

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Establishment Record

For

GUNJUWACZTOLD RESEARCH NATURAL AREA

Mt. Hood National Forest

Hood River and Wasco Counties, Oregon



RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Gumjuwac/Tolo Research Natural Area
Mt. Hood National Forest, Barlow Ranger District
Hood River and Wasco Counties, Oregon

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

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TITLE PAGE

**Establishment Record
for
Gumjuwac-Tolo Research Natural Area
Mt. Hood National Forest
Hood River and Wasco Counties, Oregon**

INTRODUCTION

The USDA Forest Service establishes Research Natural Areas to:

1. Preserve a representative array of all significant natural ecosystems and their inherent processes.
2. Use these areas to obtain information about the structure, composition, and function of natural systems, and to make comparisons with managed systems.

In Oregon, the USDA Forest Service works with the Oregon Natural Heritage Program to identify representative examples of native ecosystems through scientific inventory, and to protect the natural values of these ecosystems for future generations (ONHP, 1993).

The Gumjuwac-Tolo RNA provides examples of a wide variety of forested and subalpine types characteristic of the eastern slope of the Cascades. It contains a broad elevational spectrum of forest types, from dry Douglas-fir climax stands at low elevations, through more moist grand fir types at middle elevations, to Pacific silver fir, mountain hemlock and whitebark pine sites at upper elevations. Nonforest and riparian types are also represented. The RNA contains two entire stream drainages, and encompasses areas within which a diversity of ecological processes occur, including periodic fires and insect infestations. Steep, smooth to dissected mountain slopes are the characteristic landforms.

LAND MANAGEMENT PLANNING

The Gumjuwac-Tolo area was proposed for establishment as a Research Natural Area (RNA) through the Mt. Hood Land and Resource Management Plan (USDA 1990), based on recommendations of the Region 6 RNA Committee and the Oregon Natural Heritage Plan. It is located wholly within the congressionally-designated Badger Creek Wilderness Area, but was proposed prior to creation of the Wilderness Area.

The RNA was proposed to meet unfilled cell needs for the following ONHP categories:

- * First to third-order stream system in subalpine zone
- * Grand fir-Engelmann spruce/Starry solomon plume plant association
- * Grand fir/Skunkleaf polemonium plant association

OBJECTIVE

The goal of Research Natural Areas as stated in the Mt. Hood Land and Resource Management Plan is to "preserve examples of natural ecosystems in an unmodified condition for research and education purposes and to provide areas to serve as a baseline against which human impacts on natural systems can be measured."(USDA, 1990, Four-143)

The primary objective for the Gumjuwac-Tolo RNA is the protection of the natural elements and processes which produce the mixed conifer forests and stream systems typical of the east slope of the northern Oregon Cascades. As stated above, this area was specifically selected to represent the Grand fir-Engelmann spruce/starry solomon plume and Grand fir/skunk-leaved polemonium plant associations and to include two perennial streams - Gumjuwac and Tolo Creeks - in their entirety. The area will also serve as a site in which ecological processes (drought, insect infestation, wind, fire, etc) can be studied in a natural system. The RNA will also serve to maintain genetic diversity without the influence of non-native species or non-local ecotypes.

JUSTIFICATION

The Gumjuwac-Tolo area has been recommended by both the Pacific Northwest Region Research Natural Area Committee, and the Oregon Natural Heritage Advisory Council as a site which represents one aquatic and two terrestrial ecosystem elements: First to third order stream system in subalpine fir zone; the Grand fir-Engelmann spruce/starry solomon plume (*Abies grandis*-*Picea engelmannii*/*Smilacina stellata*) plant association; and the Grand fir/skunkleaf polemonium (*Abies grandis*/*Polemonium pulcherrimum*) plant association (ONHP, 1993). This recommendation was carried forward by the Mt. Hood Land and Resource Management Plan which proposes RNA designation for the Gumjuwac-Tolo area (USDA, 1990).

In the 1993 Oregon Natural Heritage Plan, the Oregon Natural Heritage Advisory Council noted the need to designate a set of natural areas that represent ecosystem processes as well as specific elements (ONHP, 1993). At least two such processes, drought and insect infestation, are currently well-represented within the RNA. In addition, as a result of topography, climate, plant communities, and fuel conditions, fire will inevitably occur periodically within the RNA, providing an opportunity for study of another key ecological process.

PRINCIPAL DISTINGUISHING FEATURES

Several subalpine plant communities are found on the upper slopes of the area, along with numerous basalt outcrops. Windswept stands of whitebark pine (*Pinus albicaulis*) and krumholz subalpine fir (*Abies lasiocarpa*) occupy the high ridge along the northern edge of the RNA. Whitebark pine within the RNA is physically and perhaps genetically isolated from populations on Mt. Hood, although seed may be dispersed between populations by Clark's nutcrackers (*Nucifraga columbiana*). High elevation pine/fir "islands" are interspersed with dry, exposed areas dominated by shrubs, forbs and sedges. At least three stands of quaking aspen (*Populus tremuloides*) have been found in high elevation wet areas.

The forest overstory at the mid and lower slopes is dominated by Engelmann spruce, western larch (*Larix occidentalis*), western white pine (*Pinus monticola*), grand fir, subalpine fir, and Pacific silver fir (*Abies amabilis*). At the lower elevations, Douglas-fir (*Pseudotsuga menziesii*) and grand fir are dominant species. Large ponderosa pine (*Pinus ponderosa*) individuals occur from the eastern end of the main ridge system down to Badger Creek. Grand fir is a common

regenerating species in much of the area, but Pacific silver fir and noble fir (*Abies procera*) dominate the understory in some places. Rocky, exposed sites support sparse Douglas-fir and ponderosa pine or grass/forb openings. A variety of size classes and community types are found throughout the area.

Two perennial stream drainages (Gumjuvac and Tolo Creeks) and numerous unnamed intermittent tributaries are included in their entirety. Western redcedar (*Thuja plicata*), mountain hemlock (*Tsuga mertensiana*), and western hemlock (*Tsuga heterophylla*) grow along streams and seeps, with a diverse, sometimes lush, forb/fern understory. Small (less than 3 acres) shrubby wetlands dominated by alder (*Alnus sitchensis*, *A. incana*) are scattered along the middle and upper slopes of the area.

Most of the RNA contains vegetative types that are adapted to relatively frequent disturbances. Drought followed by spruce budworm infestation has initiated successional changes in middle and lower slope forests. Root disease and blister rust are active in several locations. Standing dead trees are common in these areas and sufficient light reaches the forest floor to encourage growth of early seral understory species, such as fireweed (*Epilobium angustifolium*), bracken fern (*Pteridium aquilinum*), thistle (*Cirsium* spp), and Columbia brome (*Bromus vulgaris*). Despite the activity of these natural disturbance elements, most of the area is within its range of natural conditions (Boehm et al. 1995).

LOCATION

The Gumjuvac-Tolo RNA is located wholly within the Mt. Hood National Forest and also within the boundaries of the Badger Creek Wilderness. The lands adjacent to the RNA are also part of the Mt. Hood National Forest. Areas to the north, south, and east of the RNA are a part of the Badger Creek Wilderness and those to the west are outside of the wilderness, in the Hood River Ranger District.

Boundary

The Gumjuvac-Tolo RNA lies within Township 3 South, Range 10 East, Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 24, and Township 3 South, Range 11 East, Sections 7, 18, and 19, Willamette Meridian, on the Barlow Ranger District of the Mt. Hood National Forest, Hood River and Wasco Counties, State of Oregon.

Appendix A contains the surveyor's description of the boundary of the Gumjuvac-Tolo RNA. The boundaries of the Gumjuvac-Tolo RNA are within the range of latitudes 45° 16' to 45° 21', and the range of longitudes 121° 27' to 121° 33'.

Area

The total area of the Gumjuvac-Tolo RNA is 3600 acres (1400 hectares).

Elevation

The elevation of the RNA ranges from 3200 feet (975 meters) on Badger Creek in the southeast corner, to 6225 feet (1898 meters) atop Lookout Mountain.

Access

Maps 1, 2 and 3 show the location of and access routes to the RNA.

From Highway 35 (Hood River and points west): Drive ca. 30 miles south on Oregon Hwy. 35 from Hood River, OR to junction with Forest Road 44 (about 1.5 miles north of Sherwood Campground). To reach the west half of the RNA, follow Rd. 44 east to Rd. 4410, then continue south on Rd. 4410 to the Lookout Mtn. Trailhead (Trail 493) at High Prairie. Follow Trail 493 to Lookout Mtn. (stay to the east side of the loop for the easiest, shortest route). The RNA can be accessed at this point from trail 458, and much of the area can be viewed from the old lookout site.

To reach the eastern portions of the RNA, continue east on Rd. 44 to Rd. 4420. Follow Rd. 4420 south about 2 miles to its junction with Rd. 2730. Stay right, and continue south on Rd. 2730 to spur road 2730-200 (with sign indicating Flag Point Lookout). Take Rd. 2730-200 south to Trailhead for Trails 458 and 477.

From Highway 197 (The Dalles, and points east): Drive 13 miles south from The Dalles on U.S. Hwy. 197 to the town of Dufur. From Dufur, follow Forest Road 44 west to the junctions with either Rds. 4410 or 4420. From either junction, directions are the same as above.

Maps

The Gumjuwac-Tolo RNA is covered by two USGS 7 1/2-minute quadrangle maps: Badger Lake and Flag Point. The Mt. Hood National Forest Recreation Map shows access routes, but does not show the boundaries of the RNA.

Aerial Photographs

The RNA can be seen on the following 1995-series aerial photographs, located at the Mt. Hood National Forest Supervisor's Office in Sandy, Oregon:

<u>Flight Line</u>	<u>Photo #</u>
53	995-26, 27, 28
54	1095-28, 29, 30
55	1095-81, 82, 83
56	1095-139, 140, 141, 142, 143, 144
57	1195-25, 26, 27

AREA BY TYPES

Society of American Foresters (SAF) and Kuchler cover types present in the Gumjuwac-Tolo RNA are listed in the following tables. SAF Cover types are depicted on Map 3.

Table 1. Society of American Foresters Cover Types within the Gumjuwac-Tolo RNA. (Eyre, 1980). Acreages are approximate.

TYPE #	DESCRIPTION	ACRES	HECTARES
208	Whitebark Pine	454	182
213	Grand Fir	2940	1216
205	Mountain Hemlock	176	30
227	Western Redcedar-Western Hemlock	30	12
	TOTALS	3600	1440

Table 2. Kuchler (1966) Types within Gumjuwac-Tolo RNA. Acreages are approximate.

DESCRIPTION	ACRES	HECTARES
Lodgepole Pine - Subalpine Forest (Pinus-Tsuga)	454	182
Silver Fir - Douglas-fir (Abies - Pseudotsuga)	3116	1246
Spruce - Cedar - Hemlock (Picea-Thuja-Tsuga)	30	12
TOTALS	3600	1440

The Society of American Foresters (SAF) Whitebark Pine type consists of high elevation subalpine plant communities. The SAF Grand Fir type is roughly equivalent to the Grand Fir Forest Series described by Topik et al. (1988). The SAF Mountain Hemlock type approximates the Pacific Silver Fir Forest Series described by Hemstrom et al. (1982), and the Western Redcedar-western Hemlock type resembles the Western Redcedar Forest Series described by Diaz et al. (1996).

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

The Gumjuwac-Tolo RNA occupies the north slope of the upper Badger Creek watershed,

reaching from Badger Creek upward to the ridgeline which divides Badger Creek from the Hood River and Fifteenmile watersheds. Overall, the RNA has a southern aspect, but numerous small stream valleys, level benches, and knolls interrupt the slope. Topography is especially complex in the eastern portion of the RNA, and all aspects are represented.

Climatic Conditions

The Gumjuwac-Tolo RNA lies within the rainshadow created by the high Cascades and experiences typical eastslope climate regime: hot, dry summers and mild, relatively wet winters. Elevation and aspect strongly influence temperature and effective soil moisture, as is illustrated by abrupt changes in plant community between north and south facing slopes, and between upper and lower elevations.

Various sources provide detailed weather information for the Gumjuwac-Tolo RNA. Daily weather data is available from NOAA Cooperative Stations in Parkdale, OR (ca. 11 NW of the RNA) and Friend, OR (ca. 11 miles E of the RNA). Automated data from these stations can be obtained from the Western Regional Climate Center in Reno, Nevada. Data from the Friend Station is summarized in Table 3. Summer weather data has been recorded daily for many years at Flag Point Lookout, on the northeast edge of the RNA. Data from the Wamic Mill Remote Area Weather Station (ca. 8 miles southeast of the RNA) can be obtained from The Mt Hood National Forest Supervisor's Office, Sandy, OR.

Table 3. Average Monthly Precipitation, Maximum Temperature, and Minimum Temperature for Friend, Oregon, from Nov, 1948 to August, 1976 (NOAA Cooperative Station).

MONTH	PRECIP (.01 inch) + STNDRD DEV	MAX TEMP (°F) + STNDRD DEV	MIN TEMP (°F) + STNDRD DEV
JAN	9.59 + 21	36.89 + 11	21.49 + 12
FEB	6.27 + 16	42.75 + 10	26.18 + 08
MAR	5.17 + 12	48.11 + 08	28.02 + 07
APR	2.64 + 09	56.52 + 08	31.88 + 06
MAY	2.67 + 10	65.42 + 10	37.41 + 08
JUN	2.21 + 08	73.10 + 10	43.06 + 08
JUL	0.61 + 05	81.94 + 11	47.84 + 09
AUG	1.17 + 06	79.09 + 15	46.82 + 10
SEP	1.57 + 17	73.02 + 12	43.16 + 08

Table 3. - cont'd.

OCT	4.11 ± 13	60.00 ± 10	35.96 ± 07
NOV	7.70 ± 19	44.71 ± 11	29.00 ± 09
DEC	9.70 ± 22	38.64 ± 10	24.57 ± 09

Fire and Weather Relationships

During summer and early fall, two distinct weather scenarios may occur in the area which contribute to the likelihood of wildfire in the RNA. In the first case, prolonged hot, dry weather may occur, and since much of the RNA lies within the thermal belt where relative humidity recovery at night is low, both fuel and weather conditions may rapidly become favorable to fire ignition and spread. Under these conditions, fires may burn actively during both day and night. In the second scenario, strong westerly winds occur; temperatures may drop, but air masses may lack sufficient moisture to quell fire activity.

Both conditions can cause erratic fire behavior (torching, crown fires, spotting ½ mile or more). The first scenario does not occur every year but tends to persist when it does occur. Under this set of conditions, fire responds to topography and spreads through uphill runs and by burning material rolling downslope. Such a fire will, over a period of days or weeks, typically back downhill and down canyon as well. A plume-dominated fire (one with such a high, strong column of heat that it generates its own wind and weather) may develop since general winds (distinct from fire-generated winds) are usually less than 10 mph. Plume dominated fire can spread in any direction.

The second scenario, that of dry west winds, occurs several times every year but usually only lasts one day at a time, one or more times a year. Badger Creek is oriented parallel to the prevailing wind direction, so winds are funneled and accelerated. Under this condition, fire is predominantly wind driven. A fire starting in the west end of the RNA would likely burn across the entire RNA in a matter of hours. The Rocky Burn, which lies south of the RNA, was wind driven and burned nearly its entire 7400 acres on the first day of the fire. Wind driven fires do little backing, except downhill, so areas west of fire origin would not likely burn from that particular event. When the wind dies, fire will respond to topography, as described above.

DESCRIPTION OF VALUES

Flora

(Note: the "Principal Distinguishing Features" section contains additional information about the vegetation of the Gumjuwac-Tolo RNA). The RNA harbors a diverse array of plant associations characteristic of a range of eastside Cascades conditions. Plant associations (potential climax vegetation types) range from subalpine fir (including whitebark pine) and mountain hemlock

associations at the highest elevations, to Pacific silver fir associations within the western portions, grand fir associations through the central and lower portions of the RNA, and Douglas-fir associations on dry, rocky areas in the eastern portion of the RNA. Plant associations within the RNA have not been mapped. Association descriptions for the area can be found in the following publications:

- * Plant Association and Management Guide for the Ponderosa Pine, Douglas-fir, and Grand Fir Zones, Mt Hood National Forest (Topik et al. 1988).
- * Plant Association and Management Guide for the Pacific Silver Fir Zone, Mt Hood and Willamette National Forests (Hemstrom et al. 1982).
- * Riparian Ecological Types, Gifford Pinchot and Mt Hood National Forests and Columbia Gorge National Scenic Area (Diaz et al. 1996).

There are no known threatened, endangered or sensitive plant species within the RNA. Suitable habitat for sensitive grapefern (*Botrychium*) species may be present in western redcedar wetlands.

Appendix B contains a list of plants that have been identified within the Gumjuwac-Tolo RNA.

The vegetation of the Gumjuwac-Tolo RNA is strongly influenced by fire (Evers and others, in press). While it is not clear whether the RNA has experienced fires ignited by American Indians or by sheepherders attempting to maintain high elevation pastures (such practices are known to have occurred in similar areas), the role of natural fire is considered to be significant. A theoretical, characteristic fire regime would be expected to occur as shown below:

<u>YEAR</u>	<u>EVENTS</u>
0	Large, high intensity fire that burns most or all of the RNA.
10-50	Reburn(s), most likely on drier, westerly slopes.
50-100	Low intensity fires, if any. Some insect and disease activity.
100	Moderate intensity (or mixed intensity) fire burns ca. 200 - 500 acres, creating vegetative mosaic.
100-150	Low intensity fires, possibly some small (< 100 acre) moderate intensity fires. Insect and disease activity begins to increase with some outbreaks.
150-200	High levels of insect and disease activity. Outbreaks common and widespread, lasting several years. Tree mortality increases. Fuel bed builds rapidly as stands collapse.
200-250	Large, high intensity fire burns most or all of the RNA.

Vegetation changes (coupled with climate cycles) drive fire, insect, and disease activity. In years 1-150 early seral, fire resistant species tend to dominate the forest canopy, although less fire

tolerant species are also present. After about 150 years, late seral, less fire resistant species begin to dominate (e.g. grand fir, Pacific silver fir).

An exception to this pattern would occur in areas dominated by whitebark pine, along the north and west edge of the RNA. The stand replacement cycle is probably longer than 300 years in this area due to the short fire season, and sparse vegetation.

Vegetation and fuel accumulations within most of the Gumjuwac-Tolo RNA are within the range of natural conditions. Dry grand fir and Douglas-fir communities in the eastern third of the RNA may have higher than normal fuel accumulations at this time due to long absence of fire. Large scale insect/disease mortality are normal, if periodic, phenomena in this portion of the Badger Creek Wilderness. The RNA naturally cycles through a variety of seral stages and it is not likely that management activities could prevent this cycle from progressing.

During a stand replacing event there would be areas that escape fire. Surviving unburned and lightly burned patches as well as scattered, individual survivors in the main burn would reseed the area. Natural regeneration could occur quickly or slowly depending on burn severity, post-fire weather (i.e. in the ensuing 1-5 years), and location in the climate cycle (beginning, middle, or end of a wet or dry period).

Given the structure, composition, and natural processes that exist in the area, the Gumjuwac-Tolo RNA would provide an excellent opportunity to study recovery rates and successional stages after a stand replacing fire.

Fauna

One historic (last observation made in 1981) northern spotted owl (*Strix occidentalis*) activity center lies near Gumjuwac Creek. Some suitable nesting, roosting, and foraging (NRF) habitat remains in riparian areas but drought and insect outbreaks have killed many trees in upland areas. The amount of spotted owl NRF habitat in the RNA is decreasing as the forest canopy becomes more open.

A single peregrine falcon (*Falco peregrinus*) was observed near Lookout Mtn. in 1996. If an eyrie is located then a management plan may be called for.

A list of wildlife species known or suspected to occur in the RNA is included in Appendix C.

Geology

Map 4 shows geologic types found in the Gumjuwac-Tolo RNA. The landscape character of the RNA is a direct result of its geologic history and the geologic processes operating there.

