest lands, serve as reference areas for the study of long-term ecological change, and offer scientists, biologists and others the opportunity to study plant communities and ecological processes in unmodified conditions (Franklin et al., 1972). Along with study, research and educational purposes, they provide gene pool preserves for plant and animal species, especially rare and endangered species. RNA's also preserve prime examples of common communities that can serve as a baseline for comparison.

The protection of these natural areas began through a 1912 Act of Congress. The first Forest Service RNA was established in 1927. Other Federal agencies, including The Bureau of Indian Affairs, Bureau of Land Management, the National Park Service, the U.S. Fish and Wildlife Service, the Department of Energy, Tennessee Valley Authority, and U.S. Army Corps of Engineers have classified lands as research natural areas. Each agency involved develops criteria for selecting and managing RNA's, but with very similar objectives.

State and private partners, such as the Nature Conservancy, also work with Federal agencies to support the RNA system. All agencies involved, plus the Pacific Northwest Research Natural Area Committee, continue to search for additional areas to provide needed representation of major forest, range communities, and aquatic features as well as for unique and rare species.

Once candidate areas are identified, suitability is determined.

> For Perry Creek, the process was completed in the Mt. Baker-Snoqualmie Land and Resource Management Plan (Forest Plan) and the Final Environmental Impact Statement that accompanied it (USDA, Forest Service 1990). In the Forest Plan Record of Decision, signed by the Regional Forester, Perry Creek was recommended for formal establishment.

Establishment of a Forest Service RNA is accomplished through completion of an establishment report, following USDA FS protocol, and a combined Decision Notice/Designation Order, signed by the Regional Forester or Station Director. An environmental analysis (EA) is completed to accompany the decision notice.

> For Perry Creek, the environmental effects of a proposed RNA were analyzed in the Forest Plan FEIS. However, the site-specific analysis in this environmental assessment takes a hard look at any new issues and changed conditions since issuance of the Forest Plan, possible environmental consequences, and serves as a doublecheck that public support for the decision has not changed (USDA Forest Service, 1992).
>
> Initial scoping and public involvement for the Perry Creek site-specific analysis were completed in 1993. However, due to changing Forest priorities (watershed restoration, flood damage repair, and watershed analysis, for example), the EA was not completed.

Forest Plan Management Direction

The 1990 MBS Land and Resource Management Plan (Forest Plan) provides management direction for the three existing RNA's, in the form of forest-wide and management area standards and guidelines. Until established, recommended RNA's are managed under the same standards and guidelines. Recommended Perry Creek RNA has been managed under the standards and guidelines of MA 18, with boundaries as mapped in the Forest Plan. The most up-to-date mapping (1/97) of the recommended RNA shows the area is approximately 2,348 acres in size.

1994 ROD: In April, 1994, a major amendment to the Forest Plan was signed: the Record of Decision (ROD) for the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl. A comprehensive strategy for ecosystem management, the decision includes land allocations and management standards and guidelines. The ROD also established additional analysis requirements, prior to project implementation. This EA tiers to the Forest Plan, as amended by the 1994 ROD (and hereafter referred to as the Forest Plan).

> Perry Creek drainage is now part of the Independence Late Successional Reserve. These reserves are to be managed to protect and enhance old-growth forest conditions. The ROD Standards and Guidelines (C-11) include an exception for Research Natural Areas: RNA's take precedence over LSR standard and guidelines. A preliminary "merger" of the 1990 Plan and the ROD indicates the standards and guidelines for MA 18 are compatible, if not more restrictive, than those for Late Successional Reserves. An initial Assessment for Independence LSR was completed in March, 1995. This EA tiers to the Independence LSR Assessment.

A key concept of the ROD is the Aquatic Conservation Strategy, developed to restore and maintain the ecological health of watersheds and aquatic ecosystems. The four components of the Aquatic Conservation Strategy include land allocations -- Key Watersheds and Riparian Reserves -- plus watershed analysis and watershed restoration (USDA, USDI 1994).

> Perry Creek lies within a Tier I Key Watershed; portions of the recommended RNA are within the riparian reserve of Perry Creek. A watershed analysis for the Upper South Fork Stillaguamish River Watershed has been completed (April 1995). This EA tiers to the watershed analysis. In addition, a basin-wide wildlife habitat dispersal analysis was completed as part of the South Fork Lower Stillaguamish/Canyon Creek Watershed Analysis (August 1996).

Refer to the ROD for a complete description of these allocations, and applicable standards and guidelines.

New Issues, Changed Conditions

One issue has been raised related to the establishment of Perry Creek, as recommended in the 1990 Forest Plan. The Plan included a proposed 7.7 mile trail, Ridge Trail #716, in the pool of potential projects listed in the trail implementation schedule (Appendix E, and Table E-1). The trail would actually be 13 miles in length, and would traverse the ridge that forms the north/northeastern boundary of the recommended Perry Creek RNA. The primary

user objective of this trail would be pack and saddle. There is a demand for this type of use.

The establishment of the RNA at the size analyzed and recommended in the 1990 Forest Plan would preclude any future option for a trail along the ridge, unless the trail met the standards and guidelines for research natural areas.

> Standards and guidelines for recommended RNA's do not encourage recreation use; new trails are not normally constructed unless needed for research or in conformance with the purpose of the RNA. Recreation pack and saddle stock are prohibited (Management Area 18 - RNA, pages 4-252 to -256, 1990 Forest Plan).

The trail appendix of the Plan supports that "...all trail planning in these areas must conform to the Forest Plan" (USDA 1990, page E-2) and recognized that some of the Forest landbase has been designated to specific uses that affect or limit trail planning, including existing and recommended RNA's.

To protect the option for a trail along the ridge, especially with pack and saddle as the primary user objective, the boundary of the Recommended RNA would need to be adjusted to protect the unique resources of Perry Creek from the introduction of weeds and exotic plants by hikers and especially horses.

The Ridge Trail is currently one of numerous potential projects. There is no specific proposal to construct this trail, nor is any funding likely in the near future. Preliminary trail planning was done in the late 1960's; additional environmental (NEPA) analysis would be required prior to a decision and any construction. However, based on the scoping done for this EA in 1993, there is public interest in Trail #716. The comments received pre-date the ROD and allocation of this area to late successional reserve, but dispersed recreation uses are generally consistent with the objectives of LSR's (ROD C-18).) The effects of proposed new trail construction would be analyzed in light of the ROD allocations, the findings of the Late Successional Reserve Assessment, and the findings of the Watershed Analysis.

While not technically new information, this issue is analyzed in detail in this EA.

Decision to Be Made

The decision to be made is whether to establish Perry Creek, and if established, the location of the RNA boundary. A Forest Plan amendment would be included to add Perry Creek to the Established RNA list. The Plan amendment may also address the High Ridge Trail #716. Depending upon the decision, the amendment could remove the trail from the implementation schedules or change the primary user objective. A decision of no action would result in Perry Creek remaining a recommended RNA, as per the Forest Plan.

<u>Not to be decided</u> are any future actions regarding trail construction along the ridge.

Also not considered in this analysis is the option to allocate Perry Creek to another use, such as Botanic Area or other allocation (based on the Regional Forester's recommendation, and the public comment received on the EIS for the 1990 Forest Plan).

Public Participation

Scientific and public interest in Perry Creek has been on-going since the 1930's (Rolph and Agee, 1992). Botanical exploration began that decade, with scientists and naturalists returning to the area since then. The most prominent field trip to Perry Creek occurred in 1969, when scientists attending the 12th International Botanical Congress visited the site. Today, field trips are led by many local botanical groups, including the Washington Native Plant Society.

Public input collected during the Forest Plan process, in the late 1980's, was generally favorable to designating additional RNA's on the Forest. Of the 76 respondents mentioning Perry Creek by name, only one input stated it should not be an RNA. Comments ranged from "protect from harvest" to "build a trail/valuable for recreation" (USDA Forest Service, 1989).

Public involvement for this analysis began in January, 1993. An information letter and map was mailed to approximately 185 individuals, agencies, Tribes, and organizations. Preliminary issues and three alternatives were summarized. The public was asked to identify additional issues or concerns and comment on the preliminary alternatives. A total of 22 replies were received. A fourth preliminary alternative was developed, in response to the first set of comments. It was described in a follow-up letter mailed in February; this letter generated 11 more responses. The comments received are summarized more completely in Appendix A, and available in the analysis file for this EA.

In January 1997, a letter was mailed to the three interested Indian Tribes, informing them of the upcoming release of this environmental assessment and public comment period.

Significant Issues

The preliminary issues were identified and sent to the public in 1993. Issues raised by the public included: need for more recreation trails; need for more stock trails; concern for adverse impacts to the significant and unique resources of Perry Creek; the concern for introduction of weeds and exotic plants by horses (and to a lesser degree by hikers); concern for impacts of additional recreation use (if the trail were built) on mountain goats; and the need to keep the scientific validity of the boundaries and not reduce the size of the RNA.

The interdisciplinary team combined the issues in a set of two, listed below. These were used to develop a range of alternatives and appropriately narrow the scope of this analysis. While Forest management direction has changed significantly since 1993, these issues are still valid.

1. Protection of the ecosystem and the values for which the Perry Creek Research Natural Area was proposed. This issue includes: concern for the introduction of exotic species and waste materials into the Perry Creek drainage by hikers, horses, dogs, etc.; and impacts on sensitive, threatened, and endangered species.

2. Public demand for more recreational opportunities, including hiking trails, trails for pack and saddle stock, and trails for mountain biking. Included in this issue: impacts from user or "social" trails in the upper drainage; and potential for increased use of the existing Perry Creek trail #711.

Management Plan for Perry Creek RNA

Once the Decision Notice/Finding of No Significant Impact for this analysis has been signed and the Establishment Record accepted, a management plan with monitoring will be prepared for Perry Creek.

CHAPTER II - ALTERNATIVES

Alternative Development Process

Based on the preliminary issues and new information since the Forest Plan was implemented in June 1990, the interdisciplinary team (ID team) developed three preliminary alternatives. These were briefly described in a January, 1993 letter inviting public participation in the planning effort for Perry Creek.

Comments received from the public prompted development of a fourth alternative. The team again asked for public comments, and considered but did not develop in detail several other alternatives (see below). Refer to Appendix A for a discussion of the comments received.

The 1990 Forest Plan listed Perry Creek Recommended RNA as totalling approximately 2,066 acres. More accurate mapping was completed during the preparation of the Establishment Record and through the use of Geographic Information Systems. The most accurate estimate of the size of the recommended RNA is about 2,348 acres. This figure will be used in this analysis when referring to the RNA as recommended in the Forest Plan.

Alternatives Not Considered in Detail

As discussed in Chapter 1, the interdisciplinary team did not consider any alternative that would reallocate Perry Creek to some other management area (such as Botanic area or semi-primitive nonmotorized recreation). Neither Forest Service nor public participants in this analysis suggested any other allocations.

Alternatives not considered in detail include:

a. Formally establish Perry Creek as an RNA, approximately 2,348 acres in size as per the boundaries recommended in the Forest Plan; close and obliterate the existing trail on the valley bottom (Perry Creek Trail #711); and close and obliterate Forest Service Road 4063, which accesses Trail #711. Any future trail construction along the ridge would be precluded.

   It is recognized that the Perry Creek Trail #711 is accessible from the Mountain Loop Scenic Byway and receives considerable recreation use. Trampling of sensitive species, plant collection, and the introduction of exotic species <u>is</u> a concern. But Perry Creek is a known site and the trail has a 60-year history of use. It also provides access for research. If the trail were closed, experience has shown that recreation users would still visit the area, potentially causing more trampling and resource impacts than those associated with the managed use offered by the existing developed trail. Access for research would also be lost. Therefore, this alternative was not developed in detail. The standards and guidelines for Management Area 18 allow use of permits or closures, if needed for protection of the RNA values.

b. Also not considered in detail was an alternative to close the existing Perry Creek Trail #711 and establish a slightly smaller Perry Creek RNA of

approximately 1,850 acres, with the boundary dropped down from the ridge, leaving open the future option for a Ridge Trail. Two alternatives analyzed in detail address a smaller RNA, with the future option for the High Ridge Trail left open. The alternative of closing Trail #711 is addressed above.

Alternative Considered in Detail

The four alternatives examined in detail are described below. Maps of the alternatives can be found on pages II-6 and II-7; see figure II-3, on page II-8 for a map comparing the boundaries of Alternatives 1 and 2, and 3 and 4.

Alternative 1 - No Action (Continue As Recommended RNA)

In this alternative, the current management direction under the Forest Plan (as amended by the 1994 ROD) would be continued. Perry Creek would be managed as a Recommended RNA, approximately 2,348 acres in size.

- o The Forest-wide and Management Area 18 - Research Natural Area standards and guidelines would guide all activities, including recreation use of the existing Perry Creek Trail #711. Activities, including research, would meet or not prevent attainment of the Aquatic Conservation Strategy and be consistent with the Riparian Reserve standards and guidelines.

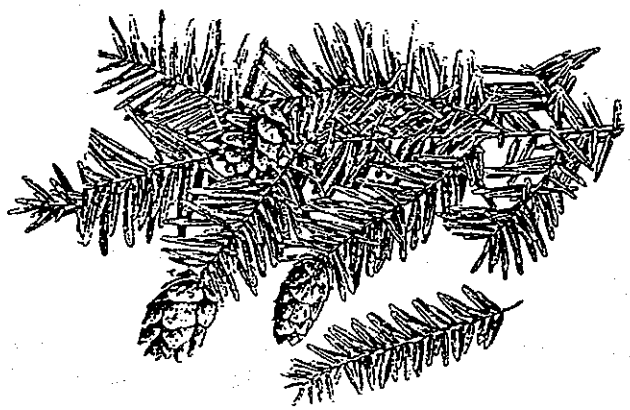
  The ROD states Research Natural Areas take precedence over Late-Successional Reserve standards and guidelines. This exception would also apply in this alternative, as Perry Creek as a Recommended RNA would continue to be managed under the same standards and guidelines as established RNA's (Management Area 18).

- o Any future trail construction along the ridge would be precluded, as per Forest Plan Management Area 18 standards and guidelines.

<u>Planned Monitoring</u>

- o Assess use activities within the RNA to assure consistency with the Forest Plan, including the Aquatic Conservation Strategy.

Refer to page II-6 for a map of Alternative 1, which has the same RNA boundary as Alternative 2.



Alternative 2 - Establish Perry Creek RNA as Recommended in the Forest Plan

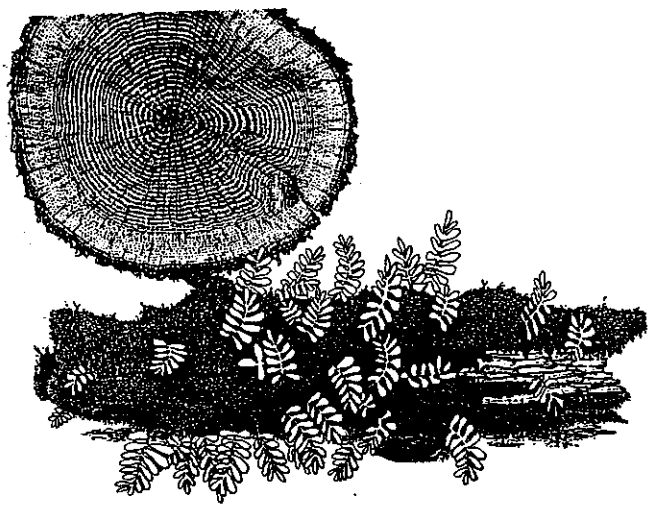
In this alternative, Perry Creek would be formally established as a Research Natural Area, approximately 2,348 acres in size up to the ridgeline, as per the boundaries recommended in the Forest Plan.

- o Once the Final Establishment Report is accepted and the decision made, a Management Plan would be prepared for Perry Creek RNA.
- o The legal description of the RNA boundary from the Establishment Report would be accepted.
- o The Forest-wide and Management Area 18 - Research Natural Area standards and guidelines would guide all activities within Perry Creek RNA, including recreation use of the existing Perry Creek Trail #711. Activities, including research, would meet or not prevent attainment of the Aquatic Conservation Strategy and be consistent with the Riparian Reserve standards and guidelines. Research Natural Areas take precedence over Late-Successional Reserve standards and guidelines.
- o Any future trail construction along the ridge would be precluded, as per Forest Plan Management Area 18 standards and guidelines.
- o Alternative 2 includes an amendment to the Forest Plan, which would: 1) establish Perry Creek as a Research Natural Area (rather than as a Recommended RNA); and 2) delete Ridge Trail #716 from the pool of possible projects, Table E-1, Trail Inventory in the Plan appendices. Refer to Appendix C of this EA for draft Plan amendments.

<u>Planned Monitoring</u>

- o Assess use activities within the RNA to assure consistency with the Forest Plan, including the Aquatic Conservation Strategy.

Refer to page II-6 for a map of Alternative 2, which has the same RNA boundary as Alternative 1.



Alternative 3 - Establish Smaller Perry Creek RNA, Retain Future Option for Ridge Trail, Primary User Objective: Pack and Saddle Stock

In Alternative 3, Perry Creek would be formally established as a Research Natural Area, approximately 1,850 acres in size. The boundary along the north to northeast side of the RNA in the upper watershed of Perry Creek would be dropped to the 4,600 foot contour. The option for possible future construction of a Ridge Trail is left open.

