

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Establishment Record
for

RONALD J. TAYLOR RESEARCH NATURAL AREA

Mt. Baker-Snoqualmie National Forest
Whatcom County, Washington



**SIGNATURE PAGE
FOR
RESEARCH NATURAL AREA ESTABLISHMENT RECORD**

**Ronald J. Taylor Research Natural Area
Mt. Baker-Snoqualmie National Forest
Whatcom 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 5e(3) in arriving at this recommendation.

Prepared by:

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Date

Oct 24, 2001

Recommended by:

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Date

1/22/2002

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Date

1-24-02

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Date

2-6-02

PREFACE

This establishment report is based on an original draft completed September 11, 2001 by

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The original report was completed under contract #43-05M6-1-0068 for the Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, WA. It is referred to in this document as Douglas (2001).

INTRODUCTION

The Ronald J. Taylor Research Natural Area (RNA) is centered on Chowder Ridge, on the northwest slopes of Mt. Baker, and includes portions of Bastille Ridge, Cougar Divide, and Skyline Divide. This RNA is mostly within the subalpine and alpine zones, within the Mt. Baker Wilderness Special Area, and is part of the Mt. Baker-Snoqualmie National Forest (Figure 1).

The Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (USDA Forest Service 1990a) recommended 769 ha (1900 acres) centered on Chowder Ridge as Management Area 18 - Research Natural Area. The environmental consequences of establishing the Chowder Ridge RNA were analyzed in the Forest Plan FEIS (USDA Forest Service 1990b). See Appendix 1 for relevant pages of these documents.

Additional analysis expanded the RNA to 1089.40 ha (2691.91 acres) to include a larger portion of the alpine community mosaic along the north and south sides of Chowder Ridge. The Environmental Analysis for the establishment of this RNA evaluates the effects of expanding the area.

The area is designated as Congressionally Reserved under the NW Forest Plan (USDA and USDI 1994). In addition, the Aquatic Conservation Strategy (ACS), an integral part of the Northwest Forest Plan includes objectives to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. All projects proposed in these areas must be designed to meet specific standards and guidelines in order to be consistent with ACS objectives. When lands, such as Ronald J. Taylor RNA, have more than one land management designation, the most restrictive Standards and Guidelines supercede those of less restrictive Standards and Guidelines.

A major component of the ACS was the designation of Key Watersheds. The Nooksack River system has been designated a Key Watershed because it provides refugia for at-risk anadromous salmonids and resident fish species. An extensive network of headwater streams and riparian reserves are found throughout the proposed RNA area. Establishing the Chowder Ridge area as the Ronald J. Taylor Research Natural Area is consistent with the ACS objectives.

OBJECTIVES

The objective of the Ronald J. Taylor RNA is to preserve an alpine mosaic in the western Cascades of Washington, in a condition that is relatively undisturbed by humans. The RNA will serve as a reference area for study, as a baseline for determining long-term ecological changes, and can serve as a "control" when monitoring the effects of management techniques and practices applied to similar ecosystems.

JUSTIFICATION FOR ESTABLISHMENT OF THE AREA

Until now there has been no representation of an "alpine mosaic with krummholz tree groups" in the western North Cascades (Washington Natural Heritage Program 1995, Dyrness et al. 1975). Chowder Ridge contains the largest area of continuous alpine vegetation in the western North Cascades. The Ronald J. Taylor RNA was recognized as the best area to fulfill the need for the "alpine mosaic" element type (page 58, Washington Natural Heritage Program 1995).

PRINCIPAL DISTINGUISHING FEATURES

This RNA is of particular interest to the scientific community. It contains the largest area of continuous alpine vegetation in the western North Cascades. With its southwestern aspect, Chowder Ridge contains a "curious mixture of relatively drought-tolerant plants more frequently encountered in the eastern Cascades and Rocky Mountains" (Taylor and Douglas 1978). The ridge is composed of marine sediments of the Nooksack Group, whereas other

nearby mountains are composed primarily of andesite from the nearby Mt. Baker volcano. With all of the landforms characteristic of the alpine zone and eight plant community types in the subalpine and alpine zones, Chowder Ridge represents a unique combination of biological and physical characteristics. The fact that the area remains more or less undisturbed by humans, with the plants and wildlife in a relatively natural state make the Ronald J. Taylor RNA "incomparably suited" for Research Natural Area designation (*Ibid* 1978).

LOCATION

The Ronald J. Taylor Research Natural Area is located on the northwest slopes of Mt. Baker within the Mt. Baker-Snoqualmie National Forest. No other National Forest System lands are involved. The approximate center of the Ronald J. Taylor Research Natural Area is located at a latitude of 48° 50' 35" and a longitude of 121° 50' 30". The RNA is in Townships 38 and 39 North, Ranges 7 and 8 East, W.M., Whatcom County, Washington.

Boundary

The boundary for the Ronald J. Taylor RNA is shown in Figure 2. The legal boundary description for the Ronald J. Taylor RNA has been officially prepared by the Forest Land Surveyor for the Mt. Baker-Snoqualmie National Forest (Appendix 2). Appendix 2 also includes an official letter from the Forest Land Surveyor certifying that the boundary is correctly described.

Area and Elevation

Total area is 1089.40 ha (2691.91 acres) and the elevation is 1360 to 2320 m (4462 to 7612 feet).

Access

Access to the Ronald J. Taylor Research Natural Area is shown in Figure 3. From Interstate 5 in Washington, take Washington State Highway 542 to the town of Glacier. For Skyline Divide access travel approximately 11 km (7 miles) east of Glacier, turn south on Forest Road 37 and travel 10 km (6-7 miles) to near end of road. The trail to Skyline Divide climbs approximately 2.4 km (1 ½ miles) southeast to Skyline Divide, then another 3.2 km (2 miles) south to Chowder Ridge. For Cougar Divide access travel approximately 14.5 km (9 miles) east of Glacier, turn south on Forest Road 33 and travel 13.7 km (8-9 miles) to end of road. The trail up Cougar Divide climbs approximately 4 km (2 ½ miles) southwest to Chowder Ridge.

AREA BY COVER TYPES

Vegetation cover types according to potential vegetation zones are mapped in Figure 4. Potential vegetation zones, based on a model by Henderson and Leshner (personal communication), are compared to vegetation cover types by Kuchler (1966) and the Society for American Foresters (SAF; Eyre 1980) in Table 1.

Table 1. Summary of Ronald J. Taylor RNA Vegetation Cover Types.

Reference Cited	Cover Type	Acres	Hectares
Henderson and Leshner (2001)	mountain hemlock, 2300 series	751	304
Henderson and Leshner (2001)	subalpine fir, 2500 series	92	37
Henderson and Leshner (2001)	parkland, 3200 series	1305	528
Henderson and Leshner (2001)	alpine, 3300 series	574	232
Total		2722	1101
SAF (1980)	mountain hemlock, type 205	843	341
SAF (1980)	non-forest, unclassified	1879	760
Total		2722	1101
Kuchler (1966)	fir-hemlock forest, type 4	843	341
Kuchler (1966)	alpine meadows & barren, type 52	1879	760
Total		2722	1101

PHYSICAL CONDITIONS

The area is specifically impressive, in large part, because of its unique physical attributes. Because of the southwest aspect of Chowder Ridge, water stresses are more critical than those typifying the North Cascades in general. This fact results in a curious mixture of relatively drought-tolerant plants more frequently encountered in the eastern Cascades and Rocky Mountains with the characteristic species of the western North Cascades. In addition, Chowder Ridge contains all the landforms characteristically associated with the alpine zone, e.g., frost heaving, rock stripes, soil stripes, vegetation stripes, turf-banked terraces, turf-banked lobes, solifluction, coarse talus, extensive fell-fields, and sparsely vegetated rock formations.

CLIMATIC CONDITIONS

The weather at Chowder Ridge is variable and often severe. The prevailing winds follow the general pattern for that of the North Cascades, northwesterly during spring and summer and southwesterly during fall and winter (Douglas 1972).

The nearest meteorologist data are recorded from the Mt. Baker station, located about 16 km (10 miles) away, at the Mt. Baker Ski Area, 1296 m (4250') in elevation. At the weather station, the mean annual precipitation is 2,790 mm (110 inches) with only 274 mm (11 inches) occurring during the summer months (June, July, and August). The mean annual temperature is 4.4° C (40°F) with a July mean of 21°C (70°F). However, Chowder Ridge is both colder and drier than the ski area, because it is higher in elevation and is in the path of multiple rainshadows (Henderson, Personal Communication). Based on models by Henderson (Personal Communication), the mean annual temperature on Chowder Ridge is negative 0.3°C (31.4°F), and the mean annual precipitation is 1854mm (73"), but varies widely within the RNA, from 1397mm to 2210mm (55" to 87").

DESCRIPTION OF VALUES

Flora

Zonal Patterns

The vegetative zones on Chowder Ridge were shown to be distinct and readily recognizable (Taylor and Douglas 1978). The montane zone or closed forest ends abruptly at approximately 1,500 m (4920') and is more or less restricted by the topography to the western end of the ridge. Because of prominent snowfields and glaciers on the northern slopes, the subalpine zone¹ is restricted to the south side and western end of the ridge. Even here, the subalpine vegetation is limited to a narrow band, probably because of the steep (approximately 45 percent) slope and prevailing aspect, resulting in less snow accumulation, earlier snowmelts, and more rapid runoff. The resulting xeric conditions are more favorable to alpine vegetation. Because of these factors, the alpine zone is very extensive and comprises the greater part of the vegetation on Chowder Ridge.

The USFS Area Ecology Program has established 48 plots in the Chowder Ridge area, which will be used in a classification of non-forested vegetation of the Mt. Baker-Snoqualmie National Forest (Leshner and Henderson, Personal Communication).

Plant Community Patterns

The major plant communities in the subalpine and alpine zones of Chowder Ridge are usually sharply delineated and create a complex mosaic over the landscape. This patterning of plant communities is a response to various environmental parameters, especially wind amount (and its influence on evapotranspiration), snow depth, and time of snowmelt. According to Bliss (1969, 1971), those factors are the most important in determining plant community's structure at high elevations throughout western North America.

¹ The subalpine zone is defined here as that area above the montane (closed) forest and below the upper limit of conifers as an upright tree form. Above this is the alpine zone where tree species occur only in a dwarfed or krummholz form (Douglas 1972, 1973, 1974; Douglas and Bliss 1977).

Twelve plant community types were recognized in the subalpine and alpine zones of Chowder Ridge (Taylor and Douglas 1978). Six of these represent habitat-physiognomic types whereas the other two (fell-fields and vegetation stripes) are associated with patterned ground. The vegetational composition and structure and the topographic characteristics of these community types are described below.

Plant Communities of the Subalpine Zone

Mesic Herb Communities - These communities are dominated by herbs 10 to 40 cm (4-16") tall and occur on moist, fairly well to well-drained sites. On steep slopes where snowmelt is earlier *Carex spectabilis* forms a lush, dominant cover. Important associates are *Lupinus latifolius* var. *subalpinus* and *Polygonum bistortoides*. On more moderate slopes where snow accumulation is greater, *Luetkea pectinata* is the dominant species. A number of other species are also important on these latter sites. Some of these species are *Deschampsia atropurpurea* var. *latifolia*, *Carex spectabilis*, *Castilleja parviflora* var. *albida*, and *Hieracium gracile* var. *gracile*.

Dwarf Shrub Communities - This community type is characterized by low growing ericads, about 10-30 cm (4-12") tall, and occurs on the more mesic slopes or sporadically along the lower flanks of the ridge. These associations are dominated by either *Cassiope mertensiana* and *Phyllodoce empetriformis* or *Vaccinium deliciosum*. *Luetkea pectinata* is also an important component of these communities. The ecological differences associated with this change in floristic composition is not well known, although the *Vaccinium* dominated stands are more often, but not exclusively, found in close proximity to subalpine tree clumps (Douglas 1972).

Snowbed Communities - In depressions or on gentle slopes where snow accumulates and persists until mid- or late summer, *Carex nigricans* forms a continuous mat of vegetation. Frequent associates of *C. nigricans* in these snowbed associations are *Epilobium alpinum* var. *alpinum* and *Luetkea pectinata*, both with low cover values.

Tree Clump Communities - On Chowder Ridge, tree clumps, although conspicuous, are restricted to a relatively limited band along the southwest to west flanks of the ridge. These stands are found on mesic mounds or ridges which were the first areas to become snow free in the subalpine zone. They are dominated mainly by *Tsuga mertensiana* and *Abies amabilis* with occasional occurrences of *Abies lasiocarpa* and *Chamaecyparis nootkatensis*. The understory of these tree clumps is variable depending on density. In open stands, *Vaccinium membranaceum*, *A. amabilis*, *Tsuga mertensiana*, and *Phyllodoce empetriformis* are common while in closed stands understory vegetation is sparse.

On the periphery of most clumps a band of tall shrubs (e.g., *Vaccinium membranaceum*, *Rhododendron albiflorum*, *Sorbus sitchensis* var. *grayi*) is generally present. This peripheral vegetation is probably a response to the more favorable microenvironment provided by the tree clump (Douglas 1972).

Plant Communities of the Alpine Zone

Mesic Herb Communities - At lower elevations in the alpine zone, where snow persists slightly longer, the steep slopes are dominated by a lush herbaceous cover. These sites remain moist throughout much of the growing season due to melting of snowbanks upslope. *Lupinus latifolius* var. *subalpinus* is the most persistent species in these stands. Other important plants are *Polygonum bistortoides*, *Vaccinium deliciosum*, *Luetkea pectinata*, and *Carex spectabilis*. The abundance of subalpine elements in these stands indicates their close relationship with subalpine vegetation.

A second alpine mesic herb type occurs locally along the flanks of the ridge between approximately 2,030 - 2,090 m (6660-6855') elevation. This band, about 100 m (328') long, occurs on a steep, relatively unstable slope. Species richness is low, with only *Lupinus latifolius* var. *subalpinus* being important. Other species present are *Phacelia heterophylla* var. *pseudohispida*, *Epilobium alpinum* var. *lactiflorum*, and *Poa cusickii* var. *epilis*.

Dry Graminoid Communities - On some of the well-drained, exposed upper slopes and ridgetops, where snow cover melts by early summer, floristically rich communities dominated by sedges are found. The most extensive community

of this type is dominated by *Carex spectabilis*. These alpine *C. spectabilis* stands are markedly different from those of the subalpine zone. The drier alpine stands are not only richer floristically but are characterized by prominent alpine elements such as *Phlox diffusa* var. *longistylis*, *Carex breweri*, *Sibbaldia procumbens*, *Solidago multiradiata* var. *scopulorum*, *Antennaria alpina* var. *media*, and *Festuca ovina* var. *brevifolia*.

The most xeric sites occupied by dry graminoid communities are dominated by *Carex phaeocephala* with important associates including *Phlox diffusa* var. *longistylis*, *Solidago multiradiata* var. *scopulorum*, and *Oxytropis campestris* var. *gracilis*.

Dwarf Shrub Communities - Two dwarf shrub communities occur in the alpine zone on Chowder Ridge. The most common is the heath type which has close floristic affinities with the subalpine heath type. In the alpine communities, however, *Phyllodoce empetriformis* is mostly replaced by *P. glanduliflora* and is co-dominant with *Vaccinium deliciosum*, *Cassiope mertensiana*, and *Luetkea pectinata*. Except for the increased elevation and the occurrence of these stands above tree-line, the ecological differences are not readily apparent. Several small stands dominated by *Salix cascadiensis* occur near the crest of the ridge. These nearly pure mats occur in slight depressions.

Snowbed Communities - Flat boulder fields are prominent on the eastern end of Chowder Ridge, along the southern flank. Snow accumulates in these sites, resulting in a short growing season. Here vegetative cover is sparse with only *Saxifraga tolmiei* var. *tolmiei* being common in spaces between the boulders. Less frequent associates include *Juncus drummondii* var. *subtriflorus* and *Luzula piperi*.

Herb-field Communities - Continuous vegetation comprised of a rich assemblage of plants with a cushion or matted habit occurs on many of the exposed ridgetops. Most of these stands cover a limited area. Some of the most prominent species on these sites are *Phlox diffusa* var. *longistyla*, *Potentilla diversifolia*, *Oxytropis campestris* var. *gracilis*, *Solidago multiradiata*, *Carex albonigra*, *Achillea millefolium*, and *Poa alpina*.

Fell-field Communities - These sparsely vegetated communities are restricted to relatively level sites along the ridgetop. The plants are scattered, usually in clumps, among the front-shattered rocks. Characteristic species, with low cover values, are *Phlox diffusa* var. *longistyla*, *Selaginella densa*, *Oxytropis campestris* var. *gracilis*, *Carex phaeocephala*, *Solidago multiradiata* var. *scopulorum*, and *Saxifraga bronchialis* var. *austromontana*.

Vegetation Stripe Communities - Along the south-facing flank of the ridge, on the upper slopes near the ridge tops, the vegetation is arranged in long stripes 20 - 40 cm (8"-16") wide, each separated by about 1 m (3.28') of scree material. This striping is a result of the downslope creep of the unstable substrate. Floristically, the composition of these associations is similar to that found in the fell-fields. Some of the more common species in the vegetation stripes are *Solidago multiradiata* var. *scopulorum*, *Phlox diffusa* var. *longistyla*, *Oxytropis campestris* var. *gracilis*, *Cerastium arvense*, *Silene acaulis* var. *escapa*, and *Festuca ovina* var. *brevifolia*.

Krummholz Communities - In the lower part of the alpine zone, along the southern flanks of the ridge, clumps of dwarfed tree species (krummholz) occur. Because of their ability to accumulate snow, these stands become snow free later than all other associations except those of snowbeds. *Abies lasiocarpa* is the dominant species with *Tsuga mertensiana* occurring infrequently. Understory vegetation is usually sparse or lacking.

Vascular Plant Species

The Mt. Baker area has been of botanical interest since Gorman (1907) first described the vegetation of the northeast slope. Later, St. John and Hardin (1929) and Muenscher (1941), and more recently Douglas (1971) and Taylor and Douglas (1978) provided vascular plant lists for the area.

Several factors have contributed to the interesting nature of the floristics of the Chowder Ridge area. The area has contrasting habitats, especially those associated with steep, dry, southerly slopes and those of cool, snowy, equally steep north slopes. Floristically it contains species assemblages of both the Cascades and the northern Rockies, resulting in an unusual mixture of relatively drought-tolerant species. Finally, the Chowder Ridge area is located at

the southern limit of glaciation, with consequential representation of northern and southern species. These and other features contribute to the floristic diversity and species richness of the area.

The species of the area can for convenience be divided into three major categories: (1) typical representatives of the western North Cascades; (2) species typically occurring in the eastern Cascades and northern Rockies; (3) plants representing range extensions of more northerly distributed species. These categories, especially the latter two, are not clearly distinct. The first group is naturally the largest and includes most of the dominants of the area, which as such are discussed in the plant communities section of this paper.

Two species occurring in the area, *Aster sibiricus* var. *meritus* (Siberian aster) and *Gentiana glauca* (glaucous gentian), are listed as sensitive species (USDA Forest Service 1999, Washington Natural Heritage Program 1997). Appendix 3 lists the vascular plant species of the Ronald J. Taylor RNA.

Lichens

The lichens of the slopes of Mt. Baker were first documented by Douglas (1974), while a later paper by Ryan (1985) listed 200 lichens specifically for Chowder Ridge area. Forty-five of the lichen species were collected and listed by Ryan (1985) as new to Washington. These are considered rare for the state at the present time. Appendix 4 lists the collections by Ryan (1985). One of the lichen species, *Lobaria linata*, is currently on the "Survey and Manage" list (USDA Forest Service, USDI BLM 2001).