The area is underlain by seven volcanic bedrock units. The oldest of these are two sequences of lava flows of the Columbia River Basalt Group (Tcgn2, Tcwf). Columbia River Basalt flows flooded this area about 15 million years ago, originating from fissures in eastern Oregon. These

flows probably underlie the entire RNA.

About 8 million years ago a series of andesite lava flows and breccia flows covered the western part of the area (Taef). Within a million years another thick series of lava flows, this time of rhyolite composition (Trgd), covered the eastern half of the area. Some time later both of these units and the Columbia River Basalt flows were subjected to enough heat to alter and weaken the rocks considerably.

Between 4 and 3 million years ago several small volcanoes near the Cascade Crest produced more andesite lava flows and pyroclastic flows (Trbg, Taft). The last major eruptions in this area were at the Lookout Mountain volcano. Extensive andesite flows (Tlma) covered the older volcanic rocks to the north and perhaps to the south as well.

Since that time fluvial and glacial erosion have carved the existing canyons and gullies. During the most recent glaciation, about 20,000 years ago, a large valley glacier developed in Badger Creek valley. A tributary glacier developed high on the slopes east of Gunsight Butte. Evidently the snowfall, elevation, and aspect at these locations were conducive to year-round snow and glacial ice formation. The more protected Badger Creek valley glacier grew larger and lasted longer than the Gunsight Butte glacier and modified the Badger Creek valley into a classic mountain glacier valley, with a cirque lake at its head. The tributary glacier was unable to erode as quickly and left an unorthodox-looking hanging valley. The combined glacier probably stopped near the confluence of Tolo Creek and Badger Creek. The valley walls modified by these glaciers are smoother, with less local relief, than those hillsides not modified by glaciers. Glacial till deposits (Qg) cover the lower valley slopes and valley bottoms.

Before and after the period of glaciation, fluvial erosion has been active. The altered bedrock units (Tcgn2, Tcwf, Taef, Trgd) have been the most easily eroded and as a result, the hillsides underlain by these units have a high density of deeply incised drainages. Ridges and hillsides underlain or capped by the unaltered and more resistant bedrock units (Trbg, Taft, Tlma) are generally steeper, higher, and have lower drainage densities.

Two large ancient landslides (Qls) occur within the RNA. Their occurrence is perhaps related to the melting of the glacial ice and the subsequent removal of support from the valley walls or perhaps to large magnitude earthquakes. The landslide deposits form landforms that are more poorly-drained and have lower overall slope gradients than the surrounding hillsides.

Colluvial fan deposits (Qf) have accumulated over thousands of years from the extensive surface erosion, debris flows, and debris slides occurring on these hillslopes. Accumulation rates have been greater from the altered bedrock terrain. Colluvial fan deposits probably existed along the base of the entire valley wall but were removed west of Tolo Creek by the glacier.

Freeze-thaw action and gravity have created many small areas of talus and one mappable unit.

Soils

Soils in the Gumjuwac-Tolo RNA are classified and described in the Mt. Hood Soil Resource Inventory (SRI) (Howes, 1979) and can be seen on Map 5. The soils within the RNA are primarily formed from glacial till, varying in the degree of steepness. Inclusions of poorly-drained wetland soils, rock outcroppings and talus occur.

Lands

The Gumjuwac-Tolo RNA is located entirely within the Mt. Hood National Forest, and also the Badger Creek Wilderness Area. No outstanding mineral rights or claims exist within the RNA.

Cultural Resources

Cultural resource data on 13 sites was acquired from surveys of areas with a high probability of human use.

No data on actual dates of prehistoric use is available at the surface. Prehistoric objects that have been located, primarily projectile points, are of types that were used over long periods of time, and so cannot be accurately dated. The evidence suggests use of the RNA and surrounding areas by American Indians travelling to destinations beyond the RNA, as was typical in steep terrain. Evidence within individual sites suggests the sites were used for short periods of time for camping, during which stone tool production and refurbishment took place. Two sites contain deliberately stacked rock structures; these are of unknown date, cultural affiliation, and function.

There are two historic structures in the area, a fire lookout and the remains of a log cabin; both are outside of the RNA boundary and are associated with Lookout Mountain. The fire lookout was built by the USDA in 1930; only the cement foundation exists today. The remains of the log cabin are located at High Prairie, just north of Lookout Mountain, built in 1907 by USDA Ranger J. B. Senecal. This cabin was reportedly used as a guard station and by local sheep herders from 1907 to the early 1940s. This structure has deteriorated over the years, and presently only a few corner timbers remain standing.

Other than possible surface collecting of cultural artifacts, no known sites associated with this area would be adversely impacted by the designation of the Gumjuwac-Tolo RNA.

IMPACTS AND POSSIBLE CONFLICTS

Mineral Resources

According to Bureau of Land Management records, there have never been any mining claims for locatable minerals within the Research Natural Area. The US Bureau of Mines considers this area to be a "less favorable or unknown" area for locatable minerals. Based on the historical record and the known geologic history, this area must be considered to have low potential for economic deposits of locatable minerals (USDI 1984).

There are no approved or currently pending leases for any leasable minerals within the RNA. Some oil and gas lease applications were applied for in the 1970's but were never approved and the lease applications were withdrawn by 1984. The US Bureau of Mines considers the entire area of the RNA to be a "less favorable or unknown" area for all leasable minerals. Considering the historical record for leasable minerals in the vicinity and the known geology of the RNA, the area must be considered to have low to moderate potential for oil, gas, and geothermal, and very low potential for coal and all other leasable minerals.

The RNA has never had any salable minerals removed. About half of the bedrock within the boundary is good quality material that is suitable for construction rock. Depending on the fracture density at a particular location, the rock could be processed to produce riprap, pit run, or crushed aggregate. No other salable minerals occur in economic quantities within the RNA. The area has a high potential for one salable mineral, construction rock, and a low potential for all others.

On February 26, 1984, an Act of Congress established the Badger Creek Wilderness. As part of that legislation the wilderness area was withdrawn from locatable mineral entry. The Gumjuwac-Tolo Research Natural Area is completely within the wilderness and is therefore withdrawn from future locatable mineral entry. Salable mineral development is presently prohibited within the RNA under the guidelines of the Mt. Hood National Forest Land and Resource Management Plan. This restriction is also expected to continue unchanged.

Grazing

Sheep herding occurred on High Prairie and Gumjuwac Saddle near the turn of the century, but did not continue past the early 1900's. No livestock grazing allotments exist within the area, and none will be proposed in the future due to Wilderness designation. Existing allotments on neighboring lands are separated from the RNA by long distances and steep topography, so livestock are not likely to stray into the RNA.

Timber

The Gumjuwac-Tolo RNA lies entirely within the Badger Creek Wilderness, in which timber harvest is not permitted. Therefore, RNA establishment does not affect the Mt. Hood National Forest's ability to contribute to the supply of timber.

Watershed

The Gumjuwac-Tolo RNA lies within a Tier 2 Key Watershed. Establishment of the RNA will not conflict with the watershed values of the area.

Recreation

Foot travel and equestrian use are discouraged within Research Natural Areas. Parts of Wilderness Trails 458, 417, 477, 479, and 480 lie within the RNA or along its border. These trails receive relatively light use and do not appear to detract from the natural values of the RNA. They also provide access to interior portions of the RNA which could assist researchers and

educators in examining remote sites. Recreation values are not considered to be in conflict with establishment of this RNA.

Wildlife and Plants

Establishment of this RNA will not alter the habitat or management direction for flora and fauna extant in the area. Establishment of the RNA will have no impact on or conflict with existing biological values.

Special Area Management

The Gumjuwac-Tolo RNA lies within the Badger Creek Wilderness Area. The goals of these two land allocations are compatible, as are their management prescriptions. Standards and Guidelines associated with Wilderness Area management shall take precedence over Research Natural Area Standards and Guidelines. No new wilderness trails are proposed within this portion of Badger Creek Wilderness, and existing trails do not significantly detract from the value of this site as a Research Natural Area. (USDA 1990, pp four-136 to four-150)

Transportation Plans

The Bennett Pass Road (Forest Rd. 3550) follows the northwest border of the RNA for a stretch of about 1.5 miles. A short stretch (ca. 1/3 mile) of Forest Road 2730-200 flanks the northeast edge of the RNA. No other roads lie within or adjacent to the RNA. Parts of wilderness trails 458, 417, 477, 479, and 480 lie within the RNA or along its boundary. These portions of road and trails receive relatively light maintenance and use, and do not conflict with establishment of this RNA. At present, Forest Roads 3550 and 2730-200 are rough roads, unsuitable for passenger vehicles. Upgrading either road would improve access to the RNA and could lead to increased use of trails in the area.

MANAGEMENT PRESCRIPTIONS

Management direction for Research Natural Areas, in the form of Standards and Guidelines, is provided by the Mt. Hood Land and Resource Management Plan (USDA, 1990) are summarized in Appendix D. Where Wilderness Area standards and guidelines are more restrictive, those management prescriptions are noted in Appendix D as well. Management recommendations specific to the Gumjuwac-Tolo RNA but not stated in the Mt. Hood Land and Resource Management Plan are also included. The highlights of management direction for the RNA are summarized below.

Wilderness Area Considerations

Use, whether for recreation or research, should not exceed estimated carrying capacity for the Badger Creek Wilderness, as measured in recreation visitor days. Encounters with other groups shall be limited to no more than 6 groups per day during 80% of the primary recreational use season. No more than one other campsite will be visible, or continuously audible, from any other site. Group size should not exceed 12 in any combination of people and livestock. Larger groups may be permitted under special permit.

Biophysical standards for wilderness areas shall be maintained. Campsites shall blend in with natural setting and should be set back 200 feet from streams, lakes, trails, and meadows; exposed mineral soil shall not exceed 25% of any particular site; ground vegetation should not be permanently injured (i.e., should be able to recover in two growing seasons).

Scientific studies and educational programs may occur provided they do not degrade wilderness values. Use of motorized or mechanized equipment, except small battery-powered-hand-held devices such as cameras, shall be prohibited unless authorized by the USDA.

Recreation

Use of dispersed recreation facilities and trails shall be discouraged if it would compromise research values. Trails which conflict with RNA values shall not be constructed or reconstructed except where needed to meet requirements for health and safety.

Biological Resources

Ecological processes, including natural infestations of insects, should be allowed to operate freely. Actions to control endemic insects or diseases should not be undertaken. If control measures are deemed necessary (i.e. as documented in an environmental assessment), biological control measures shall be considered. Any pest management actions considered shall be coordinated with PNW Research Station.

Representative plant communities which currently exist within the RNA shall be maintained. Habitat improvement or maintenance work should be consistent with management direction for both Wilderness and Research Natural Areas. Introduction of non-native plant species shall be prohibited. Vegetation management shall not be allowed unless part of an approved research project. Pesticide use shall be prohibited.

Timber harvesting and commercial gathering of forest products (i.e. mushrooms, medicinal plants) shall be prohibited within the RNA. Hazard trees may be cut or knocked down but should not be removed from the site. Firewood gathering shall be prohibited.

Travel and Access Management

In order to minimize disturbance to natural elements within the RNA, foot travel and equestrian use should be discouraged. No new trails should be constructed within the RNA and existing trails will be maintained to wilderness standards.

Fire Management

A fire management plan for the Badger Creek Wilderness Area, including the Gumjuwac-Tolo RNA, should be developed. This plan should enumerate objectives for both protection from and use of fire and should describe when and why specific fire management practices would be used. If parts of the Research Natural Area are assigned for eventual prescribed burning, they shall be described, as well as areas assigned for permanent protection from fire.

Prescribed fire may occur in the RNA, but the need for, and feasibility of, prescribed fire will be analyzed in the Badger Wilderness fire management plan. Naturally occurring ignitions should be managed as prescribed fire unless declared a wildfire. Human caused wildfires shall be suppressed. Unless required to provide protection to adjacent non-RNA acreage, fuels treatment shall not occur where the sole purpose of the project is fire hazard reduction.

Control of fire within Research Natural Areas shall be by methods that cause the least disturbance. Application of fire retardant or use of tractors should not occur. Preference should be given to fire suppression methods and strategies resulting in the least practicable area burned, commensurate with cost-effectiveness, and having the least effect on values in the RNA. Fire rehabilitation activities shall be consistent with RNA management direction.

ADMINISTRATION AND PROTECTION

Administration and protection of the Gumjuwac-Tolo RNA is the responsibility of the Mt. Hood National Forest. The District Ranger, Barlow Ranger District, has direct responsibility.

The Regional Forester is responsible for any studies or research conducted in the area. The director will evaluate research proposals and coordinate all studies and research conducted in the area with the District Ranger.

The Pacific Northwest Forestry Sciences Lab in Corvallis, Oregon is responsible for maintaining the Gumjuwac-Tolo RNA research file. A copy of the research data file will be maintained at the Forest Supervisor's Office, Sandy, Oregon.

All plant and animal specimens collected in the course of research conducted in the area will be properly preserved and maintained within the Mt. Hood National Forest herbarium and museum located at the Forest Supervisor's Office, Sandy, Oregon. A list of collections will be maintained with the research data files at the Pacific Northwest Forestry Sciences Lab, Corvallis, Oregon.

The Gumjuwac-Tolo RNA Establishment Record will be maintained at the Regional Office, Pacific Northwest Region, Portland, Oregon. Copies will be maintained at the following offices:

Forest Supervisor, Mt. Hood National Forest, Sandy, Oregon
District Ranger, Barlow Ranger District, Dufur, Oregon
Pacific Northwest Forestry Sciences Lab, Corvallis, Oregon.

Archiving

The Station Director shall establish and maintain a system for archiving data and reports from Research Natural Areas in a manner that will facilitate the exchange and transfer of information among Stations and scientists.

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APPENDIX A. Surveyor's Report

GUMJUWAC/TOLO RNA BOUNDARY DESCRIPTION

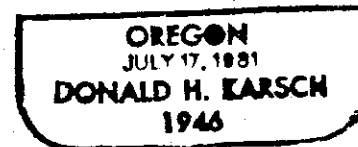
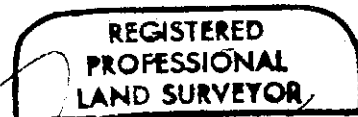
The following description of the Gumjuwac/Tolo RNA boundary is based on information gathered from RNA planning documents, the Mt Hood Forest Plan, Gumjuwac/Tolo RNA proposed maps, and as depicted on 7 1/2 min. quad maps; "Badger Lake" 1979, and "Flag Point" 1962 on file at the Mt Hood National Forest Supervisor's Office.

The Gumjuwac/Tolo RNA lies entirely within the Badger Creek Wilderness Area, in Township 3 South; Range 10 East; Sections 1,2,3,4,9,10,11,12,13,14,24; and Township 3 South; Range 11 East; Sections 7 & 18; Willamette Meridian; on the Barlow Ranger District of the Mt Hood National Forest, Hood River and Wasco Counties, State of Oregon.

Beginning at (A), a point on the Badger Creek Wilderness Area Boundary which is 10 feet southerly of and perpendicular to USFS Trail #458 and 100 feet southwesterly of and perpendicular to the centerline of USFS road #2730200; thence southeasterly along the Badger Creek Wilderness, which parallels USFS Road #2730200, 100 feet southwesterly of the centerline to AP 894 of the Badger Creek Wilderness, thence southeasterly along the Badger Creek Wilderness which is the 5600 foot contour to a point on a ridge (B); thence southwesterly ascending along a ridge to an unnamed peak; thence southwesterly descending along a ridge to an unnamed peak; thence continue southwesterly descending along a ridge to a point at the intersections of the thread of Drop Creek and the thread of Badger Creek (C); thence ascending along the thread of Badger Creek to a point at the intersection of the thread of Badger Creek and the thread of Gumjuwac Creek (D); thence northwesterly ascending along a ridge to a point on the ridge (E); thence southwesterly ascending along a ridge and the northerly breaks of Badger Creek to a point on the Badger Creek Wilderness, near Gunsight Butte, which is 100 feet easterly of and perpendicular to USFS road #3550 (F); thence northeasterly along the Badger Creek Wilderness, which parallels USFS Road #3550, 100 feet easterly of the centerline to a point on a ridge (G); thence northeasterly ascending along a ridge to a point on the summit of Lookout Mountain; thence southeasterly descending along a ridge to a point 10 feet southerly of and perpendicular to the centerline of USFS Trail #458 (I); thence southeasterly paralleling USFS Trail #458, 10 feet southerly of the centerline to the point of beginning (A).

This description prepared by: DON KARSCH PLS#1946
Forest Land Surveyor

Date: November 8, 1996



APPENDIX B. Plant Species Found in Gumjuwac-Tolo Research Natural Area.

Plants on this list were identified by Marty Stein, Mt. Hood Forest Botanist on September 14, 1995, and by Caitlin Cray, Barlow Ranger District Botanist on September 5, 1996. Nomenclature for vascular plants follows Hitchcock and Cronquist (1973) except for trees which follows Little (1979).