- o Once the Final Establishment Report is accepted and the decision made, a Management Plan would be prepared for Perry Creek RNA.

- o A legal description of the RNA boundary would be prepared (modified from that in the Establishment Report).

- o The Forest-wide and Management Area 18 - Research Natural Area standards and guidelines would guide all activities, including recreation use of the existing Perry Creek Trail #711, in Perry Creek RNA. Activities, including research, would meet or not prevent attainment of the Aquatic Conservation Strategy and be consistent with the Riparian Reserve standards and guidelines. Research Natural Areas take precedence over Late-Successional Reserve standards and guidelines.

- o Alternative 3 includes an amendment to the Mt. Baker-Snoqualmie National Forest Plan, which would: 1) establish Perry Creek as a Research Natural Area (rather than as a Recommended RNA); and 2) reallocate the 498 acres that were MA 18 in the Forest Plan to Management Area 1B - Semi-Primitive Nonmotorized Recreation and Late Successional Reserve. No changes would be made to Table E-1, Trail Inventory: the primary objective for the potential Ridge Trail #716 would remain pack and saddle stock. Refer to Appendix C of this EA for draft Plan amendments.

- o Prior to any trail construction, a site-specific environmental analysis with public involvement would be completed.

- o If future environmental analysis and a decision document approve construction of Ridge Trail #716, the design for that trail <u>will</u> include the following mitigation measures: the trail shall be closed to all uses except hiker, stock, and llama.

<u>Planned Monitoring</u>

- o Assess use activities within the RNA to assure consistency with the Forest Plan, including the Aquatic Conservation Strategy.

Refer to page II-7 for a map of Alternative 3, which has the same RNA boundary as Alternative 4.

Alternative 4 - Establish Smaller Perry Creek RNA, Retain Future Option for Ridge Trail, Change Primary User Objective to Hiker Only

As in Alternative 3, Perry Creek would be formally established as a Research Natural Area, approximately 1,850 acres in size. The boundary along the north to northeast side of the RNA in the upper watershed of Perry Creek would be dropped to the 4,600 foot contour. The option for possible future construction of a Ridge Trail is left open, with the primary objective for this trail changed to Hiker Only.

- o Once the Final Establishment Report is accepted and the decision made, a Management Plan would be prepared for Perry Creek RNA.

- o A legal description of the RNA boundary would be prepared (modified from that in the Establishment Report).

- o The Forest-wide and Management Area 18 - Research Natural Area standards and guidelines would guide all activities, including recreation use of the existing Perry Creek Trail #711, in Perry Creek RNA. Activities, including research, would meet or not prevent attainment of the Aquatic Conservation Strategy and be consistent with the Riparian Reserve standards and guidelines. Research Natural Areas take precedence over Late-Successional Reserve standards and guidelines.

- o Alternative 4 includes an amendment to the Mt. Baker-Snoqualmie National Forest Plan, which would: 1) establish Perry Creek as a Research Natural Area (rather than as a Recommended RNA); 2) reallocate the 498 acres that were MA 18 in the Forest Plan to Management Area 1B - Semi-Primitive Nonmotorized Recreation and Late Successional Reserve; and 3) in Plan appendices, Table E-1, Trail Inventory, change the primary objective for the potential Ridge Trail #716 to Hiker Only. Refer to Appendix C of this EA for draft Plan amendments.

- o Prior to any trail construction, a site-specific environmental analysis with public involvement would be completed.

- o If future environmental analysis and a decision document approve construction of Ridge Trail #716, the design for that trail <u>will</u> include the following mitigation measures: the trail shall be closed to all uses except hiker.

<u>Planned Monitoring</u>

- o Assess use activities within the RNA to assure consistency with the Forest Plan, including the Aquatic Conservation Strategy.

Refer to page II-7 for a map of Alternative 3, which has the same RNA boundary as Alternative 4.

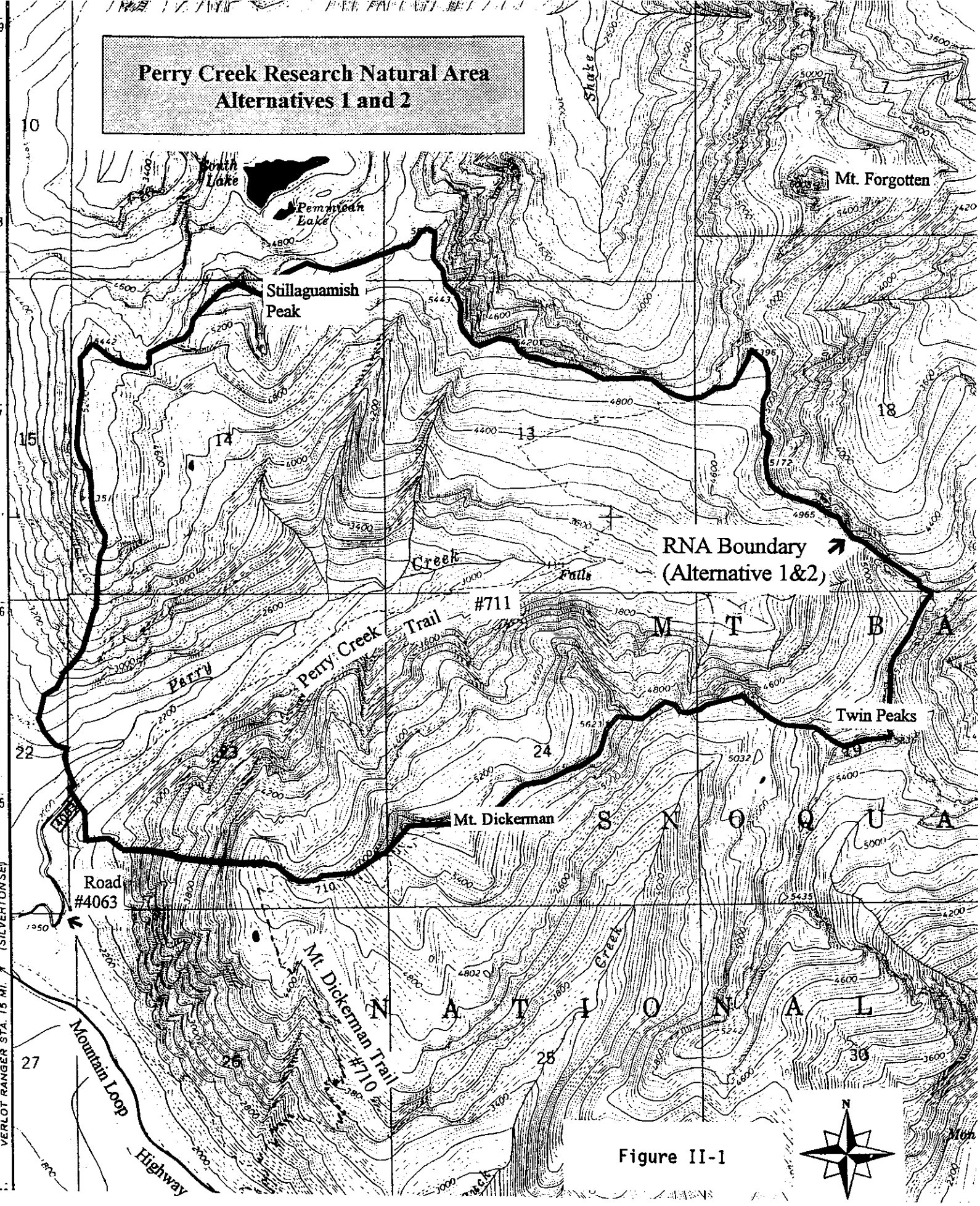

Perry Creek Research Natural Area
Alternatives 1 and 2
Mt. Forgotten
Stillaguamish Peak
RNA Boundary
(Alternative 1&2)
Perry Creek Trail
#711
Twin Peaks
Mt. Dickerman
Road #4063
Mt. Dickerman Trail #710
Mountain Loop Highway
M T B A
S N O Q U A
N A T I O N A L
Perry Creek
Falls
Pemmican Lake
Shake
N

Figure II-1

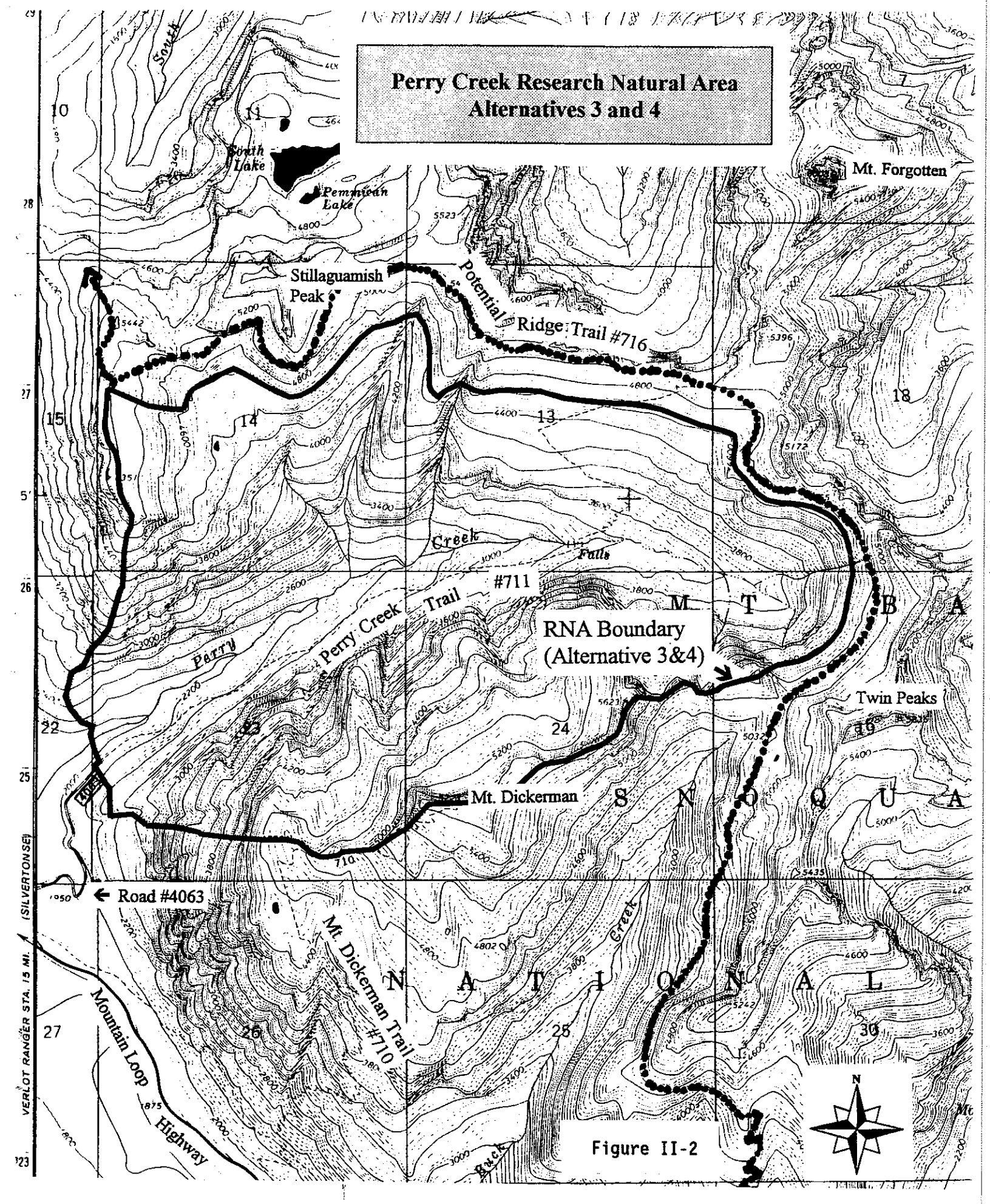

Perry Creek Research Natural Area
Alternatives 3 and 4
South Lake
Pemmican Lake
Stillaguamish Peak
Potential Ridge Trail #716
Mt. Forgotten
Creek
Falls
#711
Perry Creek Trail
Perry
RNA Boundary
(Alternative 3&4)
Twin Peaks
Mt. Dickerman
Road #4063
Mt. Dickerman Trail #710
Mountain Loop Highway
Creek
Buck
N
M T B A
S N O Q U A
N A T I O N A L
(SILVERTON SE)
VERLOT RANGER STA. 15 MI.

Figure II-2

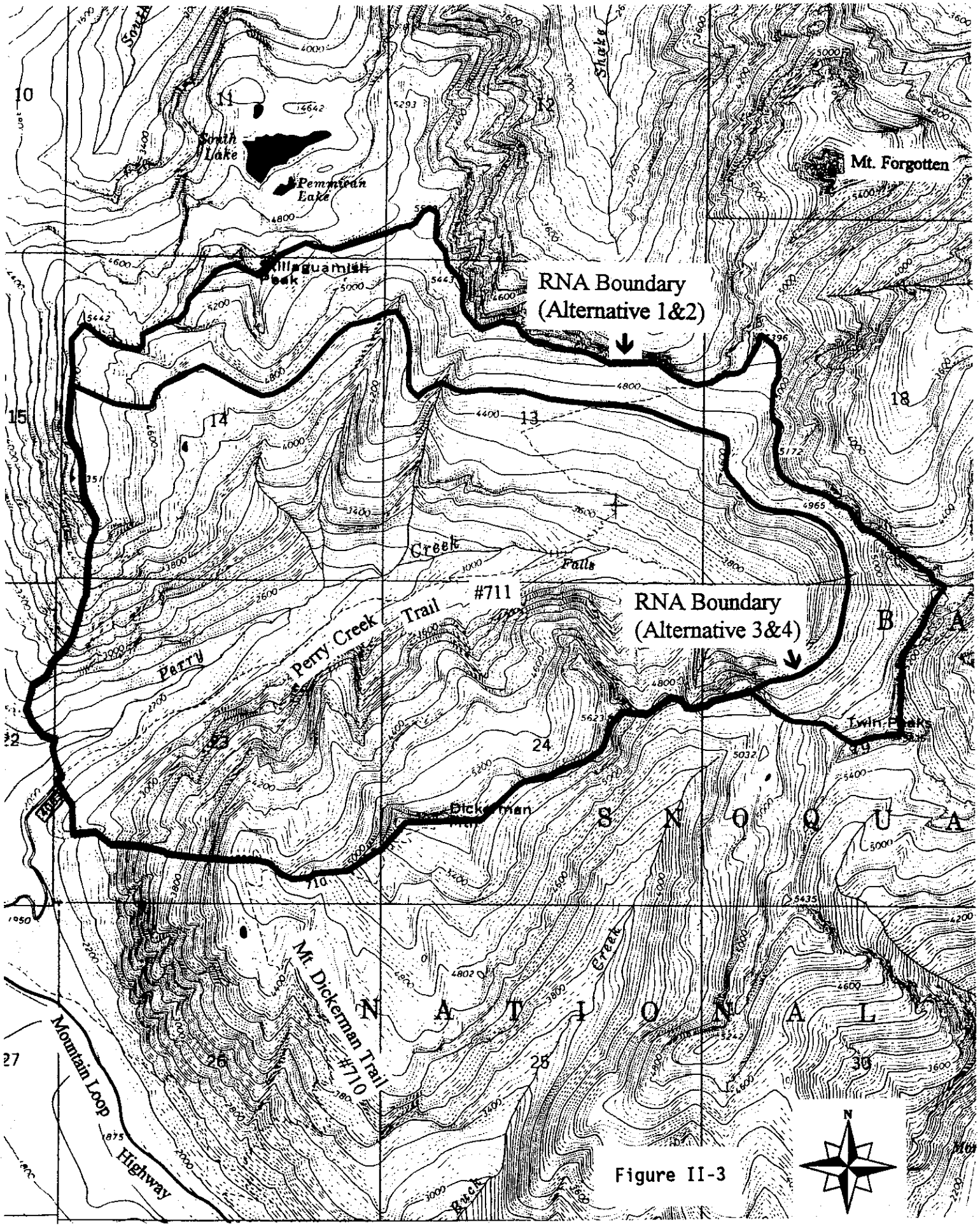

RNA Boundary
(Alternative 1&2)
RNA Boundary
(Alternative 3&4)
Mt. Forgotten
South Lake
Pemmican Lake
Illaguamish Peak
Perry Creek Trail
#711
Perry Creek
Falls
Dickerman
Mt. Dickerman Trail
#710
Mountain Loop Highway
Twin Peaks
Shake Creek
Back Creek
N A T I O N A L
S N O Q U A
B A
N

Figure II-3

CHAPTER III - AFFECTED ENVIRONMENT

This chapter includes a brief description of the affected environment in the Perry Creek drainage. This discussion forms the baseline for the estimated effects of implementing each alternative, discussed in Chapter IV. The reader should also refer to the Establishment Record (Potash 1996) for detailed descriptions of the natural resources and principal distinguishing features of this area. Additional discussions of the basin and larger watershed may be found in the Upper South Fork Stillaguamish Watershed Analysis (USDA Forest Service 1995), the Independence Late Successional Reserve (Initial) Assessment (USDA Forest Service 1995a), and the South Fork Lower Stillaguamish/Canyon Creek Watershed Analysis (USDA Forest Service 1996).