Bryophytes

The bryophytes of the area were listed in a paper by Spence (1986). Three species, *Dicranum muelenbeckii*, *Mnium arizonicum* and *Racomitrium (Racomitrium) microcarpon*, all new to Washington, were documented in this study. These are considered rare for the state at the present time. Appendix 5 lists the bryophyte collections by Spence (1986).

Fauna

Vertebrates of the RNA (Appendix 6) were generally described by Taylor and Douglas (1978). Additional information was provided by Gay (Personal communication). The most conspicuous animals of Chowder Ridge are mountain goats (*Oreamnos americanus*) which graze the south slopes during the summer but apparently spend the winter on better protected ridges such as Barometer Mountain in the Wells Creek area. Other mammals that are occasional in the summer are blacktail deer (*Odocoileus hemionus columbianus*), cougar (*Felis concolor*), coyote (*Canis latrans*) and wolverine (*Gulo luscus*).

The most common inhabitants, however, are rodents, several species of which are known to occur on Chowder Ridge or may be expected to live there given their distribution on adjacent Cougar and Skyline Divides. The largest and most obvious of these is the hoary marmot (*Marmota caligata*) which frequents both the northern and southern slopes of Chowder Ridge, building its den near or below snowfields. Here water-release continues through the summer, providing an abundance of vegetation for the herbivorous marmot. Pikas (*Ochotona princeps*) are common on Cougar Ridge and may be expected in suitable rock formations on Chowder Ridge. Unlike the marmot which hibernates, the pika remains active through the winter, feeding on "hay piles" stored during summer.

One of the most common rodents of mountain meadows in the Mt. Baker area is the heather vole (*Phenacomys intermedius*). As the name suggests, this mouse is normally found in heather meadows where it remains active through the winter, building nests of grasses and sedges beneath the snow and heather. It excavates rather extensive tunnel and room systems under the snow and feeds on nearby vegetation. As the snow melts, the nests and latrine piles are readily seen scattered over the meadows.

The water rat (*Microtus richardsonii*) also builds nests and tunnel systems under the snow, but usually not in heather associations. The tunnels are often earth-filled and as the snow melts they appear as shallow elongate mounds, often several meters long, or rutted runways through the vegetation.

Two other mice of the area are the forest deer mouse (*Peromyscus oreas*) and the Pacific jumping mouse (*Zapus trinotatus*), the latter hibernating during the winter. Mice are most prevalent in the subalpine zone, on the north slope of Chowder near Cougar Divide. The upper south slopes are used most extensively in early summer. As the alpine meadows become dry in the summer, the mice migrate downward, returning in early fall. Chipmunks (*Entomias townsendi*) are common inhabitants of subalpine areas, especially among tree clumps. Occasionally they also range upwards into the alpine zone.

Carnivores of the Chowder Ridge area include such transient hunters as the cougar and coyote. The wolverine has also been reported to be in the area. The insectivorous dusky shrew (*Sorex obscurus*) is a frequent inhabitant of the area and is active all winter. The lesser weasel that prey on pika would also be expected in the area. Finally, deer and bear may be expected in the subalpine area of both the north and south slopes.

Although no attempt has been made to inventory the birds of Chowder Ridge, three species deserve mention. These are blue grouse (*Dendrogapus obscurus*) of subalpine habitats, ptarmigan (*Lagopus leucurus*), a common inhabitant of the rugged subalpine slopes, and horned lark (*Erimophila alpestris*) found in the alpine areas of Chowder Ridge.

Threatened, Endangered, and Sensitive Wildlife Species

The following account of special status species was provided by Gay (Personal Communication). There is no potential habitat for: Oregon spotted frog, bald eagle, gray wolf (ungulate populations are too low to provide potential habitat), Canada lynx (nearest occupied habitat is (35 miles) east of recommended RNA), marbled murrelet (recommended RNA is above (3,500') elevation), northern spotted owl (recommended RNA is located in the mountain hemlock forest, subalpine, and primarily alpine zone, with no nesting habitat). The RNA is located in the Nooksack grizzly bear management unit, but this unit is not believed occupied at present.

Regional Forester's Sensitive Animal Species, Survey and Manage Wildlife

There is no potential habitat for: common loon, Peregrine falcon, Townsend's big-eared bat (the area is too high in elevation), Larch Mountain or Van Dyke's salamanders. Potential habitat for wolverine does exist within the RNA (Douglas 2001).

Management Indicator Species

The area is too high in elevation to provide winter habitat for deer and elk. The area does contain occupied habitat for cavity nesting birds (including pileated woodpecker), and for pine marten—though with changes in forest management as a result of the 1994 Plan amendment (USDA Forest Service, USDI BLM 1994) cavity nesting birds and pine marten are now considered secure and are likely no longer good management indicator species. The recommended Ronald J. Taylor RNA also contains occupied habitat for mountain goat. Mountain goat populations have declined, in general, for the past several decades, but appear to be increasing around Mt. Baker.

Neotropical Migratory Birds

Despite its elevation, the recommended Ronald J. Taylor RNA contains habitat for a variety of neotropical migratory bird species, who visit the ridgetops on their way south, including the Rufous hummingbird, various fly catchers, and hermit thrushes.

Invertebrates

There has been minimal study of invertebrates in the Chowder Ridge area. Shaw and Taylor (1986) studied pollinators during the summer of 1981. Although they did not identify specific insects their study did show that in the alpine fell-field association on Chowder Ridge the most important pollinators were bumblebees, syrphid flies, muscoid flies and, of lesser importance, butterflies.

Fish

No fish are expected to be found in the headwater streams within the proposed RNA due to the harsh aquatic habitat conditions.

Geology

The Mt. Baker area is characterized by landforms caused by sedimentation, uplift, volcanics and glaciation (Taylor & Douglas 1978). The oldest rocks in the area belong to the Yellow Aster complex. Basement rocks are made up of the Shuksan Group metamorphics, Chilliwack Group sediments and volcanics, and the Nooksack Group sediments (Easterbrook and Rahm, 1970). Mt. Baker itself is a composite volcano made of alternating layers of lava and pyroclastic materials.

The ruggedness of the area is due in large part to the action of alpine glaciers which reached their maximum development during the Pleistocene Ice Age and again as recently as 50 years ago. Alpine glaciers were overrun below about 1,700 m (5575') by continental ice sheets, the last (Fraser Glaciation) receding 10,000 years ago (Easterbrook and Rahm, 1970). At present the alpine glaciers fluctuate in size as a consequence of temperate variations and snow accumulation.

Most of Chowder Ridge is of sedimentary origin, of the Nooksack Group (Misch 1966). This group is of late Jurassic and early Cretaceous age and consists of graywackes siltstones, granite rocks, and limestone boulders. The group is fossiliferous and appears to have been formed during a period of rapid marine accumulation. The marine fossils are responsible for the name "Chowder Ridge". Uplift and deformation of sedimentary rocks is shown by folded, sometimes nearly vertical beds. The ridge itself appears to be an arete formed by Pleistocene alpine glaciers. Glacial remnants are seen along the northeast slope, especially in the area where Chowder joins Bastile Ridge. Here the Chowder Glacier abuts against the northwest lobe of Mazama Glacier.

Weathering and erosion have been dominant factors in shaping Chowder Ridge and in establishing superficial landforms. Extensive deposits of pebbles and boulder-size sediments funnel into the three principal streams containing runoff water from the ridge. These streams (Bar Creek, Deadhorse Creek, and Glacier Creek) eventually empty into the North Fork Nooksack River.

The sedimentary origin of Chowder Ridge is an unusual and interesting feature. Other mountain formations immediately associated with Chowder Ridge are apparently composed primarily of andesite. These include Skyline Divide, Cougar Divide, Bastile Ridge, and Mt. Baker itself.

The following account of the geology of the RNA was interpreted from Tabor and Haugerud (1999). The rocks along the Skyline Divide Trail appear dark and drab. Mostly, they consist of lightly metamorphosed, fine grained sedimentary rocks. The sediments were mostly of volcanic origin, and deposited on an ocean floor that existed in this area during the Mesozoic era. Across the valley of the North Fork of the Nooksack, the same rocks are spectacularly displayed on Excelsior Ridge, and the sedimentary beds are more readily seen. Farther up the Skyline Divide trail, which winds along the ridge top to about 1921 m (6,300') elevation, outcrops containing fossil clams show these rocks to be truly ocean-born. These clams lived in the ocean some 140 million years ago, along with tubular belemnites (an extinct type of cephalopod known from cigar-shaped fossils). More easily found than the clams are cylindrical holes in the rocks, where belemnite remains have mostly dissolved away.

Soils

Soils studies have not been conducted in the RNA. The subalpine/alpine soils, however, would be similar to those described by Douglas (1972) and Douglas and Bliss (1977) for the western North Cascades. The pattern of soil types in these zones generally corresponds to the vegetation patterns.

The greatest profile development in the zone is illustrated in the soils of mature *Tsuga-Abies* subalpine tree-clumps. In contrast, colluvial slope meadow habitats have poor soil development. These soils usually attain only enough stability for weak *A-B-C* profiles to develop.

In the alpine zone, beneath krummholz and heath vegetation, cheluviation is a common process. This process is most intense in the western North Cascades where leached *A2* horizons and iron-rich *B* horizons are typical.

Inceptisols are typical of many of the drier association types. These soils usually have higher cation exchange capacity, higher nutrient levels and are more acidic.

Sites that are unstable and sparsely vegetated are characterized by Entisols. These soils usually have only shallow A-C profiles beneath vegetation and have low organic matter, cation exchange capacity and nutrient levels.

Lands

All lands within the RNA are under federal ownership jurisdiction of the United States Department of Agriculture, Mt. Baker-Snoqualmie National Forest. No other National Forest System lands are involved.

Cultural

No aboriginal studies have been conducted specific to the RNA. Establishment falls in a category of special land use designations which do not authorize surface-disturbing projects (...Research Natural Areas, etc.) and has little or no potential to affect historic properties (USDA Forest Service 1997).

IMPACTS AND POSSIBLE CONFLICTS

Potential impacts and conflicts with the establishment of this RNA are not expected. This topic is addressed in detail in the USFS Environmental Assessment for the establishment of the Ronald J. Taylor RNA, which will be signed in conjunction with this Establishment Record.

Mineral resources

No mineral resources are known within the RNA. After establishment, the RNA can be removed from mineral entry.

Grazing

No grazing allotments exist within the RNA boundaries, nor has any livestock grazing ever been known to occur within the RNA boundaries.

Timber

No commercial timber exists within the RNA, and the area has never been harvested.

Watershed Values

The watershed values are relatively low since the drainages of the RNA are, with respect to area, only a very small component of the Nooksack River drainage.

Recreation Values

Present recreational use within the Research Natural Area is in the form of non-system, user-made trails and climbing routes up Hadley Glacier. There are two existing system trails that access the area: Skyline Divide Trail # 678, which terminates west of the RNA boundary and Cougar Divide Trail #601, which follows the divide east of the area.

Although visitor use is rated as "heavy" for Cougar Divide trail (a total of 3-5,000 visitors per year) and "extra heavy" for Skyline Divide (up to 8,000 per year), there are few overnight stays, due to lack of camping sites. More importantly, forest specialist's experience finds that most visitors do not continue along the user-made trails into the RNA—and it remains relatively undisturbed (Hazelet, personal communication). Overall, the recreation use that the area currently receives has not resulted in significant adverse effects on the biological/physical values for which the RNA was recommended.

Wildlife and Plant Values

The creation of the RNA will assist in the maintenance of the viability of wildlife and plant values of the area. The habitat of the two sensitive vascular plant species (*Aster sibiricus* var. *meritus* and *Gentiana glauca*) is not expected to be adversely affected by trail users.

Special Management Area Values

The establishment of this RNA will not impact management plans because it is a permissible use of a Wilderness Area.

Transportation Plans

No transportation plans are proposed for the area. Existing roads below the RNA will probably remain in place but have little effect on the RNA. Current annual trail maintenance adjacent to the area will have little effect on the RNA.

MANAGEMENT PRESCRIPTION

Vegetation Management within the RNA will follow the guidelines outlined for RNAs within the Mt. Baker-Snoqualmie National Forest Plan (USDA Forest Service 1990a and 1990b). 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. Active vegetation management of the RNA does not appear to be necessary at the present time. A management plan will be prepared for this RNA in the future, which will assess current impacts and determine if mitigation is needed. Noxious weed populations, if found, should be immediately controlled.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of the RNA will be the responsibility of the Mt. Baker-Snoqualmie National Forest. Mt. Baker 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 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, Mt. Baker Ranger District, Sedro Woolley, Washington

Station Director, Pacific Northwest Research Station, Corvallis, Oregon.

ARCHIVES

The Pacific Northwest Research Station will be responsible for maintaining a research data file for the RNA. The RNA database is located at the Forestry Science Lab in Corvallis, Oregon as part of the 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 museums 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).

REFERENCES

- Bliss, L. C. 1969. Alpine community patterns in relation to environmental parameters, pp. 167-184. *In* K. N. J. Greenridge (ed.), *Essays in Plant Geography and Ecology*. Nova Scotia Museum, Halifax, Nova Scotia.
- Bliss, L. C. 1971. Arctic and alpine plant cycles. *Ann. Rev. Ecol. And Syst.* 2: 405-438.
- Daubenmire, R. 1968. *Plant Communities*, Harper and Row, New York. 300 pp.
- Douglas, G. W. 1971. The alpine-subalpine communities of the western North Cascades, Washington. *Wasman J. Biol.* 29: 129-168.
- Douglas, G. W. 1972. Subalpine plant communities of the western North Cascades, Washington. *Arct. Alp. Res.* 4: 146-166.
- Douglas, G. W. 1973. *Alpine Plant Communities of the North Cascades Ridge, Washington and British Columbia*. Univ. of Alberta, Edmonton, Ph.D. Dissertation. 145 pp.
- Douglas, G. W. 1974. Montane zone vegetation of the Alsek River region, southwestern Yukon. *Can. J. Bot.* 52: 2505-2532.
- Douglas, G. W. and L. C. Bliss. 1977. Alpine and high subalpine plant communities of the North Cascades Range, Washington and British Columbia. *Ecol. Monogr.* 47: 113-150.
- Douglas, G.W. Program Botanist, Conservation Data Centre, B.C. Ministry of Environment Lands, and Parks. Personal Communication with USFS Biologist D. Gay. July 2001.
- Dyrness, C. T., J. F. Franklin, C. Maser, S. A. Cook, J. D. Hall, and G. Faxon. 1975. Research natural area needs in the Pacific northwest—a contribution to land-use planning. *USDA For. Ser. Gen. Tech. Rep. PNW-38*. 231 pp.
- Easterbrook, D. J. and D. A. Rahm. 190. *Landforms of Washington*. Union Printing Co., Bellingham, WA. 156 pp.
- Eyre, F. ed. 1980. *Forest Cover Types of the United States and Canada*. Society for American Foresters. Washington, DC
- Gay, D. USFS, Mt. Baker Ranger District Wildlife Biologist. Personal communication, July 2001.
- Gorman, M. W. 1907. Vegetation of the northeast slope of Mt. Baker. *Mazama* 3: 31-48.
- Hazelet, L. USFS, Mt. Baker Ranger District Trails Manager. Personal communication, August 2001.
- Henderson, J. and R. Leshner. USFS Area Ecology Program. Personal Communication, September 2001.
- Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press, Seattle, WA. 730 pp
- Kuchler, A. 1966. *Potential natural vegetation*. USDI Geological Survey. Washington, DC
- Leshner, R. and J. Henderson. USFS Area Ecologists, Mt. Baker-Snoqualmie National Forest. Personal communication, July 2001.

- Little, E.L. 1979. Checklist of United States trees (native and naturalized). Agricultural Handbook No. 541. U.S. Department of Agriculture, Washington, D.C., 375 pp
- Misch, J. 1966. Tectonic Evolution of the Northern Cascades of Washington State. Inst. Mining and Metallurgy Spec. Vol. 8: 101-148.
- Muenschler, W. C. 1941. The Flora of Whatcom County, State of Washington. Published by the Author. Ithaca, NY. 134 pp.
- Nichols, R.A. 2001. Geological account for the Ronald J. Taylor Research Natural Area. Personnel communication.
- Ryan, Bruce D. 1985. Lichens of Chowder Ridge, Mt. Baker, Washington. *Northw. Sci.* 59: 279-293.
- St. John, J., and E. Hardin. 1929. Flora of Mt. Baker. *Mazama* 11: 52-102.
- Shaw, D. C. and R. J. Taylor. 1986. Pollination ecology of an alpine fell-field community in the North Cascades. *Northw. Sci.* 60: 23-31.
- Spence, J. R. 1986. The moss flora of the alpine - high subalpine Chowder Ridge area, western North Cascades Range, Washington State, U.S.A. *Can. J. Bot.* 64: 146-150.
- Tabor, Rowland, and Haugerud, R. 1999. Geology North Cascades, A Mountain Mosaic. The Mountaineers, Seattle WA. 143pp
- Taylor, R. J., and G.W. Douglas. 1978. Plant ecology and natural history of Chowder Ridge, Mt. Baker: A potential alpine research natural area in the western North Cascades. *Northw. Sci.* 52: 35-49
- USDA Forest Service 1990a. Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan.
- USDA Forest Service 1990b. Final Environmental Impact Statement, Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan.
- USDA Forest Service. 1997. Project review for heritage resources, under the terms of the Programmatic Agreement between ACHP, Washington State Historic Preservation Officer and USDA Forest Service Region 6. USDA Forest Service, Portland OR.
- USDA Forest Service, USDI BLM 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Owl.
- USDA Forest Service, USDI BLM 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Document within the Range of the Northern Spotted Owl. Portland, Oregon.
- USDA Forest Service 1999. Regional Forester's Sensitive Species Plant List for Region 6 U.S. Forest Service, Pacific Northwest Region, Portland, OR.
- Washington Natural Heritage Program. 1995. Natural Heritage Program Plan. Washington State Department of Natural Resources, Olympia, WA. 147pp and appendices.

Washington Natural Heritage Program. 1997. Endangered, Threatened, & Sensitive Vascular Plants of Washington—
with Working Lists of Rare Non-Vascular Species. Washington State Department of Natural Resources,
Olympia, WA. 62pp

Appendix 1

Standards and Guidelines for Research Natural Areas and Wilderness Management Area 18 and Management Area 10E Reprinted from MBS 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

<u>Program Element</u>	<u>Standards and Guidelines</u>
A. Recreation	
1. Use and Administration	<ol style="list-style-type: none">Recreation activities and use within RNA's shall not be encouraged. If necessary to prevent damage, permits or closures may be instituted.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.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
- G. Minerals and Geology
 - a. Meet Forest-wide Standards and Guidelines.
 - 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.

2. FA&O Facility Maintenance and Reconstruction

P. Protection

1. Fire Management Planning

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.

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

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.

10 WILDERNESS

Goal: Preserve and protect the wilderness character. Allow for naturalness and provide opportunities for solitude, challenge, and inspiration. Within these constraints, and following a policy of non-degradation management, provide for recreational, scenic, educational, scientific, and historical uses.

Description of Lands Where Prescription Applicable: This prescription is applied to those acres classified as Wilderness, including: Glacier Peak, Mt. Baker, Noisy-Diobsud, Boulder River, Henry M. Jackson, Clearwater, and Norse Peak. Refer to the Alpine Lakes Management Plan for management direction for the Alpine Lakes Wilderness. (See Management Prescription 27).

Desired Future Condition: Common to all 10A, 10B, 10C, 10D, 10E.

The ROS concept emphasizes that quality in outdoor recreation can best be achieved by providing a diversity of opportunities consistent with resource limitations to satisfy varying preferences of users. This concept is combined with factors for efficient management and adapted to wilderness in this plan. Wilderness ROS and their standards apply to all designated wilderness on the Forest (for specific direction regarding Alpine Lakes, consult the Alpine Lakes Area Land Management Plan).