TREES

<i>Abies amabilis</i>	Pacific silver fir
<i>Abies grandis</i>	grand fir
<i>Abies lasiocarpa</i>	sub-alpine fir
<i>Abies procera</i>	noble fir
<i>Acer glabrum</i> var. <i>douglasii</i>	Douglas' maple
<i>Acer macrophyllum</i>	big-leaf maple
<i>Alnus incana</i>	mountain alder
<i>Alnus sinuata</i>	Sitka alder
<i>Larix occidentalis</i>	western larch
<i>Picea engelmannii</i>	Engelmann spruce
<i>Pinus albicaulis</i>	white bark pine
<i>Pinus monticola</i>	western white pine
<i>Pinus ponderosa</i>	ponderosa pine
<i>Populus tremuloides</i>	quaking aspen
<i>Populus trichocarpa</i>	cottonwood
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Thuja plicata</i>	western red cedar
<i>Tsuga heterophylla</i>	western hemlock
<i>Tsuga mertensiana</i>	mountain hemlock

SHRUBS

<i>Amelanchier alnifolia</i>	serviceberry
<i>Arctostaphylos nevadensis</i>	pinemat manzanita
<i>Arctostaphylos patula</i>	green-leaf manzanita
<i>Artemisia arbuscula</i>	low sage
<i>Berberis nervosa</i>	Oregon-grape
<i>Castanopsis chrysophylla</i>	golden chinquapin
<i>Ceanothus velutinus</i>	snowbrush
<i>Corylus cornuta</i> v. <i>californica</i>	hazlenut
<i>Eriogonum compositum</i>	northern buckwheat
<i>Eriogonum umbellatum</i>	sulphur buckwheat
<i>Haplopappus bloomeri</i>	rabbitbrush goldenweed
<i>Holodiscus discolor</i>	oceanspray
<i>Juniperus communis</i>	mountain juniper
<i>Lonicera involucrata</i>	twinberry
<i>Pachistima myrsinites</i>	boxwood

Penstemon fruticosus
Penstemon rupicola
Prunus emarginata
Purshia tridentata
Ribes cereum
Rosa gymnocarpa
Sorbus sitchensis
Symphoricarpos mollis
Vaccinium membranaceum
Vaccinium scoparium

shrubby penstemon
cliff penstemon
bittercherry
antelope bitterbrush
currant
baldhip rose
Sitka mountain-ash
trailing snowberry
big huckleberry
grouseberry

FORBS

Achillea millefolium
Achlys triphylla
Aconitum columbianum
Agastache occidentalis
Anaphalis margaritacea
Angelica canbyi
Antennaria luzuloides
Arabis furcata
Arenaria aculeata
Arenaria macrophylla
Arnica mollis
Artemisia ludoviciana var. latiloba
Asarum caudatum
Aster foliaceus
Balsamorhiza sagittata
Campanula scouleri
Castilleja miniata
Chaenactis douglasii
Chimaphila umbellata
Circaea alpina
Cirsium vulgare
Clintonia uniflora
Cordylanthus capitatus
Cornus canadensis
Epilobium angustifolium
Epilobium minutum
Eriogonum nudum
Helianthella uniflora
Heracleum lanatum
Hieracium scouleri
Hypericum anagalloides
Ipomopsis aggregata

yarrow
vanilla-leaf
monkshood
western horse-mint
pearly-everlasting
Canby's angelica
woodrush pussy-toes
Cascade rockcress
needleleaf sandwort
bigleaf sandwort
hairy arnica
prairie sage
wild ginger
leafy aster
balsamroot
Scouler's bellflower
scarlet paintbrush
hoary chaenactis
prince's pine
enchanter's nightshade
bull thistle
bead-lily
Yakima birdbeak
bunchberry
fireweed
small flwr willow-herb
barestem buckwheat
little-sunflower
cow parsnip
wooly-weed
bog St. John's-wort
scarlet gilia

Linnaea borealis
Listera caurina
Lomatium martindalei
Luina stricta
Lupinus polyphyllus
Lysichitum americanum
Machaeranthera shastensis var.
 latifolia
Mimulus lewisii
Orthocarpus bracteosus
Osmorhiza chilensis
Parnassia fimbriolata
Penstemon euglaucus
Plantago lanceolata
Polemonium pulcherrimum
Rubus pedatus
Saxifraga arguta
Sedum oregonum
Sedum oregonense
Sedum stenopetalum
Senecio triangularis
Solidago canadensis
Smilacina stellata
Stachys cooleyae
Trautvetteria caroliniensis
Valeriana sitchensis
Xerophyllum tenax

twinflower
western twayblade
weather changer
tongue-leaf luina
bigleaf lupine
skunk cabbage
Shasta aster

Lewis' monkeyflower
rosy owl-clover
sweet cicely
grass-of-Parnassus
glaucus penstemon
English plantain
skunk-lvd polemonium
strawberry bramble
brook saxifrage
Oregon stonecrop
creamy stonecrop
wormleaf sedum
arrowleaf groundsel
Canada goldenrod
starry solomon plume
betony
false bugbane
sitka valerian
bear-grass

GRAMINOIDS

Agrostis exarata
Agrostis thurberiana
Bromus carinatus
Carex disperma
Carex geyeri
Carex mertensii
Carex microptera
Carex pachystachya
Festuca idahoensis
Glyceria elata
Luzula parviflora
Stipa occidentalis

spike bentgrass
Thurber bentgrass
mountain brome
soft-leaved sedge
elk-sedge
Merten's sedge
ball-headed sedge
thick-headed sedge
Idaho fescue
tall mannagrass
woodrush
western needlegrass

FERNS

Athyrium filix-femina
Cystopteris fragilis
Polystichum munitum
Pteridium aquilinum

lady-fern
bladder-fern
sword-fern
bracken-fern

APPENDIX C. Wildlife Species Known or Suspected to Occur in the Gumjuwac-Tolo RNA. List compiled by Rich Thurman, Biologist, Barlow Ranger District. Nomenclature is from the PNW Region WILDOBS Database.

AMPHIBIANS

<i>Rana cascadae</i>	Cascades frog
<i>Dicamptodon copei</i>	Cope's giant salamander
<i>Plethodon dunni</i>	Dunn's salamander
<i>Ensatina eschscholtzii</i>	Ensatina
<i>Batrachoseps wrighti</i>	Oregon slender salamander
<i>Dicamptodon tenebrosus</i>	Pacific giant salamander
<i>Pseudacris regilla</i>	Pacific treefrog
<i>Ascaphus truei</i>	Tailed frog
<i>Bufo boreas</i>	Western toad

BIRDS

<i>Melanerpes formicivorus</i>	Acorn woodpecker
<i>Corvus brachyrhynchos</i>	American crow
<i>Cinclus mexicanus</i>	American dipper
<i>Carduelis tristis</i>	American goldfinch
<i>Falco sparverius</i>	American kestrel
<i>Turdus migratorius</i>	American robin
<i>Haliaeetus leucocephalus</i>	Bald eagle
<i>Columba fasciata</i>	Band-tailed pigeon
<i>Tyto alba</i>	Barn owl
<i>Strix varia</i>	Barred owl
<i>Thryomanes bewickii</i>	Bewick's wren
<i>Picoides arcticus</i>	Black-backed woodpecker

<i>Pica pica</i>	Black-billed magpie
<i>Parus atricapillus</i>	Black-capped chickadee
<i>Pheucticus melanocephalus</i>	Black-headed grosbeak
<i>Dendroica nigrescens</i>	Black-throated gray warbler
<i>Dendragapus obscurus</i>	Blue grouse
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Certhia americana</i>	Brown creeper
<i>Molothrus ater</i>	Brown-headed cowbird
<i>Psaltriparus minimus</i>	Bushtit
<i>Stellula calliope</i>	Calliope hummingbird
<i>Catherpes mexicanus</i>	Canyon wren
<i>Carpodacus cassinii</i>	Cassin's finch
<i>Bombycilla cedrorum</i>	Cedar waxwing
<i>Parus rufescens</i>	Chestnut-backed chickadee
<i>Spizella passerina</i>	Chipping sparrow
<i>Nucifraga columbiana</i>	Clark's nutcracker
<i>Hirundo pyrrhonota</i>	Cliff swallow
<i>Chordeiles minor</i>	Common nighthawk
<i>Phalaenoptilus nuttallii</i>	Common poorwill
<i>Corvus corax</i>	Common raven
<i>Geothlypis trichas</i>	Common yellowthroat
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Empidonax occidentalis</i>	Cordilleran flycatcher
<i>Junco hyemalis</i>	Dark-eyed junco
<i>Picoides pubescens</i>	Downy woodpecker
<i>Empidonax oberholseri</i>	Dusky flycatcher
<i>Sturnus vulgaris</i>	European starling
<i>Coccothraustes vespertinus</i>	Evening grosbeak

<i>Passerella iliaca</i>	Fox sparrow
<i>Aquila chrysaetos</i>	Golden eagle
<i>Regulus satrapa</i>	Golden-crowned kinglet
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow
<i>Perisoreus canadensis</i>	Gray jay
<i>Strix nebulosa</i>	Great gray owl
<i>Bubo virginianus</i>	Great horned owl
<i>Pipilo chlorurus</i>	Green-tailed towhee
<i>Picoides villosus</i>	Hairy woodpecker
<i>Empidonax hammondi</i>	Hammond's flycatcher
<i>Histrionicus histrionicus</i>	Harlequin duck
<i>Catharus guttatus</i>	Hermit thrush
<i>Dendroica occidentalis</i>	Hermit warbler
<i>Eremophila alpestris</i>	Horned lark
<i>Passer domesticus</i>	House sparrow
<i>Troglodytes aedon</i>	House wren
<i>Charadrius vociferus</i>	Killdeer
<i>Chondestes grammacus</i>	Lark sparrow
<i>Passerina amoena</i>	Lazuli bunting
<i>Melospiza lincolni</i>	Lincoln's sparrow
<i>Lanius ludovicianus</i>	Loggerhead shrike
<i>Asio otus</i>	Long-eared owl
<i>Oporornis tolmiei</i>	Macgillivray's warbler
<i>Falco columbarius</i>	Merlin
<i>Sialia currucoides</i>	Mountain bluebird
<i>Parus gambeli</i>	Mountain chickadee
<i>Oreortyx pictus</i>	Mountain quail
<i>Zenaida macroura</i>	Mourning dove

<i>Vermivora ruficapilla</i>	Nashville warbler
<i>Colaptes auratus</i>	Northern flicker
<i>Accipiter gentilis</i>	Northern goshawk
<i>Circus cyaneus</i>	Northern harrier
<i>Glaucidium gnoma</i>	Northern pigmy-owl
<i>Aegolius acadicus</i>	Northern saw-whet owl
<i>Lanius excubitor</i>	Northern shrike
<i>Strix occidentalis caurina</i>	Northern spotted owl
<i>Contopus borealis</i>	Olive-sided flycatcher
<i>Vermivora celata</i>	Orange-crowned warbler
<i>Empidonax difficilis</i>	Pacific slope flycatcher
<i>Dryocopus pileatus</i>	Pileated woodpecker
<i>Pinicola enucleator</i>	Pine grosbeak
<i>Carduelis pinus</i>	Pine siskin
<i>Carpodacus purpureus</i>	Purple finch
<i>Sitta pygmaea</i>	Pygmy nuthatch
<i>Loxia curvirostra</i>	Red crossbill
<i>Sitta canadensis</i>	Red-breasted nuthatch
<i>Sphyrapicus ruber</i>	Red-breasted sapsucker
<i>Sphyrapicus nuchalis</i>	Red-naped sapsucker
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Salpinctes obsoletus</i>	Rock wren
<i>Leucosticte arctoa</i>	Rosy finch
<i>Buteo lagopus</i>	Rough-legged hawk
<i>Regulus calendula</i>	Ruby-crowned kinglet
<i>Bonasa umbellus</i>	Ruffed grouse
<i>Selasphorus rufus</i>	Rufous hummingbird
<i>Pipilo erythrophthalmus</i>	Rufous-sided towhee

<i>Passerculus sandwichensis</i>	Savannah sparrow
<i>Sayornis saya</i>	Say's phoebe
<i>Aphelocoma coerulescens</i>	Scrub jay
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Vireo solitarius</i>	Solitary vireo
<i>Melospiza melodia</i>	Song sparrow
<i>Cyanocitta stelleri</i>	Steller's jay
<i>Catharus ustulatus</i>	Swainson's thrush
<i>Picoides tridactylus</i>	Three-toed woodpecker
<i>Dendroica townsendii</i>	Townsend warbler
<i>Myadestes townsendi</i>	Townsend's solitaire
<i>Tachycineta bicolor</i>	Tree swallow
<i>Cathartes aura</i>	Turkey vulture
<i>Ixoreus naevius</i>	Varied thrush
<i>Chaetura vauxi</i>	Vaux's swift
<i>Pooecetes gramineus</i>	Vesper sparrow
<i>Tachycineta thalassina</i>	Violet-green swallow
<i>Vireo gilvus</i>	Warbling vireo
<i>Sialia mexicana</i>	Western bluebird
<i>Tyrannus verticalis</i>	Western kingbird
<i>Sturnella neglecta</i>	Western meadowlark
<i>Otus kennicottii</i>	Western screech-owl
<i>Piranga ludoviciana</i>	Western tanager
<i>Contopus sordidulus</i>	Western wood-pewee
<i>Sitta carolinensis</i>	White-breasted nuthatch
<i>Zonotrichia leucophrys</i>	White-crowned sparrow
<i>Picoides albolarvatus</i>	White-headed woodpecker
<i>Meleagris gallopavo</i>	Wild turkey

<i>Sphyrapicus thyroideus</i>	Williamson's sapsucker
<i>Empidonax traillii</i>	Willow flycatcher
<i>Wilsonia pusilla</i>	Wilson's warbler
<i>Troglodytes troglodytes</i>	Winter wren
<i>Dendroica petechia</i>	Yellow warbler
<i>Icteria virens</i>	Yellow-breasted chat
<i>Dendroica coronata</i>	Yellow-rumped warbler

MAMMALS

<i>Taxidea taxus</i>	Badger
<i>Castor canadensis</i>	Beaver
<i>Eptesicus fuscus</i>	Big brown bat
<i>Ursus americanus</i>	Black bear
<i>Odocoileus hemionus</i>	Black-tailed & mule deer
<i>Felis rufus</i>	Bobcat
<i>Sylvilagus bachmani</i>	Brush rabbit
<i>Neotoma cinerea</i>	Bushy-tailed woodrat
<i>Spermophilus beecheyi</i>	California ground squirrel
<i>Myotis californicus</i>	California myotis
<i>Scapanus orarius</i>	Coast mole
<i>Canis latrans</i>	Coyote
<i>Microtus oregoni</i>	Creeping vole
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Tamiasciurus douglasii</i>	Douglas' squirrel
<i>Sorex monticolus</i>	Dusky shrew
<i>Cervus elaphus</i>	Elk
<i>Mustela erminea</i>	Ermine

<i>Martes pennanti</i>	Fisher
<i>Spermophilus lateralis</i>	Golden-mantled ground squirrel
<i>Urocyon cinereoargenteus</i>	Gray fox
<i>Canis lupus</i>	Gray wolf
<i>Perognathus parvus</i>	Great basin pocket mouse
<i>Phenacomys intermedius</i>	Heather vole
<i>Lasiurus cinereus</i>	Hoary bat
<i>Myotis evotis</i>	Long-eared myotis
<i>Myotis volans</i>	Long-legged myotis
<i>Microtus longicaudus</i>	Long-tailed vole
<i>Mustela frenata</i>	Long-tailed weasel
<i>Felis lynx</i>	Lynx
<i>Martes americana</i>	Marten
<i>Mustela vison</i>	Mink
<i>Sylvilagus nuttallii</i>	Mountain (nuttall's) cottontail
<i>Aplodontia rufa</i>	Mountain beaver
<i>Felis concolor</i>	Mountain lion
<i>Glaucomys sabrinus</i>	Northern flying squirrel
<i>Thomomys talpoides</i>	Northern pocket gopher
<i>Zapus trinotatus</i>	Pacific jumping mouse
<i>Ochotona princeps</i>	Pika
<i>Peromyscus truei</i>	Pinon mouse
<i>Erethizon dorsatum</i>	Porcupine
<i>Procyon lotor</i>	Raccoon
<i>Vulpes vulpes</i>	Red fox
<i>(Arborimus) phenacomys longicaudus</i>	Red tree vole
<i>Neurotrichus gibbsii</i>	Shrew-mole

<i>Lasionycteris noctivagans</i>	Silver-haired bat
<i>Lepus americanus</i>	Snowshoe hare
<i>Mephitis mephitis</i>	Striped skunk
<i>Plecotus townsendii</i>	Townsend big-eared bat
<i>Tamias townsendii</i>	Townsend's chipmunk
<i>Microtus townsendii</i>	Townsend's vole
<i>Sorex trowbridgii</i>	Trowbridge's shrew
<i>Sorex vagrans</i>	Vagrant shrew
<i>Zapus princeps</i>	Western jumping mouse
<i>Thomomys mazama</i>	Western pocket gopher
<i>Clethrionomys californicus</i>	Western red-backed vole
<i>Myotis ciliolabrum</i>	Western small-footed myotis
<i>Spilogale gracilis</i>	Western spotted skunk
<i>Gulo gulo</i>	Wolverine
<i>Marmota flaviventris</i>	Yellow-bellied marmot
<i>Tamias amoenus</i>	Yellow-pine chipmunk
<i>Myotis yumanensis</i>	Yuma myotis

REPTILES

<i>Thamnophis sirtalis</i>	Common garter snake
<i>Pituophis catenifer</i>	Gopher snake
<i>Coluber constrictor</i>	Racer
<i>Diadophis punctatus</i>	Ringneck snake
<i>Charina bottae</i>	Rubber boa
<i>Contia tenuis</i>	Sharptail snake
<i>Crotalus viridis</i>	Western rattlesnake
<i>Thamnophis elegans</i>	Western terrestrial garter snake

APPENDIX D. Standards and Guidelines from Mt. Hood Land and Resource Management Plan (USDA, 1990)

1. Administration: Management activities should be confined to research consistent with needs determined by the Pacific Northwest Research Station (PNW) (A3-001).
2. Wilderness Area Considerations: Use, whether for recreation or research should not exceed estimated carrying capacity for the Badger Creek Wilderness, as measured in recreation visitor days (A2-004). Encounters with other groups shall be limited to no more than 6 groups per day during 80% of the primary recreational use season. No more than one other campsite will be visible, or continuously audible, from any other site. Group size should not exceed 12 in any combination of people and livestock. Larger groups may be permitted under special permit. (A2-026 - 030)

Biophysical standards for wilderness areas shall be maintained: Campsites shall blend in with natural setting and should be set back 200 feet from streams, lakes, trails, and meadows; exposed mineral soil shall not exceed 25% of any particular site; ground vegetation should not be permanently injured (ie, should be able to recover in two growing seasons). (A2-015 - 025)

Scientific studies and educational programs may occur provided they do not degrade wilderness values (A2-039). Use of motorized or mechanized equipment, except small battery-powered-hand-held devices such as cameras, shall be prohibited unless authorized by the USDA (A2-043).

3. Recreation: Use of dispersed recreation facilities and trails shall be discouraged if it would compromise research values. Trails which conflict with RNA values shall not be constructed or reconstructed except where needed to meet requirements for health and safety. Off-road vehicle (ORV) and non-motorized bicycle use shall be prohibited. RNAs shall be posted as closed to ORV and bicycle use. (A3-003 - 007)

Special use permits may be issued for outfitter-guide type activities (A2-096). Developed recreational use shall be prohibited (A3-009).

4. Biological Resources: Ecological processes, including natural infestations of insects, should be allowed to operate freely (A2-057). Actions to control endemic insects or diseases should not be undertaken. If control measures are deemed necessary (i.e. as documented in an environmental assessment), biological control measures shall be considered. Any pest management actions considered shall be coordinated with PNW. (A3-050 & 051)

Representative plant communities which currently exist within the RNA shall be maintained (A3-002). Habitat improvement or maintenance work should be consistent with management direction for both Wilderness and Research Natural Areas. Introduction of non-native plant species shall be prohibited. Vegetation management shall not be allowed

unless part of an approved research project (A3-022). Pesticide use shall be prohibited (A2-082).

Timber harvesting and commercial gathering of forest products (i.e. mushrooms, medicinal plants) shall be prohibited within the RNA. Hazard trees may be cut or knocked down but should not be removed from the site. Firewood gathering shall be prohibited. (A3-019 - 025)

5. Range Management: No grazing allotments lie in or near the RNA and topography prevents livestock from straying into the area from other allotments.
6. Soil, Water, Geology, and Air Quality: Air Quality Related Values shall be protected consistent with the Clean Air Act (1977). Natural stream and riparian ecological processes shall be allowed to operate freely. Monitoring activities may take place as necessary to establish a baseline for determining effects of land management practices on terrestrial and/or aquatic systems. Temporary gauging stations and instrument shelters may be established provided they do not conflict with wilderness management guidelines. Gumjuwac-Tolo RNA has been withdrawn from mineral entry and mineral leasing. Technical inventory, evaluation, and site-specific investigation may occur, but shall not have a detrimental effect on the natural, unmodified condition of the area. (A3-026 - 031)
7. Special Uses: Special uses inconsistent with Wilderness Area management direction shall not be allowed (A2-100). New rights-of-way shall not be permitted (A3-033).
8. Travel and Access Management: Roads shall not be constructed within the Gumjuwac-Tolo RNA. Landing of aircraft, or dropping or picking up of any material, supplies or person from aircraft shall be prohibited unless specifically authorized by the USDA. (A2-102 - 106)

In order to minimize disturbance to natural elements within the RNA, foot travel and equestrian use should be discouraged (A3-041). No new trails should be constructed within the RNA and existing trails will be maintained to wilderness standards.

9. Fire Management: Prescribed fire may occur in the RNA. Naturally occurring ignitions should be managed as prescribed fire unless declared a wildfire. Human caused wildfires shall be suppressed. Unless required to provide protection to adjacent non-RNA acreage, fuels treatment shall not occur where the sole purpose of the project is fire hazard reduction.