Topography, Soils, and Hydrology

The recommended RNA includes most of the Perry Creek subwatershed, except for the lowermost section of the creek. Perry Creek drains into the South Fork Stillaguamish River, about one mile southwest from the trailhead (refer to Figure I-2, page I-3). Perry Creek drains a particularly rugged, high mountain area with great vertical relief. From the valley bottom and the trailhead for Perry Creek Trail #711 (elevation 1,900 feet), the surrounding peaks and ridgeline soar to over 5,900 feet, at the summit of Twin Peaks. Other peaks surrounding the valley are Stillaguamish Peak (5,683 feet) and Mt. Dickerman (5,732 feet).

Cliff walls are common and year-round snowmelt feeds numerous Class III and IV streams, flowing down the steep valley walls to intersect with Perry Creek (a Class II stream). Bedrock in the eastern portion of the South Fork Upper Stillaguamish watershed, which includes the Perry Creek sub-watershed, is composed of Tertiary Period sedimentary and volcanic rocks (USDA Forest Service 1995). The fine-grained tertiary volcanic rocks are most easily weathered.

Cascading waterfalls, snow avalanches, and debris flows maintain a valley bottom composed predominately of boulder fields and rocky talus (Rolph and Agee 1992). Deep glacial, deep glacial lake-deposited, and deep and shallow residual soils are found in Perry Creek drainage, in a complex mosaic of units, due to past glaciation and more recent mass wasting and erosion (Snyder and Wade 1970).

The avalanches, rockfalls and debris flows from the steep valley walls continue to build a rocky substrate and talus slopes, which are suitable to seral hardwoods, deciduous shrub, herbaceous, and moss communities. Conifers that would normally succeed these vegetation types are not able to invade the talus slopes due to chronic disturbances, lack of mineral soil, water drainage, and summer drought conditions (Franklin and Dyrness 1988; Rolph and Agee 1992).

Present channel conditions in the South Fork Upper Stillaguamish watershed have recently been impacted by storms in the early 1980's, followed by two large rain-on-snow events in 1990 and 1991 (USDA Forest Service 1995). All of these storms caused significant channel and riparian impacts in the South Fork of the Stillaguamish River. However, because Perry Creek is relatively little developed by harvesting and roading and retains a fairly intact riparian

vegetation community, the flood impacts in Perry Creek were limited to some stream channel scour from sediment derived from the upper slope avalanche chutes, and short sections of stream braiding near the mouth of the creek (outside the RNA boundary) from sediment deposition.

Vegetation

The vegetation found within Perry Creek RNA is distinctive when compared with other valley areas found along the western slopes of the Cascade Mountains. The vegetation communities, and particularly the diversity and richness of fern species, are unique (Kruckeberg 1976). The site has been recognized as exceptional by the 12th International Botanical Congress. This international organization held a field trip at Perry Creek in 1969.

While Perry Creek drainage is best-known for its incredible diversity of ferns, there is also a great diversity of other vascular and non-vascular plant species in there as well, a result of the local microclimates and the dynamic history of disturbance (Potash 1996). All the forms of disturbance discussed above, along with infrequent wildfires, have affected the vegetation found in the recommended RNA.

In their analysis of the network of Research Natural Areas within the Pacific Northwest, Dryness et al.(1975) noted adding Perry Creek to the network was a high priority. In addition to the rare ferns, representation of several plant communities was lacking in the RNA system, including: subalpine forests composed of mountain hemlock, silver fir, and Alaska yellow cedar; and heather-huckleberry meadows. Perry Creek contains fine examples of each of these vegetation types.

Some of the principal distinguishing features in the Perry Creek RNA include:

<u>A diverse and rich assemblage of fern species</u>:

There are a total of 30 known species of ferns and fern allies in the Perry Creek recommended RNA, many of which are uncommon or rare (Potash 1996).

<u>Habitat and/or known presence of plant species of concern</u>:

In this document, species of concern refers to those species included on the Regional Forester's Sensitive Species List, those to be protected through survey and management standards and guidelines (Table C-3 of the ROD (USDA, USDI 1994) and commonly referred to as "survey and manage" species), and those listed in the ROD as protection buffer species.

In the Perry Creek drainage, six of the known fern species are included on the Regional Forester's Sensitive Species List (USDA Forest Service 1991). Two of these six ferns are also classified as Survey and Manage Component 1 species. Appropriate habitat for many of the non-vascular species discussed in the ROD standards and guidelines occurs within the Perry Creek drainage; however, field surveys have not been conducted to verify the presence of these species. Approved survey protocol has not yet been issued from the Regional Ecosystem Office.

A diverse and rich assemblage of cryptogams (nonvascular plants):

This includes the moss Dendroalsia abietina, which is unusual in Washington State. While many of the rare plants in the Stillaguamish drainage are more common in British Columbia or Alaska, this moss is typical of southwestern Oregon, where it grows on canyon live oak.

Presence of large old growth forest stands:

Old growth Douglas-fir, western hemlock, siver fir, and mountain hemlock forests can all be found within the Recommended RNA. Significant portions of these forests are considered suitable habitat for the northern spotted owl and marbled murrelet (USDA Forest Service 1995).

Presence of extensive hardwood and herbaceous communities:

The extent of these seral communities in the valley bottom is uncommon (Kruckeberg 1976); they are maintained primarily by snow avalanches. These communities contain a high diversity of plant and animal species.

Alaska yellow cedar, subalpine fir, and big leaf maple combination:

The existence of Alaska cedar and subalpine fir growing within hardwood communities dominated by big leaf maple is quite unusual.

Research Natural Area Boundaries -- Current Findings

Many scientists have stressed the importance of including entire watersheds, and in particular the entire upper watershed within the boundaries of RNA's. The ridgeline is recognized as a viable RNA boundary, as supported by the following discussion:

In a lecture on principles of natural area design, Franklin (1984) advises that: "The topographic nature of reserve boundaries may overshadow the importance of size and shape alone. In mountainous regions, boundaries placed along major topographic breaks, such as ridgelines, can result in effective isolation of even small tracts from surrounding lands. By carefully selecting topographic boundaries, smaller viable reserves may be possible than if legal lines are selected as boundaries." Gore (1975) recommended that a park [natural area] should occupy a whole natural catchment area. "If this is not possible, however, protection of upper rather than lower reaches will prevent the import of upstream environment alterations."

Theberge (1989) writes, in "Guidelines for Drawing Ecologically Sound Boundaries for National Parks and Nature Reserves," Guideline Number One: "Boundaries should sever drainage areas as little as possible. The park or reserve should encompass the greatest possible proportion of the area drained by the river of the highest order...if the largest stream must be excluded, the next smallest drainage basin should be chosen." Applying this guideline to the Perry Creek drainage would mean that the best option would be to draw the boundaries from the ridgecrest down to the South Fork Stilliguamish River, adding about 160 acres to the proposed RNA. (This is not alternative considered in this EA. It was not considered in the Forest Plan.) To best meet this guideline, it would be of higher priority to

include the upper portion of the Perry Creek drainage (3rd and 4th order streams) than the lower (2nd order stream). This concept is emphasized in Theberge's Guideline Number Two: "Boundaries should not leave out headwater areas. Headwater areas establish water quality and quantity regimes. If they are excluded, the risk is is greatly increased of substantial off-site alteration of the natural area."

Wildlife

The recommended RNA provides suitable habitat for many wildlife species. Located within the Independence Late Successional Reserve (LSR), between the Boulder River Wilderness and Henry M. Jackson Wilderness (and near Glacier Peak Wilderness), Perry Creek drainage contributes to a habitat link which may be regionally significant for dispersal and migration of wildlife (Noss and Harris 1986, Thomas et al. 1990, USDI 1992, Rolph and Agee 1992). Refer to Figure III-1, following.

Much of the following discussion is based on the Establishment Record (Rolph and Agee 1992), and the two watershed analyses, referenced on page III-1. Species of particular concern (and discussed below) include: 1) federally listed Threatened, Endangered, or Sensitive (TE&S) with suitable habitat within the recommended RNA; 2) Management Indicator Species (MIS) for the Mt. Baker-Snoqualmie National Forest with suitable habitat in the area; and 3) other species of concern, including survey and manage species. A Biological Assessment was not completed/is not needed for this EA: there are no ground disturbing activities in any of the proposed alternatives nor do any of the proposed alternatives result in any change in habitat.

Federally Listed Threatened, Endangered, and Sensitive Wildlife Species

Species with suitable habitat include: northern spotted owl (Strix occidentalis caurina); marbled murrelet (Brachyramphus marmoratus); gray wolf (Canis lupus); grizzly bear (Ursus arctos); Townsend's big-eared bat (Plecotus townsendii); and peregrine falcon (Falco peregrinus).

Northern Spotted Owl

Portions of the drainage include slopes with old-growth conifer forests suitable for nesting, roosting, and foraging. But much of the Perry Creek drainage contains fragmented spotted owl habitat, containing rock outcrops, avalanche chutes, open canopy forest stands, and acres at higher elevations, all factors which may limit use by spotted owls.

The lower Perry Creek drainage was surveyed for northern spotted owls in the early 1990's. A spotted owl pair was located in both 1991 and 1992, with reproduction confirmed in 1992. A nest was located less than 1/4 mile outside of the recommended RNA, with the expected home range and foraging area including portions of the RNA.

The LSR allocation provides for the managment of Perry Creek for habitat for late successional species such as the spotted owl. There is no designated Critical Habitat for the northern spotted owl within the boundaries of the recommended RNA, although 30 acres of the Perry Creek drainage is within such a designation.

Perry Creek Research Natural Area

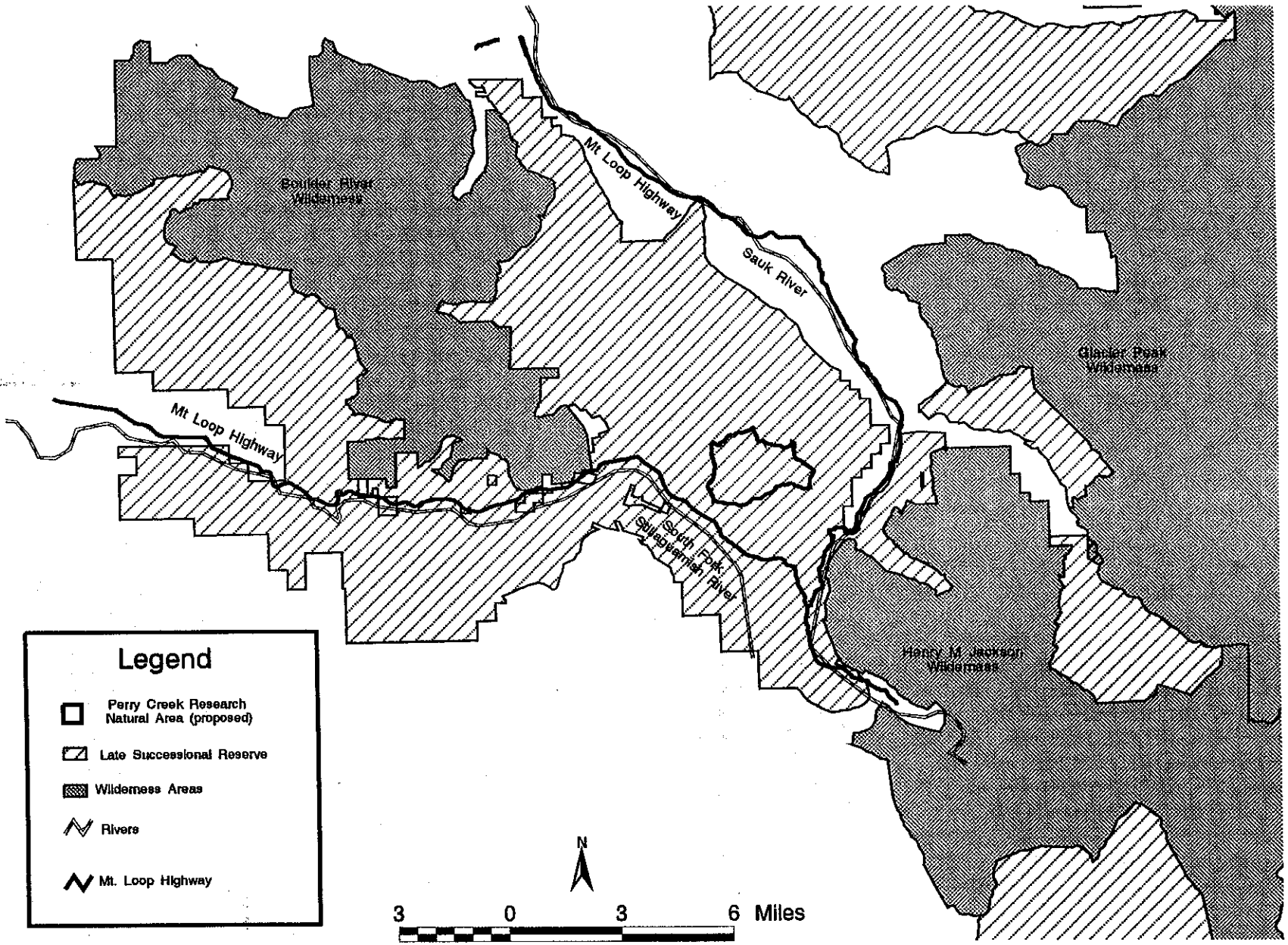


Figure III-1

Marbled Murrelet

The marbled murrelet, a small seabird, was designated as a federally threatened species in September 1992. This species is also closely associated with old-growth forests, which have the branching structure suitable for nest sites. Since murrelets have been observed flying inland to forested areas other than during the breeding season, it is thought that the forests may also be important for roosting or nest site bonding (Nasland 1993).

The first murrelet nests sites discovered in the state of Washington in 1990, were within the South Fork of the Stillaguamish River drainage, approximately 12 miles to the west of Perry Creek. During 1992 to 1996 surveys in the lower Perry Creek drainage, high murrelet activity was detected. The birds were seen circling over or within the forest stands, and calling from below the canopy; this activity suggests that murrelets may be using portions of the drainage for nesting. The upper drainage has not been surveyed, but has habitat with characteristics suitable for nesting murrlets.

Grizzly Bear

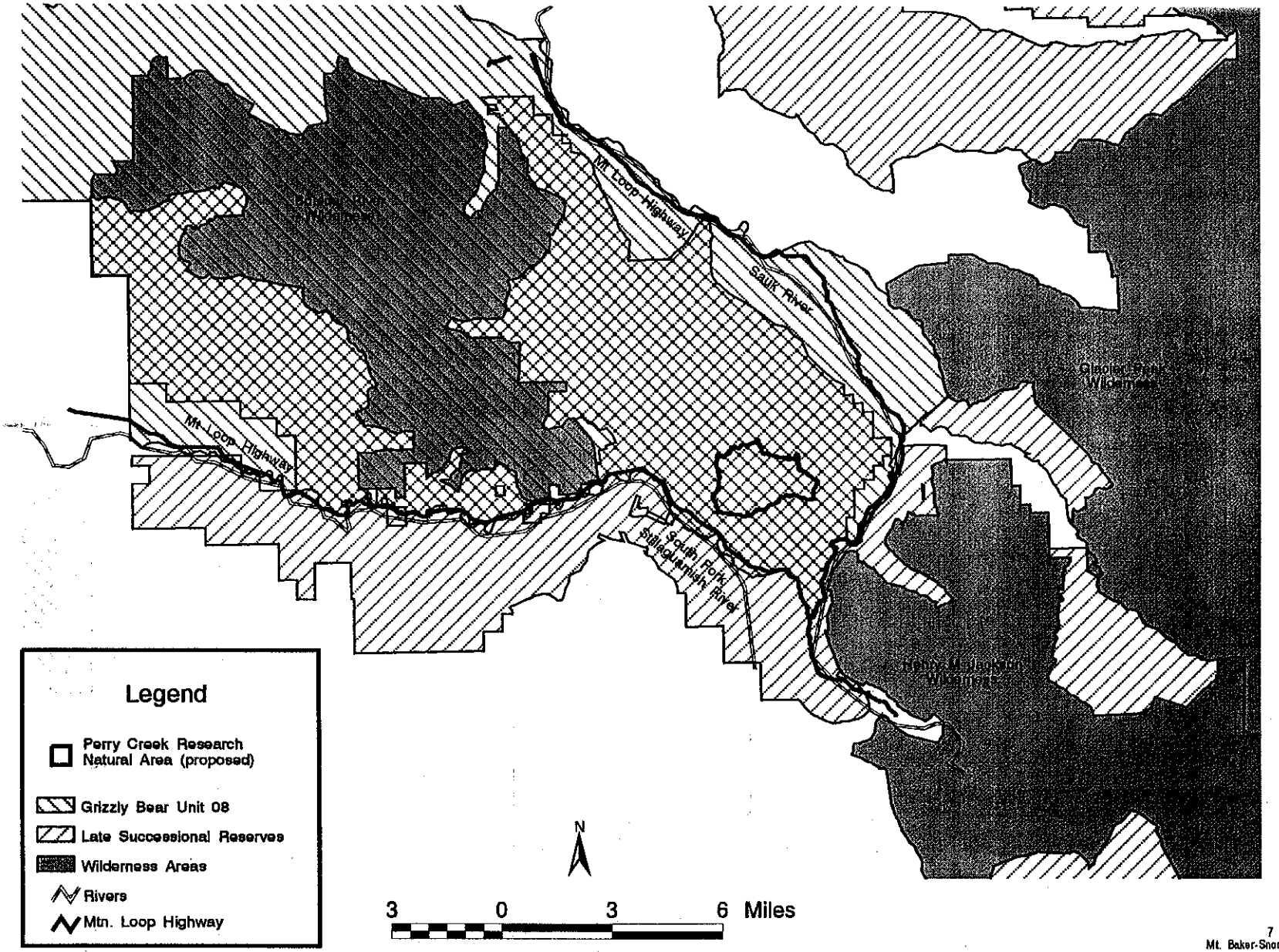
Although the presence of grizzly bear within the recommended Perry Creek RNA is unconfirmed, the area is considered potential habitat and is located within the boundaries of North Cascade Grizzly Bear Ecosystem (USFWS 1992). Historical photographs from the 1920's (estimate) show black bears around the cabins at Big 4 (across the highway). On this same roll of film were shots of a meadow area with a sow and cubs, identified as grizzlies by State of Washington Fish and Wildlife (WDFW) personnel (personal communication J.Almack). Perry Creek drainage has features which could provide both foraging habitat and access to denning habitat. The variety of vegetation and elevation in Perry Creek would include the variety of foraging habitat attractive to the grizzly bear.