Within each WROS Class there are Limits of Acceptable Change (LAC) which presuppose that certain areas (transition for example) of the wilderness will be allowed to receive relatively higher levels of use than other areas (trailless), and thus will receive higher levels of resource change or impact. Decisions about management of WROS Classes are aimed at making a conscious choice about the changes that will be allowed to occur. LAC should not be confused with a management objective that one is attempting to achieve. LAC is a maximum limit of change allowed. Managers try to achieve the best conditions possible rather than allowing conditions to deteriorate until this threshold is reached.

Wilderness must be managed to prevent degradation. The nondegradation principle directs that each Wilderness must essentially be as wild as it was at the time of classification, or if conditions are not known and cannot be reconstructed for the time of classification, the first Wilderness condition inventory should be used as the benchmark for maintaining Wilderness conditions. Nondegradation applies to all values of Wilderness: social, physical, and biological factor. Additionally, conditions shall be improved in situations where natural processes are not operating freely, and where the values for which a Wilderness was created are impaired.

The standards listed below and summarized at the end of this Management Prescription were derived from field study and professional judgement.

Carrying Capacity - Carrying capacities have been developed to estimate the amount of recreation visitor use that a wilderness or portion of wilderness, could support without degradation of resource values. Carrying capacity is commonly expressed in Recreation Visitor Days (RVD's) per year or people-at-one-time (PAOT).

In the Recreation Opportunity Spectrum system, coefficients have been developed that help in the estimation of carrying capacity. These coefficients are the estimated RVD's per average acre per year, that a WROS class can support. Different coefficients are identified for each class and are theoretical estimation of capacity based on average conditions.

For the Land and Resource Management Plan for the Mt. Baker-Snoqualmie National Forest, the following carrying capacity coefficients were developed in coordination with adjacent Forests sharing management of the Washington State Cascade Range Wilderness:

<u>Zone</u>	<u>RVD/Acre/Year</u>	<u>RVD/Sq. Mile/Year</u>
Transition	15.000	9600
Trailed	3.750	2400
General Trailless	.25	160
Dedicated Trailless	.078	50
Special Area	To be established after study.	

Limits of Acceptable Change - Recreation visitor use of wilderness cannot occur without some degree of impact on wilderness resources. Impact occurs on the physical and biological features of wilderness as the quality of the recreation experience of other visitors. There is a point at which increasing impact of visitor use will result in unacceptable degradation outside the intent and direction of the Wilderness Act. The Regional Nondegradation Policy is described in FSM 2322.03.

The limits of acceptable change concept is a system to establish limits on the change that can be permitted within the nondegradation policy, before management actions must be taken to reverse trends of change. These actions can be either directed to improve the knowledge and abilities of the users or to reduce the numbers of visitors in impacted areas during critical time periods, or both.

The system has incorporated limits or maximum levels for which key indicator resource values can change before management actions are implemented. The system assumes that the condition of key indicators which are easily quantifiable and measurable reflect the general condition of resource values which are not easily measured. the impact of human-caused noise and human disturbance of wildlife are examples of impacts not easily measured.

The limits of acceptable change levels or standards are different for each Wilderness Recreation Opportunity Spectrum Class. The standards for the Dedicated Trailless tolerate the least impact in order to achieve the most pristine wilderness conditions and the least evidence of man's activity. The Transition Class standards are more tolerant reflecting management of the area for a semi-primitive recreation experience and physical evidence of man's activity.

The table following the standards and guidelines summarizes the key indicators that will be measured in monitoring the physical, biological, and social conditions and the standards for each Wilderness Recreation Opportunity Spectrum Class.

When monitoring results indicate that the condition of one or more of the key indicators is approaching the standard, or limit of acceptable change, a trend analysis will be done. this analysis will assess the changing conditions and identify all factors of visitor use contributing to the change. Cost effectiveness of possible management actions and recreation opportunity tradeoffs will be considered in the analysis. The analysis will identify alternative courses of action and a most suitable alternative will be chosen and implemented. Actions appropriate to resolve impact problems are shown in the wilderness Forest-wide Standards and Guidelines.

There is a high probability that initial monitoring results in some areas will indicate impact conditions in excess of standards established for particular WROS Classes. In this event, monitoring efforts will need to be intensified to establish the current trends. The objectives in these situations will be to institute management actions to achieve an improving trend. Downgrading the Wilderness Recreation Opportunity Class to a class more tolerant of impact will not be an option.

Over the long term, wilderness management activities should lead to an improving trend in the effects of man's activity on wilderness resources in all WROS classes.

Intensities in this Management Prescription:

- 10A. Transition
- 10B. Trailed
- 10C. General Trailless
- 10D. Dedicated Trailless
- 10E. Special Areas

INTENSITY 10A: TRANSITION

This trailed class includes system trails and may include user-made trails that have a travelway worn to mineral soil over long distances, and is characterized by having a large proportion of day-users who are often mixed in with overnight and long distance travelers. This area is usually adjacent to trailheads and extends into the wilderness a distance that is typically traveled in one day by a hiker. This class includes areas accessed by trail, around lakes or other attractions used by people, or pack stock within the day-use influence area. The class extends at least 500 feet on either side of a trail, but this may be wider around lakes or heavily used areas. The length of this trail class will be established for each trail depending on ease of travel, distance from trailhead outside wilderness, and destination attractions inside wilderness. This generally will be 3 to 5 miles inside the wilderness boundary. If the day-use activity occurs entirely outside wilderness, the trail will have no Transition Class.

Opportunities for exploring and experiencing isolation contrast with adjacent, more developed areas outside the Wilderness, though the visitor can expect the greatest number of people compared to other wilderness classes. This class introduces users to the Wilderness setting. This area normally provides relatively low challenge or risk in using outdoor skills compared to other classes. The managed trail system may include trails classified as "easiest," "more difficult," or "most difficult," and they shall receive maintenance activities as appropriate for the primary objective and difficulty level. Users may encounter improvements where the frequency and magnitude of use dictates the need for such improvement to protect the wilderness resource.

Program Element

Standards and Guidelines

A. Recreation

- 1. American Indian Religious and Cultural Use

a. Meet Forest-wide Standards and Guidelines.

B. Wilderness

- 1. Wilderness Use Administration

a. Capacity coefficient is 15 RVD's per acre per year.

b. Vegetative loss at campsites shall not exceed 1,000 square feet, or cumulatively, 3% from any acre.

c. Mineral soil exposed shall not exceed 200 square feet at campsites.

- d. Trees felled or with scarring shall not exceed 10 trees, or 50 percent of trees on site, whichever is smaller.
- e. Average number of parties encountered per day when traveling during snow-free season shall not exceed 8.
- f. Maximum encounters with other groups on any one day shall not exceed 30.
- g. Unit size (people and stock) shall not exceed 12 unless otherwise authorized under Special Use Permit.
- h. The number of "campsites" per 160 acre area shall not exceed 20.

C. Wildlife and Fish

- i. Occupied campsites visible shall not exceed 4.
- a. Displacement of wildlife due to visitor use can be significant and should be an overriding concern in wilderness where the primary objective is to maintain a natural ecosystem. Since only a small amount is managed in this class, evaluation of visitor use effects on habitat effectiveness should include adjacent areas. Visitor use must not decrease habitat effectiveness in each wilderness (average of all WROS classes) for any species by more than 20%.

D. Range

- a. Meet Forest-wide Standards and Guidelines.

E. Timber

- a. Not applicable.

F. Water, Soil, and Air

- a. Meet Forest-wide Standards and Guidelines.

G. Minerals & Geology

- a. Meet Forest-wide Standards and Guidelines.

H. Rural Community & Human Resources

- a. Meet Forest-wide Standards and Guidelines.

J. Lands

- a. Meet Forest-wide Standards and Guidelines.

L. Facilities

- a. Meet Forest-wide Standards and Guidelines.

F. Protection

1. Fire Management Planning

- a. Forest-wide Fire Protection Group B applies.

INTENSITY 10B: TRAILED

This class includes all managed system trails extending beyond the Transition Class. This class extends at least 500 feet on either side of the trail but may be wider around lakes or heavily used areas.

A moderate to high degree of opportunity exists for exploring and experiencing isolation (from the sights and sounds of civilization), independence, closeness to nature, tranquility and self-reliance through the application of no trace skills in a natural environment that offers a moderate to high degree of challenge and risk as one travels further from trailheads. The managed trail system may include trails classified as "more difficult," or "most difficult" and they shall receive maintenance activities as appropriate for the primary objective and difficulty levels. Visitors must be prepared for overnight camping, outdoor living, and changes in weather. A variety of user restrictions may be implemented to control use impacts as the need arises.

Program Element

Standards and Guidelines

A. D-P

- a. Same as 10A.

B. Wilderness

1. Wilderness Use Administration

- a. Capacity coefficient is 3.75 RVD's per acre per year.
- b. Vegetative loss at campsites shall not exceed 1,000 square feet, or 3 percent from any acre.
- c. Mineral soil exposed shall not exceed 200 square feet.
- d. Trees felled or with scarring shall not exceed 6 trees, or 25 percent of the trees on site whichever is smaller.
- e. Average number of parties encountered when traveling per day per snow-free season shall not exceed 5.
- f. Maximum encounters with other groups on any one day shall not exceed 10.
- g. Unit size (people and stock) shall not exceed 12 unless otherwise authorized under Special Use Permit.
- h. The number of "campsites" per 160 acre area shall not exceed 10.
- i. Occupied campsites visible shall not exceed 3.

C. Wildlife and Fish

- a. Displacement of wildlife due to visitor use can be significant and should be an overriding concern in wilderness where the primary objective is to maintain a natural ecosystem. Since only a small amount is managed in this class, evaluation of visitor use effects on habitat effectiveness should include adjacent areas. Visitor use must not decrease habitat effectiveness in each wilderness (average of all WROS classes) for any species by more than 20%.

 INTENSITY 10C: GENERAL TRAILLESS

This class is characterized by area not falling into the other classes. It generally attracts lower use because of the lack of constructed trails and a relative lack of attractions. The area is unmodified and user-made trails are not encouraged, but they may exist. If obvious user-made trails become well established, or are causing resource damage, consideration will be given to restricting use or reconstructing these trails in order to protect the wilderness resource from further damage. Reclassification from general trailless to trailed requires a supplement of the Forest Plan, which shall include full public involvement. This class is available for new trail construction only to protect resources or meet management objectives by dispersing use. If this should occur, the trail will be constructed to no higher than "more difficult" or "most difficult" standards.

This class provides an outstanding opportunity for isolation and solitude, mostly free from evidence of human activities and with very infrequent encounters with others. The user has outstanding opportunities to travel cross-country utilizing a maximum degree of outdoor skills, often in an environment that offers a very high degree of challenge and risk. No-trace camping skills are strongly encouraged and any user built "improvement" is undesirable and shall be removed.

Program Element
Standards and Guidelines

- | | |
|----------------------------------|--|
| A. D-P | a. Same as 10A. |
| | |
| B. Wilderness | |
| 1. Wilderness Use Administration | a. Capacity coefficient is 0.25 RVD's per acre per year. |
| | b. Vegetative loss at campsites shall not exceed 500 square feet. |
| | c. Mineral soil exposed shall not exceed 100 square feet. |
| | d. Trees felled or with scarring shall not exceed 4 trees, or 25 percent of trees on site, whichever is smaller. |
| | e. Average number of parties encountered when traveling during snow-free season shall not exceed 2 per day. |
| | f. Maximum encounters with other groups on any one day shall not exceed 4. |
| | g. Unit size (people and stock) shall not exceed 12 unless otherwise authorized under Special Use Permit. |
| | h. The number of "campsites" per 160 acre area shall not exceed 5. |
| | i. Occupied campsites visible shall not exceed 2. |

C. Wildlife and Fish

- a. Displacement of wildlife due to visitor use can be significant and should be an overriding concern in wilderness where the primary objective is to maintain a natural ecosystem. Since only a small amount is managed in this class, evaluation of visitor use effects on habitat effectiveness should include adjacent areas. Visitor use must not decrease habitat effectiveness in each wilderness (average of all WROS classes) for any species by more than 10%.

INTENSITY 10D: DEDICATED TRAILLESS

This class is managed forever trailless; obvious user-made travel ways are not permitted. Class may include way trails and routes not discernible as human related, the condition to be avoided is vegetation and soil loss along a continuous tread. The class may include popular attractions accessed only by cross-country travel. Human impact and influence is, by design, minimal therefore user restrictions may be necessary to insure that trailless experiences remain. Areas chosen for Dedicated Trailless should be of a size that will allow for a meaningful experience and can be reasonably protected for the experiences and remoteness identified. Generally the class is at least 2,000 - 3,000 acres in size and contain whole drainages or basins out of sight and sound of trails, or areas outside the wilderness.

This class provides an outstanding opportunity for isolation and solitude, free from evidence of human activities and with very infrequent encounters with users. The user has outstanding opportunities to travel cross-country utilizing a maximum degree of outdoor skills, often in an environment that offers a very high degree of challenge and risk.

Program Element

Standards and Guidelines

A. D-P

- a. Same as 10A.

B. Wilderness

1. Wilderness Use Administration

- a. Capacity coefficient is .078 RVD's per acre per year.
- b. Vegetative loss at campsites shall not exceed 0 square feet.
- c. Mineral soil exposed shall not exceed 0 square feet.
- d. There shall be no trees felled or scarred at the sight.
- e. Average number of parties encountered when traveling during snow-free season shall not exceed 1 per day.
- f. Maximum encounters with other groups on any one day shall not exceed 1.

- g. Unit size (people and stock) shall not exceed 12, but strongly encourage 6 people and 0 stock, unless otherwise authorized under Special Use Authorization.
- h. The number of "campsites" per 160 acre area shall not exceed 2.
- i. Occupied campsites visible shall be 0.

C. Wildlife and Fish

- a. Displacement of wildlife due to visitor use can be significant and should be an overriding concern in wilderness where the primary objective is to maintain a natural ecosystem. Since only a small amount is managed in this class, evaluation of visitor use effects on habitat effectiveness should include adjacent areas. Visitor use must not decrease habitat effectiveness in each wilderness (average of all WROS classes) for any species by more than 10%.

INTENSITY 10E: SPECIAL AREAS

The intent of this class is to provide for changes in standards or other management guidelines for unique areas. Situations that qualify for Special Area designation include congressionally acknowledged areas, areas of significant cultural or historic value, areas with special wildlife considerations and areas that have limited management options to deal with unique situations. Areas do not qualify for this class for administrative convenience in dealing with overuse. This class is rare and will not exist in many wildernesses.

Experience opportunities vary widely depending upon the special feature and its location. A high number of other visitors may or may not be encountered. Rules and regulations to protect resources or preserve visitor experience can be expected. The following have been identified as Special Areas:

<u>Special Area Name</u>	<u>Significance</u>	<u>Standards and Guidelines</u>
A, D-P	a.	Same as 10A.
B. Wilderness		
Coleman Glacier Climbing Route- Mt. Baker Wilderness	Second most popular climbing route in State	a. Capacity coefficient will be in RVD's per acre per year. Coefficient to be developed thru ID Team analysis. b. Same as 10A.

		c. Same as 10A.
		d. Same as 10A.
		e. Average Number of parties encountered per day when traveling shall not exceed 16.
		f. Campsites visible shall not exceed 10.
		g. Same as 10A.
		h. Same as 10A.
Winchester Mountain Lookout-Mt. Baker Wilderness	Lookout addressed in Committee Reports of enabling legislation for 1984 Wilderness bill.	a. Accept non-conforming use, Standards and Guidelines same as 10A.
Three Fingers Lookout Boulder River Wilderness	Lookout addressed in Committee Reports of enabling legislation for 1984 Wilderness bill.	a. Accept non-conforming use, Standards and Guidelines same as 10B.
Miners Ridge Lookout Glacier Peak Wilderness	Lookout addressed in Committee Reports of enabling legislation for 1984 Wilderness bill.	a. Accept non-conforming use, Standards and Guidelines same as 10B.
Green Mountain Lookout Glacier Peak Wilderness	Lookout addressed in Committee Reports of enabling legislation for 1984 Wilderness bill.	a. Accept non-conforming use, Standards and Guidelines same as 10B.
Park Butte Lookout Mt. Baker Wilderness	Lookout addressed in Committee Reports of enabling legislation for 1984 Wilderness bill.	a. Accept non-conforming use, Standards and Guidelines same as 10A.
Cascade Glacier U.S.G.S. Facility Glacier Peak Wilderness	Glacial Research Station Maintained by Geological Survey	a. Accept non-conforming use, periodically review Special Use Permit, and manage same as 10C.
Green Mtn. Research Natural Area (Proposed) Glacier Peak Wilderness	Dual designation with Wilderness	a. Follow Wilderness or RNA Standards and Guidelines, whichever is more restrictive.
Lily Lake Research Natural Area (Proposed) Clearwater Wilderness	Dual designation with Wilderness	a. Follow Wilderness or RNA Standards and Guidelines, whichever is more restrictive.
North Fork Nooksack Research Natural Area Mt. Baker Wilderness	Dual designation with Wilderness	a. Follow Wilderness or RNA Standards and Guidelines, whichever is more restrictive.

North Fork Nooksack
Research Natural Area
(Proposed expansion)
Mt. Baker Wilderness

Dual designation with
Wilderness

- a. Follow Wilderness or RNA
Standards and Guidelines,
whichever is more restrictive.

Chowder Ridge
Research Natural Area (Proposed)
Mt. Baker Wilderness

Dual designation with
Wilderness

- a. Follow Wilderness or RNA
Standards and Guidelines,
whichever is more restrictive.

Long Creek Research
Natural Area
Boulder River Wilderness

Dual designation with
Wilderness

- a. Follow Wilderness or RNA
Standards and Guidelines,
whichever is more restrictive.

C. Wildlife and Fish

- a. Displacement of wildlife due to visitor use can be significant and should be an overriding concern in wilderness where the primary objective is to maintain a natural ecosystem. Since only a small amount is managed in this class, evaluation of visitor use effects on habitat effectiveness should include adjacent areas. Visitor use must not decrease habitat effectiveness in each wilderness (average of all WROS classes) for any species by more than 20%.

Summary of Management Intensities Standards and Guidelines for Wilderness ^{1/}

Standard	Intensities			Coleman Glacier	
	Transition	Trailed	General Trailless	Dedicated Trailless	Special Area
Capacity coefficient RVD's/acre/year	15.000	3.750	0.25	0.078	To be Determined
Veg. Loss at Campsite (square feet) ^{2/}	1,000 (or 3% from any acre)	1,000	500	0	1,000
Mineral Soil Exposed (square feet)	200	200	100	0	200
Trees Scarred or Felled or Percent of Trees on a Site Scarred or Felled ^{3/}	15 (50)	15 (50)	7 (25)	0 (0)	15 (50)
Average number parties encountered when traveling day/snow-free season ^{4/}	8	5	2	1	16
Maximum Encounters on Any Day ^{5/}	30	10	4	1	To be Determined
Unit size limit (people and stock together) unless otherwise author- ized under Special Use Permit ^{6/}	12	12	12	12 (strongly encourage 6 people, 0 stock)	12
Number of Campsites per 160 Acre Area ^{7/}	20	10	5	2	To be Determined
Occupied campsites visible from other campsites ^{8/}	4	3	2	0	10

^{1/} A standard may be made more restrictive on site-specific areas at the discretion of the District Ranger, if resource damage is occurring. These areas will be identified by name and the lower LAC documented.

^{2/} Vegetation Loss at Campsites

This indicator, measured in square feet using a transect method, was determined in U.S.F.S. Research Paper INT-284 (1982) as being an excellent indicator of soil changes and as a good measure of areal extent of site impacts.