Control of fire within Research Natural Areas shall be by methods that cause the least disturbance. Application of fire retardant or use of tractors should not occur. Preference should be given to fire suppression methods and strategies resulting in the least practicable area burned, commensurate with cost-effectiveness, and having the least effect on values in the RNA. Fire rehabilitation activities shall be consistent with RNA management direction. (A2-107 - 111 and A3-043-051)

APPENDIX E. List of Contributors

Caitlin Cray, Barlow Ranger District - establishment report preparation; botany

Tom DeRoo, Mt. Hood National Forest - geology and minerals

Nancy Diaz, Mt. Hood National Forest - RNA program coordinator

Louisa Evers, Barlow Ranger District - fire history and ecology; climate

David Hanken, Mt. Hood National Forest - establishment report preparation; botany

Kathy Martin, Barlow/Bear Springs Ranger District - cultural resources, archaeology

Marty Stein, Mt. Hood National Forest - botany

Rich Thurman, Barlow Ranger District - wildlife

**DECISION NOTICE / DESIGNATION ORDER
and
FINDING OF NO SIGNIFICANT IMPACT**

**ESTABLISHMENT OF ELEVEN
RESEARCH NATURAL AREAS**

**USDA Forest Service
Pacific Northwest Region
Oregon and Washington**

By virtue of the authority vested in me by the Chief of the Forest Service, in Forest Service Manual Section 4063, I hereby establish the Research Natural Areas listed in Table 1 and as described in their respective Establishment Records in the section entitled "Location".

Table 1: Research Natural Area Locations

R N A	National Forest	Ranger District	County	Acres
Oregon				
Cache Mountain	Deschutes	Sisters	Deschutes	1400
Dry Mountain	Ochoco	Snow Mountain	Harney	2205
Gumjuwac/Tolo	Mt. Hood	Barlow	Hood River	3600
Hagan	Willamette	Blue River	Lane	1126
McKenzie Pass	Willamette	McKenzie	Lane	1187
Mokst Butte	Deschutes	Bend/Fort Rock	Deschutes	1250
Reneke Creek	Siuslaw	Hebo	Tillamook	480
Tenmile Creek	Siuslaw	Oregon Dunes NRA	Coos	1190
Vee Pasture	Fremont	Bly	Klamath & Lake	620
Washington				
Fish Lake Bog	Wenatchee	Lake Wenatchee	Chelan	206
Roger Lake	Okanogan	Tonasket	Okanogan	436

The Regional Forester recommended the establishment of these RNAs in the Record of Decision for their respective Land and Resource Management Plans (Forest Plans). That recommendation was the result of an analysis of the factors listed in 36 CFR 219.25 and Forest Service Manual 4063.2. Results of the Regional Forester's analysis are documented in the Forest Plans and Final Environmental Impact Statements which are available to the public.

SELECTED ALTERNATIVE

The Regional Forester has reexamined the RNAs to ensure that the environmental effects of establishing the areas as RNAs have not changed since the Forest Plans were adopted. In three cases (Cache Mountain, Dry Mountain, and Gumjuwac/Tolo) areas were recommended for addition or deletion from the proposed RNA to better accomplish the original purpose of the RNA. Proposed Tenmile Creek RNA boundary adjustments were adopted by the Record of Decision for the Oregon Dunes National Recreation Area Management Plan in 1994. For the remaining RNAs no changes were found. This analysis is documented in the attached Environmental Assessment.

Based on the analysis in the Environmental Assessment, it is my decision to adopt Alternative 2 which establishes these eleven areas as Research Natural Areas. Alternative 2 is selected because it provides long-term protection of the research and educational values of these special areas and the ecosystem elements that they represent. The RNAs will be managed in compliance with all relevant laws, regulations and Forest Service Manual direction regarding RNAs and in accordance with the management direction identified in their respective Forest Plans.

Although this alternative is consistent with the management direction in each Forest Plan it does change the allocation for these areas from "Proposed RNA" to "Established RNA". This is a non-significant amendment of the Forest Plans [36 CFR 219.10(f)].

OTHER ALTERNATIVE CONSIDERED

The other alternative considered was Alternative 1, the "No Action" alternative which would continue management of the RNAs as "Proposed RNAs". Alternative 1 was not selected because it would provide only short-term protection of the research and educational values of the areas. Alternative 1 is consistent with the Forest Plans.

FINDING OF NO SIGNIFICANT IMPACT

Based on the environmental analysis documented in the Environmental Assessment, it has been determined that the proposed action 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 is based on the following factors [40 CFR 1508.27]:

CONTEXT

Although this is an addition to the national system of RNAs, both short-term and long-term physical and biological effects are limited to the local area.

INTENSITY

1. There are no known effects on public health and safety.
2. No significant direct, indirect or cumulative impacts to the natural resources or other components of the human environment are anticipated.
3. Effects on the human environment are not uncertain, do not involve unique or unknown risks,

and are not likely to be highly controversial.

4. There are no known effects on historical or cultural resources, park lands, prime farmlands, wetlands, or wild and scenic rivers. Effects of establishing the RNAs is to protect ecologically sensitive areas. No significant adverse effects are anticipated to any environmentally sensitive or critical area.

5. The action is not likely to establish a precedent for future actions with significant effects.

6. The proposed action will not adversely affect any federally listed or proposed endangered or threatened species or Regionally listed sensitive species of plants or animals or their critical habitats.

7. The proposed action is consistent with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 1994).

8. The proposed action is consistent with Federal, State, and local laws and requirements for protection of the environment.

NOTIFICATION and IMPLEMENTATION

Legal notice of this decision will appear in The Oregonian and The Seattle Post-Intelligencer. The Forest Supervisor of each National Forest shall notify the public of this decision and mail a copy of the Decision Notice/Designation Order to all persons on their Forest Plan mailing lists.

Implementation of this decision shall not occur within seven days following publication of the legal notice of the decision in The Oregonian and The Seattle Post-Intelligencer.

APPEAL RIGHTS

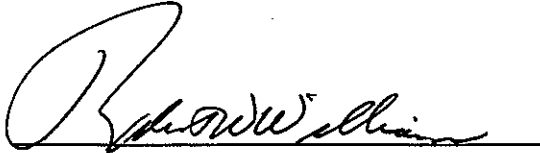
This decision is subject to appeal pursuant to 36 CFR Part 217. A copy of the Notice of Appeal must be in writing and must be submitted to:

Chief, USDA Forest Service
ATTN: NFS Appeals
14th and Independence Ave., S.W.
P.O. Box 96090
Washington, DC 20090-6090

Any written Notice of Appeal of this decision must be fully consistent with 36 CFR 217.9 (Content of a Notice of Appeal), must include the reasons for appeal, and must be submitted within 45 days from the date of legal notice of this decision in The Oregonian and The Seattle Post-Intelligencer.

CONTACT PERSON

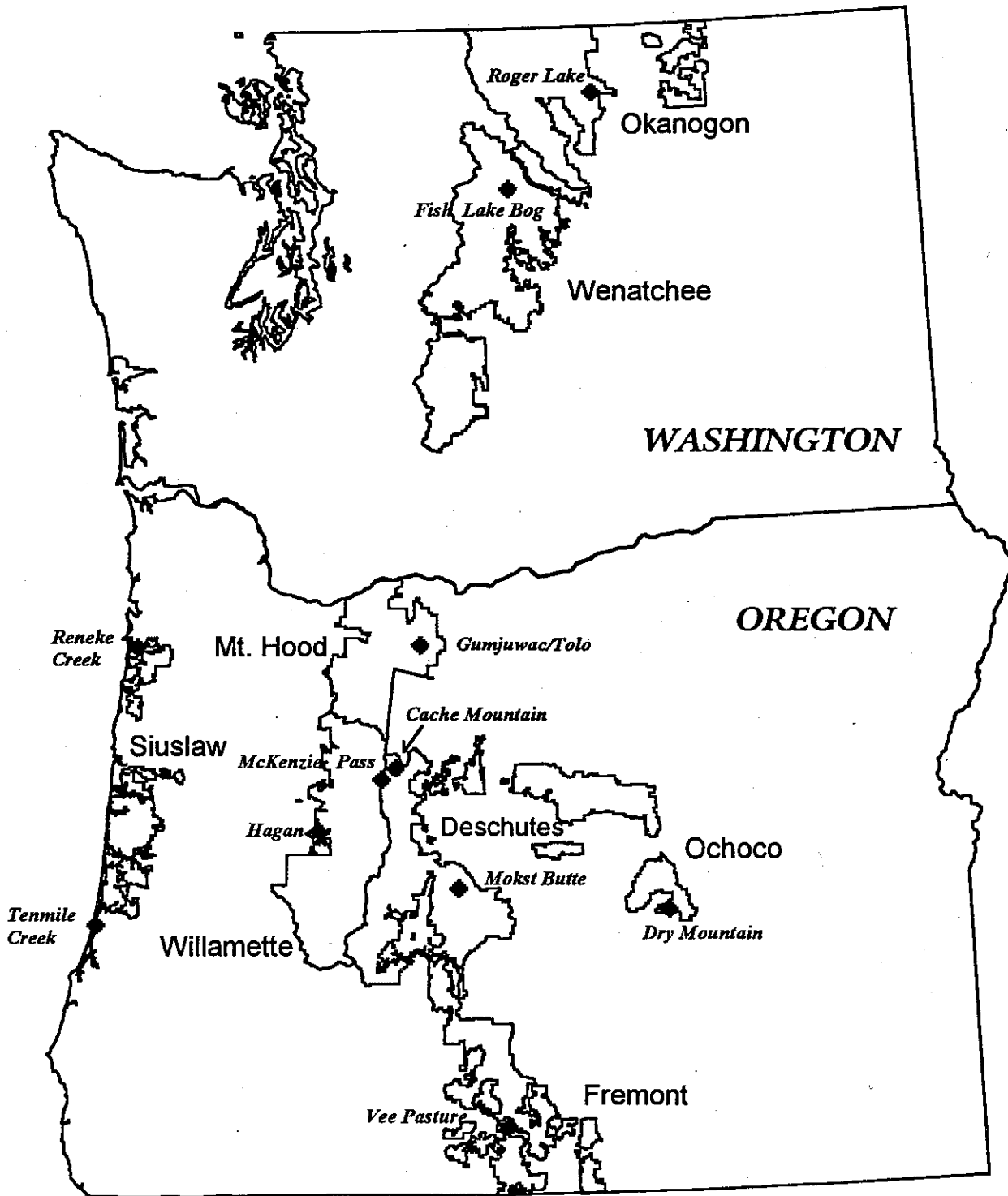
For further information regarding this decision contact Sarah Greene,
RNA Coordinator, Pacific Northwest Research Station, 3200 S.W. Jefferson
Way, Corvallis, Oregon 97331, Phone 541-750-7360.



ROBERT W. WILLIAMS
Regional Forester

6/9/97
Date

Research Natural Area Locations



50 0 50 Miles



ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

ENVIRONMENTAL ASSESSMENT

Pacific Northwest Region
USDA Forest Service
Oregon and Washington

Lead Agency:

USDA Forest Service
P.O. Box 3623
Portland, OR 97208

Responsible Official:

ROBERT W. WILLIAMS, Regional Forester
Pacific Northwest Region
P.O. Box 3623
Portland, OR 97208

Prepared by:

Donna Short
Sweet Home Ranger District
Willamette National Forest
3225 Highway 20
Sweet Home, OR 97386
541-367-5158

Abstract:

This Environmental Assessment identifies the need for the proposed action, describes the analysis process and the alternatives formulated during that process. It discusses the environmental effects of each of the proposed alternatives. Two alternatives were evaluated and compared and are as follows: Alternative 1 - No Action and Alternative 2 - Finalize Establishment.

ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

USDA FOREST SERVICE
PACIFIC NORTHWEST REGION
OREGON AND WASHINGTON

ENVIRONMENTAL ASSESSMENT

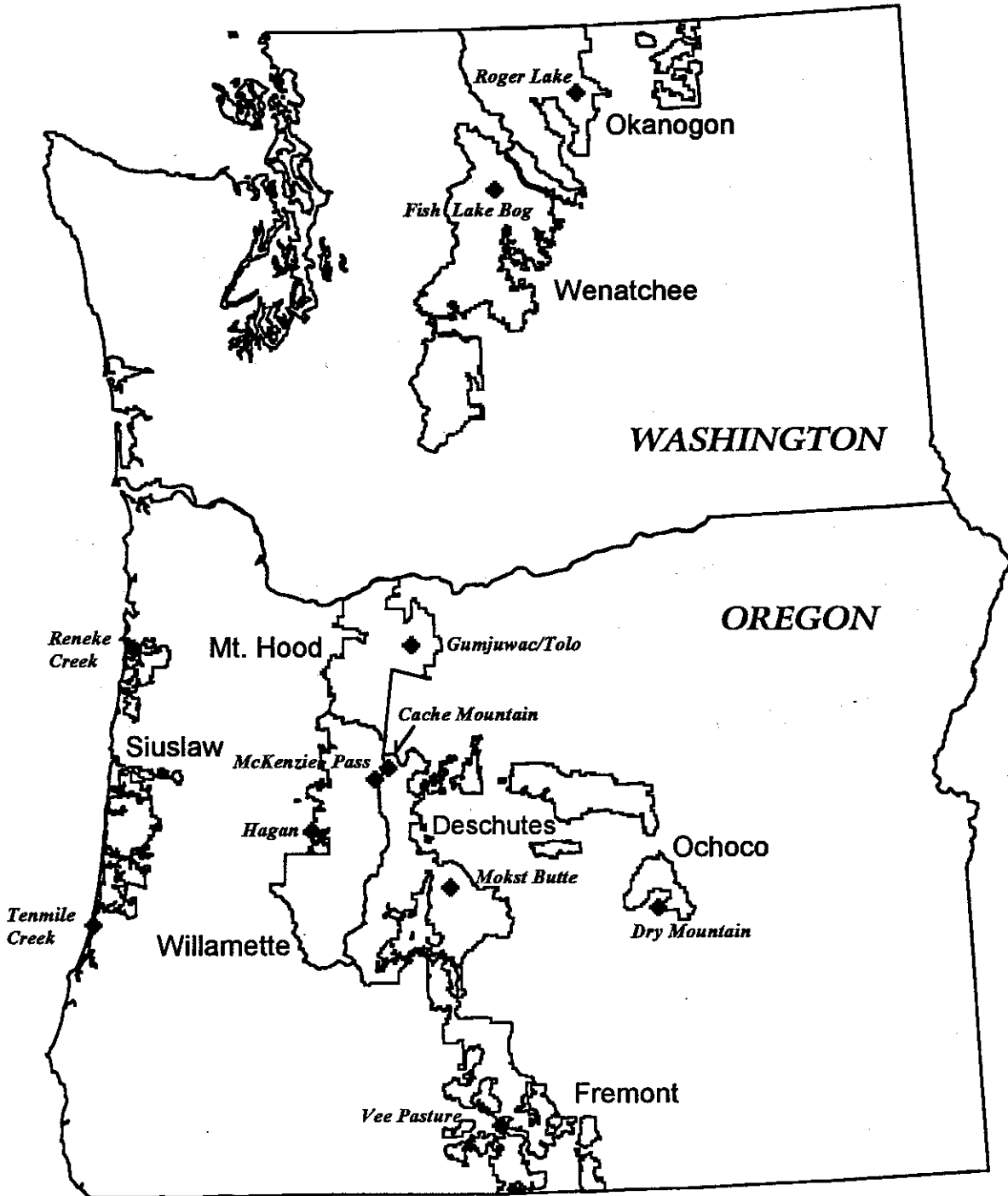
Proposed Action

The proposed action is to establish eleven Research Natural Areas (RNAs) as proposed in the Land and Resource Management Plans (Forest Plan) of each respective National Forest and the Oregon Dunes Management Plan (Tenmile Creek). These RNAs will be managed according to the direction provided in the management plans. This proposed action, formal designation of the RNAs by the Regional Forester, will amend each National Forest's Forest Plan. Table 1 lists the RNAs that are included in this environmental assessment and Figure 1 shows their locations.

Table 1: Research Natural Area Locations

RNA	National Forest	Ranger District	County	Acres
Oregon				
Cache Mountain	Deschutes	Sisters	Deschutes	1400
Dry Mountain	Ochoco	Snow Mountain	Harney	2205
Gumjuwac/Tolo	Mt. Hood	Barlow	Hood River	3600
Hagan	Willamette	Blue River	Lane	1126
McKenzie Pass	Willamette	McKenzie	Lane	1187
Mokst Butte	Deschutes	Bend/Fort Rock	Deschutes	1250
Reneke Creek	Siuslaw	Hebo	Tillamook	480
Tenmile Creek	Siuslaw	Oregon Dunes NRA	Coos	1190
Vee Pasture	Fremont	Bly	Klamath & Lake	620
Washington				
Fish Lake Bog	Wenatchee	Lake Wenatchee	Chelan	206
Roger Lake	Okanogan	Tonasket	Okanogan	436

Figure 1: Vicinity Map



50 0 50 Miles



Purpose and Need for Action

The purpose of establishing these RNAs is to contribute to a series of RNAs 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" (36 CFR 251.23). An evaluation by the Regional RNA Committee, pursuant to direction in Forest Service Manual 4063.04b, identified the vegetation types represented by these RNAs as suitable and desirable for inclusion in the national network. Establishment of these RNAs will provide long-term protection and recognition of these representative vegetation types (see Table 2).

Table 2: Representative Vegetative Types

RNA	Physiographic Province	Major Vegetation Types		
Cache Mountain	East Slope Oregon Cascades	Mid-elevation lakes with marshy shores	Lodgepole pine/ beargrass and /grouse huckleberry	White fir - Pacific silver fir/snowberry
Dry Mountain	Blue Mountains	Western juniper/big sagebrush	Ponderosa pine/ mountain mahogany	Mountain mahogany/ bunchgrass
Fish Lake Bog	East slope Wash. Cascades	Low elevation wetland & sphagnum bog	Grand fir/vine maple	Western hemlock/ Oregongrape-twinflower
Gumjuwac/Tolo	East Slope Oregon Cascades	Grand fir/ Engelmann spruce/starry solomonseal	Grand fir/ skunkleaf polemonium	
Hagan	West slope Oregon Cascades	Western hemlock/salal-Oregongrape	Douglas-fir/ oceanspray/grass	
McKenzie Pass	High Cascades	Lavaflores with mountain hemlock associations		
Mokst Butte	East Slope Oregon Cascades	Cinder cones with mixed conifer/snowbrush	Ponderosa pine/ bitterbrush	Lava communities
Reneke Creek	Oregon Coast Range	Sitka spruce/ salmonberry	Red alder dominated riparian communities	
Roger Lake	East slope Wash. Cascades	Subalpine fir/ Engelmann spruce	Sedge dominated wetlands	
Tenmile Creek	Oregon Coast Range	Coastal dune mosaic with tree islands	Native stabilized dune grassland	Deflation plain marsh
Vee Pasture	East Slope Oregon Cascades	Western juniper/ low sage	Low sage/ bluegrass/fescue	Low sage/one-spike oatgrass/ junegrass

A more detailed description of the vegetation, wildlife, and physical and climatic conditions can be found in the Establishment Record for each RNA. Site conditions have been reviewed since these RNAs were proposed during the land management planning process and no significant changes have occurred.

Public Involvement

Each National Forest included this project in their quarterly publication "Schedule of Proposed Actions" (FSH 1909.15, sec. 17) or sent a letter to interested parties. No comments were received from the public on continuing with the establishment process for ten of the RNAs. The proposed RNAs were also subjected to public review and comment during the land management planning process that resulted in the Forest Plans and the Oregon Dunes Management Plan (Tenmile Creek).

Several comments were received on Cache Mountain RNA on the Deschutes National Forest. Eunice Brandt and Donald Fontin expressed support for establishment of the RNA. Comments from the Blue Ribbon Coalition addressed the area proposed to be added to the original RNA boundary, road closures, and access for off-road vehicles. Northwest Antenna Site Services had concerns about use of the communications site on Cache Mountain. Sisters Sno-Go-Fers and William Rice expressed their opposition to placing restrictions on more public lands.

Alternatives and Environmental Consequences

Alternative 1, No Action: This alternative continues management according to the direction in the each National Forest's Forest Plan for "proposed RNAs". This management generally limits recreation use to non-motorized use of existing trails and prohibits timber harvest and/or other vegetation management. There are no cumulative effects generated by this alternative. Other environmental consequences are described in the Final Environmental Impact Statement for each Forest Plan. For those RNAs with boundary changes (Cache Mountain, Dry Mountain, and Gumjuwac/Tolo) there is a possible loss of research potential in the areas that were not included in these RNAs originally.