Since grizzly bears have large home ranges (up to 64,000 acres or 100 square miles), adequate security zones within the home range are a concern. Perry Creek drainage is located within Grizzly Bear Analysis Unit-08 (GBU-08); refer to Figure III-2. This Unit contains an estimated 139,700 acres of National Forest system lands. This is over 200 square miles, but the Unit includes portions of the Forest with a high density of roads, a number of developed recreation sites, and intensive past management activities.

To determine which portion of this Unit functions as security area for grizzly bears, Forest biologists mapped-out a "human influence zone": acres within one-half mile of a open roads, or one-quarter mile of closed roads and trails are considered the human influence zone. Within the human influence zone, roads and trails provide more opportunity for human access and bear/people interaction. Areas outside this zone are considered security areas.

Based on initial review of the 139,700 acre GBU-08, roughly 55 percent of the unit is in the human influence zone, especially in the extensively-roaded Canyon Creek drainage (west of Perry Creek) and near the Mountain Loop Highway. The remaining 45 percent could be described as security acres. Most of the GBU-08 security acres are located within the Boulder

Perry Creek Research Natural Area with Grizzly Bear Unit 08



7 March 1997
Mt. Baker-Snoqualmie National Forest
Geographic Information Resource Team

Figure III-2

River Wilderness and the acres between this wilderness and Glacier Peak Wilderness, allocated to semi-primitive, nonmotorized dispersed recreation lands with LSR overlapping. Again, refer to Figure III-2. Perry Creek drainage, especially the upper ridge system, contributes to this minimally roaded and trailed habitat. This area may be significant for dispersal of wildlife and connection of large blocks of suitable habitat for species with large home ranges and species which exhibit avoidance behavior of human presence.

Gray Wolf

Wolves have been seen sporadically throughout the North Cascades; sightings in recent years (1990-92) have been along the Cascade crest. Wolves also have large home ranges, characterized by presence of prey and minimal human contact. Perry Creek is located between and near several wilderness areas, which may contribute to potential use of the drainage by wolves. The proximity of the recommended RNA to the Mountain Loop Scenic Byway and high recreation use, however, may limit use of portions of this area by wolves. Recovery plans for the gray wolf have not been formulated at this time (January 1997).

Townsend's Big-eared Bat

The Perry Creek drainage includes area of rock formation which may include caves or crevices between rocks which would provide roosting habitat for bats, including Townsend's big-eared bat. No specific cave sites have been identified, but the talus slopes and rock faces of the drainage are areas of interest for potential surveys.

Peregrine Falcon

Nesting habitat for falcons is characterized by rock outcrops with ledges which provide nesting platforms, with protection from predators. The steep cliffs of Perry Creek may provide the appropriate ledges and nesting sites for peregrine falcons. Limited helicopter surveys by WDFW have not resulted in the identification of this drainage as a peregrine use area. The drainage has been identified for potential ground surveys.

Forest Carnivores (Sensitive and Candidate)

There are several forest carnivores which are species of concern in the Perry Creek drainage; these include: wolverine (a Sensitive species on the Regional Forester's list); pine marten (a Managment Indicator Species and Sensitive species); and the fisher (candidate for federal listing as Threatened and Endangered).

Wolverine

Wolverine sightings are rare, with most reports coming from the more remote and rugged portions of the Cascades. Wolverine appear to utilize relatively large areas of upper-elevation habitat, that have minimal human disturbance. Their home ranges are reported at 25,940 acres, based on wolverines in south-central Alaska (Ruggerio et al. 1994).

Perry Creek drainage contributes to a large, rugged area connecting several Cascade wilderness areas (and allocated to Late Successional Reserve). The

drainage provides high habitat diversity, habitat characteristics reported as being selected by wolverine. Perry Creek was rated high for dispersal habitat for wolverine in the model prepared for the South Fork Lower Stillaguamish/Canyon Creek Watershed Analysis (USDA Forest Service 1996: 3-84). Again, open roads and areas accessed by people are modeled as human disturbance which reduces the dispersal rating.

Pine Marten

Pine marten are a Forest Management Indicator Species (see discussion of others, below) and a Sensitive species. They are closely associated with mature and old-growth forests (Marshall 1993) and reportedly show a tendency to use riparian and streamside habitats (Jones 1991). Other habitat needs include: 1) resting sites, in or on live trees (45%), in snags (23%), and in slash, log piles, root wads, boulders, and burrows (Jones, 1990); and 2) winter foraging in down large woody material (since the logs provide increased access to prey under the snow). Use of Perry Creek recommended RNA by pine marten is suspected due to the presence of suitable habitat. Since this species has a relatively small home range, the Recommended Perry Creek RNA could hypothetically support a breeding pair of pine martins.

Fisher

The fisher is a candidate species for federal listing as Threatened and Endangered. Current population in the Pacific Northwest are estimated to be at extremely low levels (Powell and Zieliniski 1994). The fisher is also associated with large tree forest structure, with high use of riparian areas, which provide foraging and dispersal opportunities. Since deep snow is thought to inhibit fisher movement, areas below 3,000 feet in elevation are important to the fisher during winter.

Perry Creek may be important to the fisher for the diversity of habitat found in the drainage, especially the riparian corridor and areas with difficult access for people. Due to the elevation and high snow pack during winter, the drainage is expected to be marginal wintering habitat. Looking at the entire Stillaguamish River basin for modeling fisher dispersal opportunities, Perry Creek was rated as moderate to low (USDA Forest Service 1996: 3-92). (The fisher is a species which was trapped and is somewhat impacted by human presence; the rating includes the influence of the road and trail system.) However, with the riparian corridor and diversity of suitable habitat within the recommended RNA, this area is expected to contribute to a reproductive habitat for fisher.

Management Indicator Species

Management Indicator Species (MIS) are those which represent a number of species utilizing similar habitat. MIS are used as a management strategy: it is assumed that if habitat for MIS is distributed throughout the Forest, populations of those species and associated species are likely to be healthy and viable over time. Forest Management Indicator Species with suitable habitat in the Perry Creek area are: pileated woodpecker (Dryocopus pileatus); mountain goat (Oreamnos americanus); black-tailed deer (Odocoileus hemionus columbianus), and the previously discussed TE&S species of northern spotted owl, grizzly bear, gray wolf, and pine marten.

Pileated Woodpecker

Pileated woodpeckers are used as a management indicator species for those species using mature and old growth forests, as well as snag and downed log components (USDA Forest Service 1990). Suitable habitat components are present within the recommended RNA, and are not thought to be limiting for this species presence within the drainage.

Mountain Goat

The mountain goat has been designated an MIS for a specialized habitat (USDA 1990). Perry Creek contains habitat that is suitable for mountain goat, including portions designated as both summer and winter range for this species. District information, hunting reports, and agency surveys suggests a significant downward trend in the local goat population. Little information can be found for numbers of goats in the area before the 1960's. Between 1961 and 1982, between 10 and 13 animals have been counted near Perry Creek (Stillaguamish and Dickerman Peaks). A 1993 aerial survey of the Darrington District was conducted by the WDFW. Despite clear weather, only 39 goats were reported for the entire District, a very low number. One was sighted in the Twin Peaks area, another goat in the Perry Creek area. The scheduling of the flight during hunting season may have influenced the number of goats seen. Appendix C of this document includes more information/references for mountain goats in the Perry Creek area.

Black-tailed Deer

Perry Creek recommended RNA provides optimal cover, thermal/hiding cover, and forage opportunities for the black-tailed deer within the desired ranges outlined in the Forest Plan (USDA Forest Service 1990: 4-231). Healthy populations of deer are considered important for their indication of habitat suitability, but also are important as a prey base for many of the other species of concern such as forest carnivores, or wildlife species feeding on carrion.

The recommended RNA is located primarily at elevations over 2,200 feet, thus is not considered primary winter range for large game. The snow level would often preclude optimal use of the area by wintering animals. The drainage does provide spring, summer, and fall habitat. Refer to Appendix C for a summary of the deer cover/forage evaluation.

Other Wildlife Species

Many species of bats and amphibians, whose populations are also of concern, may be found within Perry Creek drainage. The Larch Mountain salamander is a Survey and Manage Component 2 species, with a home range described as south of the geographic area of Perry Creek. However, surveys north of that boundary are encouraged in suitable habitat conditions. Perry Creek contains the talus slopes which are described as preferred habitat for this species. There is habitat in throughout the proposed RNA that could support the Cascade frog and the tailed frog.

Mollusk species of concern include eight with the potential to occur in the area which includes the Stillaguamish drainage and Perry Creek (the Northern sub-province, from Burke, 1994). Species of heightened concern are generally associated with the mature or late-successional forest stands, frequently in

the riparian zones. Oregon Megomphina was reported as being found on rocky slopes at Big 4, in the lower Perry Creek subwatershed (USDA Forest Service 1996: 3-94).

Many of the survey and manage species are yet to have survey protocol developed for effective detection. While suitable habitat is known or suspected for various wildlife species, there were no surveys conducted for mollusk, amphibians or other species (TES or otherwise) for this analysis. The establishment of the Research Natural Area is not a ground-disturbing activity nor is any change in habitat expected from implementing the proposed action, therefore survey at this time has been determined as not needed (R.Hickenbottom, personal communication 1997).

Fish

Granite Falls has historically been a barrier to anadromous fish passage into the South Fork Upper Stillaguamish watershed, except for a few steelhead. In 1954, a fishway was constructed and chinook, coho, and pink salmon have been hauled and released above the falls. Current steelhead and coho relative abundance in the South Fork Upper Stillaguamish watershed is unknown. Perry Creek contains habitat suitable for spawning and rearing needs for both of these species within the first 1.5 miles of the channel. Perry Creek is known to contain resident species of cutthroat trout and two species of sculpin. The presence of native char (Bull trout, Dolly Varden) in Perry Creek is presently unknown; bull trout is currently a candidate species for listing under the federal Endangered Species Act.

Refer to the discussion of fishing, below, under Recreation.

Recreation

Historic Recreation Use

Recreation use in the Perry Creek area began following construction of the Big Four Inn in 1920. The first two miles of the Perry Creek Trail (#711) were built in the mid 1930's, to provide an easy stroll for guests of the Inn. More adventurous hikers discovered the wonderful meadows and huckleberry fields of upper Perry Creek, and a boot-built trail developed up the steep forested slopes. A rough climbers trail continued on to the summit of Mt. Forgotten. The Big Four Inn burned down in 1949, but recreation use of this area continued to grow.

Since the 1960's, boot paths heading off towards Stillaguamish Peak and South Lake have become more defined; there is a badly-eroded climbers route to Mt. Forgotten. Recognition of the unique plant communities of the area started in the 1930's, but was not widely noted until 1969, when the 12th Annual Botanical Congress held a field trip in the area. Since then, botanical field trips along the trail have become popular.

Current Recreation Use

Today, the recreation use pattern is about the same as that of the 1930's, though the number of visitors has increased dramatically. Perry Creek is only a 90-minute drive from Seattle and, unlike the access to many trailheads, all

but the last mile is on paved highway. The easy access and low elevation accounts for some of the Perry Creek Trail's popularity. In 1995 (most current data), approximately 3,300 people used the Perry Creek Trail between May 1 and October 31.

The access road, Forest Service Road 4063, ends at an old log landing. Parking here is limited, about 10 cars, and many visitors park along the road. There is a trailhead register for Perry Creek Trail #711, which is managed for hikers only. Recreation use is "not to be encouraged" in RNA's and Forest Plan standards and guidelines authorize the use of permits or closures if needed to prevent damage to the RNA values (USDA Forest Service 1990).

The available data shows the following use patterns:

- 41% of visitors hike to Perry Creek Falls;
- 27% continue on to the meadows;
- 29% continue on to Mt. Forgotten 29%; and
- 2% continue on to other destinations.

Peak weekend use is typically 75 people per day, but it can be as high as 150. During the week, use average 8 to 15 people per day.

Overnight use is minimal, accounting for about 6% of total visits (1995 trailhead registration record). There is very little opportunity for camping along the trail corridor through Perry Creek. Few suitable camps are found along the lower two miles of the valley and the rest of the trail climbs steep hillsides without good camping opportunities. Scraggly camps are found across Perry Creek from the falls. No additional camping opportunities exist along the trail until the high meadows.

Winter use in Perry Creek is very light. The Mountain Loop Highway is not plowed beyond Deer Creek, about 3 miles west of Road 4063, making it a 4 mile ski, snowshoe, or snowmobile ride just to get to the trailhead. High avalanche danger makes entering the Perry Creek valley dangerous.

Fishing and Hunting

There are no lakes within the steep Perry Creek drainage and access to the banks of the creek is very difficult. With tough access and a limited fishery, fishing pressure is negligible compared to other recreation activities. (Fish stocking is prohibited, except to reintroduce former native species (USDA Forest Service 1990)).

Hunting pressure within the RNA is low to moderate; a record of about 50 recorded trailhead comments from 1992 show no interest in either hunting or fishing in the area. The biggest attraction for hunters is the opportunity to hunt mountain goat. The Perry Creek and Mt. Dickerman trails provide primary access for hunters. Due to a sharp decline in goat populations, Washington State Department of Wildlife -- the agency managing wildlife populations -- has temporarily suspended goat hunting in this game management unit. (Hunting and trapping are "not to be encouraged" in RNA's (USDA Forest Service 1990).

Recreation Use Management in Perry Creek

Refer to Appendix B of this document for the Forest Plan, Management Area 18 standards and guidelines applicable to RNA's. These state: "recreation activities and use within RNA's shall not be encouraged." Limited entry permits and closures are both options that can be implemented if unacceptable resource damage is occurring. Overnight use and campfires are to be discouraged -- or prohibited should they create resource problems.

In addition, the standards and guidelines for Late Successional Reserves apply. Most existing uses -- such as the Perry Creek Trail #711 -- may remain. If use begins to adversely impact the LSR, the 1994 ROD supports modifying or eliminating the activity (USDA, USDI 1994; C-16). Dispersed recreation uses are generally consistent with the objectives of LSR's. Again, the standards and guidelines state that measures such as education, use limitations, traffic control devices, or increased maintenance should be used if recreation practices retard or prevent attainment of Late-Successional Reserve objectives.

To date, no restrictions have been placed on recreation use within the Recommended RNA. The use of campfires is minimal due to the poor opportunities for camping. Perry Creek Trail #711 is open to use by hikers only; dogs are permitted on the trail. The trail received limited use by stock in the past, but not within the last 30 years. Today, stock animals are not permitted within RNA's (recommended or established).

There are some problems with human impacts (including human waste) at the point Trail #711 crosses Perry Creek. The area is a focal point of use, popular as a picnic spot and the break-point for those hiking up to Mt. Forgotten. The Forest Service has maintained a box toilet near this location for many years which has helped minimize, but not eliminate, the problem.

Because use of interpretive signs/facilities are not generally permitted within an RNA, off-site management of this area is very important. Perry Creek Trail #711 is listed in all Forest Service publications referring to the general area. In addition to many guidebooks, information on Forest trails and recreation opportunities are appearing on the Internet. Sensitive information in these publications can help prevent recreation caused impacts on the ground.

Trail Management

Perry Creek Trail #711 receives annual maintenance (often accomplished by volunteer work crews) to keep human impacts to the unique vegetation to a minimum. A lack of maintenance increases the impacts of trail users: hikers create new paths around fallen trees and rocks, possibly into sensitive plant communities. There have been incidents in the past where volunteers unintentionally cleared the rare plants during trail clearing activities. An effort is now being made to educate work crews to avoid excessive brushing in areas where unique plant assemblages occur and to avoid cutting any ferns.