Both visual impacts and physical/ecological impacts of campsite use are reflected in this indicator, which can be measured fairly accurately using methodology developed in the mid-1970's by Schreiner, Moorehead, Koch and others.

3/ Trees Scarred or Felled

This indicator is one of the easiest to measure and is the only LAC proposed which deals with the effects of firewood gathering, and general site vandalism. Although some tree damage is inevitable, the cumulative effects over time can become critical, and therefore, monitoring the trends of this indicator is essential, given the near impossibility of restoration.

4/ Average Encounters

Although maximum encounters is one way of monitoring social impacts, it is also desirable to monitor average number of parties encountered when travelling per day during the snow-free season as well. Due to the limits of personnel and funds, constant patrol is not possible in many areas and a maximum level of encounters could be difficult to monitor in these places. Also, average encounters is more a measure of the day-to-day situation which the majority of visitors will be subject to. Again, this indicator may be measured by patrols, encounters, or permits.

5/ Maximum Encounters

This indicator is an upper threshold LAC for social impact, indicating a level of use where the WROS class no longer retains its character. Although this may not be easily monitored in all areas, it is a necessary limit tied to definition of the WROS opportunity for solitude. Maximum encounters per day can be variously monitored by counters, observation, or permits.

6/ Special Use Permit may be denied if other standards are being exceeded or resource damage is expected. Permit must specify route of travel, camp locations, dates, and other conditions necessary to meet management objectives. Llamas are considered stock and are counted the same as horses and people.

7/ Number of Sites Per Any 160 Acre Area

This indicator, as suggested by Stankey et al. is an indicator of campsite density and an indirect measure of aggregate site impacts. In many areas individual campsites might have acceptable levels of impact, yet the total number of sites far exceeds need. In such instances, unnecessary physical and social impacts occur due to the haphazard location and selection of sites. This LAC indicator is easily measured from a Code-A-Site or similar site inventories and is based on 160 acres (1/4 section) since most destination spots will fall within this area.

8/ Campsites Visible From Each Site

Campsites visible is largely an indicator of social impacts, and is our only measure of in-camp social impact. Campsites visible is a measure which can be attained from a Code-A-Site or similar inventories, and is fairly easily and accurately measured.

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

The Exterior Boundary of
RONALD J. TAYLOR RESEARCH NATURAL AREA
within
Mt. Baker Wilderness Area
Mt. Baker Ranger District
Mt. Baker-Snoqualmie National Forest

Pacific Northwest Region

Pursuant to Organic Administration Act
of June 4, 1897 (16 U.S.C. 551)



Definition of Intent

The boundary of the Ronald J. Taylor Research Natural Area is as generally described in the Mt. Baker-Snoqualmie National Forest Plan dated June, 1990. The approximate courses of the map boundaries are identified on the attached maps and legal description. Where the boundary is described as following a topographical or other specific feature, the actual location of the feature will control the approximate course identifying that part of said boundary. Unless specified in the description, calls to a stream shall be to the thread of that stream and calls to a ridge shall be to the crest or hydrographic divide as stated. Elevations or described features used to specify angle points control the location over bearing and distances to and from angle point. Any portion of the boundary not described as tied to a feature, line, corner, or coordinate as named above, shall be located using the actual distance and bearing in the description for that portion.

Data Collection Process

The data base for the Ronald J. Taylor Research Natural Area is a series of 7.5 minute, 1:24,000 scale quadrangle maps published by the United States Forest Service as identified in the following legal description. The various boundaries were manuscripted on stable-base film overlays by Forest Service personnel, and digitised in the Universal Transverse Mercator datum, Zone 10. A point file and ARC/INFO coverage was then produced from the final files. This point file was then converted to a perimeter traverse file and is published as the attached metes and bounds description accompanied by text description written by the Forest Land Surveyor. Coordinates from the traverse files have been included where necessary to specify angle points.

RONALD J. TAYLOR RESEARCH NATURAL AREA
BOUNDARY DESCRIPTION

All bearings and distances shown in the following description are based on the Universal Transverse Mercator coordinate grid system, Zone 10. International, State, Indian Reservation, National Park, Mineral Claim, or Sectional land boundaries have been included although record bearing, distance, and monuments will prevail.

QUAD SHEET NAME	ANGLE BEARING POINT	DISTANCE FEET (METERS)	DESCRIPTION
Mt. BAKER SE	1		Summit of Hadley Peak, Latitude 48°48'41" North, Longitude 121°49'15" West, UTM Zone 10 Coordinates 586570.125, 5407158.500, map elevation 7515 feet MSL
		N18°55'57"W 7502.24 (2286.71m)	
	2		A point in a minor saddle on Cougar Divide, at the 6800 foot contour, thence Northeasterly, along a line parallel to and offset 100 feet from the crest of Cougar Divide.
		N6°59'59"E 1024.69 (312.33m)	
	3		
		N9°41'08"E 1038.41 (316.51m)	
	4		
		N29°44'08"E 1409.30 (429.56m)	
	5		
		N31°36'39"E 959.24 (292.38m)	Along said offset line parallel to Cougar Divide.
	6		
		N39°53'59"E 990.01 (301.76m)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE				
	7			A point on said offset line lying 100 feet Northwesterly of a saddle on Cougar Divide, approximate map elevation 5475 feet, and being approximately 300 meters Southwesterly of a summit on Cougar Divide, map elevation 5640 feet.
		N82°14'18"W	6826.33 (2080.69m)	
	8			A point on the crest of Skyline Divide, approximate map elevation 6225 feet.
		S23°14'28"W	540.94 (164.88m)	
	9			
		S57°10'17"W	196.88 (59.95m)	
	10			
		S9°31'07"W	823.35 (250.96m)	Ascending along the crest of Skyline Divide, through a minor saddle, to a summit.
	11			
		S43°10'56"W	429.69 (130.97m)	
	12			
		S49°19'09"W	1024.23 (312.19m)	
	13			A summit on crest of Skyline Divide, map elevation 6563 feet.
		S16°07'51"E	756.49 (230.58m)	
	14			Along crest of Skyline Divide.
		S20°17'28"E	622.63 (189.78m)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE				
	15	S36°22'24"E	605.08 (184.43m)	Along crest of Skyline Divide.
	16			A high point on Skyline Divide, approximate map elevation 6550 feet.
	17	S34°41'35"E	367.09 (111.89m)	Continuing along Skyline Divide, ascending and descending through minor summits to the junction of Skyline Divide with Chowder Ridge.
		S16°31'46"E	1550.28 (472.53m)	
	18	S25°33'56"E	725.55 (221.15m)	
	19	S10°40'39"E	600.94 (183.17m)	
	20	S15°34'26"W	252.03 (76.82m)	
	21			A summit on Skyline Divide, approximate map elevation 6425 feet.
		S35°40'24"W	926.86 (282.51m)	Along crest of Skyline Divide.
	22			A summit at junction of Skyline Divide with crest of Chowder Ridge, due west of a permanent snowfield.
	23	S65°45'58"W	879.22 (267.99m)	Descending a shoulder of Chowder Ridge.

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE		S84°41'01"W	566.53 (172.68m)	
	24	S83°41'33"W	597.24 (182.04m)	
	25	N76°10'58"W	741.82 (226.11m)	Descending a shoulder of Chowder Ridge.
	26	N54°52'26"W	444.75 (135.56m)	
	27			A point on crest of Chowder Ridge, elevation 5930 feet.
		N17°05'09"W	2677.16 (816.01m)	Descending along a line of bearing to the 5000 foot contour. (Points 28 and 29 omitted)
	30			A point on the 5000 foot contour.
Mt. Baker SW		S55°19'16"W	1542.43 (470.14m)	
	31	S82°57'38"W	1499.13 (456.94m)	
	32	S19°23'23"E	1938.17 (590.76m)	
	33	S46°58'40"E	2470.41 (752.99m)	Along the 5000 foot contour.
Mt. Baker SE	34	S85°18'08"E	1301.92 (396.83m)	
	35	S50°16'42"E	1057.57 (322.35m)	
	36			

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE		S37°46'43"E	641.13 (195.47m)	
	37	S69°49'42"W	808.68 (246.49m)	
	38	S70°33'08"E	674.99 (205.74m)	
	39	N86°34'33"E	466.92 (142.32m)	
	40	S81°18'38"E	629.75 (191.95m)	
	41	S55°18'04"E	1175.70 (358.36m)	
	42	S41°51'28"E	539.59 (164.47m)	Along the 5000 foot contour, passing through Smith Basin.
	43	S58°00'03"W	612.95 (186.83m)	
	44	S65°37'40"W	826.83 (252.02m)	
	45	S64°59'31"W	648.02 (197.52m)	
	46	S87°46'40"W	507.67 (154.74m)	
	47	S44°58'32"W	338.55 (103.19m)	
	48			Intersection of the 5000 foot contour with crest of Bastile Ridge, on the divide between Smith Basin and Chromatic Moraine.

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE				
		S56°17'43"E	440.48 (134.26m)	
49		S89°24'23"E	633.42 (193.07m)	
50		S86°17'09"E	759.67 (231.55m)	
51		S82°43'32"E	751.40 (229.03m)	
52		S85°05'44"E	748.32 (228.09m)	
53		S86°27'30"E	823.22 (250.92m)	
54		S70°01'26"E	571.42 (174.17m)	Ascending crest of Bastile Ridge.
55		S60°23'31"E	298.82 (91.08m)	
56		S73°17'01"E	787.03 (239.89m)	
57		S77°31'15"E	819.87 (249.90m)	
58		N74°03'49"E	352.49 (107.44m)	
59		S69°54'10"E	386.68 (117.86m)	
60		S63°22'53"E	490.61 (149.54m)	
61		S81°38'06"E	360.82 (109.98m)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
Mt. Baker SE				
	62	S82°58'39"E	469.61 (143.14m)	Ascending crest of Bastile Ridge, with Bastile Glacier to North.
	63			Summit of Bastile Ridge, on an unnamed peak on southern shoulder of Hadley Peak, dividing Smith Basin, Chromatic Moraine, and Mazama Glacier drainages, map elevation 7842 feet.
		N66°04'32"E	501.60 (152.89m)	
	64	N30°25'29"E	422.34 (128.73m)	
	65	N24°34'11"E	331.89 (101.16m)	
	66	N24°35'36"E	703.57 (214.45m)	Descending and ascending a shoulder of Hadley Peak, through a series of minor saddles, to the summit of Hadley Peak, along divide between Smith Basin and Mazama Glacier.
	67	N07°38'25"W	542.87 (165.47m)	
	68	N09°08'10"E	1397.29 (425.90m)	
	1			Summit of Hadley Peak, the Point of Beginning.

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE FEET (METERS)	DESCRIPTION
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 Containing 2691.91 acres (1089.405 hectares), more or less.

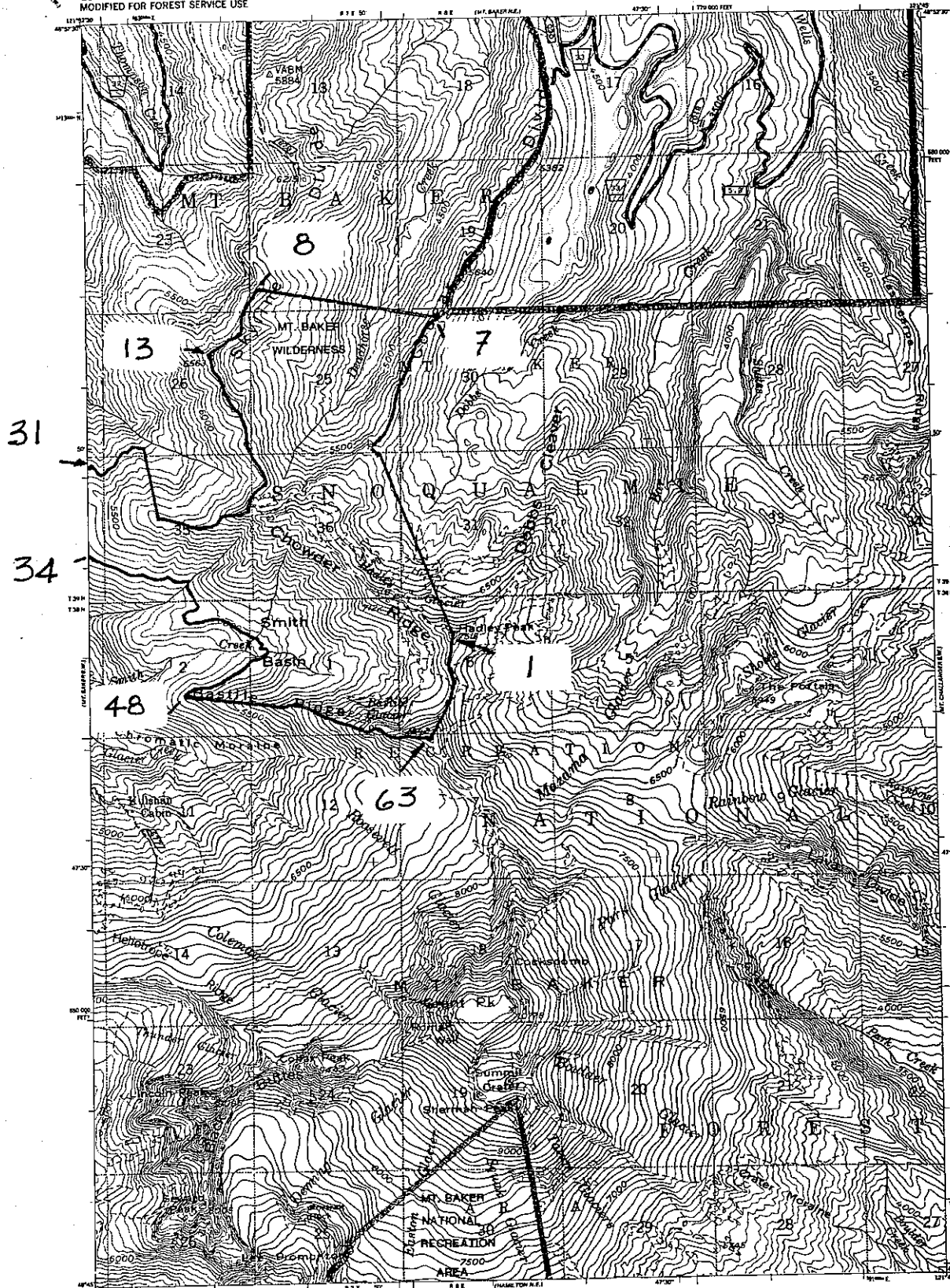
The above written description accurately depicts, to the best of my ability, that parcel of land intended for use as a Research Natural Area.

Forrest Shoemaker

Forrest Shoemaker
 Forest Land Surveyor
 Mt. Baker-Snoqualmie and
 Olympic National Forests

6 SEPT. 2001
 Date

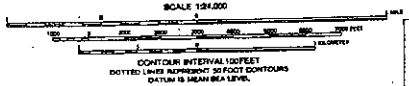




TRANSPORTATION SYSTEM UPDATE	
	ROADWAY
	PRIVATE ROAD
	MAINTAINED DRIVE
	IMPROVED LIGHT DUTY
	UNIMPROVED HIGH CLEARANCE
	TRAIL
	INTERSTATE HIGHWAY
	US HIGHWAY
	OREGON STATE HIGHWAY
	WASHINGTON STATE HIGHWAY
	COUNTY ROAD
	W. COLLECTOR
	W. LOCAL
	FOREST HIGHWAY
	PRIVATE ROAD
	BRIDGE
	ROAD TUNNEL
	OPEN
	BLOCKED ROAD
	ROAD ANNUALLY OPENED

CONSTRUCTED BY THE REGIONAL OFFICE, PORTLAND, OREGON, IN 1984 FROM U.S. FOREST SERVICE PROPERTY MAPS. THESE MAPS ARE NOT TO BE USED FOR ANY PURPOSES OTHER THAN THAT AUTHORIZED BY THE REGIONAL OFFICE. RETURNED TO THE REGIONAL OFFICE, PORTLAND, OREGON, IF NOT USED WITHIN 1 YEAR OF DATE OF ISSUE.

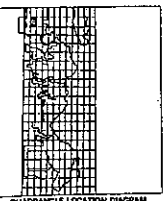
Base map prepared by the U.S. Geological Survey
under USGS USGS-2 and Job City Commission
Topography by photogrammetric methods from aerial
photographs taken 1950. Field checked 1952.
Map projection, 1927 North American datum
10,000-foot grid based on Washington coordinate system,
North zone, 1000 meter Universal Transverse Mercator
UTM zone 10.
Reduction to USGS base map by the Geomatics
Service Center from 1975 aerial photography and
1979 correction grids furnished by Pacific Northwest Region.
Landmark checked according to additional Forest Service evidence
INTERMEDIATE EDITION



SCALE 1:124,000
CONTOUR INTERVAL 100 FEET
DOTTED LINES REPRESENT 30 FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

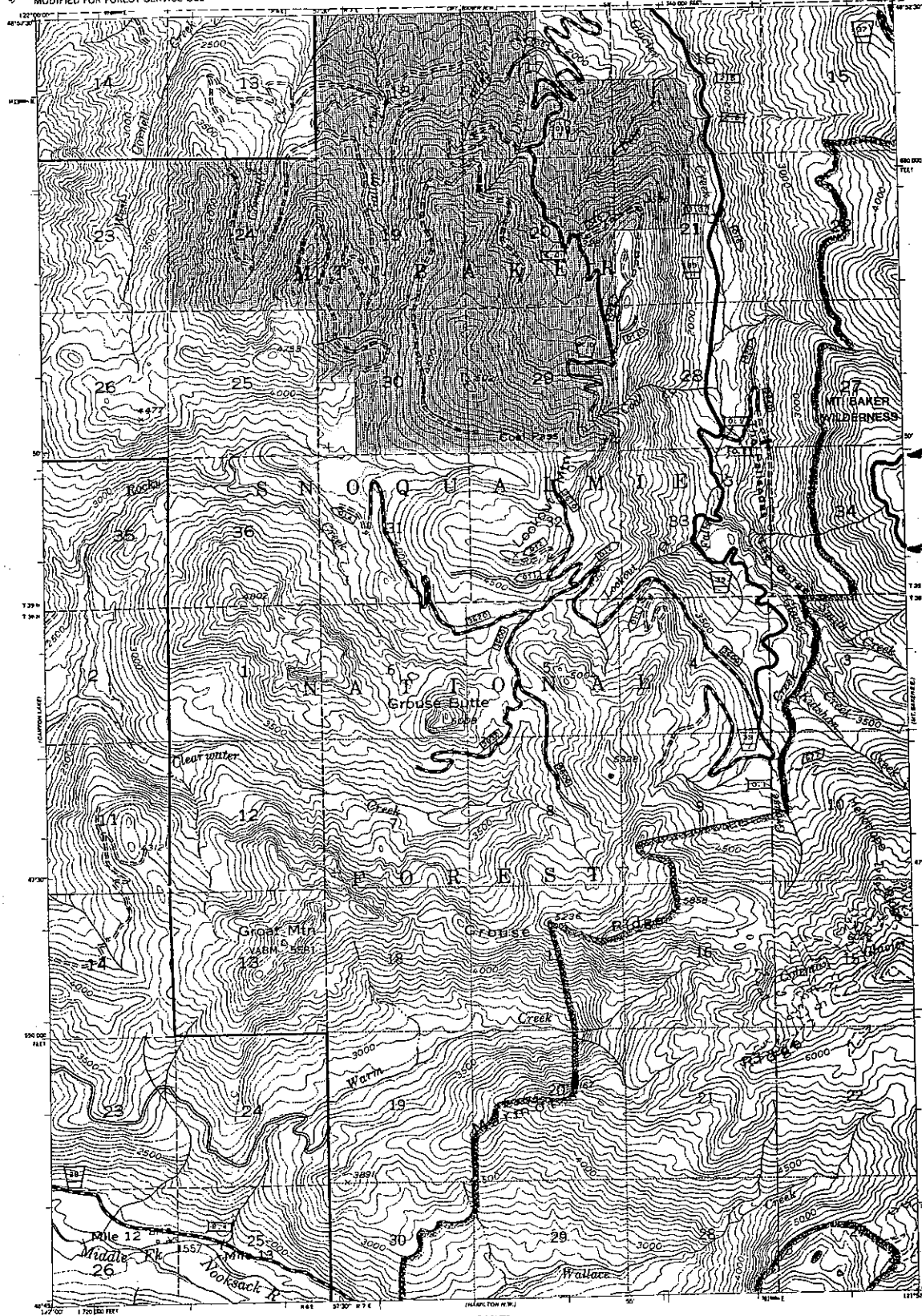
National Forest Boundary
Allocated Land within the National Forest Boundary as of 1978
Special Area Boundary

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protection by BLM



MT. BAKER S.E. WASH.
1845-1825-57.5
1980
DMA 1085 IV B-SERIES 5781

DISCLAIMER:
WILDERNESS BOUNDARIES
SHOWN ARE APPROXIMATE

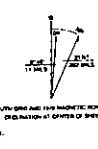


31
34

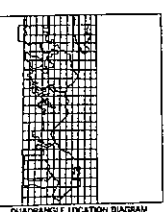
TRANSPORTATION SYSTEM UPGRADE	
	IMPROVED ROAD
	UNIMPROVED ROAD
	UNIMPROVED LIGHT DUTY
	UNIMPROVED HIGH CLEARANCE
	TRAIL
	INTERSTATE HIGHWAY
	US HIGHWAY
	OREGON STATE HIGHWAY
	WASHINGTON STATE HIGHWAY
	COUNTY ROAD
	W. FEDERAL
	W. COLLECTOR
	W. LOCAL
	TRAIL
	FOREST HIGHWAY
	PRIVATE ROAD
	BRIDGE
	ROAD TERMINATION
	OPEN
	BLOCKED ROAD
	ROAD ANNUALLY OPENED

CONSTRUCTED BY THE REGIONAL OFFICE OF THE FOREST SERVICE, 1885-1985. THIS MAP IS A REVISION OF THE 1973 MAP OF THE QUADRANGLE. THE ORIGINAL MAP WAS PREPARED BY THE GEOLOGICAL SURVEY IN 1952. THE ORIGINAL MAP WAS A 7.5-MINUTE SERIES MAP. THE ORIGINAL MAP WAS A 7.5-MINUTE SERIES MAP. THE ORIGINAL MAP WAS A 7.5-MINUTE SERIES MAP.