Alternative 2, Proposed Action: This alternative will formally establish each RNA in the location described in their respective Establishment Record. The standards and guidelines listed in each respective Forest Plan will be applied to the management of these RNAs (see Table 3). Environmental consequences of this alternative have been discussed in the Final Environmental Impact Statements for each Forest Plan (Final EIS) and the Record of Decision and Final Environmental Impact Statement for the Oregon Dunes National Recreation Area (Tenmile Creek) (see Table 3). These consequences include the short-term loss of opportunities to change vegetation conditions through management. There are no significant cumulative effects from establishment of these RNAs beyond those already discussed in the Final EIS's.

The direction in the National Forest management plans for established RNAs also includes reasonably foreseeable actions such as withdrawal of the area from mineral entry. The general consequences of withdrawal are discussed in the Final EIS's. Site-specific consequences will be disclosed in more detail when the mineral entry withdrawal recommendation is implemented.

A map of each RNA follows in Figures 2 - 12. A summary of the consequences associated with a particular RNA are listed below the map for that RNA. Those with proposed boundary changes (Cache Mountain, Dry Mountain, Gumjuwac/Tolo) also discuss any additional environmental consequences not covered by the Forest Plan Final EIS for that RNA.

Table 3: Land Management Plan References

RNA	Administrative Unit	Standards and Guidelines in Land and Resource Management Plan	Environmental Consequences in Final EIS
Cache Mountain	Deschutes NF	Chapter 4 - pages 92-93	Chapter IV - pages 69-70
Dry Mountain	Ochoco NF	Pages 125-264*	Chapter IV - 9,10, 41, 51, 108
Fish Lake Bog	Wenatchee NF	Chapter IV - pages 189-197	Chapter IV - pages 83-85
Gumjuwac/Tolo	Mt. Hood NF	Chapter IV - pages 136-150	Chapter IV - pages 145-150
Hagan	Willamette NF	Chapter IV - pages 134-137	Chapter IV - pages 166-169
McKenzie Pass	Willamette NF	Chapter IV - pages 134-137	Chapter IV - pages 166-169
Mokst Butte	Deschutes NF	Chapter 4 - pages 92-93	Chapter IV - pages 69-70
Reneke Creek	Siuslaw NF	Chapter IV - pages 104-107	Chapter IV - pages 77-80
Roger Lake	Okanogan NF	Chapter 4 - pages 73-75	Chapter IV - pages 71-72
Tenmile Creek	Oregon Dunes NRA	Chapter III - pages 49-51	Chapter IV - pages 60-62
Vee Pasture	Fremont NF	Pages 126, 165-166	Chapter IV - pages 171-172

*Specific pages that refer to RNA management include 125-127, 132, 136-138, 142-143, 147, 152, 155, 160, 163-168, 172-175, 178-179, 182, 190, 192, 198, 210, 228-234, 238-239, 250 and 262-264.

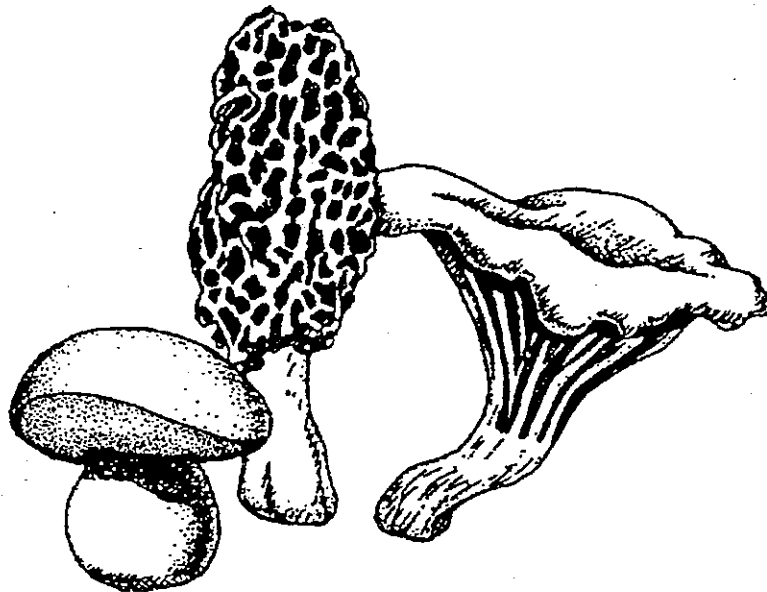
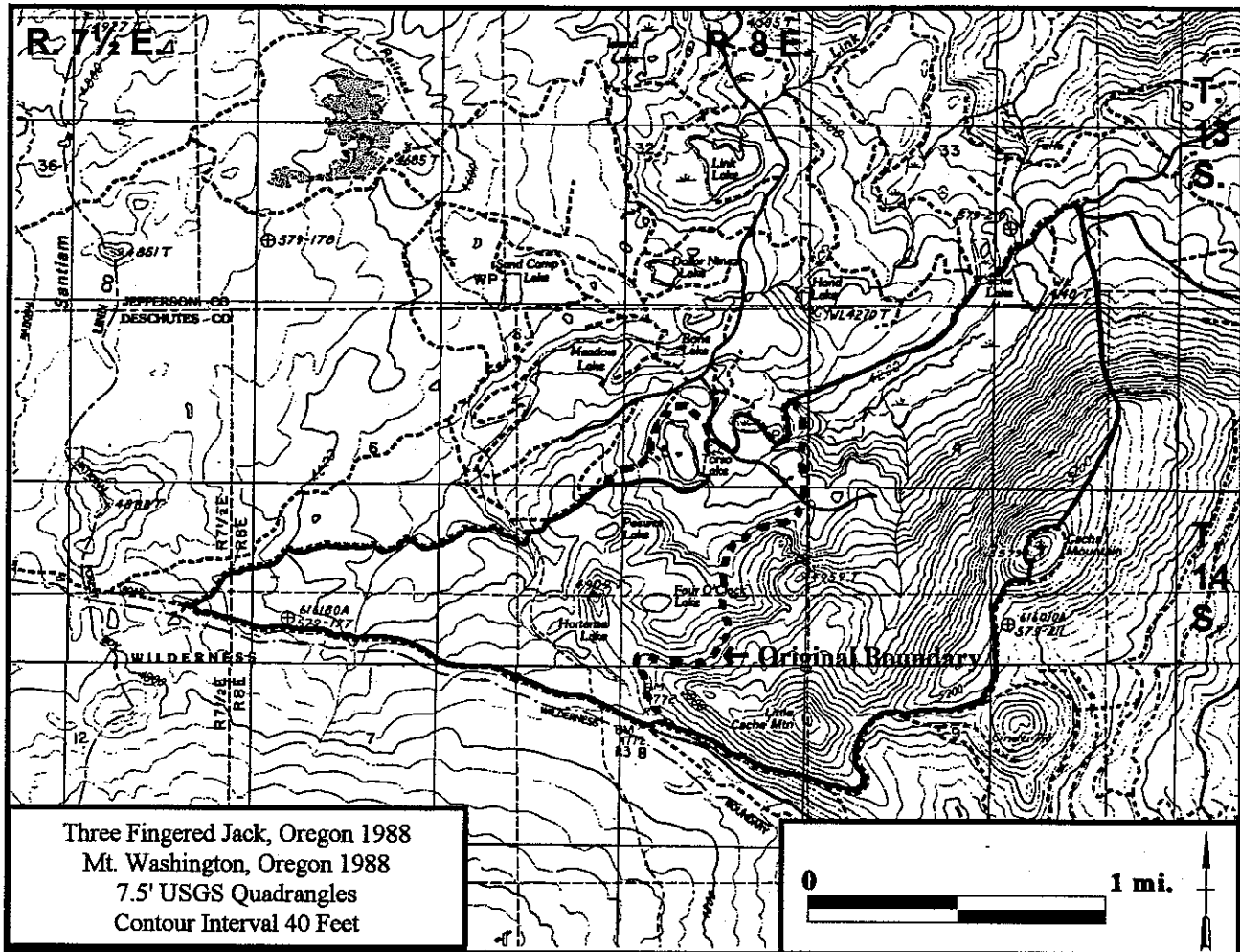


Figure 2: Cache Mountain RNA



Boundary Change: This RNA was originally proposed to include 600 acres in the Deschutes Forest Plan. Review of the area during the establishment process found that the uplands make a significant hydrologic contribution to the lakes and marshy areas that were the main objective for this RNA. To adequately maintain the hydrologic integrity of the system 800 acres were added to the RNA. Torso Lake was found to be significantly altered by previous recreational use and was therefore excluded from the final RNA boundary.

Mineral Resources: There are no known locatable or leasable mineral resources in the RNA and there is a low probability of finding them. Salable mineral resources include cinders and a potential hard rock resource. There has been no exploratory work done on the potential hard rock source.

Grazing: One quarter of an existing but inactive sheep grazing allotment will no longer be available for grazing.

Timber: Of the 1400 total acres in the RNA, 1300 are within a Late-Successional Reserve and are unavailable for timber management purposes. The other 100 acres include Riparian Reserves and Forest

Matrix allocations. The Matrix lands are all within the proposed addition to the RNA and will no longer be available for timber harvest. The effect on the probable sale quantity will be negligible.

Recreation: Most recreation use is associated with the lakes. Due to limited road and trail access, use has been low in the proposed RNA. It is not anticipated that establishment of the RNA will affect this type of dispersed use. Off-highway vehicle (OHV) use in the area surrounding the RNA is high particularly along roads and the summit of Cache Mountain on the eastern boundary of the RNA. Much of the area added to the RNA is unroaded and is already off limits to this use because of wetlands standards and guidelines. Abundant down wood and steep topography in other areas has and will continue to limit OHV use in the remainder of the area that has been added. The summit area of Cache Mountain is outside the RNA. For these reasons it is anticipated that the effect of establishment on OHV use in the area will be minimal. About one half mile of Rd. 2076-800 lies within the RNA. If closure of this road to protect RNA values becomes desirable, a separate NEPA analysis will be completed.

Communications Site: The communications site on Cache Mountain is not included in the proposed addition to the RNA and the road to the site will remain open. There should be no conflict between use of the site and establishment of the RNA.

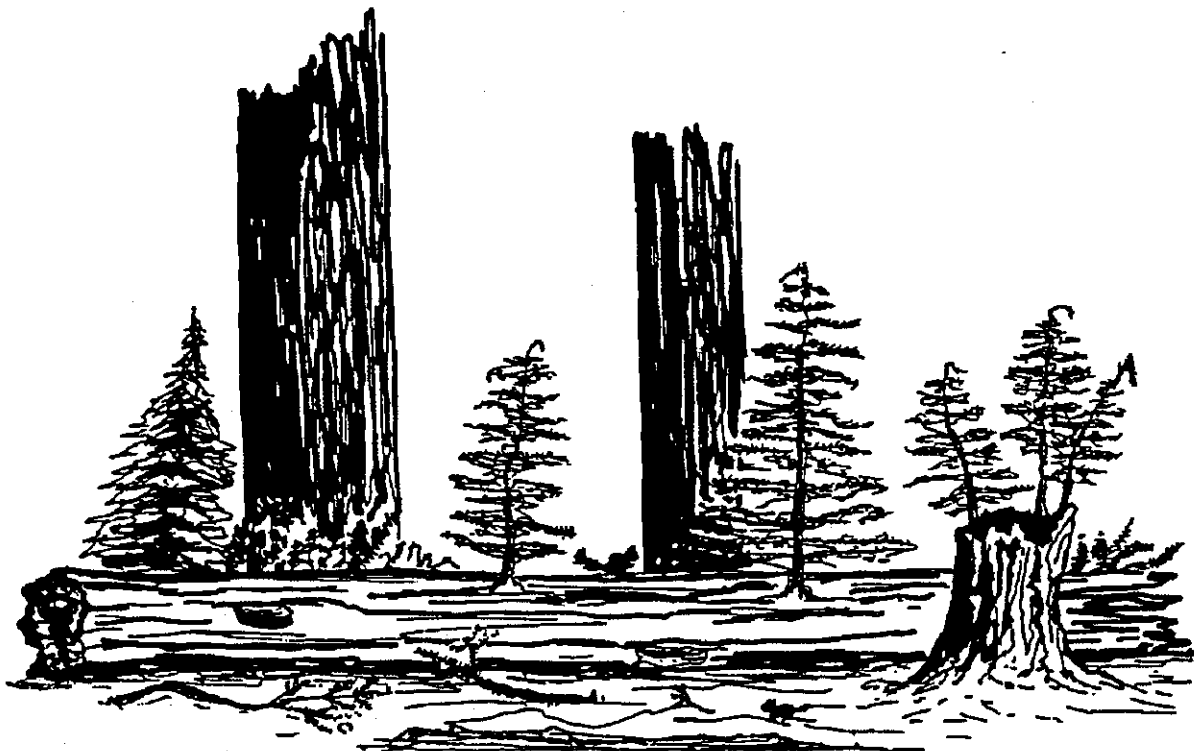
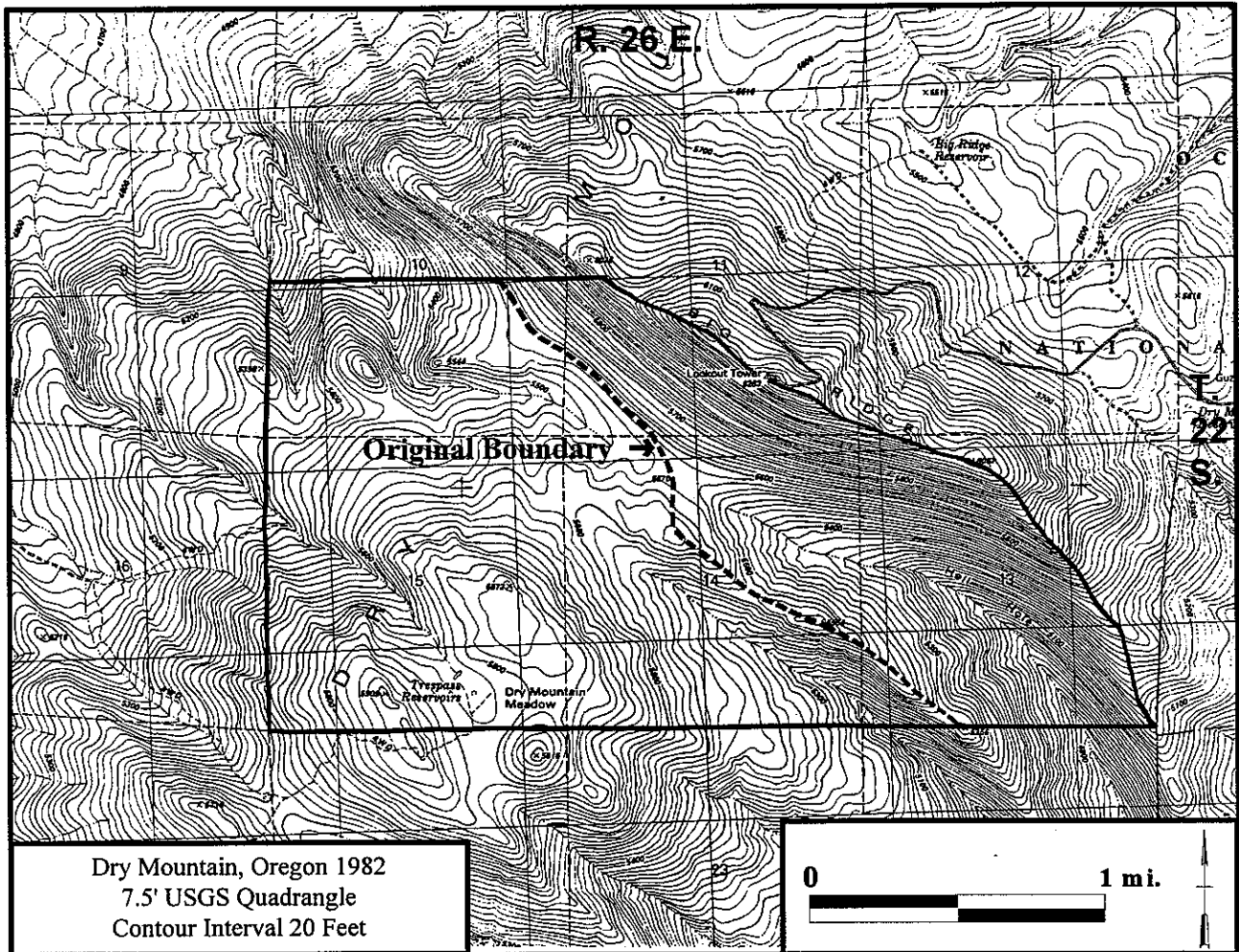


Figure 3: Dry Mountain RNA



Boundary Change: The proposed change incorporates natural watershed boundaries and is more consistent with the topography of the area. The additional acres are currently managed as big game winter range. This change will not have any measurable effect on Forest plan outputs.

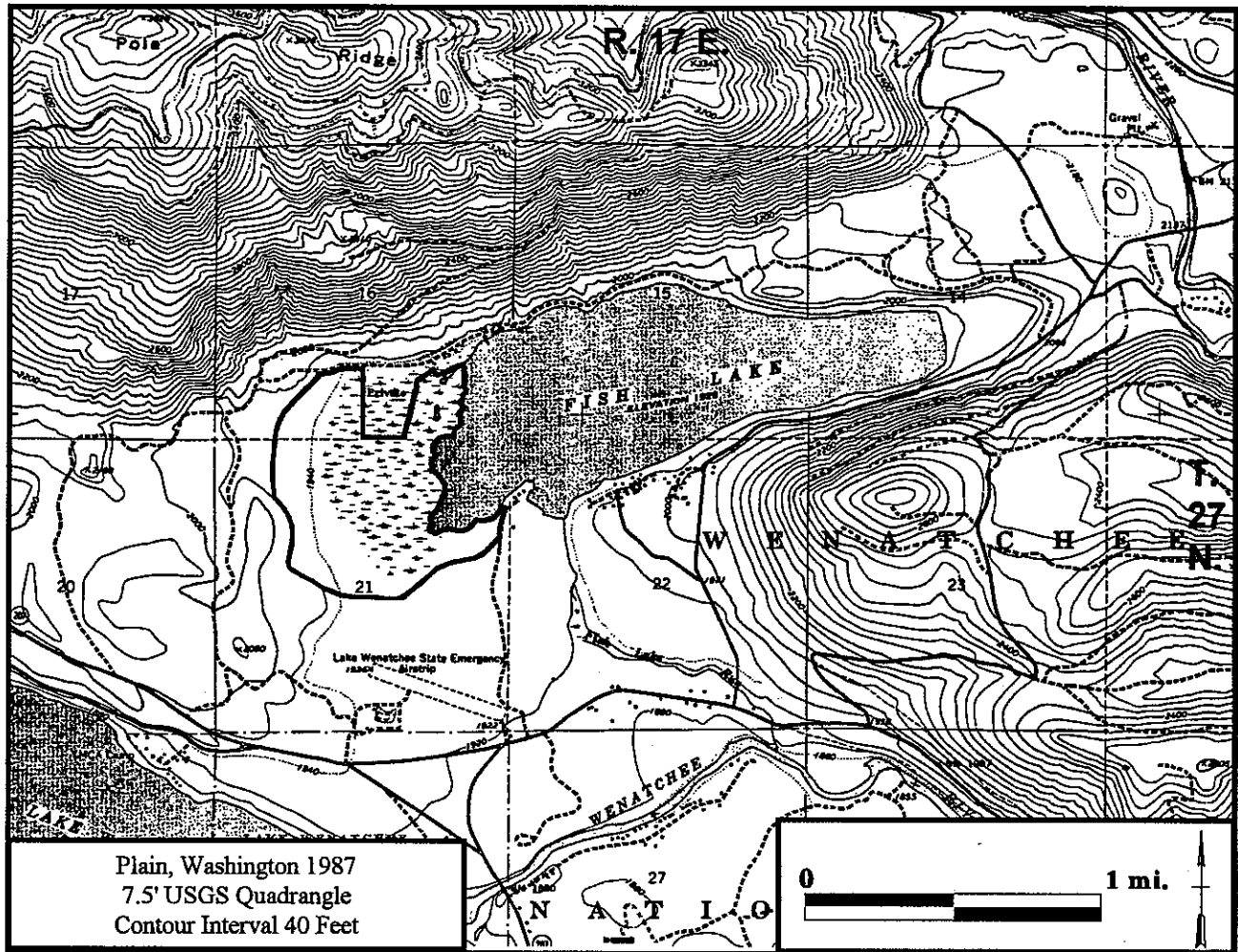
Mineral Resources: There are no reported hardrock mining claims in the RNA. The geology of the area does not lend itself to valuable mineral claims. Salable minerals, such as gravel, are potentially available on the RNA but recovery of these resources would be difficult due to the limited access to the area.