Recreation Use in the Surrounding Area

Recommended Perry Creek RNA is located within one of the most popular recreation areas of the Cascade Range. Numerous easily accessible campgrounds

and hiking trails are found near the Mountain Loop Scenic Byway. Use on these trails range from heavy to very heavy. Below is a sampling of annual use for some trails along the Mountain Loop:

Trail Name	Total Visitors	Year of Data (Source)
Perry Creek	3,300	1995 (Register)
Mt. Pilchuck	9,950	1992 (Register)
Heather Lake	5,350	1994 (Register)
Mt. Dickerman	2,500	1994 (Register)
Sunrise Mine	2,550	1994 (Register)
Big 4	40,000	1995 (Vehicle Count and Trail Register)

General Recreation Demand in the Area

Strong population growth in the Puget Sound area is resulting in increased demand for new (and maintained) trails. Public response to the 1990 forest planning effort included a proposal spear-headed by the Sierra Club and the Washington Trails Association to restore 3,883 miles of trails and build 1,886 miles of new trail by the year 2000. Most of these trails would be outside wilderness. Currently, outfitter/guide permittees are asking for increases in their allowed user days, and new outfitters are requesting permits. There is more and more pressure to increase "eco-friendly" enterprises. However, Forest Service funding has not allowed the issuance of additional permits.

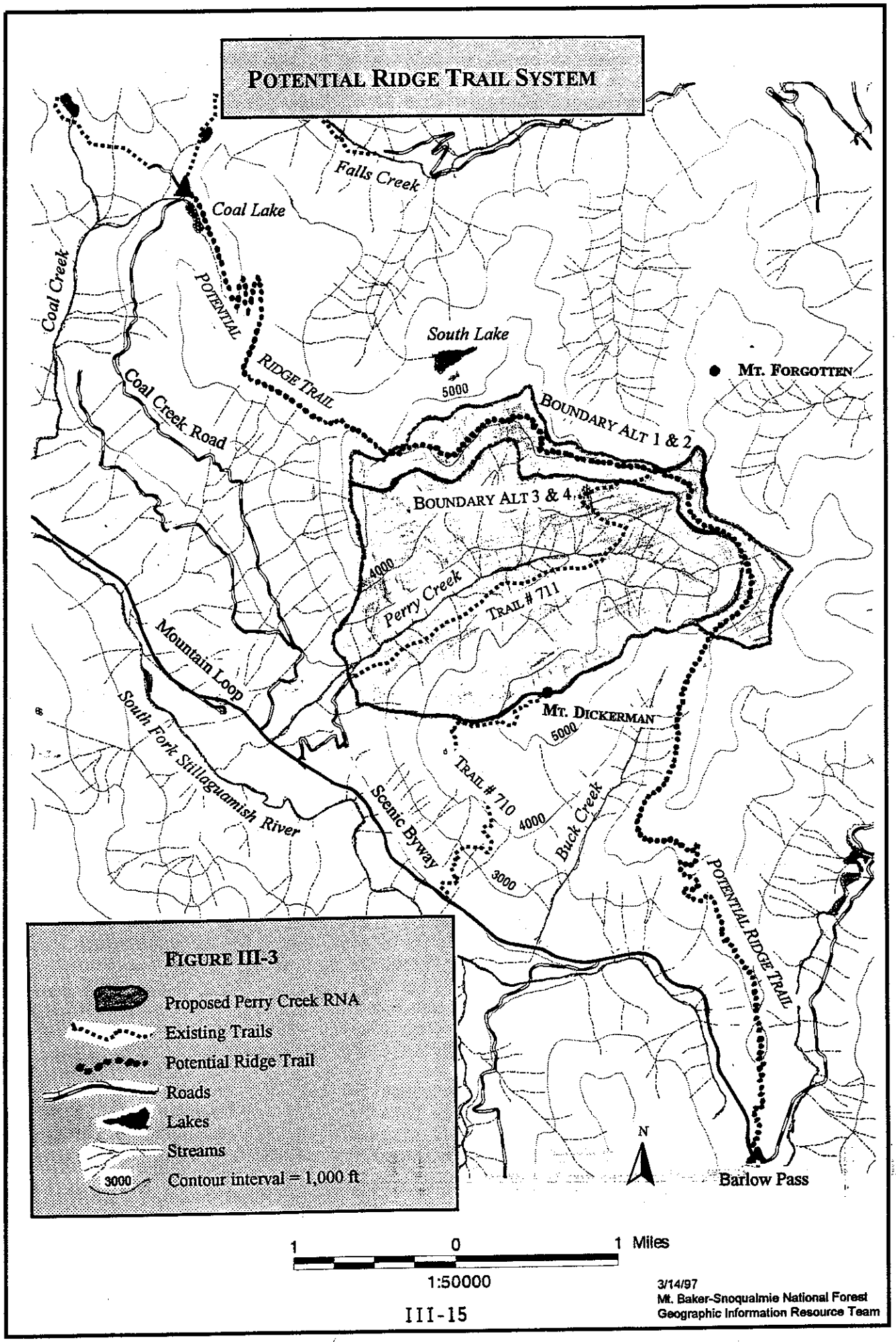
Potential Ridge Trail #716

As discussed in Chapter I, this trail is not currently proposed for analysis or construction, but it has a long history and there is public interest.

During the 1960's, all of the trails in the old Monte Cristo District that had been open to stock were gradually closed. Later that decade, a trail along the ridge between Barlow Pass and Coal Lake was scouted by the Forest Service, to help replace some of the lost stock trail opportunities. As shown on Figure III-3, 2.5 miles of the proposed 13.0 mile long Ridge Trail #716 would traverse the headwaters of Perry Creek.

Initial planning work was done in 1969-70; a complete reconnaissance report was completed for the segment from Barlow Pass to the junction with the Perry Creek Trail. The trail was to be open to stock use and several stock camps were planned. In conjunction, a variety of other hiker-only trails were also planned, outside of the Perry Creek subwatershed. The intent was creating a loop trip up and over Mt. Dickerman from Barlow Pass.

Construction on the Ridge Trail was scheduled to begin in 1972, but priorities were shifted to the Pacific Crest Trail. The Ridge Trail was never started and its funding lapsed. None of the other planned trails have been built either.


POTENTIAL RIDGE TRAIL SYSTEM
Falls Creek
Coal Lake
Coal Creek
POTENTIAL
RIDGE TRAIL
South Lake
5000
MT. FORGOTTEN
Coal Creek Road
BOUNDARY ALT 1 & 2
BOUNDARY ALT 3 & 4
4000
Perry Creek
TRAIL # 711
Mountain Loop
South Fork Stillaguamish River
MT. DICKERMAN
5000
TRAIL # 710
4000
Buck Creek
Scenic Byway
3000
POTENTIAL RIDGE TRAIL
FIGURE III-3
Proposed Perry Creek RNA
Existing Trails
Potential Ridge Trail
Roads
Lakes
Streams
3000
Contour interval = 1,000 ft
N
Barlow Pass
1
0
1 Miles
1:50000
3/14/97
Mt. Baker-Snoqualmie National Forest
Geographic Information Resource Team

The forest planning process began in 1980; part of the 1990 Forest Plan decision included a recommended RNA at Perry Creek, with a boundary at the ridgeline. New trail construction within MA 18 Research Natural Areas is not normally allowed and stock use is prohibited. The 1994 ROD amending the Forest Plan added an allocation of Late Successional Reserve to much of the area planned for trail development two decades ago.

Current Pack and Saddle Stock Trail Opportunities

Opportunities for equestrian use on the Forest are not uniformly distributed. The best areas are located in the White River Ranger District, and east of Perry Creek, in the Henry M. Jackson and Glacier Peak Wildernesses. No trails in the nearby Boulder River Wilderness are now open to use by stock. Stock trails are generally better on the Wenatchee and Okanogan National Forests, but this is a long trip for west side horse owners.

Looking at opportunities close to Perry Creek: there are 250 miles of trail within the MBS portion of Glacier Peak and Henry M. Jackson Wildernesses. About 180 miles (73 percent) are open to stock use.

However, flood damage and lack of maintenance on this system has made large segments unusable to stock users. It took five years to repair damage from the 1990 flood that left 45 miles of the Pacific Crest Trail plus three of four major access trails inaccessible to equestrians. Flood damage in 1996 has limited access again. Two other problems limit the number of trails available for pack and saddle stock: the lack of maintenance funds has made it more difficult to clear logs, et cetera off of the trails in the long, valley-bottom approaches to these high country trails (so many of the high-country trails open to stock cannot be used); and with limited ability to use motorized equipment in the wilderness for trail maintenance, the number of trails that can be opened during the snow-free season is minimal.

Summary of Demand for Potential Ridge Trail #716: A high-country stock trail located outside wilderness, such as the potential Ridge Trail, would be relatively easy to access, making this trail very attractive to equestrians. (The ease-of-access would also make this trail easy to maintain, and to maintain with volunteer crews.) Several stock trails on the White River Ranger District offer a model of what could be expected on the Ridge Trail.

If the option is left open, the Ridge Trail could offer an important opportunity for equestrians. But it is also important to recognize that the stock use, relative to hiking, is declining. Regardless of its primary user objective, the Ridge Trail would likely serve as an alternate destination for hikers who may, in the future, be displaced from nearby wilderness areas (through limited entry) or crowded backcountry areas (by personal choice).

Unknown at this time would be the compatibility of such a trail with the objectives of the Independence Late Successional Reserve. While dispersed recreation is usually consistent with LSR, new facilities are to be considered on a case-by-case basis and may be approved if they meet public demand or provide significant public benefit and if any adverse effects to the objectives of late successional reserves can be

mitigated. Issues of wildlife security habitat would need to be addressed in any future NEPA analysis of this trail.

Funding Concerns and Public Demand

The issue of whether or not to construct new trails in non-wilderness portions of the Forest will, to a large degree, be driven by demand for these recreation facilities by the public -- who will increasingly be searching for less crowded backcountry opportunities. Additional displacement of use may occur as managers seek to limit use in overcrowded wilderness areas on the west side of the Cascades to meet requirements of the Wilderness Act.

However, current and expected future Forest funding is likely to severely limit new trail construction. The 1993 Recreation Use EA for the Alpine Lakes Wilderness identified a need and supported the Forest Plan level of additional non-wilderness trail construction to help reduce crowding. However, due to an extensive reconstruction backlog on existing trails, available funds are being used almost exclusively to address reconstruction, not to build new trails.

In addition, with many areas of the Forest (including Perry Creek) now in Late Successional and Riparian Reserve, future opportunities for new trail construction will be limited, even if the funding could be found. This will increase pressure on the existing trail system.

Without use restrictions, recreation use in Perry Creek is expected to climb. Fortunately for Forest managers, visitors are becoming more aware of the fragility of our wildlands, so the impact of each individual is becoming less. Much of this awareness has been fostered through published guidebooks and through the education efforts that are provided by many outfitters.

Heritage Resources, Indian Religious and Cultural Uses

Prior to the 1930's, and the beginning of recreation use in the Perry Creek drainage, human use of this area was limited. No major ore bodies exist within the drainage and prospecting has been minimal. No timber harvesting has occurred within the boundaries of the recommended RNA; there was some harvesting done in the 1960's below the recommended RNA boundary.

It is probable that American Indians used the area, most likely for berry gathering and goat hunting. It is known that the Stillaguamish people hunted goat in the Monte Cristo Lake/Barlow Pass area, located just east of Perry Creek. Barlow Pass was crossed frequently to provide access into the upper reaches of the Sauk. Perry Creek was along the travel route.

No known locations for cultural practices within Perry Creek have been identified by American Indians.

CHAPTER IV - ENVIRONMENTAL CONSEQUENCES

This chapter discloses the environmental consequences if any of the four alternatives were implemented; direct, indirect, and cumulative effects are estimated and disclosed.

No Direct Effects, Limited-to-No Indirect Effects

Alternative 1 (No Action) and Alternatives 2, 3, and 4 (establishing Perry Creek as a Research Natural Area) would have no direct effect and limited to no indirect effects on a number of resources, including: air quality or noise, the economy, roads, visual resources, or fire protection within the Late Successional Reserve. Refer to Recreation for potential indirect effects on visual resources, Alternatives 3 and 4.

For cultural resources, the proposed action is one of the types of actions included on the "non-undertakings list" as developed by the Forest Service in consultation with the Advisory Council on Historic Preservation (NPS, USDI). The alternatives also do not meet the definition of an undertaking, pursuant to Section 307(7) of the National Historic Preservation Act. No additional information on anticipated effects has been uncovered; therefore, there would be no effect on cultural resources if any of the alternatives were implemented.

Within Perry Creek, no concerns about religious or cultural uses and practices have been identified by the appropriate American Indian tribes.

Direct, Indirect, and Cumulative Effects

Soils, Plant Communities, and Other Ecosystem Values

Alternative 1 - No Action/Manage as Recommended RNA (2,348 acres)

If No Action were implemented, Perry Creek would continue to be managed as a Recommended Research Natural Area, up to the ridgeline, under the Standards and Guidelines for Management Area 18, and as Late Successional Reserve. Natural processes would still occur.

Impacts related to the existing Perry Creek Trail #711 would continue to occur, including on-going surface erosion problems between the falls and the meadow (as this trail was not built or maintained to current standards, designed to minimize these impacts).

A variety of impacts on the plant communities and ecosystem values would continue to occur, including:

- the introduction of exotic species (refer to studies correlating trail use and the introduction of exotic plant species, Bright 1986, Hall and Kuss 1989, Tyser and Worley 1992); and

- trampling of vegetation near the trail: the existing trail intersects most of the rare fern populations and accidental trampling by dogs and

hikers plus the inadvertent excavation of some rare plants during regular trail maintenance is an ongoing concern.

Impacts to water quality, wetlands and riparian areas would include leaching of human and animal (dogs, primarily) waste into the water and resulting degradation of water quality, particularly in the area above the falls where the trail crosses Perry Creek.

The "recommended" status would mean management under the Forest Plan as if the area were an RNA. Instituting permits or closures, while controversial, could be supported. However, the funding necessary to prepare RNA management and monitoring plans would be more difficult (or impossible) to obtain. Thus, the baseline data to support permits or closures would also be very difficult to obtain, and effective management difficult to accomplish.

Under Alternative 1, Perry Creek would likely be re-assessed at the next Forest Plan revision (scheduled for 2002). Its future land allocation is unknown.

Alternative 2 - Establish Perry Creek RNA as Recommended in the Forest Plan (2,348 acres)

If implemented, Alternative 2 would result in an Established Research Natural Area, with the boundary including the headwaters and up to the ridgetops. For plant communities and ecosystem values, this alternative would provide a viable RNA boundary, as defined by by top scientists in the field (see Chapter III discussion, pages III-3 to III-4). An established Perry Creek RNA at 2,348 acres would:

- meet Franklin's criterion: place boundaries along major topographic breaks, such as ridgelines, especially to isolate small reserves;

- protect the upper reaches of Perry Creek, as recommended by Gore (1975);

- best meet (among the four alternatives) Theberge's first guideline: boundaries should sever drainage areas as little as possible...the reserve should encompass the greatest possible proportion of the area drained by the river of the highest order...if the largest stream must be excluded, the next smallest drainage basin should be chosen;

- best meets Theberge's second guideline: Boundaries should not leave out headwater areas; see pages III-3 to III-4; and

- include a boundary to the ridge top, which would most effectively provide a natural buffer to human impacts (including human-caused erosion from the ridge side), since access from the cliffs to the north/northeast is very difficult.

Other effects on plant communities and ecosystem values would be identical to Alternative 1.

The direct and indirect effects on soils from recreation use, including that related to existing Perry Creek Trail #711, would be identical to Alternative 1.

See the Recreation section, later in this chapter, for effects on the option for future construction of a ridge trail.

As in Alternative 1, impacts to water quality, wetlands and riparian areas would include leaching of human and animal (dogs, primarily) waste into the water and resulting degradation of water quality, particularly in the area above the falls where the trail crosses Perry Creek.

Formal establishment would facilitate funding for developing an RNA management and monitoring plan. This, in turn, would facilitate actual monitoring, including gathering the baseline data to assess human impacts, and propose corrections.

As a formally established RNA, Perry Creek would not likely be re-assessed at the next Forest Plan revision (scheduled for 2002). (New allocations were not examined for the three existing RNA's during the initial round of forest planning.)

Alternative 3 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Pack and Saddle Stock

If Alternative 3 were implemented, Perry Creek would be established as a Research Natural Area, but at a size smaller than recommended in the Forest Plan and analyzed in the Establishment Record. About 498 acres (21%) of the recommended RNA would be removed from the formally established area and allocated to other management areas (see Chapter II).

The headwaters of the drainage, up to the ridgetop, would not be included in the RNA. Because the headwaters are vital to the healthy functioning of the subwatershed, eliminating them from the established RNA may have repercussions throughout the ecosystem.

The effects on plant communities and ecosystem values identified in Alternative 1 would occur with the addition of a major concern from the potential, future impacts from stock and hikers in the headwaters of Perry Creek if the Ridge Trail were developed. These effects would include:

- livestock use in the higher-elevation areas of the Perry Creek drainage may compromise the ecological integrity to a greater extent than foot traffic, with the risk of introduction of exotic species and human/animal waste into the headwaters, plus addition human-caused erosion. The impacts to these fragile areas may extend to lower areas, throughout the basin (Rolph and Agee 1992); and

- the introduction of noxious weed seeds into the wet habitats of the Perry Creek drainage, where over 85% of the known or suspected sensitive species are located. Water is an excellent vector for transport of noxious weed seeds; introduction of these species into the headwaters would facilitate their movement within the RNA much

more than introduction of these species in the lower reaches of Perry Creek.