Base map prepared by the U.S. Geological Survey
Control by USGS, USACE and US Army Commission
Topography by photogrammetric methods from aerial
photographs taken 1950. Field checked 1952.
Polyconic projection, 1927 North American Datum.
1:25,000 scale and based on Washington coordinate system,
north datum, 1000 meter Universal Transverse Mercator
and NAD 83 zone 10.
Modification to USGS base map by the Geomatics
Service Center from 1979 aerial photography and
1973 correction guides furnished by Pacific Northwest Region.
Land use revised according to additional Forest Service evidence.



SCALE 1:25,000
CONTOUR INTERVAL 100 FEET
DOTTED LINES REPRESENT 50 FOOT CONTOURS
OUTSIDE OF MAIN 500 LEVEL
LEGEND
National Forest Boundary
Alluvial Lands within the National
Forest Boundary as of 1978
Special Area Boundary



MT. BAKER S.W., WASH.
1885-1985
DMS 1461 89 SERIES 1981

MAP REVISED 1985-MBS

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Projections by BLM

APPENDIX 3
 LIST OF VASCULAR PLANTS FROM THE RONALD J. TAYLOR RNA.
 List taken from Taylor and Douglas (1978).
 Names follow Hitchcock et al (1973) and Little (1979).

<u>Scientific Name</u>	<u>Common Name</u>
<i>Abies amabilis</i>	Pacific silver fir
<i>Abies lasiocarpa</i>	alpine fir
<i>Achillea millefolium</i> ssp. <i>lanulosa</i> var. <i>alpicola</i>	yarrow
<i>Agoseris aurantiaca</i> var. <i>aurantiaca</i>	orange agoseris
<i>Agropyron caninum</i> ssp. <i>majus</i> var. <i>latiglume</i>	broadglumed wheatgrass
<i>Agrostis idahoensis</i>	Idaho bentgrass
<i>Agrostis scabra</i>	hair bentgrass
<i>Androsace septentrionalis</i> var. <i>subumbellata</i>	northern fairy-candelabra
<i>Anemone drummondii</i>	alpine anemone
<i>Anemone multifida hirsuta</i>	cut-leaved anemone
<i>Anemone multifida multifida</i>	cut-leaved anemone
<i>Antennaria alpina</i> var. <i>media</i>	dark pussytoes
<i>Antennaria microphylla</i>	white pussytoes
<i>Antennaria umbrinella</i>	umber pussytoes
<i>Arabis lyallii</i>	Lyall's rock cress
<i>Arenaria nuttallii</i>	Nuttall's sandwort
<i>Arenaria obtusiloba</i>	alpine sandwort
<i>Arenaria rubella</i>	boreal sandwort
<i>Arnica latifolia</i> var. <i>gracilis</i>	tall mountain arnica
<i>Arnica nevadensis</i>	Sierra arnica
<i>Arnica rydbergii</i>	Rydberg's arnica
<i>Aster foliaceus</i> var. <i>foliaceus</i>	leafy aster
<i>Aster sibiricus</i> var. <i>meritus</i>	Arctic aster
<i>Astragalus alpinus</i>	alpine milk-vetch
<i>Campanula rotundifolia</i>	common harebell
<i>Cardamine oligosperma</i> var. <i>kamtschatica</i>	Siberian bitter-cress
<i>Carex albonigra</i>	two-toned sedge
<i>Carex breweri</i> var. <i>paddoensis</i>	Engelmann's sedge
<i>Carex capitata</i>	capitate sedge
<i>Carex nardina</i>	spikenard sedge
<i>Carex nigricans</i>	black alpine sedge
<i>Carex phaeocephala</i>	dunhead sedge
<i>Carex pyrenaica</i>	Pyrenean sedge
<i>Carex rossii</i>	Ross' sedge
<i>Carex spectabilis</i>	showy sedge
<i>Cassiope mertensiana</i>	white mountain-heather
<i>Castilleja parviflora</i> var. <i>albida</i>	small-flowered paintbrush
<i>Castilleja rupicola</i>	cliff paintbrush
<i>Cerastium arvense</i>	field chickweed
<i>Chamaecyparis nootkatensis</i>	Alaska-cedar
<i>Claytonia lanceolata</i>	western springbeauty
<i>Deschampsia atropurpurea</i>	mountain hairgrass
<i>Draba incerta</i>	Yellowstone draba
<i>Draba lonchocarpa</i>	lance-fruited draba
<i>Draba paysonii</i> var. <i>trealeasii</i>	Payson's draba
<i>Draba praealta</i>	tall draba
<i>Draba stenoloba</i>	Alaska draba

<i>Draba ventosa</i> var. <i>ruaxes</i>	coast mountain draba
<i>Empetrum nigrum</i>	crowberry
<i>Epilobium alpinum</i> var. <i>clavatum</i>	club-fruited willowherb
<i>Epilobium alpinum</i> var. <i>lactiflorum</i>	white-flowered willowherb
<i>Epilobium latifolium</i>	broad-leaved willowherb
<i>Eriogonum umbellatum</i> var. <i>subalpinum</i>	sulphur buckwheat
<i>Eriogonum umbellatum</i> var. <i>hausknechtii</i>	sulphur buckwheat
<i>Erigeron compositus</i> var. <i>glabratus</i>	cut-leaved daisy
<i>Erigeron Peregrineus</i> ssp. <i>callianthemus</i> var. <i>scaposus</i>	subalpine daisy
<i>Erigeron Peregrineus</i> ssp. <i>Peregrineus</i> var. <i>Peregrineus</i>	subalpine daisy
<i>Festuca ovina</i> var. <i>brevifolia</i>	alpine fescue
<i>Gentiana glauca</i>	glaucous gentian
<i>Haplopappus lyallii</i>	Lyall's goldenweed
<i>Hieracium gracile</i>	slender hawkweed
<i>Juncus drummondii</i> var. <i>subtriflorus</i>	Drummond's rush
<i>Juncus parryi</i>	Parry's rush
<i>Lomatium martendalii</i>	Martindale's lomatium
<i>Luetkea pectinata</i>	partridge-foot
<i>Lupinus latifolius</i> var. <i>subalpinus</i>	Arctic lupine
<i>Lupinus lepidus</i> var. <i>lobbii</i>	dwarf mountain lupine
<i>Luzula piperi</i>	Piper's wood-rush
<i>Luzula spicata</i>	spiked wood-rush
<i>Lycopodium alpinum</i>	alpine club-moss
<i>Mimulus tilingii</i> var. <i>caespitosa</i>	mountain monkey-flower
<i>Oxytropis campestris</i> var. <i>gracillia</i>	mountain locoweed
<i>Oxyria digyna</i>	mountain sorrel
<i>Penstemon davidsonii</i> var. <i>menziesii</i>	Davidson's penstemon
<i>Penstemon procerus</i> <i>tolmiei</i>	small-flowered penstemon
<i>Phacelia heterophylla</i> var. <i>pseudohispida</i>	varileaf phacelia
<i>Phacelia sericea</i> var. <i>sericea</i>	silky phacelia
<i>Phleum alpinum</i>	alpine timothy
<i>Phlox diffusa</i> var. <i>longistylis</i>	spreading phlox
<i>Phylloce empetriformis</i>	pink mountain-heather
<i>Phylloce glanduliflora</i>	yellow mountain-heather
<i>Poa alpina</i>	alpine bluegrass
<i>Poa cusickii</i> var. <i>epilis</i>	Cusick's bluegrass
<i>Poa cusickii</i> var. <i>purpurescens</i>	Cusick's bluegrass
<i>Poa gracillima</i>	Pacific bluegrass
<i>Poa incurva</i>	curly bluegrass
<i>Poa lepticoma</i> var. <i>paucispicula</i>	bog bluegrass
<i>Poa rupicola</i>	timberline bluegrass
<i>Poa sandbergii</i>	Sandberg's bluegrass
<i>Polygonum bistortoides</i>	American bistort
<i>Polygonum viviparum</i>	alpine bistort
<i>Potentilla diversifolia</i> var. <i>diversifolia</i>	diverse-leaved cinquefoil
<i>Potentilla flabellifolia</i>	fan-leaved cinquefoil
<i>Potentilla fruticosa</i>	shrubby cinquefoil
<i>Potentilla villosa</i> var. <i>parvifolia</i>	villous cinquefoil
<i>Polemonium elegans</i>	elegant Jacob's-ladder
<i>Ranunculus eschscholtzii</i> var. <i>eschscholtzii</i>	subalpine buttercup
<i>Salix cascadiensis</i>	Cascade willow
<i>Salix nivalis</i> var. <i>saximontana</i>	dwarf snow willow
<i>Saxifraga bronchialis</i> var. <i>austromontana</i>	spotted saxifrage
<i>Saxifraga caespitosa</i> var. <i>emarginata</i>	tufted saxifrage

<i>Saxifraga debilis</i>	brook saxifrage
<i>Saxifraga ferruginea</i> var. <i>macounii</i>	Alaska saxifrage
<i>Saxifraga lyallii</i>	red-stemmed saxifrage
<i>Saxifraga occidentalis</i> var. <i>occidentalis</i>	western saxifrage
<i>Saxifraga odontoloma</i>	stream saxifrage
<i>Saxifraga oppositifolia</i>	purple mountain saxifrage
<i>Saxifraga punctata</i> var. <i>cascadensis</i>	dotted saxifrage
<i>Saxifraga tolmiei</i> var. <i>tolmiei</i>	Tolmie's saxifrage
<i>Sedum divergens</i>	spreading stonecrop
<i>Sedum lanceolatum</i> var. <i>lanceolatum</i>	lance-leaved stonecrop
<i>Sedum roseum</i> var. <i>integrifolium</i>	roseroot
<i>Selaginella densa</i>	common selaginella
<i>Senecio elmeri</i>	Elmer's butterweed
<i>Sibbaldia procumbens</i>	sibbaldia
<i>Silene acaulis</i> var. <i>escapa</i>	moss campion
<i>Silene parryi</i>	Parry's campion
<i>Sitanion hystrix</i> var. <i>hystrix</i>	squirreltail
<i>Smelowskia ovalis</i>	short-fruited smelowskia
<i>Solidago multiradiata</i> var. <i>scopulorum</i>	northern goldenrod
<i>Stellaria longipes</i> var. <i>altocaulis</i>	long-stalked starwort
<i>Taraxacum ceratophorum</i>	horned dandelion
<i>Trisetum spicatum</i>	spike trisetum
<i>Tsuga mertensiana</i>	mountain hemlock
<i>Vaccinium caespitosum</i>	dwarf blueberry
<i>Vaccinium deliciosum</i>	blue-leaved huckleberry
<i>Vaccinium occidentale</i>	bog blueberry
<i>Vaccinium scoparium</i>	grouseberry
<i>Veronica cusickii</i>	Cusick's speedwell

APPENDIX 4
LIST OF LICHENS FROM THE RONALD J. TAYLOR RNA.

List taken from Ryan (1985).
Taxonomy and nomenclature follows Ryan (1985).
Species new to Washington are marked with an asterisk.
No common names are available for lichens.

Scientific Name

Acarospora fuscata
Acarospora oxytona
Acarospora cf. smaragdula
Alectoria lata
Alectoria nigricans
Alectoria sarmentosa
Allantoparmelia alpicola
Arthonia spp.
Aspicilia alphoplaca
Aspicilia alpina
**Aspicilia cf. americana*
Aspicilia cinereorufescens sensu lato
Aspicilia cf. contorta
**Aspicilia mastrucata*
Aspicilia nordlandica
**Aspicilia subsorediza*
Bacidia nivalis
Baeomyces rufus
**Bryonora cf. castanea*
Bryoria cf. abbreviata
Bryoria capillaris
Bryoria cf. chalybeiformis
Bryoria fremontii
Bryoria fuscescens
Bryoria fuscescens var. positiva
Bryoria glabra
**Bryoria cf. subdivergens*
**Buellia cf. aethalea*
Buellia geophila
Buellia papillata
Buellia verruculosa
Calicium glaucellum
**Caloplaca cf. exsecuta*
**Caloplaca festiva*
Caloplaca jungermanniae
**Caloplaca leucoraea*
Caloplaca stillicidiorum
**Candelariella lutella*
Candelariella terrigena
Candelariella cf. vitellina
Cetraria hepatizon
Cetraria islandica sensu lato
Cetraria nivalis
Cetraria platyphylla

Cetraria sepincola
Cetraria subalpina
Cladina mitis
Cladina rangiferina
Cladonia bellidiflora
Cladonia carneola
Cladonia coccifera
Cladonia coniocraea
Cladonia ecmocyna
Cladonia fimbriata
Cladonia gracilis
Cladonia macrophyllodes
Cladonia pyxidata
Cladonia squamosa
Cladonia squamosa ssp. *squamosa*
Cladonia squamosa ssp. *subsquamosa*
Cladonia sulphurina
Coelocaulon cf. *aculeatum*
Collema spp.
Coniocybe furfuracea
Cornicularia normoerica
Dermatocarpon cf. *lachneum*
Dermatocarpon cf. *reticulatum*
Dermatocarpon vivulorum
Diplotomma alboatrum
Haemotomma lapponicum
Huillia cf. *albocaerulescens*
Huillia crustulata
**Hypogymnia bitteri*
Hypogymnia imshaugii
**Hypogymnia oroarctica*
**Hypogymnia* cf. *rugosa*
**Ionaspis epulotica*
Lecanora bicincta
Lecanora cenisia
Lecanora coilocarpa auct.
Lecanora hageni sensu lato
**Lecanora intricata*
Lecanora melaena
Lecanora cf. *muralis*
Lecanora novomexicana
Lecanora polytropa
Lecanora rupicola
Lecidea armeciaca
**Lecidea atromarginata*
Lecidea cf. *atrobrunnea*
Lecidea fusca
**Lecidea belvola*
**Lecidea impavida*
**Lecidea instrata*
Lecidea lactea
**Lecidea leucotballina*
**Lecidea mannii*
**Lecidea nylanderi*

Lecidea tornoensis
**Lecidea cf. truckeei*
Lecidea uliginosa
Lecidella cf. stigmatea
Lecidella wulfenii
Lecidoma demissum
Leciophysma finmarckicum
Lepraria neglecta auct.
Lepraria cf. incana
Leprocaulon subalbicans
Leptogium lichenoides
Leptogium tenuissimum
Lobaria linita
Lopadium pezizoideum
Massalongia carnosa
Melanelia elegantula
**Microglaena cf. muscorum*
Mycoblastus alpinus
Mycoblastus sanguinarius
Nephroma parile
**Ochrolechia androgyna*
**Ochrolechia frigida*
Ochrolechia oregoensis
Ochrolechia cf. pallescens
Ochrolechia upsaliensis
Pannaria leocophatea
Pannaria pezizoides
Pachyospora verrucosa
Parmelia pratermissa
Parmeliopsis sensu lato
Parmeliopsis ambigua
Parmeliopsis hyperopta
Peltigera canina
Peltigera lepidophora
Peltigera leucophlebia
Peltigera malacea
Peltigera cf. polydactyla
Peltigera rufescens
Peltigera scabrosa
Peltigera spuria
Pertusaria ophthalmiza
**Phaeophyscia constipata*
Phaeophyscia sciastra
**Phaeorrhiza nimbose*
Physcia cf. aipolia
Physcia caesia
Physcia dubia
Physcia cf. phaea
Pysconia muscigena
Placopsis gelida
**Placynthium asperellum*
Platismatia glauca
Platismatia norvegica
Polychidium muscicola

Protoblastenia cinnabarina
Protoparmelia badia
Pseudephebe minuscula
Pseudephebe pubescens
 **Psora nipponica*
Psora rubiformis
Psoroma hypnorum
 **Rhizocarpon copelandii*
Rhizocarpon disporum
Rhizocarpon geographicum sensu lato
 **Rhizocarpon inarense*
Rhizocarpon obscuratum
 **Rhizocarpon polycarpum*
Rhizocarpon riparium sensu lato
 **Rhizocarpon simillium*
Rhizoplaca chrysoleuca
Rhizoplaca melanophthalma
 **Rinodina archaea*
 **Rinodina roscida*
 **Rinodina septentrionalis*
 **Schaereria tenebrosa*
Solorina crocea
Sphaerophorus tuckermanii
 **Sporostatia polyspora*
Sporostatia testudinea
Staurothele cf. fissa
 **Staurothele fuscocuprea*
Stenocybe euspora
Stereocaulon alpinum
Stereocaulon cf. condensatum
Stereocaulon cf. glareosum
 **Stereocaulon grande*
Stereocaulon cf. vivulorum
Thamnia vermicularis
Thamnia vermicularis var. *vermicularis*
Thamnia vermicularis var. *subuliformis*
Trapeliopsis granulosa
Tremolechia atrata
Umbilicaria cylindrica
Umbilicaria deusta
Umbilicaria hyperborea
Umbilicaria kraschenikovii
Umbilicaria proboscides
Umbilicaria torrefacta
Umbilicaria virginis
 **Verrucaria elaeomelaena*
Verrucaria margacea
 **Vestergrenopsis isidiata*
Xanthoria candelaria
Xanthoria elegans
 **Xanthoria sorediata*
Xylographa abietina
Xylographa bians

APPENDIX 5
LIST OF BRYOPHYTES FROM THE RONALD J. TAYLOR RNA.