Grazing: Dry Mountain RNA is within the Green Butte grazing allotment but, because of the isolated nature of the site, there has been no recent cattle grazing on this part of the allotment.

Timber: The RNA has not been cruised to determine the volume of timber present but approximately half of the site contains 150-200 year old ponderosa pine in low to moderate densities.

Recreation: Dry Mountain RNA receives almost no recreation use therefore, establishment will have no effect on recreation.

Figure 4: Fish Lake Bog RNA



Mineral Resources: There are no known mineral resources within the RNA.

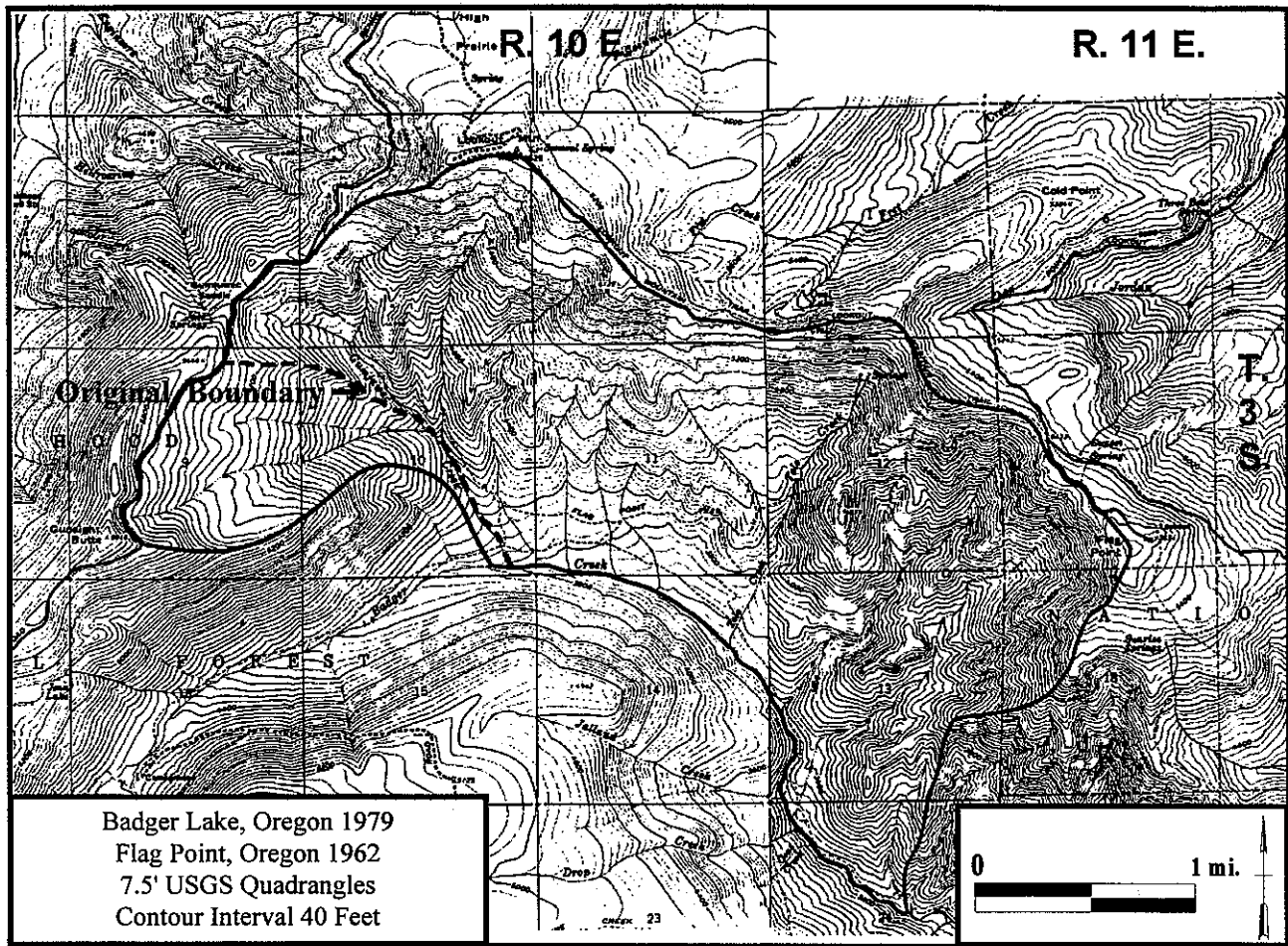
Grazing: There is no grazing allotment or potential for grazing associated with this RNA.

Timber: There about 64 acres of forest land within the RNA. This land was not included in the timber base for the Forest Plan therefore precluding timber harvest on these acres will have no effect on the probable sale quantity.

Recreation: Fish Lake which is adjacent to the RNA is a major fishing, boating, and snowmobiling area. There is a snowmobile trail along the western and northern boundaries of the RNA. This use is not expected to conflict with protection of RNA values. Because of the bog type of vegetation along the lake's boundary with the RNA there will be no impact on the water-based recreational uses of the lake.

Private Land: It is desirable to obtain the 44 acres of private land adjacent to the RNA in Section 16 in order to fully utilize the research potential of this RNA.

Figure 5: Gumjuwac/Tolo RNA



Boundary Change: The boundary was slightly modified during the establishment process to include all of Gumjuwac Creek. Since the whole RNA is within the Badger Creek Wilderness, this change is not expected to change the environmental consequences documented in the Final EIS.

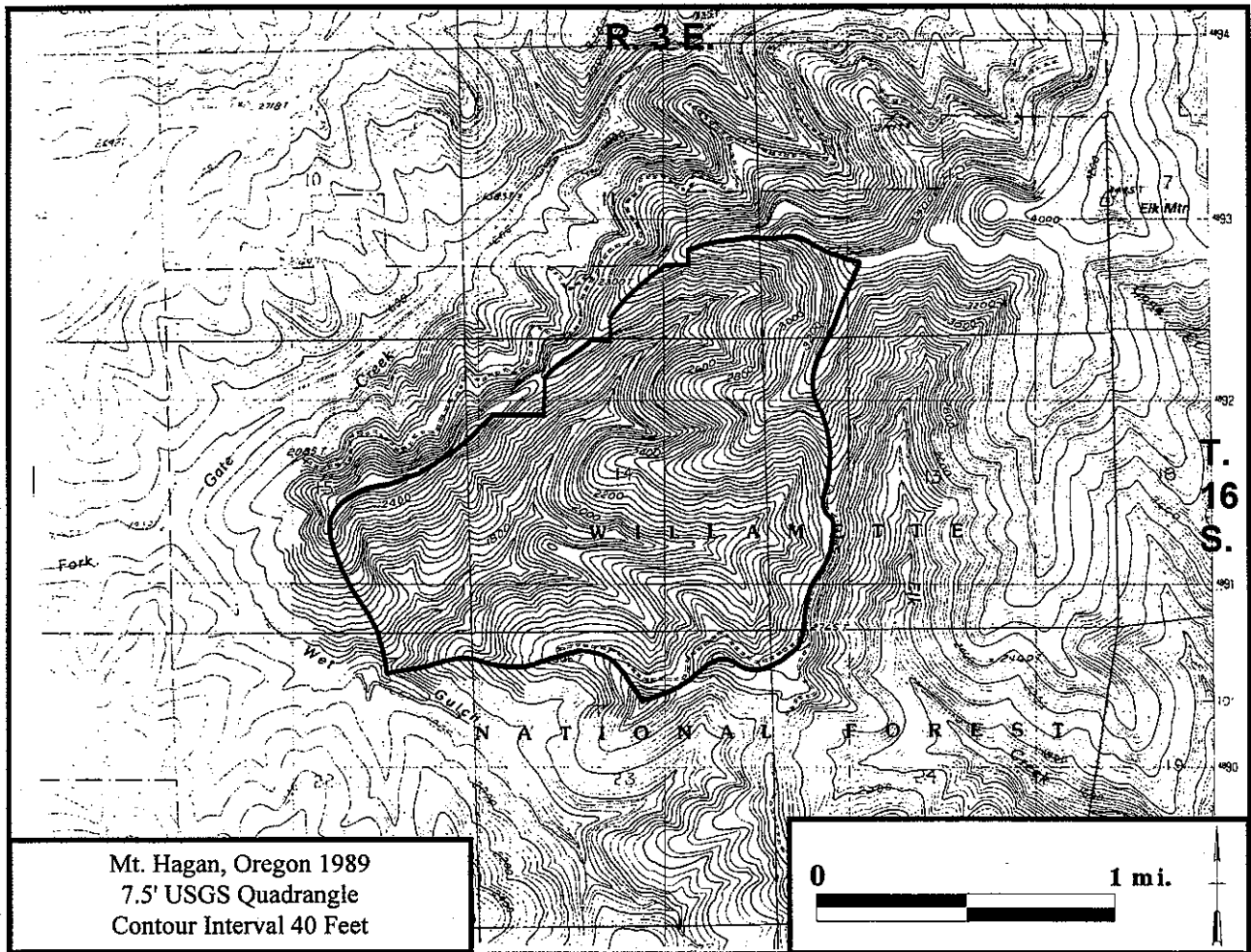
Mineral Resources: This area is considered to have low to very low potential for economic deposits of all minerals except construction rock. The RNA has already been withdrawn from future locatable mineral entry in conjunction with designation of the wilderness.

Grazing: No grazing allotments currently exist within the area.

Timber: There will be no change in the probable sale quantity by establishment of this RNA since the RNA lies entirely within the Badger Creek Wilderness, in which timber harvest is not permitted.

Recreation: Parts of several wilderness trails lie within the proposed RNA and roughly demarcate its perimeter. These trails receive relatively light use and do not appear to detract from the natural values of this area. Therefore, recreation use should not be effected by establishment of this RNA.

Figure 6: Hagan RNA



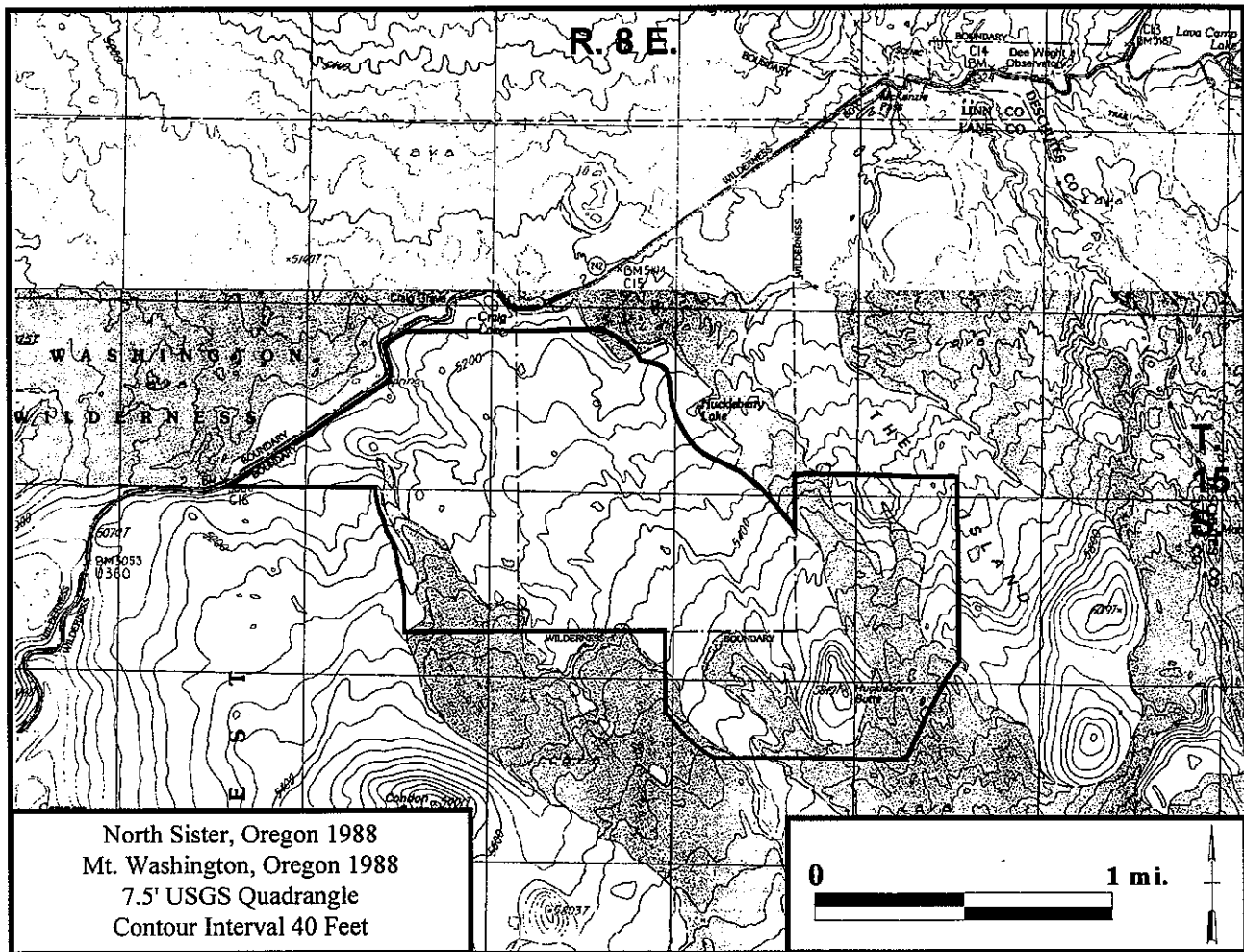
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

Grazing: There are no grazing allotments in or adjacent to the RNA.

Timber: The RNA includes 1126 acres of forested lands that meet the productivity requirements for commercial timber harvest. This land was not included in the timber base for the Forest Plan and is now within a Late-Successional Reserve. Therefore establishment will have no effect on probable sale quantity.

Recreation: Steep slopes and lack of public road access have limited recreational use of the RNA to some hunting use. Establishment is not expected to have any impact on this use.

Figure 7: McKenzie Pass RNA



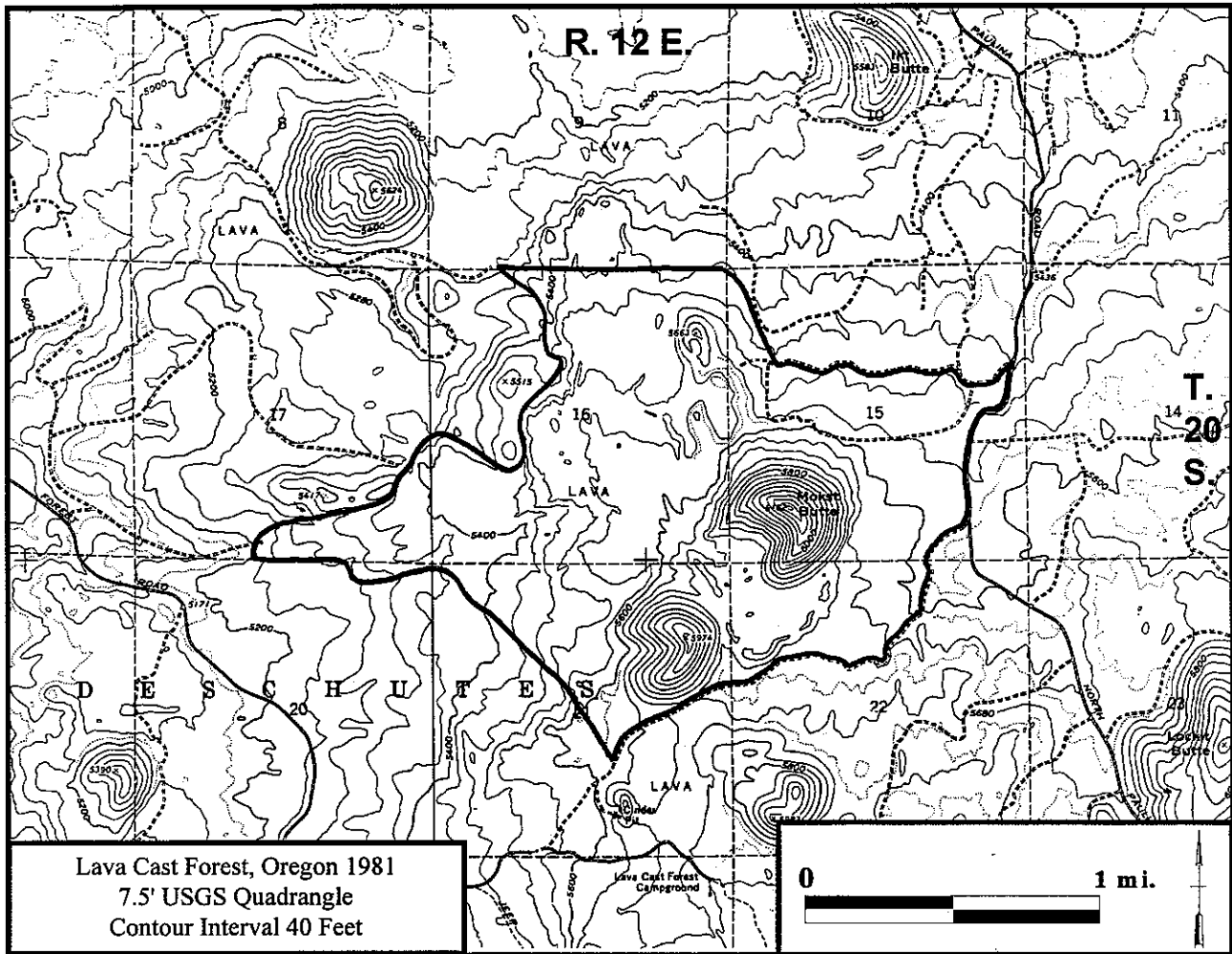
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

Grazing: There are no grazing allotments in or adjacent to the RNA because of lack of forage and inaccessibility of the area.

Timber: The RNA contains 926 acres (out of 1187 acres) of forested lands that meet the productivity requirements for commercial timber harvest. About half of these acres (471 acres) are in the Three Sisters Wilderness and are not available for harvest. The remainder were not included in the timber base for the Forest Plan. Therefore, establishment will have no effect on probable sale quantity.

Recreation: There is light to moderate use of the area by day hikers, mountain bikers, and hunters. Most of the use is concentrated around Craig Lake and Huckleberry Lake, both of which are outside the RNA boundary. The RNA includes 723 acres of the Three Sisters Wilderness. A trail in the eastern portion of the RNA that runs to Huckleberry Butte will continue to be used. No conflicts are anticipated with protection of RNA values therefore recreation use of the area will not be effected by establishment.