Additional indirect effects would include establishment of an RNA that, even more than Alternatives 1 and 2 -- which include existing Trail #711 -- does not meet findings from many researchers regarding the incompatibility of recreation use and RNA's (Theberge 1989; Bright 1986; Hall and Kuss 1989; Tyser and Worley 1992; Franklin 1984; Lesica and Ahlenslager 1993; and others).

The direct and indirect effects on soils from recreation use on existing Perry Creek Trail #711, would be identical to Alternatives 1 and 2.

See the Recreation section, later in this chapter, for more specific effects on the option for future construction of a ridge trail.

More so than in Alternatives 1 and 2, impacts to water quality, wetlands and riparian areas would include leaching of human and animal waste into the water and resulting degradation of water quality.

Formal establishment would facilitate the development of a management and monitoring program for this area. This, in turn, would facilitate actual monitoring, including gathering the baseline data to assess human impacts, and propose corrections.

As a formally established RNA, though at a smaller size, Perry Creek could be re-assessed at the next Forest Plan revision (scheduled for 2002).

Alternative 4 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Hiker Only

Alternative 4, if implemented, would be similar to Alternative 3, but the decision made in this EA would constrain any future Ridge Trail construction to a "hiker only" primary user objective. No pack and saddle stock would be allowed. Perry Creek would be established as a Research Natural Area, but at a smaller size: about 498 acres (21%) of the recommended RNA would be removed from the formally established area and allocated to other management areas (see Chapter II).

The expected effects, both direct and indirect, would be similar to those discussed for Alternative 3, although to a lesser degree because hikers generally cause less impact than stock (less tree girdling, less trampling and soil compaction, etc.). There would be less introduction of exotic species that if Alternative 3 were implemented, but still more impact than from existing Trail #711.

Overall, impacts to natural resources would still be expected to be greater than those discussed in Alternatives 1 and 2.

See the Recreation section, later in this chapter, for more specific effects on the option for future construction of a ridge trail.

More so than in Alternatives 1 and 2, but less than in Alternative 3, impacts to water quality, wetlands and riparian areas would include leaching of human and animal (not stock, but primarily dogs) waste into the water and resulting degradation of water quality.

Formal establishment would facilitate the development of a management and monitoring program for this area. This, in turn, would facilitate actual monitoring, including gathering the baseline data to assess human impacts, and propose corrections.

As a formally established RNA, though at a smaller size, Perry Creek could be re-assessed at the next Forest Plan revision (scheduled for 2002).

Wildlife

Alternative 1 - No Action/Manage as Recommended RNA (2,348 acres)

In this alternative the Forest would continue to manage the area as a recommended RNA plus Late Successional Reserve. Suitable habitat for the various wildlife would continue to cycle through natural disturbances and consequential successional stages. There would be active fire containment for protection of old-growth habitat, until a fire management plan was prepared as part of the Independence Late Successional Reserve Assessment.

Recreational use of the Perry Creek Trail #711, would continue human presence within the drainage along the trail corridor.

Direct Effects: No major change is expected in wildlife habitat components from the no action alternative.

Old-growth associated species are expected to continue to use the drainage in relation to distribution of habitat. Species such as the marbled murrelet and northern spotted owl are expected to have no change in use of the habitat in the Perry Creek drainage.

There is no expected change in the use of the drainage by species utilizing speciality habitat, such as the peregrine falcon or Townsend's big-eared bat -- species whose potential use of the drainage may be highly influenced by geological formations (such as rock ledges or outcrops, or caves and cave-like features). If implemented, Alternative 1 would result in retention of habitat for pileated woodpeckers (forage and nest sites, including snags and trees of sufficient diameter for nesting) and cavity-dependent species.

Indirect Effects: Existing Trail #711 will continue to provide recreational access into suitable habitat for species which frequently have adverse human/species interactions, such as: wolverine, gray wolf, grizzly bear, and species which are hunted or trapped (mountain goat and pine marten).

There would continue to be approximately 960 acres of "human influence zone" along the trail system. This acreage is expected to have less wildlife use than the acres considered security areas, due to human

presence (Refer to III-6). 1/ Cross-country travel (non-trailed recreation use) is expected to increase in the Perry Creek drainage, based on the attractiveness of the area, growing population base in the Puget Sound area, and the potential limitations on use in some local wilderness areas. Cross-county travel may lead to disturbance of species in previously un-trailed areas.

Species with large home ranges and a tendency to avoid humans may have a limited presence within the drainage, due to current trail and road densities. Species which are or have been hunted or trapped, such as the mountain goat and pine marten, may be influenced by current access, since both species may avoid areas with human presence.

Cumulative Effects: Fire containment for protection of the old growth may have limited influence on wildlife habitat within the drainage due to the long intervals (200-400 years) between stand replacing fire events of the west side of the North Cascades (USDA Forest Service 1995). There is some question regarding the influence fire suppression has in reducing the ignition source of otherwise smoldering snags or small lightening strike fires that could linger until the weather conditions are supportive of a more extensive burn.

Continued hunting or trapping within the drainage could lessen the effectiveness of the area to serve as a natural area with baseline information of natural interactions without human influence. IF any limits were imposed -- other than the "shall not be encouraged" Management Area 18 Standard and Guideline -- hunted or trapped wildlife populations with large home ranges may exhibit little effect from any limits on hunting or trapping. There may be some species with smaller home ranges which coincide with the subdrainages which could benefit from any such protection within the Perry Creek RNA.

Alternative 2 - Establish Perry Creek RNA as Recommended in the Forest Plan (2,348 acres)

If implemented, Alternative 2 would result in an Established Research Natural Area, with the boundary including the headwaters and up to the ridgetops.

Direct Effects: If implemented, Alternative 2 would be expected to have no change in the physical components of the wildlife habitat in the Perry Creek drainage. Direct effects are expected to be similar to Alternative 1.

1/ (The 960 acres = 3 miles of trail buffered by .25 mile on either side or 3 mi. x .5 mi = 1.5 mile x 640/mile = 960 ac.).

Indirect Effects: This alternative would have the same indirect effects from the continued human presence in the recreational and administrative use of existing Trail #711 as in Alternative 1, No Action. However, implementation of Alternative 2 would effectively precluded future trail development options in the upper ridges of the watershed. For wildlife, implementation of this alternative would better retain current security acres and dispersal habitat for species which avoid human presence. An RNA of this size would best support the role of the Perry Creek drainage as part of the connecting habitat provided by the Independence LSR, between the Henry M. Jackson and Boulder River Wildernesses (refer back to Figure III-2).

Formal establishment of Perry Creek as a Research Natural Area, with a greater likelihood for funding for a management plan and monitoring program, as discussed above, would likely have consequences for management of the area related to wildlife:

- The addition of Perry Creek as part of the established RNA system could result in more research funds directed to the area for implementing RNA objectives, including wildlife values.

- RNA establishment could promote closer coordination with other agencies with related management mandates. Since wildlife is considered a part of the ecosystem encompassed by Perry Creek RNA, formal establishment would promote a need for close coordination with the State, which regulates hunting and trapping of wildlife species, such as mountain goat and pine marten.

Cumulative Effects: See Alternative 1. If Alternative 2 were implemented, the greater likelihood of funding for monitoring, in conjunction with closer coordination with other agencies, could result in proposed changes to management standards and guidelines for hunting/trapping. There may be some species with smaller home ranges which coincide with the subdrainages which could benefit from any such protection within the Perry Creek RNA.

Alternative 3 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Pack and Saddle Stock

Direct Effects: If implemented, Alternative 3 would be expected to have no change in the physical components of the wildlife habitat in the Perry Creek drainage. Consequences are expected to be similar to Alternative 1.

Indirect Effects: This alternative would have the same indirect effects from the continued human presence in the recreational and administrative use of existing Trail #711 as Alternatives 1 and 2.

If implemented, Alternative 3 would leave the option open for future expansion of the trail density within the Perry Creek RNA and surrounding basins. Indirect effects include:

- potential increases in the trail density would result in a corresponding decrease in the area thought to provide security habitat for those species which avoid humans. If the Ridge Trail were

constructed, there would be about 704 fewer acres of security habitat provided within the Perry Creek RNA area, plus 2,176 fewer acres of connecting habitat within the Independence LSR between the wilderness areas. 2/

- additional trails would reduce the dispersal rating for the habitat in Perry Creek for species such as wolverine, which are characterized as avoiding human presence;

- additional trails could also have indirect impacts on species which are hunted or trapped by providing easier access into suitable habitat. In addition, mountain goats that are hunted may experience more stress from non-consumptive recreation users, due to learned avoidance behavior from hunters (Johnson 1983);

- stock trails would result in more potential competition for forage between horse and other stock and wild, resident grazers; and

- the introduction of noxious weeds could lessen the quality of forage habitat for wildlife species; and

- additional access and ease of access may result in increased hunting or wildlife viewing pressure within the surrounding basins and ridges of Perry Creek. This may result in the displacement of species from traditional seasonal use areas, and/or increased, negative wildlife/people interactions.

Alternative 4 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Hiker Only

This alternative would have a similar direct impact on wildlife species as Alternative 3. The difference between the two alternatives is primarily the future design and primary user objective of the Ridge Trail: hikers only in Alternative 4.

Differences in the indirect effects on wildlife/habitat if Alternative 4 were implemented would include:

- less competition for forage with wild grazers (no pack and saddle stock allowed on the Ridge Trail);

2/ The Ridge Trail construction would add approximately 2.5 miles of trail within what was the recommended RNA boundary. For calculating the human influence zone, 2.2 "impacting" miles of trail were used: the other 0.3 miles are switchbacks and included in the 0.25 mile buffer on either side of the trail. Total new trail miles within the Independence Late Successional Reserve would be about 13.0 miles, or 9.0 "impacting" miles. Acreage is figured by trail mileage x .5 mile (.25 mile either side of trail) x 640 ac/sq. mile = acres impacted.

- less introduction of noxious weeds, which may compete with native forage; and

- somewhat fewer recreational visits, since the challenging Ridge Trail would only be open to hikers. Hunters who rely upon pack and saddle stock would potentially seek other areas.

Recreation

Alternative 1 - No Action/Manage as Recommended RNA (2,348 acres)

Under the No Action alternative, recreation use would be expected to continue to grow in the Perry Creek area. Existing Trail #711 maintenance activities would continue, along with education of the trail maintenance crews to avoid brushing in specific areas. As noted under the effects on soils and plant communities, erosion of the trail would continue, with loss of topsoil, particularly on the upper 12 miles of the trail. In some areas, the trail has now been eroded to bedrock and multiple trails are developing.

The Trail #711 crossing of Perry Creek at the 2-mile post would continue to be a significant rest point and picnic area. Human activity within the area of the falls, and upstream for about 100 yards, would continue to impact the riparian habitat along this section of Perry Creek. The problems associated with human waste would continue to impact this area. If a vault toilet is installed to mitigate this impact, indirect impacts would include the noise of a helicopter to service it.

Recreation impacts to the high meadows caused by overnight camping may increase to the point that campfires are prohibited.

The upper two miles of the Perry Creek Trail #711 have been inventoried as "inadequate" in the Forest Plan. It may be appropriate to reconstruct or relocated the trail to minimize the long-term impacts of the trail on the steep hillsides and meadows of upper Perry Creek. A footlog or bridge may be placed at the crossing to minimize human impacts in this area.

As use increases along Trail #711, it is expected that cross-country travel would also increase. Existing boot paths which leave the Perry Creek Trail for Stillaguamish Peak, South Lake and Mt. Forgotten would continue to become more defined. Since these trails tend to follow the line of least resistance, grades are frequently excessive; thus these boot paths are susceptible to erosion.

No outfitter and guide use would be allocated to the recommended RNA. This would increase pressure on other areas of the Forest, including wilderness, where this use is not as severely curtailed.

The "recommended" status would mean management under the Forest Plan as if the area were an RNA. Instituting permits or closures, while controversial, could be supported.

Under Alternative 1, Perry Creek would likely be re-assessed at the next Forest Plan revision (scheduled for 2002). Its future land allocation is unknown.

Indirect Effects: If implemented, **Alternative 1 would preclude development of the Ridge Trail**, at least at this time (under the standards and guidelines of the Forest Plan, which apply to recommended as well as established RNA's).

Alternative 2 - Establish Perry Creek RNA as Recommended in the Forest Plan (2,348 acres)

The consequences of implementing Alternative 2, an established Perry Creek RNA at the full 2,348 acres, would be similar to those in Alternative 1.

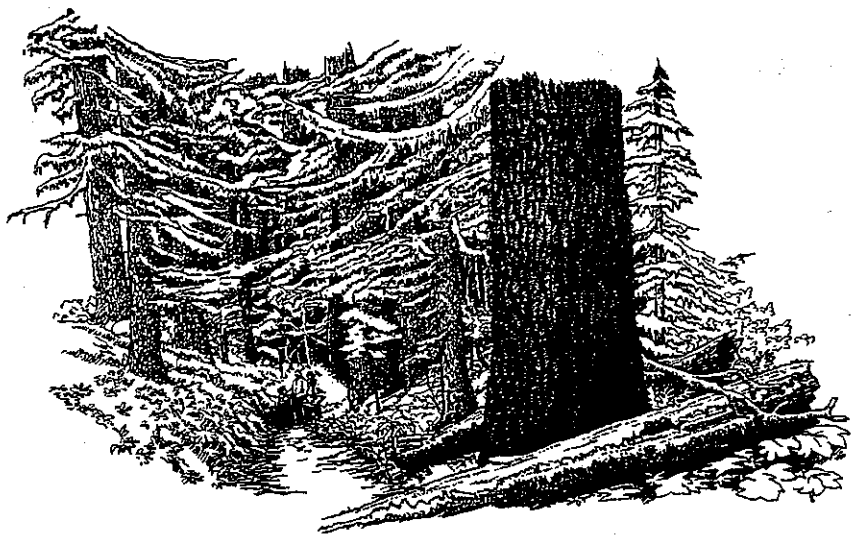
Formal establishment would facilitate the development of a management and monitoring program for this area. This, in turn, would facilitate actual monitoring, including gathering the baseline data to assess human impacts, and propose corrections.

Management actions to protect the RNA would likely be more vigorous. Additional restrictions on campfires, camping, and possibly recreation use might be considered, over time. Refer to Alternative 1 for discussion of likely construction/reconstruction work.

As a formally established RNA, Perry Creek would not likely be re-assessed at the next Forest Plan revision (scheduled for 2002).

More awareness of this area as an RNA may result in less emphasis on it in guidebooks and other publications, though this would not likely reduce recreation use.

Indirect Effects: If implemented, **Alternative 2 would preclude development of the Ridge Trail for either pack and saddle stock or hiker use.**



Alternative 3 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Pack and Saddle Stock

The direct effects on recreation use and patterns if Alternative 3 were implemented would initially be the same as Alternatives 1 and 2. However, the future option to construct the Ridge Trail #716 is left open, permanently.

Indirect Effects: If all or part of the proposed trail system were developed, future recreation use patterns in the Perry Creek watershed would likely be dramatically different:

- over half of the use of Perry Creek Trail #711 would likely shift to the new Ridge Trail (with a trailhead at Coal Lake) 3/;

- other loop possibilities would result in many hikers using the Perry Creek Trail in one direction only: to access the high country and return via the Ridge Trail. Or hikers might hike up from Barlow Pass, visit Twin Peaks, and conclude their day hike by walking down Perry Creek Trail #711;

- due to stock use on the trail, some hikers, offended by the presence and manure of horses, may choose another trail for their trip. This effect may limit total use slightly;

- sanitation problems near the Perry Creek falls would decline, but there would likely be an increase in waste in the upper part of the watershed;

- boot trails to Twin Peaks, Stillaguamish Peak, and South Lake would develop off of the Ridge Trail, all on steep slopes, with high potential for erosion. These would be in different locations than the existing trails and would receive much higher use than now. Additional spur trails would develop to obvious vista points, campsites or water sources not directly accessed by the trail;

- the Ridge Trail, if constructed, would be built to typical standards for a stock trail: 24" wide tread with 6 x 8 foot clearing limits. Grades would be gradual and continuous. Since the trail would not change elevation substantially within the Perry Creek watershed, there would not be a tremendous difference in the location of stock trail versus a hiker-only trail. Where the trail would be located on steep side slopes, the width would be up to 48" to offer room for horse and rider. Due to the low grade of the trail, erosion would be negligible.

- visually, this trail would be quite noticeable from Mt. Dickerman;

3/ 56% of the use of Trail #711 is related to access of the meadows and Mt. Forgotten -- higher alpine scenery. If constructed, the Ridge Trail would offer nearly continuous high-alpine scenery and have substantially less (1,500 feet) elevation gain to reach the high country.