List taken from Ryan (1985).
Taxonomy and nomenclature follows Ryan (1985).
Species new to Washington are marked with an asterisk.
No common names are available for bryophytes.

Scientific Name

Amphidium lapponicum
Andreaea nivalis
Andreaea rupestris
Bartramia ithyphylla
Brachythecium albicans
Brachythecium collinum
Brachythecium starkei
Brachythecium velutinum
Bryoerythrophyllum recurvirostrum
Bryum ambulyodon
Bryum caespiticium
Bryum lisae
Bryum pseudotriquetrum
Bryum schleicheri
Bryum weigelii
Calliergon stramineum
Ceratodon purpureus
Coscinodon calyptratus
Desmatodon latifolius
Dichodontium olympicum
Dicranoweisia crispula
Dicranum muehlenbeckii
Dicranum pallidisetum
Distichium capillaceum
Ditrichum flexicaule
Drepanocladus exannulatus
Drepanocladus uncinatus
Encalypta rhaptocarpa
Eurhynchium pulchellum
Grimmia alpestris
Grimmia anodon
Grimmia ovalis
Hygrohypnum molle
Hygrohypnum ochraceum
Hypnum revolutum
Kiaeria blyttii
Kiaeria falcata
Lescuraea incurvata
Lescuraea patens
Lescuraea radicata
Mnium arizonicum
Mnium thomsonii
Oligotrichum hercynicum
Oligotrichum parallelum
Orthotrichum laevigatum

Orthotrichum rupestre
Plagiothecium laetum
Pohlia bolanderi
Pohlia cruda
Pohlia drummondii
Pohlia erecta
Pohlia filum
Pohlia ludwigii
Pohlia nutans
Pohlia wahlenbergii
Polytrichastrum lyallii
Polytrichastrum sexangulare
Polytrichum juniperinum
Polytrichum piliferum
Rhacomitrium canescens
Rhacomitrium ericoides
Rhacomitrium fasciculare
Rhacomitrium lanuginosum
Rhacomitrium microcarpon
Rhacomitrium muticum
Rhacomitrium sudeticum
Roellia roellii
Schistidium apocarpum
Schistidium rivulare
Tortella fragilis
Tortella tortuosa
Tortula norvegica
Tortula ruralis
Weissia controversa

APPENDIX 6
LIST OF ANIMALS FROM THE RONALD J. TAYLOR RNA.

List taken from Taylor and Douglas (1978) and Gay (personal communication).

Scientific Name

Common Name

Birds

Dendrogapus obscurus

blue grouse

Erimophila alpestris (Linnaeus)

horned lark

Lagopus leucurus

ptarmigan

Mammals

Canis latrans Say

coyote

Eutamias townsendi (Bachman)

chipmunk

Felis concolor Kerr

cougar

Gulo luscus (Linnaeus)

wolverine

Marmota caligata (Eschscholtz)

hoary marmot

Microtus richardsonii (DeKay)

water rat

Ochotona princeps (Richardson)

pika

Odocoileus hemionus columbianus ((Richardson)

blacktail deer

Oreamnos americanus (Blaineville)

mountain goat

Peromyscus oreas Bangs

forest deer mouse

Phenacomys intermedius Merriam

heather vole

Sorex obscurus Merriam

dusky shrew

Zapus trinotatus Rhoads

Pacific jumping mouse

Martes americana (Turton)

pine marten

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NOTICE OF DECISION

On April 11, 2002, USDA, Forest Service, Regional Forester for the Pacific Northwest Region (Portland, Oregon) made a decision to establish the 2,692 acre Ronald J. Taylor Research Natural Area (RNA) on the Mt. Baker Ranger District of the Mt. Baker-Snoqualmie National Forest in Whatcom County, Washington. This decision will be implemented after April 19, 2002.

A copy of the Decision Notice/Designation Order and Finding of No. Significant Impact is available upon request from the Regional Office, Environmental Coordination, P.O. Box 3623, Portland, Oregon 97208.

This decision is subject to appeal pursuant to Forest Service Regulation 36 Code of Federal Regulation (CFR) Part 217. Any written Notice of Appeal must be fully consistent with 36 CFR 217.9 (Content of a Notice of Appeal) and must include a reasons for appeal. Any written appeal must be postmarked or received by the Appeal Deciding Officer, Chief Dale Bosworth, USDA Forest Service ATTN; NFS Appeals, P.O. Box 96090, Washington D.C. 20090-6090 within 45 days of the date of this legal newspaper notice.

For further information regarding Ronald J. Taylor RNA contact Laura Potash, Research Natural Area Coordinator, Mt. Baker-Snoqualmie National Forest, 21905 64th Avenue West, Mountlake Terrace, Washington 98043, phone 425-744-3423.

DECISION NOTICE / DESIGNATION ORDER
FINDING OF NO SIGNIFICANT IMPACT

Ronald J. Taylor Research Natural Area
(Forest Plan Amendment #17)

USDA, Forest Service
Mt. Baker-Snoqualmie National Forest
Whatcom County, Washington

An environmental assessment (EA)¹ that discusses the proposed Ronald J. Taylor Research Natural Area (RNA) on the Mt. Baker Ranger District is available for public review at the Forest Supervisor's office, 21905 64th Avenue West, Mountlake Terrace, WA 98043, and at the Mt. Baker Ranger Station, 810 State Route 20, Sedro-Woolley, WA 98284. The proposed RNA is in Townships 38 and 39 N, Ranges 7 and 8 East, W.M., in Whatcom County, Washington.

Decision

Based on the analysis and evaluation described in the environmental assessment (EA) it is my decision to select Alternative C. My decision will formally establish the area centered on Chowder Ridge as the Ronald J. Taylor RNA, approximately 2,692 acres in size. After the final Establishment Report is accepted, a Management Plan will be prepared for this RNA.

This decision amends the Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (Forest Plan) by changing the allocation of the Recommended Chowder Ridge Research Natural Area to the Established Ronald J. Taylor RNA, and by enlarging the size from 1,900 acres to 2,692 acres. The additional 792 acres will change from land management allocation 10C (Wilderness, General Trailless) to the dual allocation of 10E and 18 (Wilderness Special Area and Research Natural Area). I have determined that this amendment will not result in a significant change to the Forest Plan and is non-significant as per 36 CFR 219.10(f) – the National Forest Management Act.

Rationale

My decision to establish this RNA responds to the need for this alpine community mosaic with *krummhloz* tree groups in the RNA network, Western Slopes and Crest Province, Washington Cascades; it also meets the goals and objectives of the Forest Plan (USDA Forest Service 2001, pages 1-2). I have selected Alternative C because the boundaries reflect field verification, with more of Chowder Ridge and the alpine vegetation community – the key value of this RNA – included within the established RNA (USDA Forest Service 2001, pages 2, 3, and 9). Establishing the RNA also responds to the public comments received during scoping (USDA Forest Service 2001, page 5).

¹ USDA Forest Service 2001. Environmental Assessment for Formal Establishment of the Ronald J. Taylor Research Natural Area. Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, WA.

Public Involvement

Public Scoping for this analysis began in May 2001. An information letter and map were sent to 49 recipients, including individuals, tribes, agencies, and non-governmental organizations. A total of three responses were received; all supported establishment of the RNA (USDA Forest Service 2001, page 5).

Alternatives Considered

Other alternatives considered were (USDA Forest Service 2001, pages 5-9):

Alternative A, No Action: the Chowder Ridge area would remain allocated to Recommended RNA, with the original boundaries as described in the Forest Plan; and

Alternative B, Establish RNA with Forest Plan Boundaries, 1,900 acres in size.

Finding of No Significant Impact

Based on the analysis documented in the EA, I have determined that the establishment of the Ronald J. Taylor Research Natural Area is not a major federal action that would significantly affect the quality of the human environment; therefore an environmental impact statement is not needed. This determination was made considering the following factors [40 CFR 1508.27]:

Context

Although this decision is an addition to the national system of RNA's, both short-term and long-term physical and biological effects are limited to the local area, and are very limited (USDA Forest Service 2001, pages 10-17).

Intensity

1. There are no known effects on public health or safety.
2. No significant direct, indirect, or cumulative impacts to the natural resources or other components of the human environment are anticipated (USDA Forest Service 2001, pages 10-17).
3. Effects on the human environment are not uncertain, do not involve unique or unknown risks, and are not likely to be highly controversial (USDA Forest Service 2001, pages 10-17).
4. There are no known effects on historical or cultural resources, park lands, prime farm land, wild and scenic rivers or wetlands and floodplains (USDA Forest Service 2001, pages 18-19). The effect of establishing the RNA is to protect ecologically sensitive areas; no significant adverse effects are anticipated to any environmentally sensitive or critical area (USDA Forest Service 2001, pages 11-16).
5. The action is not likely to establish a precedent for future actions with significant effects.

6. Based on the best information available, the project will not adversely affect any federally listed or proposed threatened or endangered species or any regionally listed sensitive species or their critical habitat (USDA Forest Service 2001, pages 11-13, 15-16).
7. The proposed action is consistent with federal, state, and local laws and requirements imposed for the protection of the environment.

Other Findings Required by Law or Regulation

This decision is consistent with direction in the Forest Plan as amended by the April 13, 1994 Record of Decision for Amendments to the Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl. The established Chowder Ridge RNA will be allocated, via a non-significant Forest Plan amendment, to Management Area 18 (Research Natural Areas) and Management Area 10E (Wilderness, Special Area). The formal establishment will meet or not prevent the attainment of the Aquatic Conservation Strategy (USDA Forest Service 2001, page 11).

Forest Plan Amendment #17, showing the boundaries of the Established Ronald J. Taylor RNA, is attached (Figure 3 from the EA).

Implementation

Legal Notice of this decision will appear in the *Seattle Post-Intelligencer*. A copy of the legal notice will be mailed to all persons stating interest in the project. Implementation of this decision shall not occur within 7 calendar days following publication of the legal notice in the *Seattle Post-Intelligencer*.

Appeal Opportunities


This decision is subject to appeal under 36 CFR 217, but does not require the "notice and comment" period under 36 CFR part 215. Any Notice of Appeal of this decision must be fully consistent with 36 CFR 217.9, (Content of a Notice of Appeal) and must include the reasons for the appeal. A written notice of appeal must be postmarked or received by the Appeal Deciding Officer, Chief Dale Bosworth, within 45 days of the date the legal notice appears in the *Seattle Post-Intelligencer*. Submit written notice of appeal to:

Chief, USDA Forest Service
ATTN: NFS Appeals
14th and Independence SW
P.O. Box 96090
Washington, D.C. 20090-6090

Contact Person

For further information regarding this decision, contact:

Laura Potash
Research Natural Area Coordinator
Mt. Baker-Snoqualmie National Forest
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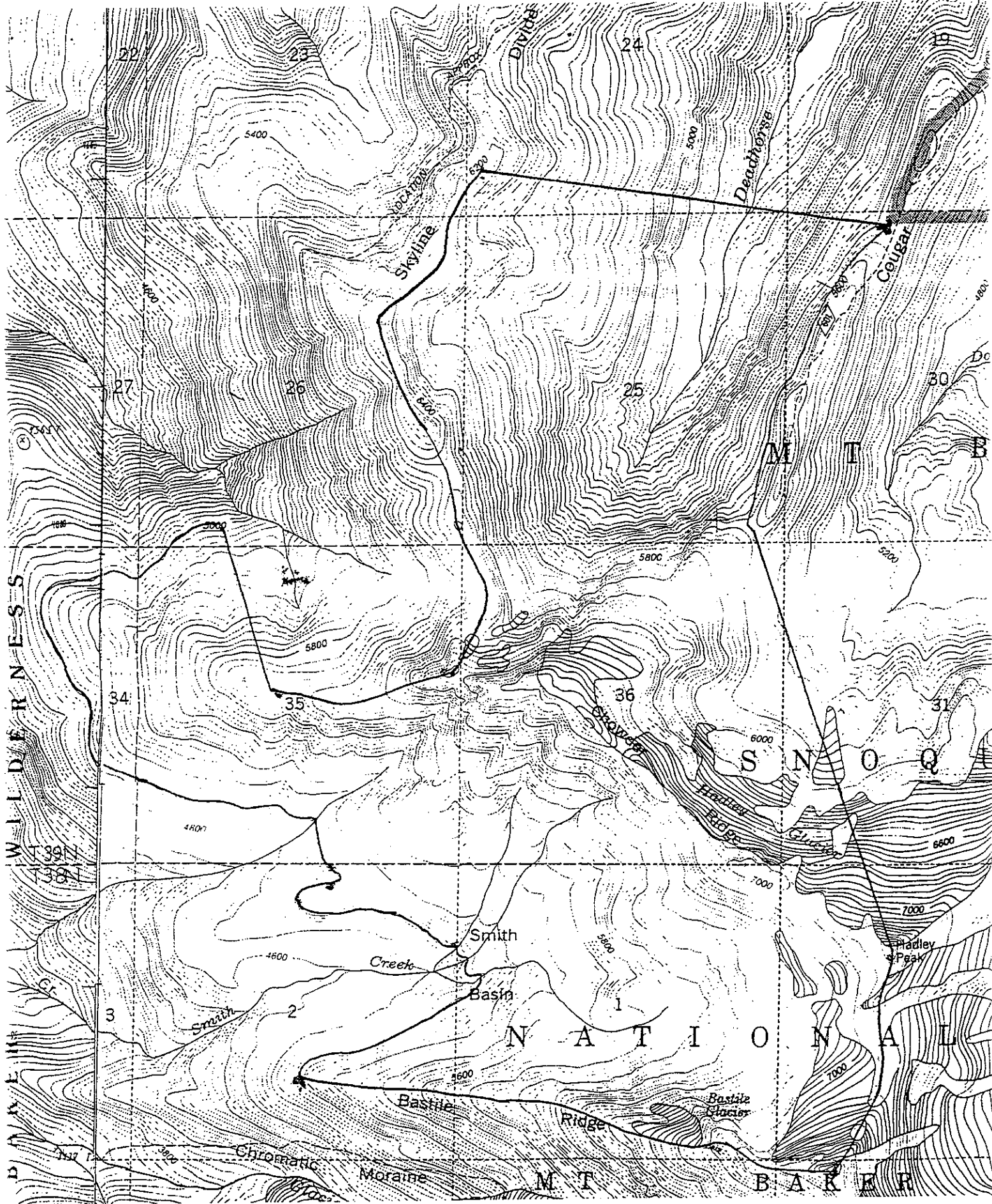


NANCY FORSGREN
Regional Forester

April 11, 2002

Date

Nancy Graybeal (for)
Deputy Regional Forester



Mt. Baker-Snoqualmie Forest Plan Amendment # 17

Established Robert J. Taylor Research Natural Area

Ronald J. Taylor Research Natural Area
Environmental Assessment for Formal Establishment
Mt. Baker-Snoqualmie National Forest ~~Whatcom County, Washington



CHAPTER 1 – PURPOSE AND NEED

The Proposed Action

The proposed action is the establishment of a Research Natural Area (RNA) at Chowder Ridge within the Mt. Baker Wilderness Area. The RNA was recommended in the Record of Decision for the Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (Forest Plan, USDA Forest Service 1990a, as amended¹). This recommended RNA was called the Chowder Ridge Research Natural Area in the Forest Plan. The formally established RNA will be named in honor of Dr. Ronald J. Taylor, who conducted research on Chowder Ridge for many years and advocated protection of this area.

Purpose and Need for Action

The purpose of formally establishing the Ronald J. Taylor RNA is to meet the goals and objectives of the Forest Plan, as amended. In *Research Natural Area Needs in the Pacific Northwest* (Dyrness and others 1975), federal RNAs are defined as naturally occurring physical or biological units where natural conditions are maintained insofar as possible. The goals for Forest Plan Management Area 18, Research Natural Areas echo the statement by Dyrness and others, and add that the purpose of RNAs include:

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 (page 4-252). Federal Regulations at 36 CFR 251.23 state that RNAs are designated to “illustrate adequately or typify for research or education purposes, the important forest and range types in each forest region, as well as other plant communities that have special or unique characteristics of scientific interest and importance.”

Establishing the Ronald J. Taylor RNA would help provide funding to monitor this unique alpine environment—one that is unusual for the western North Cascades. The Forest Plan identifies the principle features to be an alpine community mosaic with *krummholz*² tree groups. There is a need for this Terrestrial cell in the Western Slopes and Crest Province, Washington Cascades. An evaluation of the need for RNAs by the Regional RNA Committee³ identified this ecosystem type as suitable and desirable for inclusion in the national network. Establishing this RNA provides long-

¹ The major amendment is the USDA Forest Service, USDI BLM1994 Record of Decision, commonly referred to as the Northwest Forest Plan; see references.

² *Krummholz* is roughly defined as “crooked wood.”

³ Pursuant to direction in Forest Service Manual (FSM) 4063.04b.

term protection and recognition of this ecosystem type within the existing Western Cascade Province RNA network (Dyrness and others 1975).

This recommended RNA is of particular interest to the scientific community. It contains the largest area of continuous alpine vegetation in the western North Cascades. With its southwestern aspect, Chowder Ridge contains a "curious mixture of relatively drought-tolerant plants more frequently encountered in the eastern Cascades and Rocky Mountains" (Taylor and Douglas 1978). The ridge is composed of marine sediments of the Nooksack Group, whereas other nearby mountains are composed primarily of andesite from the nearby Mt. Baker volcano. With all of the landforms characteristic of the alpine zone and eight plant community types in the subalpine and alpine zones, Chowder Ridge represents a unique combination of biological and physical characteristics. The fact that the area remains more or less undisturbed by humans, with the plants and wildlife in a relatively natural state make the recommended Ronald J. Taylor RNA "incomparably suited" for Research Natural Area designation (*Ibid* 1978). Jan Henderson and Robin Leshner, Mt. Baker-Snoqualmie National Forest Ecologists, have also done extensive fieldwork in the area, both gathering data in the early 1980's (for use in Forest planning) and setting up ecology plots.

Location

The recommended Ronald J. Taylor RNA is located within the Mt. Baker Wilderness, and centers on Chowder Ridge, an "arm" of Mt. Baker (Townships 38 and 39 North, Range 7 and 8 East). It lies within the North Fork Nooksack River Watershed, a Tier 1 Key Watershed, and includes portions of the headwaters of a number of streams (see Affected Environment, below).

The recommended RNA—a continuation of Skyline Divide—is about 3 miles long and includes a portion of Hadley Glacier. The southern border, along Bastile Ridge, includes Bastile Glacier and a small portion of Mazama Glacier. Elevations in the area vary from 4,400 feet to 7,600 feet. See Figure 1, below.

The Forest Plan boundaries for a recommended RNA at Chowder Ridge delineated an area about 1,900 acres in size. As part of the analysis for this establishment project, the interdisciplinary team followed Plan implementation direction at page 5-28, which states: "During project design, field verification may indicate that the mapped Management Area boundary should be changed to reflect the environmental conditions the MA was intended to include. Such changes will be evaluated and documented in the environmental assessment..." (USDA Forest Service 1990a).

Based on better mapping techniques and on-the-ground field verification, the 2001 Recommended RNA includes more of Chowder Ridge and the alpine vegetation community—the key value of the RNA. Boundaries have also been adjusted to more closely follow ridgelines, peaks, and other obvious geographic features, so that the boundary could be reasonably followed on the ground. The adjusted size is about 2,692 acres, and is analyzed as Alternative C. Alternative B includes the Recommended RNA as mapped in the 1990 Forest Plan.