Figure 8: Mokst Butte RNA



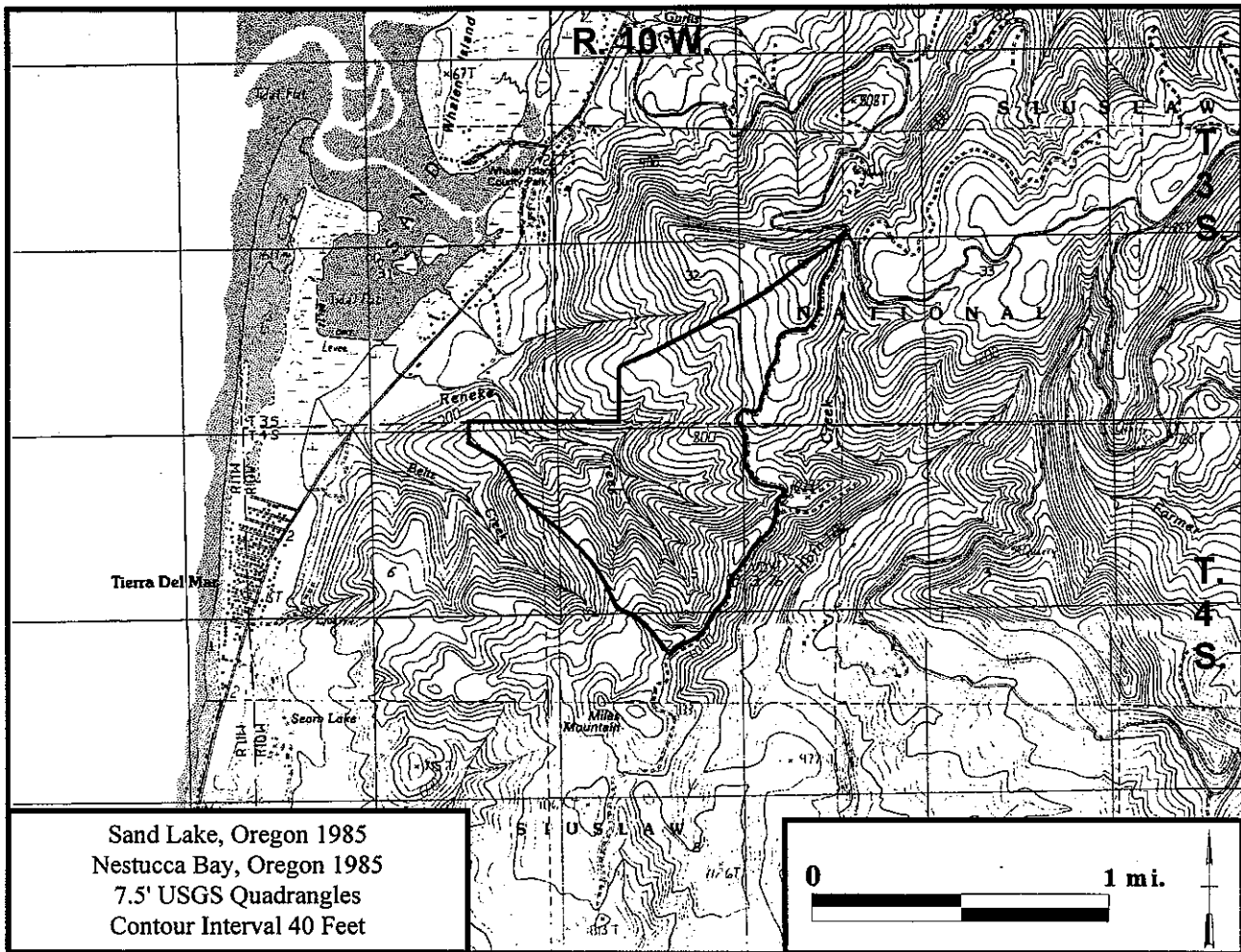
Mineral Resources: The State of Oregon has a mineral reservation covering 480 acres in section 16 of the RNA. The area is also withdrawn from mineral entry under the Newberry Crater National Volcanic Monument enabling legislation.

Grazing: There are two allotments adjacent to the RNA. Both are currently vacant and requirements for the Volcanic Monument already preclude grazing so establishment will have no effect on grazing.

Timber: The RNA contains approximately 500 acres (out of 1250 acres) of forested lands that meet the productivity requirements for commercial timber harvest. This land was not included in the timber base for the Forest Plan. Therefore, establishment will have no effect on probable sale quantity.

Recreation: The RNA receives limited recreation use, mostly hiking and dispersed camping. This use is not expected to conflict with protection of RNA values. Therefore, recreation use of the area will not be effected by establishment.

Figure 9: Reneke Creek RNA



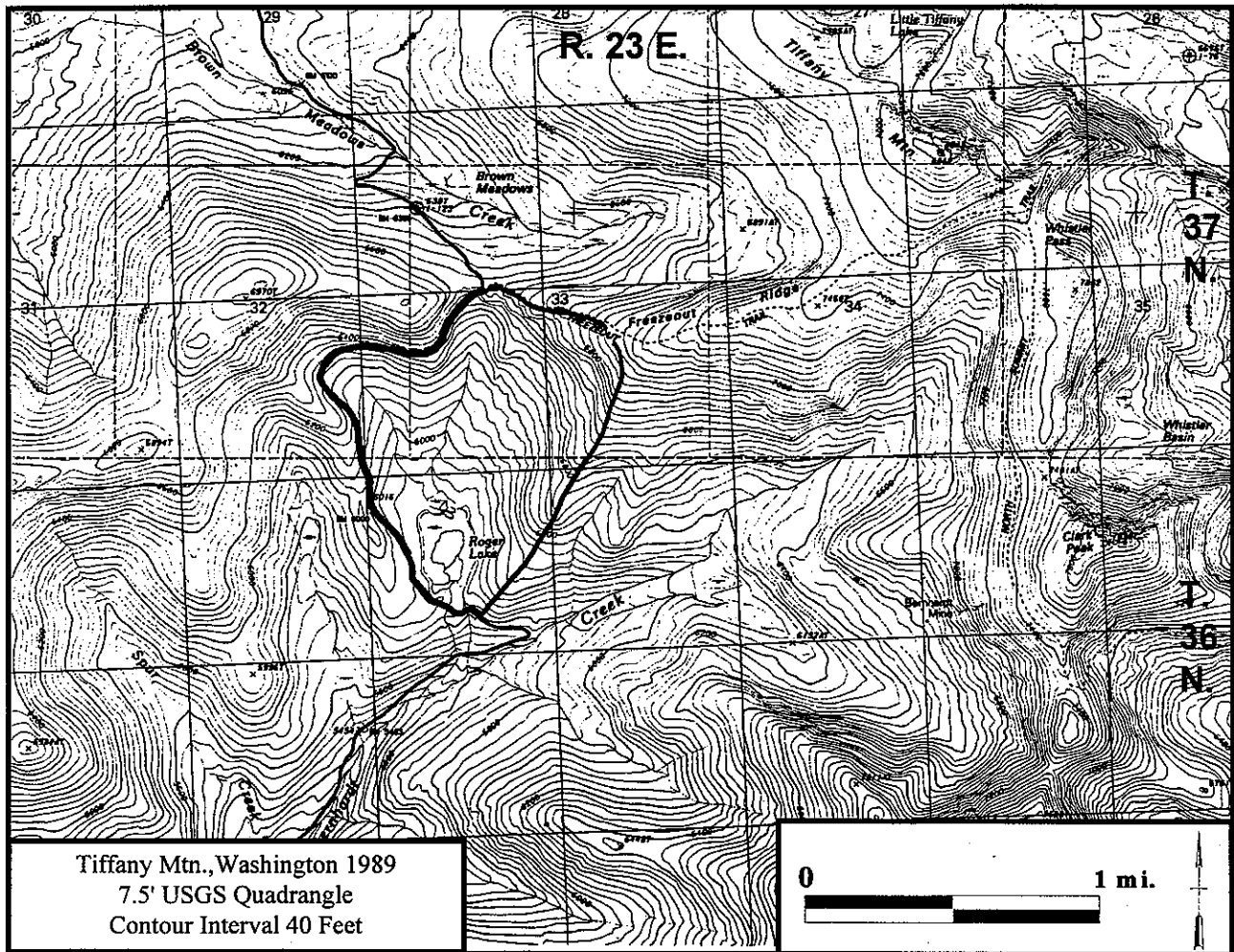
Mineral Resources: There are no known mineral resources in the RNA.

Grazing: There are no grazing allotments in or adjacent to the RNA.

Timber: The RNA is covered by forested lands that meet the productivity requirements for commercial timber harvest. This land was not included in the timber base for the Forest Plan and is within a Late-Successional Reserve. Therefore, establishment will have no effect on probable sale quantity.

Recreation: The RNA receives almost no recreation use. The site is not particularly inviting to hikers because it is densely forested and secluded by private lands. There is some use during hunting season. This use is not expected to conflict with protection of RNA values. Therefore, recreation use of the area will not be effected by establishment.

Figure 10: Roger Lake RNA



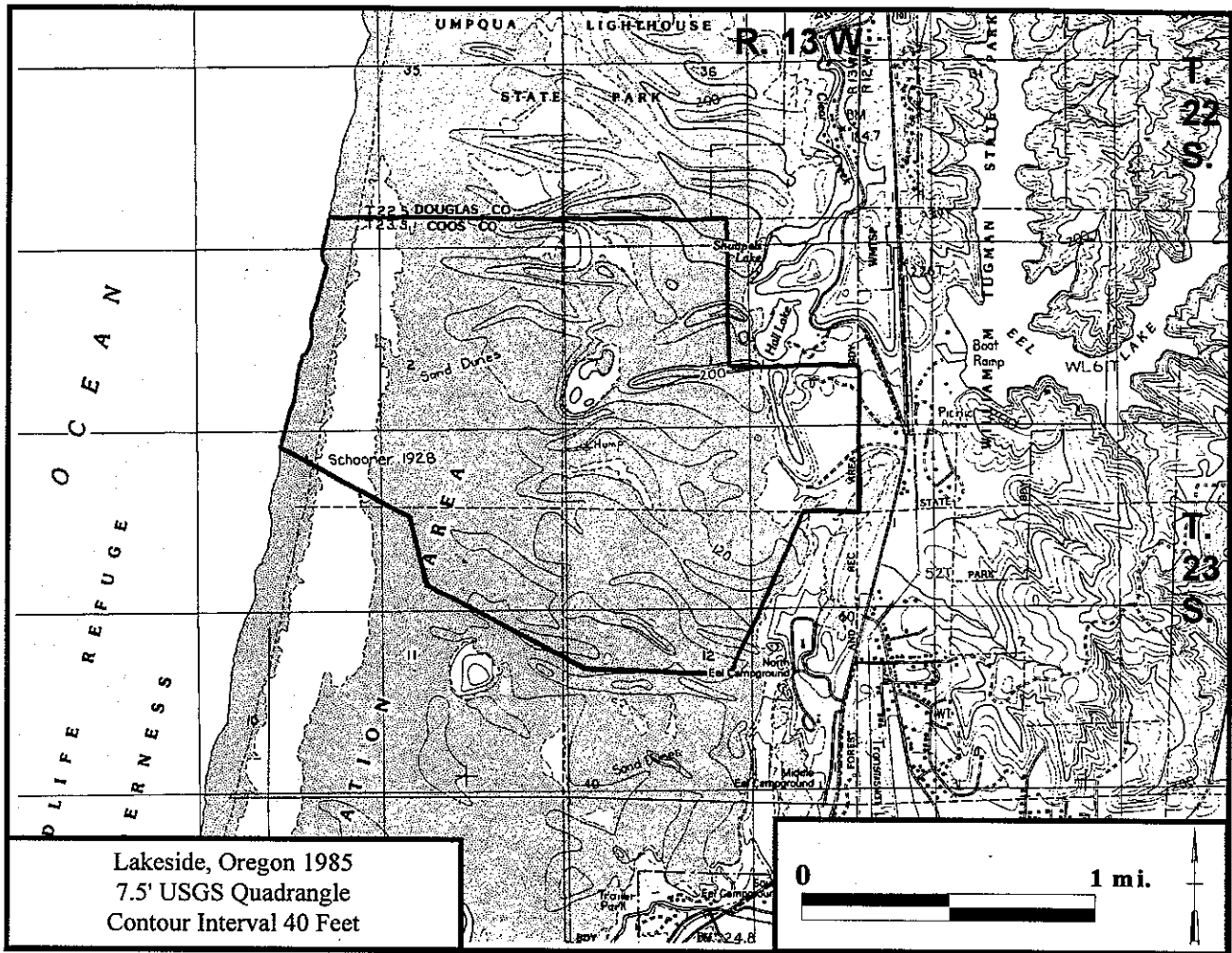
Mineral Resources: There are no known mineral resources in the RNA.

Grazing: The RNA is located within a grazing allotment that has not been grazed since 1987. If this allotment becomes active, the 436 acres in the RNA will be excluded from grazing.

Timber: Approximately 380 acres of the RNA are covered by forested lands that meet the productivity requirements for commercial timber harvest. This land was not included in the timber base for the Forest Plan. Therefore, establishment will have no effect on probable sale quantity.

Recreation: The RNA receives most of its recreation use in the area around Roger Lake where there is a parking area and two campsites. These facilities will be closed as required by the Forest Plan standards and guidelines. Dispersed recreation such as hunting and hiking will continue unless it reduces the research or educational values of the RNA.

Figure 11: Tenmile Creek RNA



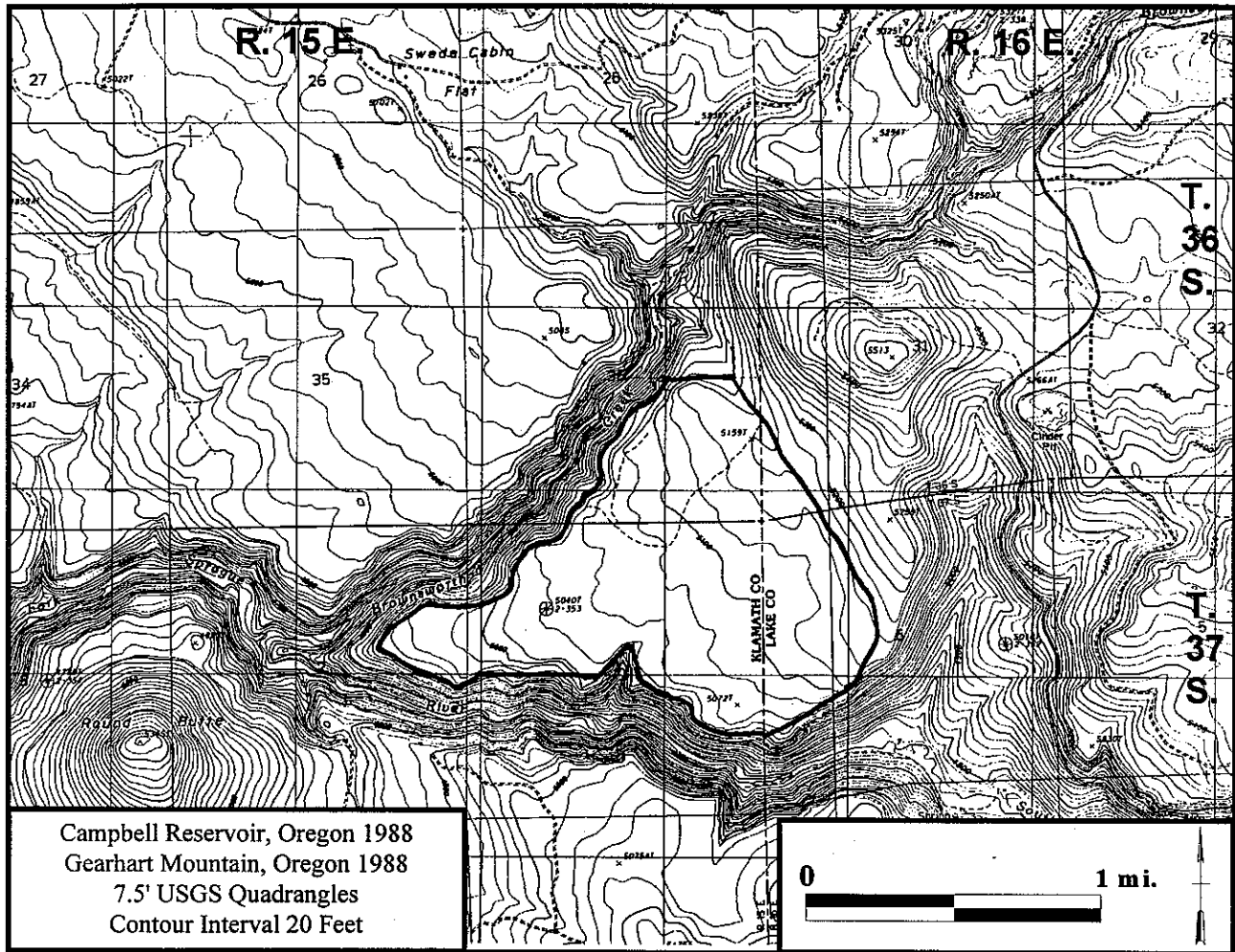
Mineral Resources: This area has been withdrawn from mineral entry as part of the Oregon Dunes National Recreation Area.

Grazing: There are no grazing allotments in or near the RNA.

Timber: A small portion of the RNA consists of timbered lands. These lands were considered unavailable for harvest during analysis for the Oregon Dunes Management Plan and EIS.

Recreation: The RNA receives some recreation use, mostly in the form of day hiking. Recreation in the RNA is a concern if use increases as expected in the Oregon Dunes National Recreation Area. It is anticipated that education of users will be used to minimize conflicts between continued recreational use of the RNA and protection of the research values of the RNA.

Figure 12: Vee Pasture RNA



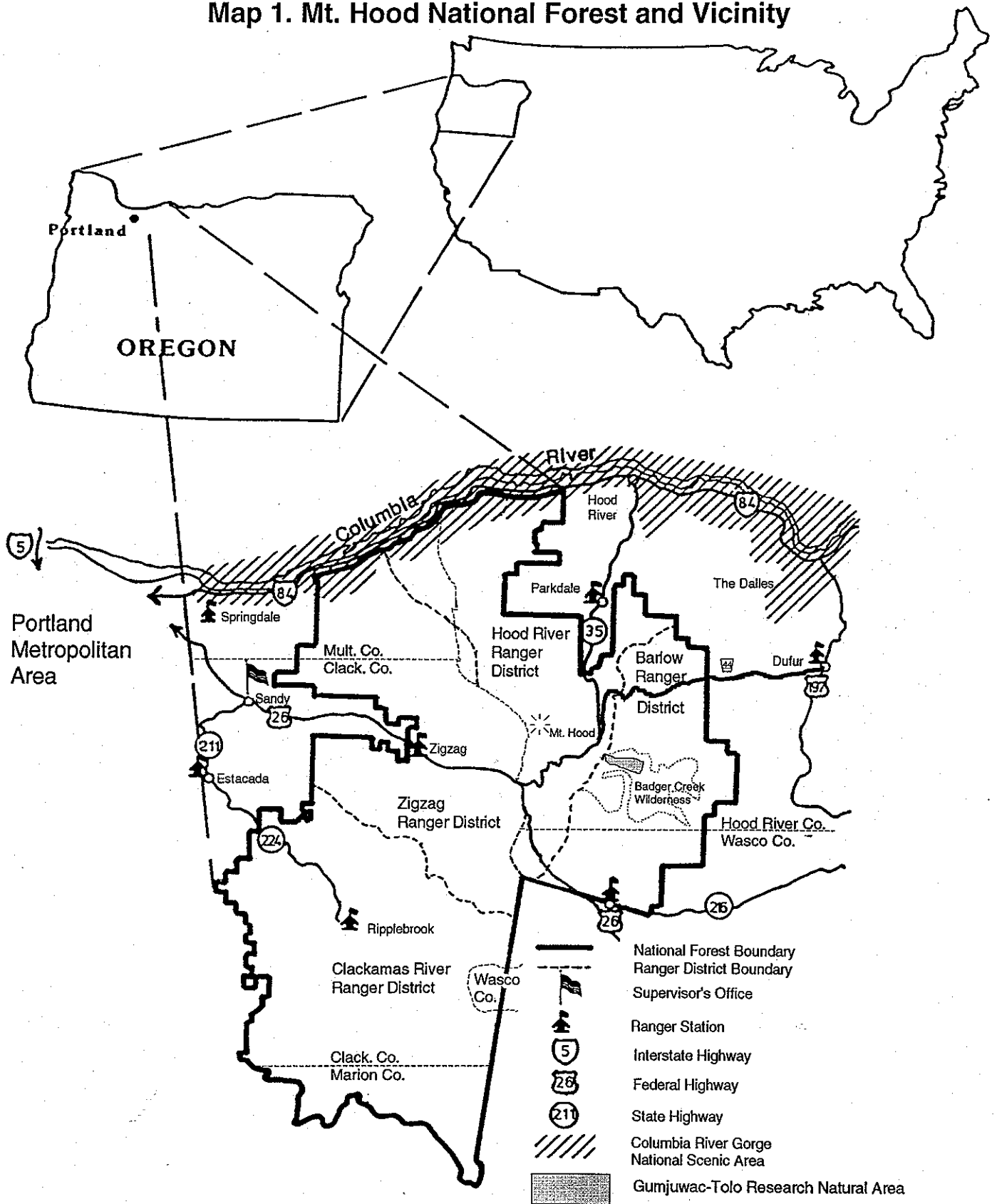
Mineral Resources: There are no known mineral resources in this RNA.