- In the initial reconnaissance report (1970), no stock campsites were identified in the Perry Creek headwaters, though some were located off of a spur trail in the valley bottom directly under the north face of Mt. Dickerman. Most stock users would use this short (13 mile) trail for day use only; 4/

- with mostly day rides taking place plus limited opportunity for cross country travel by stock, grazing by recreational stock may be minimal;

- other design aspects, if the Ridge Trail were constructed would likely include: closing the trail to the Mt. Forgotten viewpoint to stock (existing Trail #711 is closed to stock); hitch rails, or highline locations would be established in some locations to prevent root and bark damage caused by tying stock directly to trees; stock camp locations, if required, would be located outside of the Perry Creek watershed; and it would be likely that all camping may be prohibited within the headwaters of the RNA to mitigate the impacts of the increased use;

- it is possible that some increase in big game hunting (deer and bear) may occur under this alternative. Few hunters have the stamina required to pack several hundred pounds of bear out of the headwaters of Perry Creek; given a horse, a few more may be drawn to this challenge; and

- outfitter and guide use would not likely be allocated to this area, to mitigate the impact of the trail on the RNA. This would increase pressure on other areas of the Forest, including wilderness, where this use is not as severely curtailed.

Alternative 4 - Establish Smaller Perry Creek RNA (1,850 acres)
Retain Future Option for Ridge Trail, Hiker Only

The direct effects on recreation use and patterns if Alternative 4 were implemented would initially be the same as Alternatives 1 and 2. However, the future option to construct the Ridge Trail #716 is left open, permanently -- with the restriction that any future construction would be for a hiker-only trail.

Indirect Effects: If all or part of the proposed trail system were developed for hiker use only, future recreation use patterns in the Perry Creek watershed would be similar to Alternative 3, and quite different from Alternatives 1 and 2 (as discussed above):

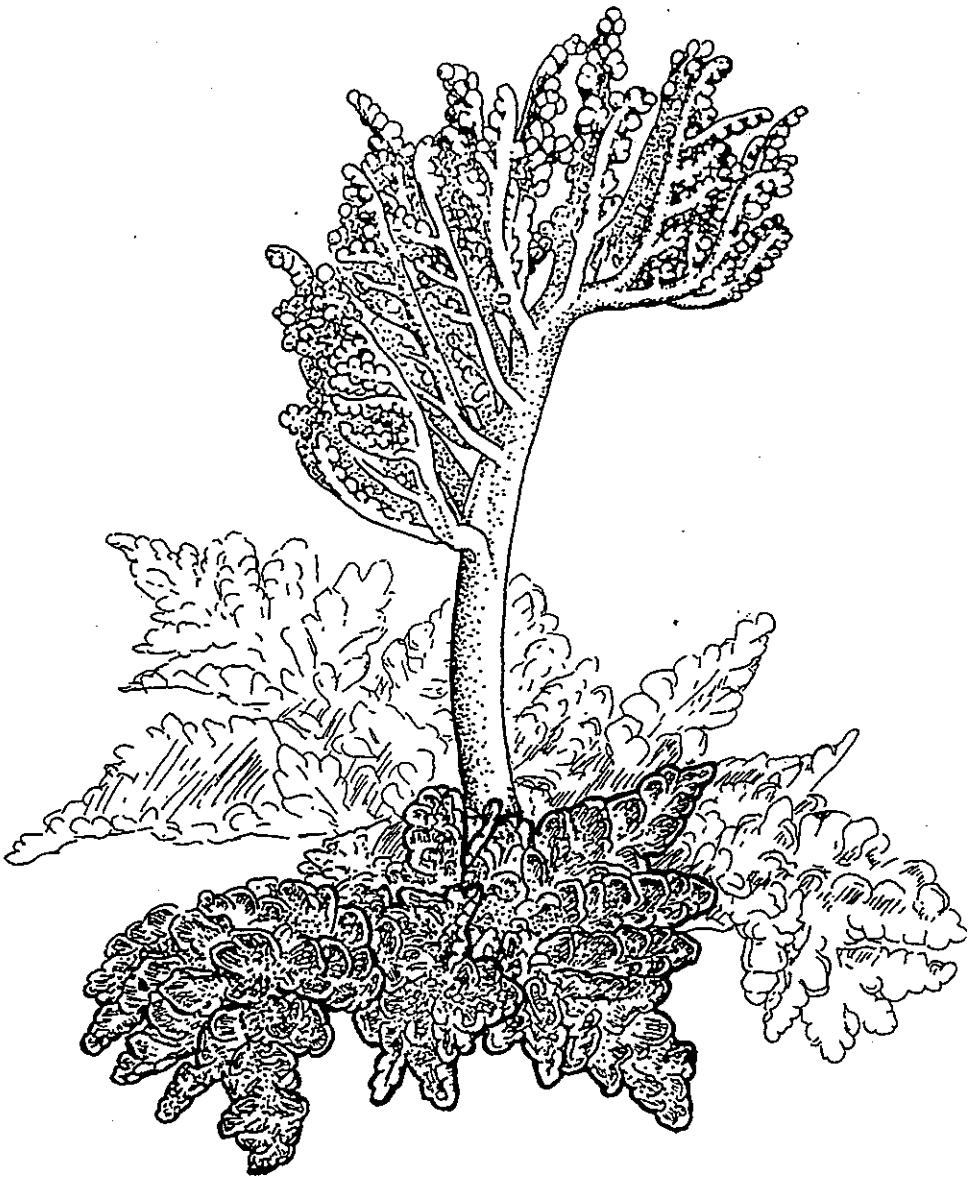
- impacts such as trampling and grazing associated with stock would not take place; hitch rails or other structures associated with stock trails would not be constructed;

4/ Experience with other trails of similar length has shown that most equestrians would prefer day rides on such a trail.

- some hikers prefer trails closed to stock, so total use may be higher under this alternative; hunting pressure would be somewhat less than in Alternative 3;

- if constructed, standards for a hiker trail through this area would call for an 18 to 24 inch wide trail tread, possibly widening to 30 inches on the steepest side slopes. Clearing limits would be minimal, for a total of about 4 feet; and

- if constructed, this trail would be less visible from Mt. Dickerman than a stock trail.



Botrychium multifidum

Thanks to David H.Wagner
Northwest Botanical Institute

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Appendix A
Public Participation Efforts

This appendix details the public participation efforts for the Perry Creek RNA Establishment environmental analysis. Refer to Chapter I of the Environmental Assessment for a summary.

Scoping Efforts - Preliminary Issues, Concerns and Preliminary Alternatives

On January 15, 1993 an initial "scoping" letter was mailed to over 170 individuals, scientists, State and federal agencies, Indian Tribes, and organizations (project files, 1/15/93 letter). Those selected to receive this mailing were identified by their previous interest in the NEPA process, Darrington Ranger District, and the research natural area process, Perry Creek in particular.

The letter outlined the RNA establishment process, explained preliminary issues (the proposed new trail along the ridge and establishment as recommended in the Forest Plan ROD), and mentioned three preliminary alternatives: (1) no action; (2) establish the Perry Creek RNA as recommended in the Forest Plan; and (3) establish a slightly smaller RNA, with the upper boundary adjusted to leave the option open for future trail construction. A map of the Perry Creek area was included.

Replies received included six letters from individuals, ten organizations, two Washington State agencies, two university scientists, and two USDA Forest Service specialists. The letters were numbered and reviewed by the interdisciplinary team; they are summarized below.

Second Scoping Letter

Analysis of the issues and concerns identified in the response to the first letter resulted in a refinement of the preliminary issues and development of a fourth preliminary alternative. On February 24, 1993, a second letter was mailed to those groups, agencies, and individuals who responded to the first letter. A slightly different version was mailed to the rest of the mailing list. The team informed the public of the status of the analysis and explained the fourth preliminary alternative: establish a slightly smaller Perry Creek RNA, with the upper boundary adjusted to leave the option open for a hiker-only trail (stock use would be prohibited). The public was invited to provide additional comments.

Eleven letters were received in response to the second scoping letter. Some respondents wrote a second time; the added preliminary alternative prompted a number of comments. A summary of the second group of letters begins on page A-5.

Public Participation - 1996-1997

Between the scoping efforts that took place in 1993 and issuance of this EA for public comment, the analysis for Perry Creek was included in the Forest's quarterly report, the Schedule of Proposed Actions (SOPA). This report is distributed to over 2500 individuals, agencies, Tribes, and organizations.

Perry Creek has been listed in the SOPA since the first issue, in May 1993, with information on the status and timing of the analysis.

Several letters from the public have been received since the initial scoping effort. No new issues or concerns were identified. While not summarized below, these letters are available in the project files, located at the Supervisor's Office in Mountlake Terrace, WA.

In January, 1997, a letter was mailed to the three interested American Indian Tribes, informing them of the upcoming release of this EA for public comment.

Comments Received In Response to First Scoping Letter - January 1993

Input #	Summary of Comments
1.	Favor building new trail, designed for pack and saddle stock. There is a definite lack of stock trails in this area and such use would be compatible with present or proposed use of the area. There should be no problem constructing the new trail with RNA values "preserved or enhanced."
2.	Establish RNA as recommended in the Forest Plan; the Ridge trail, particularly if designed for stock, is a very bad idea...would absolutely destroy this beautiful and fragile ecosystem. Even a foot-only trail would impact wildflower meadows, mountain goats, other wildlife.
3.	Located boundary of the RNA below the proposed trail No. 716 would be a great boon for hikers, an important alternative to Alpine Lakes Wilderness trails. However, before making any recommendation, what impact would hikers/horses above the RNA have? Could any potential problem be resolved by prohibiting camping in Perry Creek watershed?
4.	Develop a fourth alternative: establish a slightly smaller RNA and make trail "hiker only." Stock use has greatest impact. Given the limited season for which the trail could be open, and that it doesn't connect with other trails designed for stock use, the minimal benefits of allowing stock use would not justify the added expense of building to the standards required for such use. There is existing need for more trails, especially to relieve pressure on existing wilderness areas...[and] this drainage is situated only 1 to 1.5 hours from the Seattle-Everett area.
5.	Support Alternative 3. When the trail was proposed, it was intended to provide a more varied recreational experience for visitors to the [Darrington] District. Virtually all trails on the watershed are short distance routes to a point and return by the same way. The proposed trail would provide a longer route across beautiful country while staying above valuable biotic resources at the lower elevations of Perry Creek. Urge action to create the RNA; suggest Perry Creek be used as a site to increase public knowledge through suitable, carefully-thought-out interpretation. The same could be done along Trail #716.
6.	Against the idea of putting a horse trail anywhere near Perry Creek RNA; have concerns about horses (hikers, too) introducing "weedy" species of plants. Since this RNA is to protect unique assemblages of rare ferns

and pristine plant communities there should be no question as to whether to allow horses into this area. Allowing horse travel also may be detrimental to mountain goats, as opening would allow for more intensive hunting. These problems need to be addressed.

7. Urge adoption of Alternative 3; minor adjustments of the boundary will preserve RNA values while addressing critical need for additional hiking trails in areas close to heavily used wilderness system. The existing trail lies much closer to the ferns. Do not believe trail should be open to stock due to high precipitation in area (thus trails susceptible to erosion and damage), the rugged, steep terrain. Also, area is small compared to the distance a horse can travel in a day. We believe the interests of horse riders would be better served by spending extra monies in areas that would be more amenable to stock.

8. Wholly support formal establishment of the Perry Creek RNA; do not favor any proposal that threatens to adversely impact the highly significant and unique resources. Such proposals include development of new trails in or adjacent to the proposed RNA and encouragement of human visitation on the existing trail system. Support Alternative 2. Reject the human-only trail alternative; it is well known that trails -- with or without use by stock animals -- act as corridors for movement of weeds. Other adverse impacts from increased human use: trail cutting, increased off-trail travel, animal and human waste.

9. The Preliminary Issues did not mention the scientific reasons for establishment of the RNA -- all consideration of alternatives must have, as the preeminent concern, the scientific validity of boundaries and managing the RNA. Stock is excluded from RNAs because of the potential for damage to native plant, animal, and biotic life. Boundaries must not be artificially manipulated to accommodate recreation access.

10. Support Alternative 2; Alternative 3 is not in the best interest of preserving the integrity of the unique natural features. Realize the Forest Plan contains somewhat conflicting statements; however, given that areas worthy of RNA status are rare, it would be most prudent to err on the side of protecting the resource. The proposed trail can be rerouted, the Perry Creek RNA cannot.

11. The area possesses a truly unique fern flora that is cherished by professionals and amateur plant enthusiasts alike. Reduction of the proposed boundaries to permit construction of a recreation pack and saddle stock trail would be a serious mistake. Alien plant species, introduced through droppings of domestic stock, would inevitably spread downslope, resulting a degradation of the native plant communities for which the RNA was established. We have found that these aliens readily establish themselves along trails used by stock and in the event of any disturbance, particularly wildlife, explode downslope.

12. The major issue should be focused on what impact recreational stock use would have on the purposed for which the RNA is established. Prior to building the trail, do a study on a similar trail in wilderness that receives recreation pack stock. Evaluate the impact of use on native vegetation adjacent to trail and downstream. After this, alternatives such as rerouting the proposed trail to minimize its incursion in Perry Creek could be considered. Urge FS to include the entire drainage in the

RNA. An amendment to the Plan can address recreation use issues after sufficient monitoring and identification of actual impacts are accomplished. This will give time to evaluate other trail opportunities in the vicinity.

13. Access to public lands is a key issue. Trail riding [for mountain bikes] is in short supply. Urge FS to select Alternative 3 to leave option open for future construction of the Ridge Trail. Reducing the size of the RNA would not have a significant, if any, impact on the unusual plant community. Implementing Alternative 3 can provide needed recreation opportunities while still meeting objectives of the Plan.

14. The analysis and acceptance of Perry Creek as a candidate and recommended RNA has taken several years and has been studied and supported by numerous individuals and organizations within and outside of the FS. The boundaries have been carefully designed to include viable occurrences of several specific features. We are not in favor of any new trail developments or boundary adjustments; strongly support establishment as recommended in the Forest Plan. RNAs are a valuable tool in forest management...a baseline for comparison...important role in monitoring, research, and preservation of biological diversity. Any increased recreation activity should be actively discouraged in RNAs.

15. Strongly support establishment of Perry Creek RNA encompassing the whole Perry Creek watershed. Concern over reduction of the boundary to allow construction of a major new cross-country horse/pack trail relates to likely introduction of exotic species through feed and feces of such animals. If the RNA is to serve as a "base-line" for comparison with other areas, it would be absurd to encourage the development of an activity that would seen biologically incompatible with the objective. We are aware that pack and stock use of many westside areas has decreased due, in part, to the basic unsuitable terrain and trail conditions and, in part, to increased regulation to prevent trail and habitat damage. If the USFS is intent on providing more pack/saddle stock access, is it possible to route the trail further east?

16. Support Alternative 2. While areas for riding need to be expanded, Washington's network of natural areas represent a very meager percentage of the state's land base; we need to protect what little we have from further degradation.

17. Have concerns about Ridge Trail #716 due to mountain goat use in the area. The proposed trail would route people and livestock through portions of mountain goat summer and winter range, increasing the likelihood of goat-human interactions. In fact, we would recommend reducing use of the existing Perry Creek trail because it is located within mountain goat winter range. Recommend Alternative 2 be adopted.

18. Whole-heartedly in support of the proposal to include the entire Perry Creek watershed in the RNA. The ridge trail should not be built there. [Goes on to list three fern species the author found, in 1976, within the watershed...]

19. My acquaintance with the area is long-term (since the early 1950's). Of the three alternatives proposed, I would support the second, establish as recommended in the Forest Plan. The third alternative is undesirable on

at least three counts: alien plant introduction, pollution of the drainage, and reduction in size of the RNA. As a compromise, I would not be wholly opposed to the Ridge trail, open to hikers only. However the best solution would be to find another trail routing outside Perry Creek drainage; Coal Creek and Deer Creek just west of Perry Creek are possibilities.

20. RNAs should be integrated systems which form natural units, the best example of which is an entire drainage. Since 1982, the Natural Area Committee has supported Perry Creek RNA proposal...a preserve design including the entire drainage was deemed preferable after consultations with forest planners, the MBS Area Ecology Program, the Washington Natural Heritage Program, the Washington Natural Area Preserve Program, Professor Arthur Kruckeberg, and Professor Jerry Franklin. And this is what the Forest Plan endorsed. The proposal to alter the boundaries to allow for the construction of a future trail is not compatible with the reasons for setting the area aside nor for the management of the area as a RNA. Building of new trails in RNAs...is prohibited by FSM and the MBS Forest Plan. I cannot support moving the boundary...to accommodate a trail that not only has not been funded but is only a "possible trail project."

21. If identified in the Forest Plan -- it's a go. Make sure the area delineation and trail question be driven by what's best for meeting objectives of RNA establishment and species involved.

Comments Received In Response to Second Scoping Letter - February 1993

Input # Summary of Comments

1. Again, I favor the construction of a stock trail, either shared with or separate from the hiker trail. There are very few stock trails in this area; we would be willing to help maintain the trail if constructed.

2. I oppose Alternative 4 and favor establishment of the stock trail.

3. Recreation will play an increasingly important role on the MBS. Pressure to put trails and people everywhere will continue. It would be nice to think that the FS would recognize that they goofed when they contradicted themselves in the Plan. Since the project list for many things has become meaningless, why is the MBS sticking so long and hard to a very inappropriate changing of the boundaries. This area, recognized as sensitive by the FS does not need intrusion.