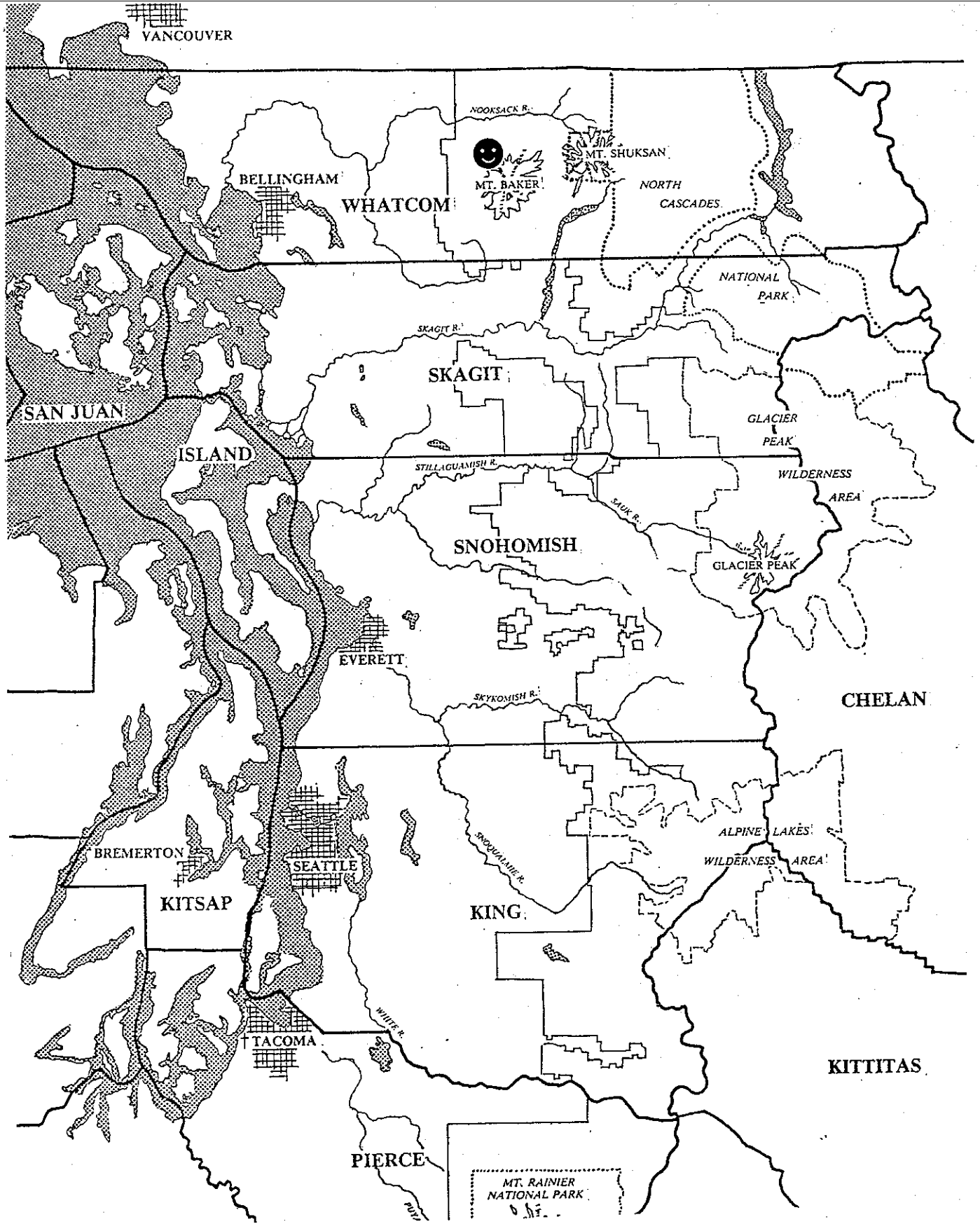


Figure 1. Vicinity map showing Ronald J. Taylor RNA (indicated by smiley face) on the northwest side of Mt. Baker.

Forest Management Direction

The Forest Plan, as amended, provides management direction for the four existing Research Natural Areas and four recommended RNAs on the Mt. Baker-Snoqualmie, in the form of forest-wide and allocation or management area (MA) standards and guidelines. Both existing and recommended RNAs are managed under the same standards and guidelines.

Recommended Ronald J. Taylor RNA has been managed under the dual allocation of MA 18 -- Research Natural Area with the Mt. Baker wilderness, MA 10E -- Wilderness, Special Area, plus Riparian Reserves, which apply (in varying widths) to all streams, lakes, wetlands, etc. Forest-wide standards and guidelines also apply, as appropriate. The standards and guidelines for this dual allocation state: "Follow Wilderness or RNA Standards and Guidelines, which ever is more restrictive" (USDA Forest Service 1990a). The standards and guidelines for both MA 18 and 10E are included as Appendix A, below. For complete information, including standards and guidelines for Riparian Reserves, refer to both the 1990 Forest Plan and the 1994 Record of Decision⁴ for the Northwest Forest Plan.

The North Fork of the Nooksack River is a Tier 1 Key Watershed. Watershed analysis has been completed (USDA Forest Service 1995).

The Decision to Be Made

Establishment of a Forest Service Research Natural Area is accomplished through completion of an establishment report, following agency protocol, and a combined Decision Notice/Designation Order, signed by the Regional Forester or Station Director.

For the RNA at Chowder Ridge, the environmental effects of a proposed RNA were analyzed in the Final Environmental Impact Statement for the Mt. Baker-Snoqualmie National Forest Plan (USDA Forest Service 1990c). The site-specific analysis documented in this EA tiers to that document, and includes a review of new issues and/or changed conditions, if any, possible environmental consequences, and serves as a double-check that public support for the decision has not changed (USDA Forest Service 1992).

The decision to be made is whether or not to formally establish the RNA, and if established, the location of the boundary. A Forest Plan amendment would be included to add this area to the Established RNA list. The formal name for the area will be the Ronald J. Taylor RNA. A decision of "no action" would result in the area remaining a recommended RNA as per the Forest Plan. The Regional Forester is the responsible official.

After acceptance of the Establishment Record and the Decision Notice, a Management Plan with a detailed monitoring plan would be prepared for the RNA. Any possible future management actions—analyzed as a result of findings from the monitoring plan yet to be prepared—are not

⁴ (USDA Forest Service, USDI BLM 1994).

within the scope of this EA or decision, and would require additional analysis pursuant to all applicable laws and regulations (NEPA, Washington Wilderness Act, NFMA, ESA, NHPA, etc.).

Not considered within this analysis is the option to allocate Chowder Ridge to another land allocation, such as botanical area or Wilderness 10D, *dedicated trailless*.

Public Involvement

Interest in incorporating the Chowder Ridge area into the Pacific Northwest Research Natural Area system dates to the early 1970's, when Ronald J. Taylor and George Douglas did extensive field research in the area. The detailed data collection and evaluation by these two individuals contributed to the selection of this area as a "principal alpine representative of the western Cascades" (Taylor and Douglas, 1978).

Public scoping for this analysis began in May 2001. An information letter and map was mailed to 49 individuals, including tribes and organizations. A total of three responses were received; all supported establishment of the RNA. The only issue noted is related to the status of current recreation (and trail) use. One commenter asked if the RNA would have any impact on present recreational use. The Mountaineers stated they were pleased to note that "there would be no change in trail status or current recreation use..." Finally, the Mt. Baker Climbing Club asked to reserve the right to comment [on any future analyses] in the event that recreational and trail status would be changed.

CHAPTER 2 – ALTERNATIVES

The interdisciplinary team reviewed the following to develop a range of alternatives:

1. the existing maps (from the 1990 Forest Plan);
2. the direction from the Forest Plan regarding field verification of MA boundaries (see discussion in Chapter 1, Location, above);
3. recent field work, including recommended boundary adjustments to more accurately encompass the values of this RNA; and
4. public comments received during project scoping.

As discussed in Chapter 1, current techniques also allow more accurate mapping, than those available during Forest planning in the 1980's.

The ID team included as one alternative the boundaries as described in the 1990 Forest Plan. A second action alternative includes boundaries that more closely follow ridgelines, peaks, and other obvious geographic features, and that include more of Chowder Ridge and the alpine vegetation community—the key value of the RNA. A no action alternative is also evaluated in detail.

Alternative A – No Action – Continue as Recommended RNA

In this alternative, the current management direction under the Forest Plan would be continued. The Chowder Ridge area would be managed as a recommended RNA, approximately 1,900 acres in size (Figure 2).

Forest-wide and MA 18 and 10E standards and guidelines would guide all activities, to be consistent with the Forest Plan. Activities, including any research, should meet or not prevent attainment of the Aquatic Conservation Strategy (ACS).

It is unlikely that funding would be allocated to develop a Management Plan for the area, if not formally established as part of the RNA system.

Planned Monitoring

It is likely that the current situation would continue, with limited to no funding for any monitoring unless a health or safety issue arose. With no detailed monitoring, it would be difficult to assess if the values for which the RNA was recommended are being maintained over time. A number of ecology plots are located in the area. There is no set schedule for visiting those plots; this would remain unchanged under No Action.

Alternative B – Proposed Action – Establish RNA with Forest Plan Boundaries

Under Alternative B, a Research Natural Area would be established at Chowder Ridge, approximately 1,900 acres in size, as per the boundaries mapped in the 1990 Forest Plan. Refer to Figure 2, on the following page. This alternative includes a Plan amendment, to formally establish the RNA, and change the name to the Ronald J. Taylor Research Natural Area.

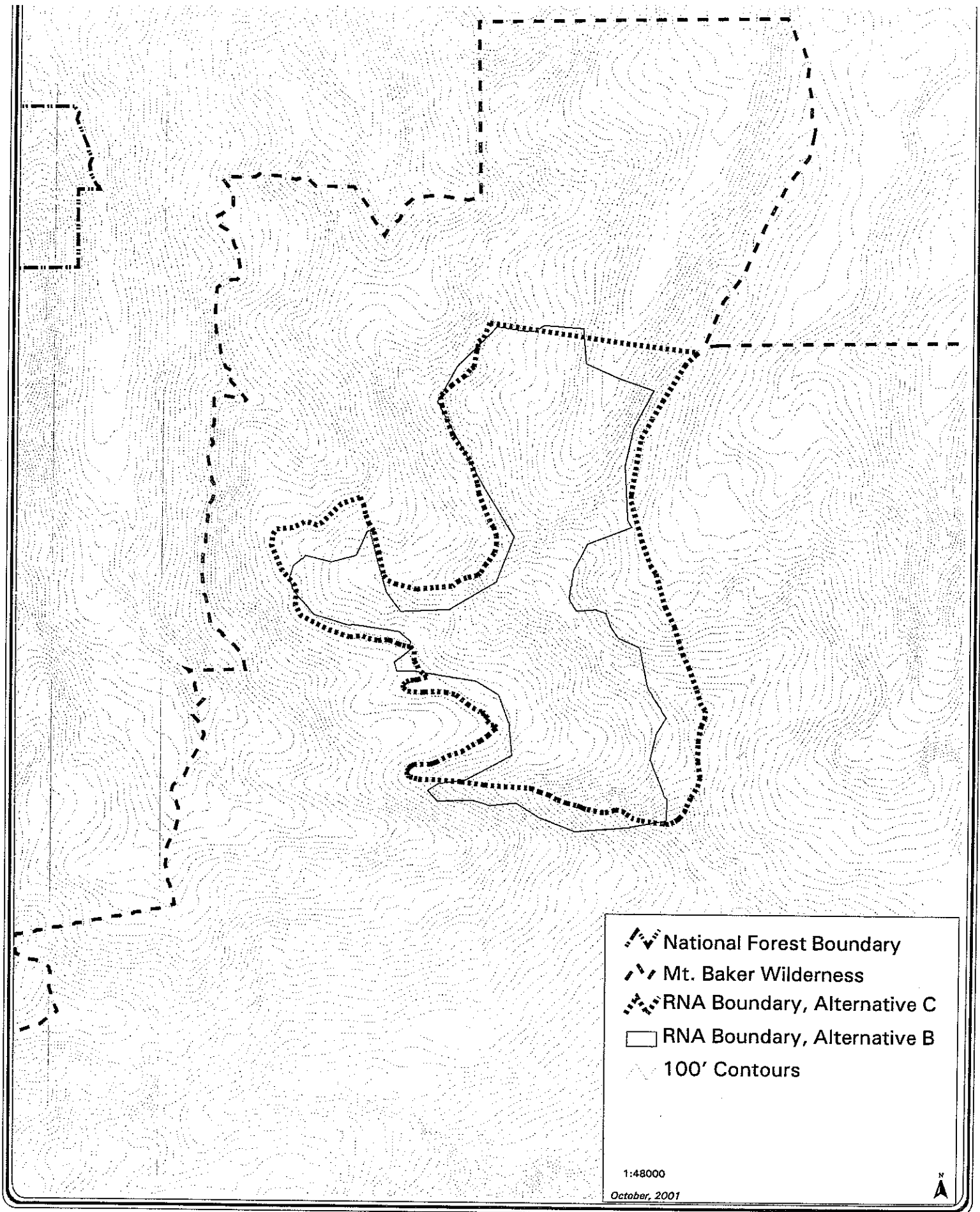
Forest-wide and MA 18 and 10E standards and guidelines (S&Gs) would guide all activities, to be consistent with the Forest Plan. Activities, including any research, would meet or not prevent attainment of the Aquatic Conservation Strategy (ACS).

After a Decision Notice is signed and the Establishment Record is accepted, a Management Plan and Monitoring Plan will be prepared for Ronald J. Taylor RNA. It is expected that the Management Plan will tier directly to the S&Gs for the dual allocation—RNA and wilderness; see Appendix A. All research and other activities would be consistent, or would be made consistent, with the Forest Plan, as amended (including the objectives of the Aquatic Conservation Strategy).

Planned Monitoring

The Monitoring Plan—to be developed—will include monitoring to assess whether the values for which the RNA was recommended are being maintained over time. Forest Plan standards and guidelines are already in place to institute closures or permitting of activities or uses, if needed to prevent interference with or damage to the naturally occurring biological and physical conditions of the RNA.

Figure 2. Map of RNA boundary under Alternatives B and C. The boundary of the No Action alternative is the same as Alternative B.



Alternative C – Preferred – Establish RNA with Adjusted Boundaries

If implemented, Alternative C would include establishment of a Research Natural Area at Chowder Ridge of about 2,692 acres, with adjusted boundaries as discussed in Chapter 1, Location and in Alternative Development, above. These boundaries would reflect field verification, with more of Chowder Ridge and the alpine vegetation community—the key value of the RNA—included within the established Research Natural Area (as per Forest Plan, page 5-28). The boundaries for Alternative C are shown on both Figures 2 (above) and 3 (following page).

This alternative includes a Plan amendment to formally establish the RNA as the Ronald J. Taylor Research Natural Area, and to reallocate an additional 792 acres of the Mt. Baker Wilderness (currently allocated to MA 10E – Wilderness, Special Area) to the dual allocated of MA 10E and MA 18 – Research Natural Area.

Forest-wide and MA 18 and 10E standards and guidelines (S&Gs) would guide all activities, to be consistent with the Forest Plan. Activities, including any research, would meet or not prevent attainment of the Aquatic Conservation Strategy (ACS).

After a Decision Notice is signed and the Establishment Record is accepted, a Management Plan and Monitoring Plan will be prepared for Ronald J. Taylor RNA. It is expected that the Management Plan will tier directly to the S&Gs for the dual allocation—RNA and wilderness; see Appendix A. All research and other activities would be consistent, or would be made consistent, with the Forest Plan, as amended (including the objectives of the Aquatic Conservation Strategy).

Planned Monitoring

The Monitoring Plan—to be developed—will include monitoring to assess whether the values for which the RNA was recommended are being maintained over time. Forest Plan standards and guidelines are already in place to institute closures or permitting of activities or uses, if needed to prevent interference with or damage to the naturally occurring biological and physical conditions of the RNA.



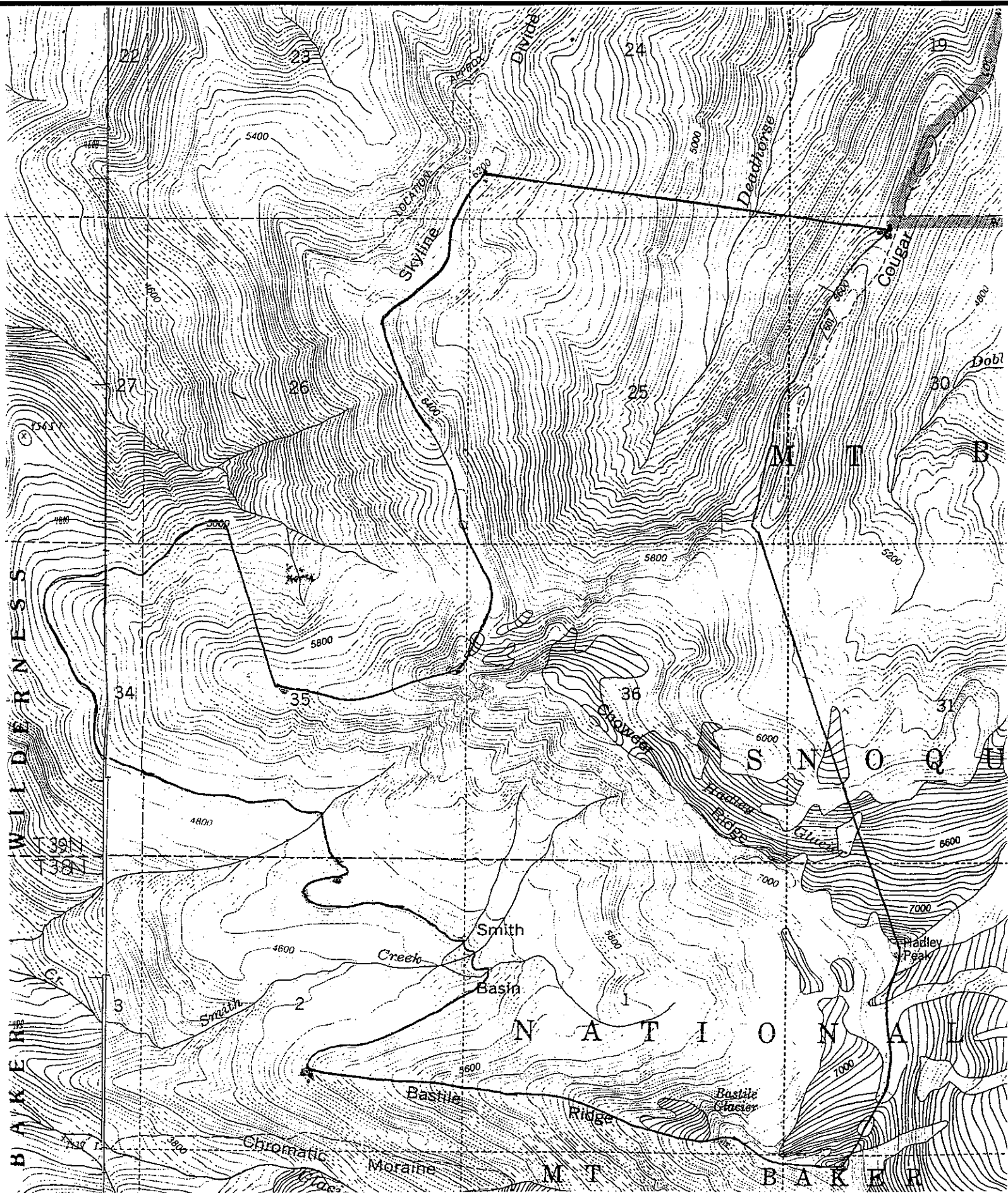


Figure 3. Boundary of Ronald J. Taylor RNA under Alternative C, superimposed on a 7.5 minute USGS topographic map.