Grazing: Livestock have used this area to only a limited extent due to natural barriers, rocky soil surface, and distance from water. It is not part of any grazing allotment.

Timber: This RNA is covered with grasslands therefore, establishment will have no effect on timber outputs.

Recreation: There is very limited recreational use within the RNA due to its inaccessibility. The most likely use is some hunting. This use is not expected to conflict with the research or educational values of the RNA.

Map 1. Mt. Hood National Forest and Vicinity



A detailed topographic map showing the Gumjuwac-Tolo Research Natural Area. The map features contour lines, a grid, and various geographical features. A thick black line outlines the research area, which includes a 'High Prairie' and a 'Wilderness' area. A creek, 'Badger Creek', is shown flowing through the area. The map is labeled with various elevations and geographical names.

Map 2. Gumjuwac-Tolo Research Natural Area

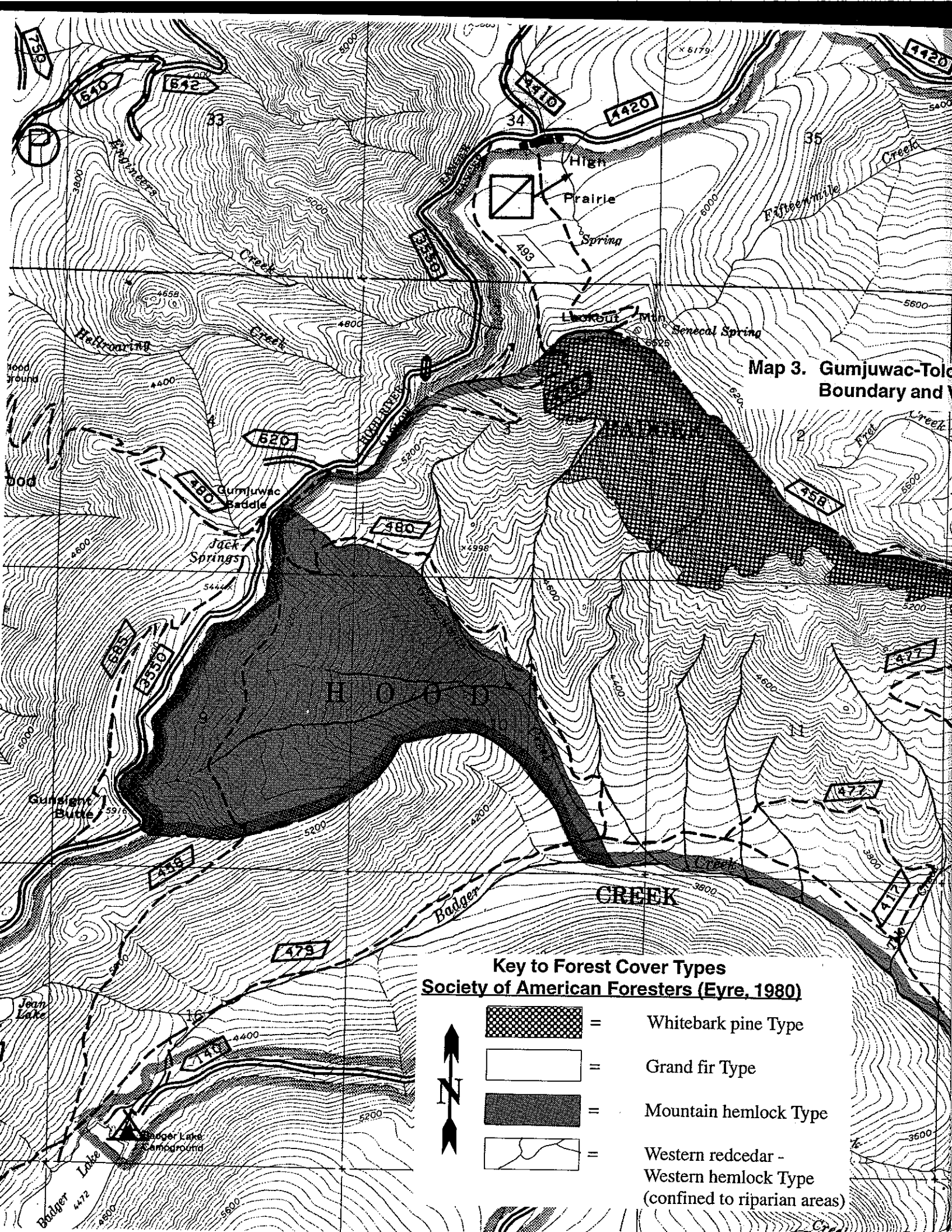
**GUMJUWAC-TOLO
RESEARCH NATURAL AREA**

**High
Prairie**

Badger

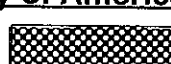
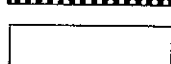
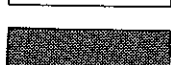

Creek

Wilderness

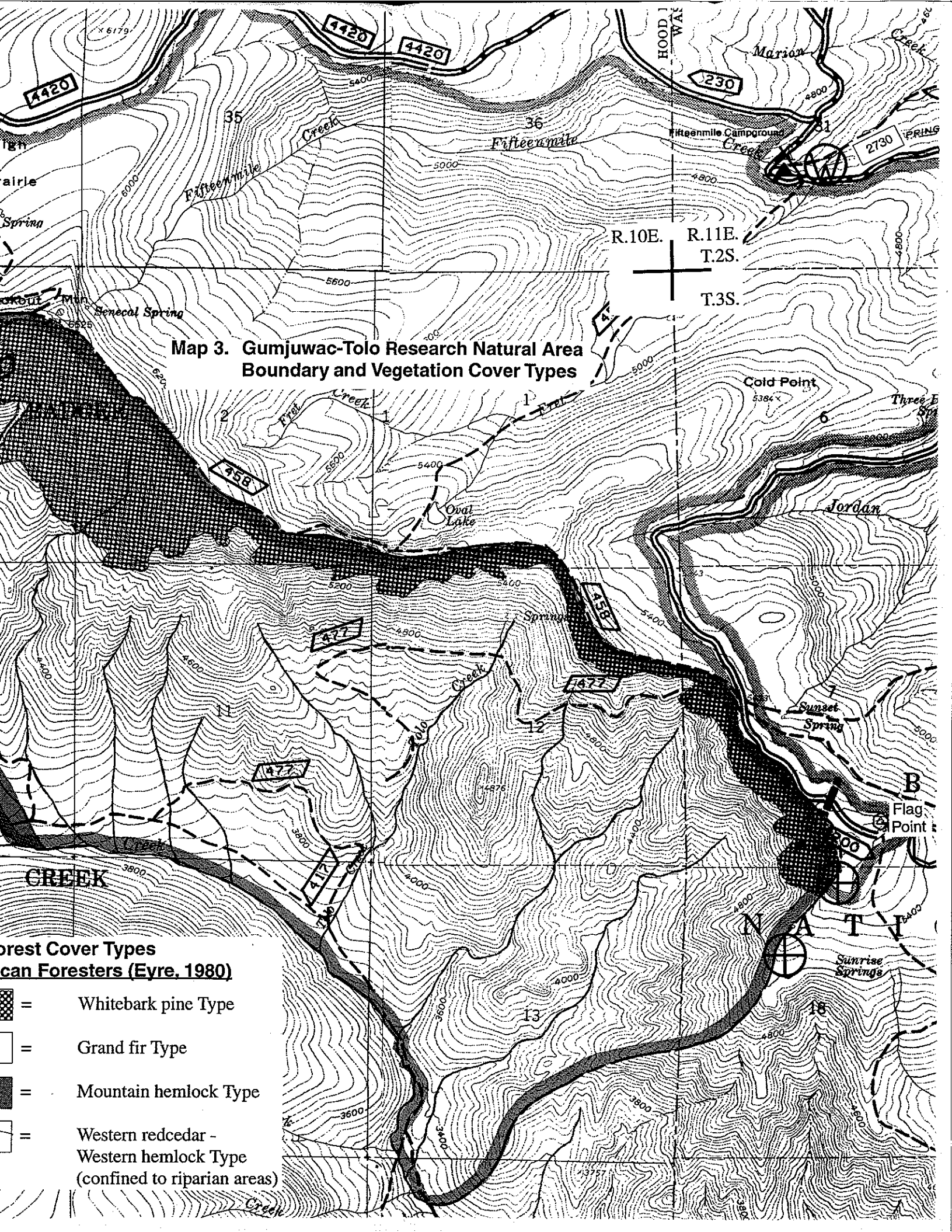


Map 3. Gumjuwac-Told Boundary and V

Key to Forest Cover Types
Society of American Foresters (Eyre, 1980)





-  = Whitebark pine Type
-  = Grand fir Type
-  = Mountain hemlock Type
-  = Western redcedar - Western hemlock Type (confined to riparian areas)





Map 3. Gumjuwac-Tolo Research Natural Area Boundary and Vegetation Cover Types

**Forest Cover Types
from Foresters (Eyre, 1980)**

-  = Whitebark pine Type
-  = Grand fir Type
-  = Mountain hemlock Type
-  = Western redcedar -
Western hemlock Type
(confined to riparian areas)

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

- Qt** **Talus deposits (Holocene and Pleistocene)**----Sheets of blocky lava detritus on some steeper slopes throughout map area. Masks extensive areas in steep, U-shaped canyons; these deposits formed by slope collapse when melting of glaciers removed support from oversteepened canyon walls. Many areas in the proposed Gumjuwac Tolo Research Area have small talus slopes, but are not extensive over the area; therefore, it has not been mapped as its own geologic unit.
- Qls** **Landslide deposits (Holocene and Pleistocene)**----Large slumped areas, generally poorly exposed and mapped on basis of landform. Commonly found where incompetent rocks are exposed beneath overlying thick sequences of lava flows.
- Qf** **Alluvial fan deposits (Pleistocene)**----Poorly to moderately sorted slope-mantling detritus that forms sheet- and wedge-shaped alluvial fans. Mantles lower parts of valley walls; grades downslope into alluvium and pinches out upslope against bedrock. May include till and outwash locally.
- Qg** **Glacial deposits (Pleistocene)**----Very poorly sorted pebbles, cobbles, and boulders in fine-grained matrix. Chiefly till; forms ground and lateral moraines in and adjacent to U-shaped valleys in map area. Includes minor alluvium where reworked by streams. Grades upslope into talus and colluvium. Most prominent glacial valley in the proposed research area is observed beginning at Gunsight Butte, the headwall of the cirque, down the Gumjuwac Creek valley into the Badger Creek valley.

BEDROCK UNIT

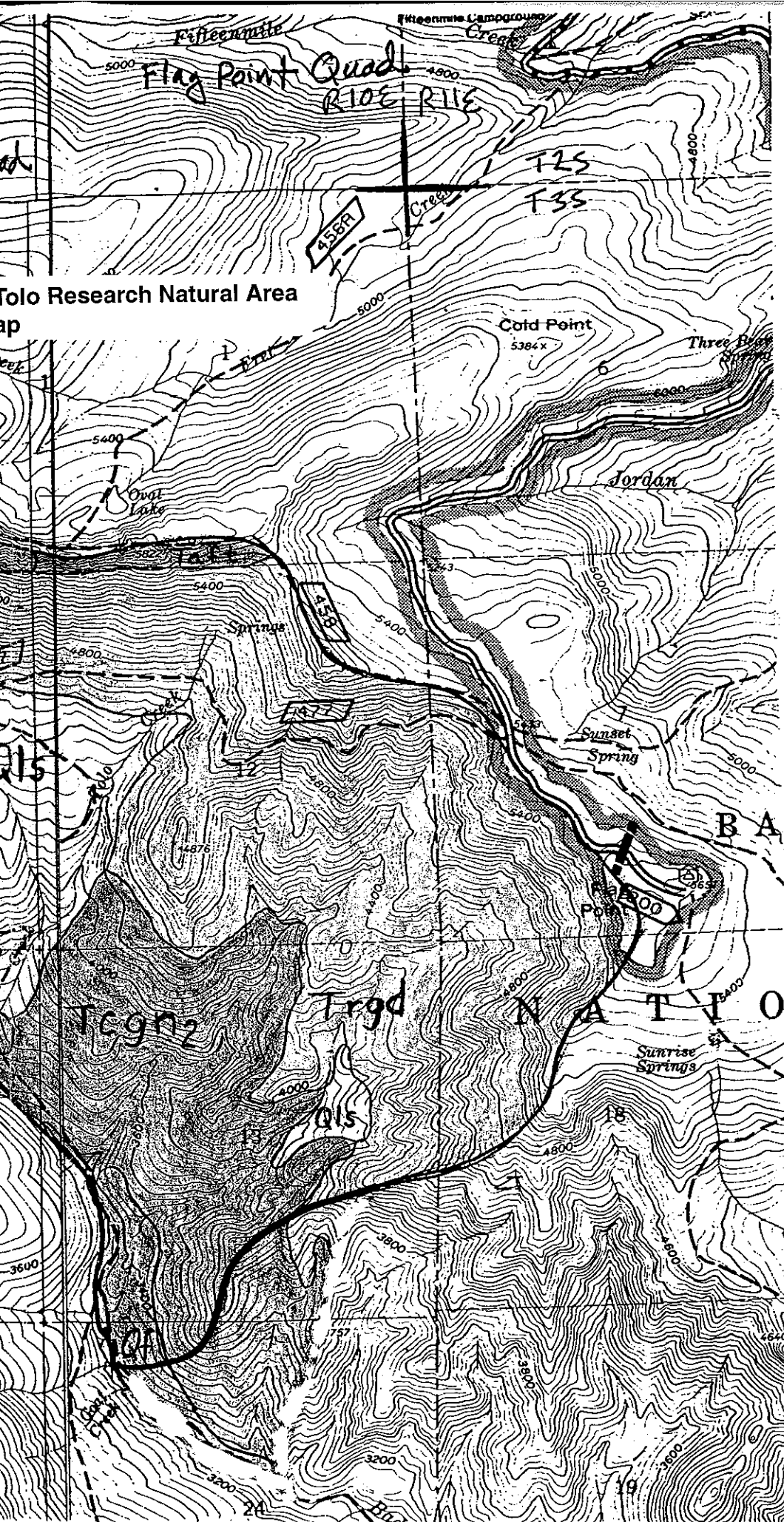
- Taft** **Andesite of Fifteenmile Creek (Pliocene)**----Medium-grey to greenish-grey, porphyritic silicic andesite. Blocky plagioclase phenocrysts 2-5 mm across, 12-15 percent. Orthopyroxene much more abundant than clinopyroxene, but both are less than 1 mm across and less than 1 percent of rock. Age is late Pliocene on basis of K-Ar age of 2.86 ± 0.04 million years ago (Ma).
- Tlma** **Andesite of Lookout Mountain**----Moderately porphyritic two-pyroxene andesite. Includes interlayered olivine basalt flows in lowest parts. K-Ar ages of 2.7 ± 0.03 and 3.0 ± 0.2 Ma.




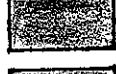






- Trbg** **Rocks of Barlow Ridge and Gunsight Butte (Pliocene and Miocene)**----Chiefly andesite lava flows and minor volcanoclastic strata; composition ranges from basalt to dacite, but mapping is still insufficient to subdivide by lithology. K-Ar age near top of sequence at Gunsight Butte is 4.1 ± 0.6 Ma.
- Trgd** **Rhyodacite of Gordon Butte (Pliocene)**----Medium- to light-grey, light purplish-grey, and white rhyodacite and rhyolite. Massive to thickly flow jointed. In this area mainly found as domes and lava flows. Blocky plagioclase phenocrysts from 1 to 3 mm across, 10-30 percent in abundance, and commonly slightly clay-altered and locally stained with iron hydroxide minerals. Orthopyroxene and clinopyroxene visible locally, less than 1 mm.
- Taef** **Andesite of East Fork Hood River (Miocene)**----Slightly to moderately porphyritic two-pyroxene andesite lava flows and minor breccia or tuff breccia. Rocks increasingly iron-stained and altered southward towards Robinhood Creek, where they overlie pyritized and moderately altered lava of the Columbia River Basalt Group. It is thought that this unit grades north into volcanoclastic strata of the Dalles Formation, but incomplete mapping and nature of transition is unknown.
- Columbia River Basalt Group (Miocene)**----Lava flows of tholeiitic flood basalt erupted from dike swarms in Columbia Plateau and Blue Mountains in eastern Oregon. Only middle Miocene formations of the group are present in the mapped area. Divided into:
- Wanapum Basalt**----
- Tcwf** **Frenchman Springs member**----Slightly porphyritic lava, typically with a few scattered glomerophytic clots of plagioclase. Normal-polarity magnetization.
- Grande Ronde Basalt**----
- Tcgn₂** **Normal-polarity unit 2**----Aphyric to very slightly porphyritic lava. K-Ar age of 15.0 ± 0.3 Ma from normally polarized sample near Tygh Ridge.

REFERENCES:

Sherrod, D.R. and Scott W.E. 1995. Preliminary Geologic Map of the Mount Hood 30- by 60- Minute Quadrangle, Northern Cascade Range, Oregon. U.S.G.S. Open-File Report 95-219. pp 35.

Note: Additional information was included in the unit descriptions by the Mount Hood National Forest Geotech Division.



-  Qls
-  Qf
-  Qg
-  Taft
-  Tlma
-  Trbg
-  Trgd
-  Taef
-  Tcwf
-  Tcgn₂

Toledo Research Natural Area

Geological units labeled on the map include: Qls, Trgd, Tcgn₂, and Tcwf. The map also shows various contour lines and place names such as Cold Point, Sunset Spring, and Sunrise Springs.



Map 4. Gumjuwac-T
Geologic Map

F O R E S T

Map 5. Soil Types of the Gumjuwac-Tolo RNA (Mt. Hood SRI; Howes, 1979)

Map Unit	Description
4	poorly drained forested bottomlands; permanent or seasonally high watertable; soils are slowly permeable and imperfectly to poorly drained.
6	unvegetated talus and rubbleland
7	igneous rock outcrop (basalt or andesite)
354	Level to sloping glaciated mountain slopes. Soils formed in old glacial till which have mixed with volcanic ash.
356	Sloping to steep high elevation mountain slopes. Soils formed on old glacial till.
357	Steep to very steep glaciated mountain slopes. Soils formed in old till deposited by glaciers. In some areas, till has been scoured away exposing highly fractured andesite bedrock.
358	Soils formed on nearly level till plains and outwash deposits. Numerous wetlands occur on this soil type where stratification of gravels and boulders impedes downward water movement.
359	Steep to very steep valley sideslopes. Soils formed in old glacial till with colluvium from slopes above.