4. [We are] extremely concerned that the priorities of the MBS are not focused upon protecting ecosystems -- particularly sensitive and/or rare communities. We strongly disagree with Alternative 4...horses or hikers the, potential for introducing noxious weeds is still high as is disturbance to mountain goats, other wildlife.

5. I strongly oppose Alternative 4; why aren't mountain bikes allowed?

6. We continue to support Alternative 2. The area under consideration is situated in both winter and summer range for mountain goats. We would not

advocate any further trail development because of increased potential for goat-human interactions.

7. I am in strong support for establishment as outlined in Alternative 2. Our main concern [is] the possible introduction of any non-native plants by use of horses on proposed Ridge Trail. Noxious weeds have become a serious threat to native plant communities in Washington. Many invasions are related to horse packing recreationalists who don't use weed-free hay.

8. My family would like to see Alternative 3 instituted...leaving open an area to construct a Ridge Trail for use of horse riders as well as hikers. Areas suitable for riding are becoming a vanishing commodity in our state. This makes preservation of these options of prime importance to all horse people.

9 We strongly support Alternative 3. You will see increased efforts [by our organization] in areas of education and legislative projects; tread lightly programs will be vigorously pursued, along with stronger relations with governing agencies.

10. As a trail horse rider, I am very concerned...we would like to see the third proposal instituted, establishing the upper boundary that leaves open an area to construct a Ridge Trail. Areas that are suitable for extended riding are becoming fewer each year.

11. [Alternative 4] is preferable to me. Restricting the route to hikers would be aesthetically better, reduce tread wear, and affect costs. At present, there are no other livestock routes in the drainage, so creating one which is easier to reach than those further east should make it a popular one for horse travel. There are no hiker-only trails..this one of significant distance would be appreciated. I support Alternative 4 as a first choice and 3 as a second; the trail should be built.

Appendix B
MA 18 Research Natural Area Standards and Guidelines
Re-printed from the Mt. Baker-Snoqualmie NF June 1990 Forest Plan

18 RESEARCH NATURAL AREAS

Goal: Preservation of naturally occurring physical and biological units where natural conditions are maintained insofar as possible for the purpose of: 1) comparison with those lands altered by management; 2) education and research on plant and animal communities; and 3) preservation of gene pools for typical as well as threatened and endangered plants and animals.

Description of Lands Where Prescription Applicable:

Existing RNA - North Fork Nooksack River - 1,407 acres established in 1934. Principal features include Douglas-fir and western hemlock forests. Lake Twenty-two - 790 acres established in 1947. Principal features include north slope western redcedar and western hemlock forests and a subalpine lake. Long Creek - 640 acres established in 1947. Principal feature includes a south-slope western hemlock forest and climax red alder forest.

Potential RNA - Perry Creek - Approximately 2,000 acres. Principal features include a unique assemblage of rare fern species and Alaska cedar in a stand with mountain hemlock and subalpine fir, and a heather-huckleberry community. Green Mountain - Approximately 2,000 acres. Principal features include a subalpine parklike mosaic, heather-huckleberry communities, and subalpine lush herbaceous communities. Chowder Ridge - Approximately 1,900 acres. Principal features include an alpine community mosaic with Krummholz tree groups. North Fork Nooksack Addition - Approximately 2,500 acres. Principal features include a 75 year old burn in Douglas-fir along with a wide array of subalpine meadow communities. Lily Lake - Approximately 800 acres. Principal features include high elevation mountain hemlock - Pacific silver fir forest. Lake is typical of mid to high elevation subalpine lakes.

Desired Future Condition:

Preservation of naturally occurring physical and biological processes without undue human intervention, as a source for gene pools and for education and research on plant and animal communities.

Intensities in this Management Prescription: None

Program Element	Standards and Guidelines
A. Recreation 1. Use and Administration	a. Recreation activities and use within RNA's shall not be encouraged. If necessary to prevent damage, permits or closures may be instituted.
	b. Overnight camping and the use of fires shall be discouraged. Such use may be prohibited where it interferes with the preservation of naturally occurring biological or physical conditions.
	c. Discourage all recreation use within 200 feet of streams, lakes and ponds except for use on system trails.

	d. Prohibit all recreation pack and saddle stock.
	e. All recreation summer and winter ORV use is prohibited.
	f. Hunting and trapping shall not be encouraged.
2. Visual Quality	a. Visual Quality Objective of preservation shall be maintained.
3. Archaeological and Historical Properties	a. Meet Forest-wide Standards and Guidelines.
4. American Indian Religious and Cultural Use	a. Manage identified and potential cultural resource sites to protect sites and preserve values.
	b. Prohibit interpretation rehabilitation or restoration of historical or archaeological sites within RNA. Relocate if possible to rehabilitate or interpret. Relocation shall include a restoration plan for the RNA.
	c. Stabilize and preserve Green Mountain Lookout. Accept non-conforming structures.
5. Interpretive and Public Use Administration	a. Education will generally be directed toward the graduate level, but may be approved for advanced undergraduate or interested groups.
	b. Prohibit on-site interpretation or demonstrative facilities.
	c. Criteria for education use shall be: 1) minimum influence on natural character of RNA, 2) minimum influence on existing research activities, 3) size, frequency, and intensity of group use, and 4) provisions for supervising and controlling group activities.
	d. Publicity that would attract the general public to the area shall be avoided.
	e. Information on location and resources of the RNA shall be made available to responsible scientific and educational parties.
	f. Signs or references on maps should be discouraged except to protect the RNA.
	g. Discourage publicity of special features within RNA's.

5. Trail System Maintenance and Operation

a. Existing trails will be allowed to remain. Minor rerouting or upgrading shall be allowed provided it does not compromise the purpose of the RNA.

b. New trails will not normally be constructed unless it is needed for research purposes or can be shown to conform to the purpose of the RNA and compliment its management objectives.

B. Wilderness

1. Wilderness Use Administration

a. For those RNA's, or portions thereof, that fall within designated Wilderness areas, no mechanized equipment will be allowed.

C. Wildlife and Fish

1. Planning

a. Prohibit introduction of exotic plant and animal species.

b. Reintroduction of former native species may be permitted with Regional Forester approval and with concurrence of PNW Station Director.

c. Species of special interest may be managed within RNA according to standards and guidelines for those species except that management shall not violate the integrity of the RNA.

d. Control of excessive animal populations may be considered where such populations threaten the RNA integrity. Control measures are subject to Regional Forester and PNW Station Director approval.

e. Habitat improvement is prohibited.

f. Fish stocking shall be prohibited, except as provided under C1b above.

D. Range

a. Grazing of domestic livestock is prohibited.

E. Timber

1. Timber Management Planning

a. Scheduled timber harvest is prohibited.

b. Logging may be permitted following fire, windthrow, insect attack, or disease which may threaten the RNA or threaten values adjacent to the RNA. This is subject to approval of the Regional Forester and PNW Station Director.

2. Reforestation

a. Natural regeneration following fire, windthrow, insect attack, or disease is the preferred reforestation method.

b. Prohibit firewood cutting.

3. Timber Management Research	a. All research proposals shall be subject to approval by the PNW Station Director and any applicable permits obtained from the appropriate National Forest System line officer.
	b. Research should be limited to non-consumptive, non-destructive, and essentially observational activities. Some collecting of soil, plants, or animal specimens may be permitted on a case-by-case basis.
	c. Research will be conducted only by qualified individuals or groups.
F. Water, Soil, and Air	a. Meet Forest-wide Standards and Guidelines.
G. Minerals and Geology	a. RNA's shall be recommended for withdrawal from mineral entry.
H. Rural Community and Human Resources	a. Meet Forest-wide Standards and Guidelines.
J. Lands	
1. Special Use Management	a. Minimal, temporary or semi-permanent research facilities and installations may be approved under permit. Approval is required through the PNW Station Director and coordinated with the Forest Supervisor.
2. Rights-of-way Grants	a. Rights-of-way easements including utility corridors existing before RNA establishment shall be honored, but upgrading of existing ones shall be discouraged.
	b. No longer needed rights-of-way shall be restored to their natural surrounding conditions.
	c. Proposals for new rights-of-way shall require Regional Forester recommendation and Chief of Forest Service approval.
	d. Roads shall be discouraged as RNA boundaries.
3. FERC License and Permits	a. Recommend against FERC licenses or permits.
4. Land Ownership Planning	a. All lands will be placed in Group II - retain or acquire.
L. Facilities	
1. Transportation System Planning	a. New trail or road construction or reconstruction should not normally take place unless it is aimed at preserving or enhancing RNA values.

b. Hazard tree felling is permitted along boundary trails or roads for safety. Felled trees shall remain in place unless lying across trail or road. Trees should not normally be hauled out or used for trail improvements.

2. FA&O Facility Maintenance and Reconstruction

a. Prohibit buildings or other facilities. Allow existing facilities to deteriorate without replacement.

P. Protection

1. Fire Management Planning

a. Managed fire may be considered to perpetuate the sere and thus the cell that the RNA is meant to represent.

b. If fire is used to manage a sere, it should mimic a natural fire, but with prudent measures to avoid catastrophe.

c. Prescribed burn plans shall be subject to approval by the PNW Station Director and Regional Forester.

d. Naturally occurring or accidental human-caused fire shall be extinguished at the smallest practical acreages unless it meets strict guidelines of a management prescription to maintain the RNA objectives.

e. Ground disturbing activity to suppress fire such as fire breaks with bulldozers shall be avoided if possible.

f. Fire retardants shall be avoided if possible.

2. Fuel Management

a. Fuels normally should be allowed to accumulate at natural rates unless they threaten adjacent values or the existence of the RNA.

3. Forest Pest Management

a. No action will be taken against insects or diseases unless the outbreak threatens adjacent resources or would drastically alter the natural ecological processes within the RNA. If action is proposed, it shall be subject to approval of the PNW Station Director and Regional Forester.

Appendix C
Wildlife Data Sources

Mountain goat information for the Perry creek area (see Chapter III) is from the following sources:

1. A 1961 report from the Department of Wildlife provides a count of 4 goats in the Perry Creek drainage; 5 in the vicinity of Twin Peaks; 1 on the south slopes of Stillaguamish Peak; and 1 in the Mt. Forgotten area.

2. A Washington Department of Game(WDG) report of the 1974 goat harvest has Perry Creek included in Game Management Area No. 10 - Stillaguamish Unit. This game unit had 25 permits authorized, and 23 tags sold. A harvest of 12 goats by 19 hunters was recorded as a 63% success rate. Goats were reported to have been taken from Dickerman Peak (1) and Stillaguamish Peak (2). The highest number of goats seen in 1974 was reported as 12 in the Stillaguamish Peak area.

3. A 1980 goat harvest sheet (WDG) reports a nanny taken from Dickerman Mt. area with 14 goats seen. Stillaguamish Peak had 3 nannies taken with 7-10 goats seen. Mt. Forgotten had 2 billies taken, with 17 goats seen. A difficulty with using the hunter reports (of total goats seen) is there is no indication if numbers represent the total goats seen over the hunting period (which could include repeat counts of animals) or if this is the total number of animals seen at any one point in the hunting period.

4. A map prepared in 1982 from WDG information (hunter reports) and sighting cards turned into the USFS showed 13 goats in the Perry Creek drainage, with the much of Perry Creek mapped as primarily summer habitat. The 13 goats reported were from sighting cards dated - 7/17/80, for the Mt. Dickerman Summit: 9 adults, 4 immatures.

5. The 1993 aerial survey of the Darrington District was conducted by the Washington Department of Fish and Wildlife (WDFW) on 9/24/93 and 9/26/93. The weather conditions were sunny and clear, with surveys conducted between 0700 and 0900. A very low count of goats for the whole area (39) was reported. On 9/24/93, 1 goat was sighted in the Twin Peaks area and another goat in the Perry Creeek area, for a total of 2 goats seen. The scheduling of the flight during hunting season may have influenced the number of goats seen.

6. In 1992, one of the hunters for the Stillaguamish Unit (Archery) reported that there were so few sign of goats that the person tore up his goat tag (P.Reed, personal communications with A.Ryals).

Other mountain goat information for the Perry Creek area was tabulated by Glenn Mackey (Marysville, WA) in his visits to the Forest. Glenn spent a number of years hiking on the Darrington District and was interested in wildlife issues. See following page:

Dickerman Mountain

1963 - no goats observed
1964 - June 28 - 6 goats, including 2 new kids
1965 - June 6 - 2 seen from Perry Creek
1966 - July - 1 billy
1969 - July 27 - 2 (both billies)
1970 - July 6 - 1
1992 - Helicopter flight with Lora Leschner (WDW) and Harold Engles (no date)
Dickerman - 2 (nanny and a kid)
Stillaguamish Peak - 4 (including 1 nanny and kid)
Twin Peak - 6 (4 adults - 2 kids)

Stillaguamish Peak

1960 - August 6 - 10 goats (4 nannies, 3 kids, 1 one yr. old, 2 - 2 year billies)
1962 - no goats observed
1963 - 7 (includes 2 billies, 2 nannies, 1 kid)
1966 - July 6 - 8 (includes 1 kid)
1967 - August 11 - 3 (includes 1 kid)
1970 - July 19 - 11 (includes 2 kids)
1973 - August 4 - 2 (both billies)
1976 - August 21 - 5 (2 nannies, 1 kid, 1 yearling, 1 2/3 yr. old)
1988 - no date - 6 goats observed - Glenn estimated there may be 10 animals.
1992 - 4 goats seen on the helicopter tour

Glenn Mackay reported that before the area was opened to hunting in 1947, there had been approximately 30 goats in the area.

Twin Peaks

1973 - July 28 - 30 goats (includes 7 kids)
1974 - July 30 - 5 goats (1 kid)
1977 - July 30 - 13 goats (5 kids)

Glenn Mackay reported that as of 10 years ago (1970?) he had a high count of 24 goats on Twin Peaks.

1992 - no date - 6 goats (4 adults, 2 kids) - helicopter flight

Cover/Forage for Black-tailed Deer:

The Perry Creek drainage was evaluated for deer cover/forage potential, along with the adjacent sub-drainages from Barlow Pass to Stillaguamish Peak; the lower elevation boundary was the S. Fork Stillaguamish River, 1700 ft. at Perry Creek confluence with the Stillaguamish River, to 2000 ft. near Barlow Pass. This evaluation area encompasses 7433 acres, and was selected due to the connection this area of the upper elevation meadows and ridges.

The proposed Perry Creek RNA is primarily at elevations over 2200 feet, not considered primary winter range for large game. The snow level in this area would often preclude optimal use of the area by wintering animals. The area would provide spring, summer, and fall habitat, so cover and forage analysis was done for existing seral stages of vegetation.

The area provides optimal cover, thermal/hiding cover and forage opportunities for the black-tailed deer within the desired ranges outlined in the Forest Plan. Healthy populations of deer are considered important for their indication of habitat suitability, but also are important as a prey base for many of the other species of concern such as forest carnivores, or wildlife species feeding on carrion.

Forage was defined as including seral stages of 1-20 years of a forest stand, plus vegetation breaks that supported forage materials. This include the following: rock outcrops with vegetation (123 acres = 2%), forb areas (171 acres = 2%), avalanche chutes (46 acres = .6%), meadow (94 acres = 13%), shrub (2214 acres = 30%) and seed and saplings (419 acres = 6%). Potential forage areas totaled 3097 acres or 42% of the analysis area. There were two categories of the potential forage (seed/saplings and shrubs) which could also be counted in the thermal/hiding category. Using aerial photo interpretation, adequate forage exists for large game which might use this area during the non-winter months.

Thermal/hiding cover was defined as including seral stages of 21-90 years of age in a forest stand. This includes areas classified as medium saw (1419 acres or 19%) and poles (619 acres or 8%), for a total of 27% of the area in thermal or hiding cover. Portions of the stands classified as saplings would also provide hiding cover, as would portions of the areas classified as shrubs. The seral stages of medium saw and poles with 50% of the shrubs and saplings providing hiding cover (another 18% of the area in this cover class) would total 45% of the area providing thermal/hiding cover for large game.

Optimal cover for wintering animals is described as having sufficient canopy cover to provide snow interception, while still allowing sunlight to filter to the forest floor for understory forage development. This age class is also preferred, at times, during the summer months for thermal protection during the heat of the day. Optimal cover is defined as stands of 90+ years of age and are represented in the analysis area by the large saw stand classification. There are 1986 acres or 27% of the analysis area represented by this classification.

Current cover/forage ratios in the analysis area include: forage (24-42%), thermal/hiding cover (27-45%) and optimal cover (27%). Since the projected

use of this area for large game is primarily in the non-winter months, the functions of cover/forage which are of concern are: 1) adequate forage; 2) visual screening from disturbance; and 3) favorable thermal regimes during summer high temperatures. The percent of habitat in the various cover and forage categories represent adequate forage and cover opportunities (Brown et al, 1985).

Since utilization of forage begins to decline at approximately 200 feet from the edge of cover, the size of forage opening is important to forage efficiency. Other factors influencing the use of forage include distribution of available forage areas over the season, and road density. The GIS representation of the cover forage displays the distribution of the habitat within the analysis area and road/trail density. The limiting factor within this analysis area is the lack of elevational areas which would provide wintering habitat. For non-wintering months, the analysis area provides adequate large game cover/forage with a road/trail density of less than 1 mile/square mile.