CHAPTER 3

AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES

This chapter includes a brief description of the affected environment, focusing on the few issues raised by the public plus baseline information for those resources pertaining directly to the environmental consequences (including threatened, endangered, sensitive, and survey and manage plant and wildlife species). Please refer to the Draft Ronald J. Taylor RNA Establishment Record (Douglas, 2001) for a detailed description of the current conditions of the area.

This chapter also discloses the environmental consequences of implementing the alternatives, including direct, indirect, and reasonably-foreseeable cumulative effects. *Effects are highlighted in italics.*

Summary of General Topography, Geology, and Soils

As mentioned in Chapter 1, the recommended RNA contains all the landforms characteristically associated with the alpine zone. Elevations range from about 4,400 to 7,600 feet. The area is characterized by steep mountainous terrain carved from sedimentary and volcanic rocks by alpine glaciers. Ice spreading out from the advancing Puget Lobe of the Cordilleran Ice Sheet inundated the area below an elevation of 5,600 feet between about 16,000 and 10,000 years ago.

Chowder Ridge is named for the marine fossils (clams) found in the sedimentary rocks that make up the ridge. For more information, refer to the Establishment Record (Douglas 2001).

None of the alternatives is expected to have any direct, indirect, or cumulative effect on topography, geology, or soils of the recommended RNA.

Aquatics, Including Fish

The recommended Ronald J. Taylor RNA is located within the Nooksack River system, in the Upper North Fork Nooksack Watershed⁵— a Tier 1 Key Watershed, as per the Forest Plan. Key watersheds serve as refugia for at-risk anadromous salmonids and resident fish species. Watershed analysis for this area has been completed (USDA Forest Service 1995).

There is an extensive network of headwater streams throughout the recommended RNA, including portions of: Thompson, Smith, Upper Glacier, Deadhorse, and Dodd's Creeks, plus several unnamed streams. The aquatic habitat conditions are harsh. Stream channels are high gradient in character (extremely steep slopes, waterfalls, cascades, etc.) and many are actually avalanche chutes. Substrates are typically bedrock, with few areas for gravels to collect for spawning and aquatic insects. Water temperatures are expected to be very low during most of the year.

⁵ As per the 2000 Interagency re-mapping of fifth field watersheds in the State. This includes the earlier Glacier Creek, Lower North Fork Nooksack, and Upper North Fork Nooksack fifth-field watersheds.

No fish are expected to be found in the headwater streams within the proposed RNA due to the harsh aquatic habitat conditions.

In streams located immediately downstream from the RNA boundary, there are a number of anadromous and resident fish species: all five species of Pacific salmon, two species of anadromous trout, two species of anadromous native char, and a number of other native and non-native resident fish species are found in the North Fork Nooksack River basin. Puget Sound Chinook and Coastal-Puget Sound bull trout are federally listed as threatened. Coastal cutthroat trout and Puget Sound coho salmon are candidate species for listing.

A Biological Assessment for fish has been completed (Level 1 Team review on July 11, 2001), with a determination of "No Effect." Refer to the project files. Establishment of the Ronald J. Taylor RNA will not alter the breeding, sheltering, or migration of, and will have no effect on, any Sensitive, Threatened, or Endangered fish species, including Puget Sound Chinook and Coastal-Puget Sound bull trout. In addition, the action will have no effect on Essential Fish Habitat for Chinook, coho, and Puget Sound pink salmon covered under the Magnuson – Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act) as amended. Alternative A – No Action will have the same effects.

Consistency with the Aquatic Conservation Strategy

The 1995 North Fork Nooksack Watershed Analysis included a preliminary assessment of consistency of this project with both Forest Plan standards and guidelines and the objectives of the Aquatic Conservation Strategy—a key element of the 1994 ROD. The Strategy was developed to restore and maintain the ecological health of watersheds and their aquatic ecosystems on public lands. The preliminary assessment concluded that most specific key watershed and riparian reserve standards and guidelines were not applicable to this project—which is formal establishment of the Ronald J. Taylor RNA. *Therefore, both the no action alternative and alternatives that would formally establishing the RNA would be at least neutral and would maintain existing conditions for each of the nine objectives of the Aquatic Conservation Strategy.*

Threatened, Endangered, Sensitive, Survey & Manage Plants

There are no known Threatened or Endangered plants on the entire Mt. Baker-Snoqualmie National Forest. *Implementing any of the three alternatives would have no direct, indirect, or cumulative effects on Threatened or Endangered Plants.*

There is one known Survey and Manage species in the Ronald J. Taylor RNA (the lichen *Lobaria linita*). *There would be no direct effect on Lobaria linita from implementation of Alternatives A, B, or C, and no indirect or cumulative effects from No Action. Implementing either of the action alternatives would likely result in no indirect or cumulative effects in the foreseeable future. Despite the potential attraction of an established Research Natural Area to various users, forest specialists—at this time—estimate that additional use this far up on the ridge is not expected to be significant, regarding impacts to Lobaria linita. In addition, standards and guidelines already in place for MA 18, Research Natural Area, including discouraging recreation use, avoiding publicity of special*

features of the RNA, and prohibiting on-site interpretation would mitigate these potential indirect or cumulative effects under Alternatives B or C. See Appendix A for S&Gs.

Two species of rare vascular plants have been documented around Chowder Ridge: *Aster sibiricus* var. *meritus* (Siberian aster) and *Gentiana glauca* (glaucous gentian). Both are listed sensitive species by the 1997 Washington Natural Heritage Program. They are also listed on the 1999 USFS Regional Forester's Sensitive Species List. *There would be no direct effect on these rare plants from implementation of Alternatives A, B, or C, and no indirect or cumulative effects from No Action. Implementing either of the action alternatives would likely result in no indirect or cumulative effects in the foreseeable future.*

Despite the potential attraction of an established Research Natural Area to various users, forest specialists—at this time—estimate that additional use this far up on the ridge is not expected to be significant. In addition, standards and guidelines already in place for MA 18, Research Natural Area, including discouraging recreation use, avoiding publicity of special features of the RNA, and prohibiting on-site interpretation would mitigate these potential indirect or cumulative effects under Alternatives B or C. See Appendix A for S&Gs.

Note that any possible future management actions—analyzed as a result of findings from the monitoring plan yet to be prepared—are not within the scope of this EA or decision, and would require additional analysis pursuant to all applicable laws and regulations (NEPA, NFAM, ESA, NHPA, etc.).

A total of 200 lichen species were collected on Chowder Ridge, and listed by Ryan (1985); 45 of these species are considered new to Washington State. The Washington Natural Heritage Program considered them rare for the state, but the species have no designated status. Spence (1986) listed the bryophytes of the area. Three of the documented species (*Dicranum muelenbeckii*, *Mnium arizonicum* and *Racomitrium microcarpon*) are new to Washington and are considered to be rare for the state by Washington Natural Heritage Program. Again, they have no designated status. *Implementing any of the three alternatives would have no direct effect. As for rare plants, in-place standards and guidelines are likely to mitigate any potential indirect or cumulative effects of implementing Alternatives B or C.*

Other Plant Communities

The *krummholz* plant communities, or clumps of dwarfed tree species, are generally found in the lower part of the alpine zone, along the southern flanks of the ridge. (Refer to the Draft Establishment Record for more detailed information.) Forest specialists have observed some human damage to these species, particularly near dispersed campsites (e.g. fire rings) along the rounded ridge past the Cougar Divide trail #601. However, with no RNA Management Plan in place, and no funding for monitoring, there has been no specific monitoring of actual conditions or measurement of any change from a baseline. (Currently, regulations for the Mt. Baker Wilderness prohibit the use of campfires within 1 mile of the Skyline Divide Trail.)

There would likely be no change in these effects under Alternative A – No Action, despite existing S&Gs for MA18 that could be instituted to mitigate any impacts. Under Alternatives B and C, there

would be no direct adverse effects from formal establishment. Establishment under Alternative C, even more than Alternative B, would directly result in development of a Management Plan, and likely funding for Monitoring. The adjusted boundaries described in Alternative C include more of Chowder Ridge and the alpine vegetation community—a key value of the RNA. The Alternative C boundaries also more closely follow ridgelines, peaks, and other obvious geographic features, and could be reasonably followed on the ground.

If Alternatives B or C were implemented, any potential indirect and cumulative effects from more interest/use in the RNA would likely be mitigated through the RNA Management Plan and a funded monitoring plan. With monitoring results, enforcement of standards and guidelines already in place for MA 18, would be more likely if use (or future use) were found to be interfering with preservation of the special biological/physical features of the Chowder Ridge area. See Appendix A for S&Gs.

Note that any possible future management actions—analyzed as a result of findings from the monitoring plan yet to be prepared—are not within the scope of this EA or decision, and would require additional analysis pursuant to all applicable laws and regulations (NEPA, NFAM, ESA, NHPA, etc.).

Wildlife Species

Threatened and Endangered Wildlife

A Biological Assessment has been completed (Level 1 team review on July 11, 2001), with a determination of “No Effect.”

There is no potential habitat for:

- Oregon spotted frog
- Bald eagle
- Gray wolf (ungulate populations too low to provide potential habitat)
- Canada Lynx (nearest occupied habitat is 35 miles east of recommended RNA)
- Marbled murrelet (recommended RNA above 3,500' elevation)
- Northern spotted owl (recommended RNA is located in the mountain hemlock forest, subalpine, and primarily alpine zone, with no nesting habitat)

The proposed RNA is located in the Nooksack grizzly bear management unit. This unit is not believed occupied at present. Both the Cougar Divide Trail #601 and Skyline Divide Trail #678 qualify as “high use trails.”⁶ The system trail on Skyline Divide terminates west of the recommended RNA boundary (both Alternatives B and C) and only the last short segment of the Cougar Divide trail is located within the boundary. However, the area within 0.3 miles of high use trails is not considered grizzly bear core habitat, thus portions of the recommended RNA do not contain core habitat. *At present, there is no indication that recreation use is incompatible with the RNA. As a result, the creation of the Ronald J. Taylor RNA is expected to have no effect on grizzly bears or grizzly bear habitat.*

⁶ Definition by the Interagency Grizzly Bear Committee, which equates to 15 parties of people per week.

Regional Forester's Sensitive Animal Species, Survey and Manage Wildlife

Habitat for Larch Mountain and Van Dyke's salamanders is not believed to extend north of Highway 2, *therefore implementation of any of the alternatives would have no direct, indirect, or cumulative effects on these species.*

There is no potential habitat for the following; *implementation of any of the alternatives would have no direct, indirect, or cumulative effects on these species.*

- Common loon
- Peregrine falcon
- Townsend's big-eared bat (the area is too high in elevation)

Potential habitat for wolverine does exist within the recommended RNA (Douglas 2001). *However, no impacts are expected with implementation of any of the alternatives, since there would be no change in access and no change in habitat.*

Management Indicator Species

The area is too high in elevation to provide winter habitat for deer and elk; *therefore, no impacts are expected for wintering deer and elk.*

The area does contain occupied habitat for cavity nesting birds (including pileated woodpecker), and for pine marten—though with changes in forest management as a result of the 1994 Plan amendment (Northwest Forest Plan), cavity nesting birds and pine marten are now considered secure and are likely no longer good management indicator species. *Since there would be no change in access or habitat modification under No Action, or from formal establishment under Alternatives B or C, none of the alternatives are expected to have any impact on cavity nesting birds (including pileated woodpecker) or pine marten.*

The recommended Ronald J. Taylor RNA also contains occupied habitat for mountain goat. Mountain goat populations have declined, in general, for the past several decades, but appear to be increasing around Mt. Baker. *Since there would be no change in access or habitat modification under No Action, or from formal establishment under Alternatives B or C, none of the alternatives are expected to have any impact on mountain goat.*

Neotropical Migratory Birds

Despite its elevation, the recommended Ronald J. Taylor RNA contains habitat for a variety of neotropical migratory bird species, who visit the ridgetops on their way south. Some species include the Rufous hummingbird, various fly catchers, hermit thrushes, and more. *Under any of the alternatives, there would be no direct change to habitat, thus no expected direct effects to neotropical migratory bird species. If Alternatives B or C were implemented, any potential indirect or cumulative effects—changes in human use from more interest/use in the RNA—would likely be mitigated through the RNA Management Plan and a funded monitoring plan. With monitoring results, enforcement of standards and guidelines already in place for MA 18, would be more likely, than under Alternative A – No Action.*

Note that any possible future management actions—analyzed as a result of findings from the monitoring plan yet to be prepared—are not within the scope of this EA or decision, and would require additional analysis pursuant to all applicable laws and regulations (NEPA, Washington Wilderness Act, NFMA, ESA, NHPA, etc.).

Recreation

Present recreational use within the recommended Research Natural Area is in the form of non-system, user-made trails and climbing routes up Hadley Glacier. As shown in Figure 1, and mentioned above, there are two existing system trails that access the area: Skyline Divide Trail # 678, which terminates west of the recommended RNA boundary (all alternatives), in about Section 26, T39N, R7E. and Cougar Divide Trail #601, which follows the divide east of the area and also terminates outside the RNA boundary.

The Skyline Divide trail is usually snow-free by mid-to-late July until early October. Cougar Divide is generally snow-free from early August to early October.

The Forest Plan distinguishes between four trail visitor use categories. These are *low, medium, heavy, and extra heavy*. Visitor use is "*heavy*" for Cougar Divide trail (a total of 3-5,000 visitors per year) and "*extra heavy*" for Skyline Divide (up to 8,000 per year); however, there are few overnight stays, due to lack of camping sites (Hazelet, personal communication). Forest specialist's experience finds that most visitors do not continue along the user-made trails into the recommended RNA—and it remains relatively undisturbed. Hikers and climbers who do continue on generally follow the rounded ridge-top. Hikers on Cougar Divide trail encounter a trail that is not well maintained. Users often camp at the saddle where the system trail ends (just inside the recommended boundary) and never make the climb up to Chowder Ridge (Potash, personal communication). Hadley Peak (elevation 7,517 feet), a high point on Chowder Ridge, receives moderate use. Access is usually via the Bastille Ridge climber's route (Beckey 1981). Overall, the recreation use that the area currently receives has not resulted in significant adverse effects on the biological/physical values for which the RNA was recommended.

There would be no direct effect on recreation use under Alternative A -- No Action. There would likely be few or no indirect or cumulative effects, even if recreation use increased and RNA values were impacted. Existing Wilderness Management Regulations are in place that could be enforced to protect the natural features of this area, if funding for field patrols was available. In addition, Forest Plan S&Gs could be instituted to mitigate any future impacts, as use increases—including discouraging recreation use, avoiding publicity of special features of the RNA, and prohibiting on-site interpretation—but without an RNA Management Plan and monitoring plan in place (plus funding), enforcement of these S&Gs, if needed, is less likely.

Under Alternatives B and C, there would be no direct effect on recreation use from formal establishment. However, establishment under either of the action alternatives would result in development of a Management Plan, and likely funding for monitoring. With monitoring results, enforcement of standards and guidelines already in place for MA 18, would be more likely if use (or future use) were found to be interfering with preservation of the special biological/physical features of the Chowder Ridge area. (See Appendix A for S&Gs.) There would be little difference between

Alternatives B and C, because the slightly smaller RNA boundary for Alternative B still includes most of the ridgetop routes that most hikers/climbers follow.

Note that any possible future management actions analyzed as a result of findings from the monitoring plan yet to be prepared—are not within the scope of this EA or decision, and would require additional analysis pursuant to all applicable laws and regulations (NEPA, Washington Wilderness Act, NFMA, ESA, NHPA, etc.).

Cultural Resources

The establishment of a research natural area at Chowder Ridge meets the conditions listed in Appendix A of the *Programmatic Agreement Regarding Cultural Resources on National Forests in the State of Washington: Types of Undertakings Excluded from Case-by-Case Review* (Advisory Council on Historic Preservation, 4/17/97). It falls under category Other, 1): Special land use designations which do not authorize surface-disturbing projects (...Research Natural Areas, etc.) and has little or no potential to affect historic properties (USDA Forest Service 1997). Refer to the project file.

General RNA Values and Management

As discussed in various resource sections above, No Action would result in no RNA Management Plan or a funded Monitoring Plan. Without these documents, Forest Service staff have no firm baseline from which to measure changes (positive or adverse) on the biological and physical characteristics of the Ronald J. Taylor RNA. With monitoring results, enforcement of standards and guidelines already in place for MA 18, would be more likely if use (or future use) were found to be interfering with preservation of the special biological/physical features of the area.

Implementation of either Alternatives B or C—formally establishing the Ronald J. Taylor Research Natural Area—would formalize the goals and objectives for the area and provide a more permanent management commitment to protection of this area.

Alternative C, if implemented, would result in an established RNA that better protects the key values—an alpine community mosaic with krummholz tree groups—for which this area was recommended as an addition to the national system. The boundaries of Alternative C include more of Chowder Ridge and the alpine vegetation community of concern. Implementation of this alternative would better meet the intent of the Forest Plan.

Management of the Ronald J. Taylor RNA would be facilitated if Alternative C were implemented, because the boundaries more closely follow ridgelines, peaks, and other obvious geographic features, and can be reasonably followed on the ground, compared to Alternative B.



Other Effects

There would be no effects, under any alternative, to: consumers, civil rights, minority groups or women; prime farmland, rangeland or forest land; or flood plains or wetlands. The continued management as a recommended RNA (no action) or formal establishment as an RNA would not result in any irretrievable or irreversible commitment of resources.

REFERENCES CITED

- Beckey, F. 1981. Cascade Alpine Guide – Climbing and High Routes, Rainy Pass to Fraser River. The Mountaineers. Seattle, WA.
- Douglas, G. 2001. Establishment Record for the Ronald J. Taylor Research Natural Area. Contract # 43-05M6-1-0068. Mt. Baker-Snoqualmie National Forest. Mountlake Terrace, WA.
- Dyrness, C., J. Franklin, C. Maser, S. Cook, J. Hall, and G. Faxon. 1975. Research Natural Area Needs in the Pacific Northwest – a contribution to land use planning. Pacific Northwest Forest and Range Experiment Station, Portland Oregon.
- Hazelet, Leif. Trails/winter sports specialist, Mt. Baker Ranger District, Mt. Baker-Snoqualmie National Forest. Personal communication, November 2001.
- Potash, Laura. Botanist, Mt. Baker-Snoqualmie National Forest. Personal communication, November 2001.
- Ryan, B. 1995. Lichens of Chowder Ridge, Mt. Baker, WA. Northwest Science 59: 270-293.
- Taylor, R. and G. Douglas. 1978. Plant ecology and natural history of Chowder Ridge, Mt. Baker: a potential alpine research natural area in the western north Cascades. Northwest Science, Vol. 52, No. 1.
- USDA Forest Service 1990a. Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan.
- USDA Forest Service 1990b. Record of Decision, Land and Resource Management Plan, Mt. Baker-Snoqualmie National Forest.
- USDA Forest Service 1990c. Final Environmental Impact Statement, Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan.
- USDA Forest Service. 1992. Washington Office white paper on RNA establishment, September 4, 1992.
- USDA Forest Service. 1995. Watershed Analysis, North Fork Nooksack River, Mt. Baker Ranger District, Mt. Baker-Snoqualmie National Forest.
- USDA Forest Service. 1997. Project review for heritage resources, under the terms of the Programmatic Agreement between ACHP, Washington State Historic Preservation Officer and USDA Forest Service Region 6. USDA Forest Service, Portland OR.
- USDA Forest Service, USDI BLM 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.

USFS Regional Forester's Sensitive Species List 1999

Washington Natural Heritage Program. 1997. Endangered, Threatened and Sensitive Vascular Plants of Washington – with Working Lists of Rare Non-Vascular Species. Department of Natural Resources. Olympia. 62 p.