UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Establishment Report

CHEWUCH RESEARCH NATURAL AREA

Okanogan National Forest
Okanogan County, Washington

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for
Research Natural Area Establishment Record

Chewuch Research Natural Area
Okanogan National Forest
Okanogan County, Washington

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ESTABLISHMENT RECORD
CHEWUCH RESEARCH NATURAL AREA

OKANOGAN NATIONAL FOREST
OKANOGAN COUNTY , WASHINGTON

INTRODUCTION

The Chewuch Research Natural Area (RNA) is 8,500 acres (3400 ha) comprised of diverse aquatic and terrestrial habitats. The area includes a four mile reach of riparian vegetation along a fourth-order stream draining the eastern Pasayten Wilderness (See Figure 1). The riparian ecosystem (riparian hardwoods-black cottonwood/willow) associated with the Chewuch River is intact and relatively undisturbed in this area . Other ecological cells identified in the area include Engelmann spruce-subalpine fir forest on lower slopes, an upwelling cold spring, lodgepole pine forest, and subalpine meadows. The RNA is on National Forest land and is entirely surrounded by the Okanogan National Forest. These lands have been managed by the United States Forest Service since 1897.

LAND MANAGEMENT PLANNING

The Chewuch RNA was recommended for inclusion in the Research Natural Area System in the Record of Decision for the Okanogan National Forest Land and Resource Management Plan (USDA Forest Service 1989, section 3 - 12).

(Note: The spelling of the river was changed from Chewack to Chewuch several years ago and so both spellings may be found in the literature of the area.)

OBJECTIVE

In general, the objective of the Chewuch RNA is to preserve the assemblage of unique aquatic and terrestrial habitat types located in the RNA. RNA's serve as reference for study, baseline areas for determining long term ecological changes, and as monitoring areas to determine effects of forest management techniques and practices applied to similar ecosystems.

This RNA is proposed specifically to study geomorphic features and processes. To that extent, disturbances such as rockslides are a desirable feature. Although the massive rock movements that sculpted much of this area are not in the historical record, the processes of talus slumping, rockslides, debris flows, and channel downcutting can occur again at any time. This area represents an excellent opportunity to study how these processes evolve over time. Interesting questions include the relative contribution of glacial processes (valley cutting, downwasting, outwash, rebound) versus processes still active today.

JUSTIFICATION

The Forest Service establishes Research Natural Areas (RNAs) for the purpose of (1) preservation of examples of all significant natural ecosystems for comparison with those influenced by man; (2) provision of educational and research areas for ecological and environmental studies; (3) preservation of gene pools for typical and rare and endangered plants and animals. This is accomplished through the designation of desired "cells" that correspond on the ground to the land type and desired species (including animals as well as plants) present in an area (Washington Department of Natural Resources 1995).

PRINCIPAL DISTINGUISHING FEATURES

The Chewuch River Research Natural Area encompasses the 3000 foot deep Chewuch River gorge between its confluence with Thirtymile Creek and Andrews Creek, south to North Twentymile Peak. The Chewuch River area is characterized by low-relief, continentally glaciated terrain with ridges averaging 6000-7000 feet (1800-2100 meters) in elevation.

The RNA helps fill the following cells from the Washington Natural Heritage Plan (Washington Department of Natural Resources. 1995):

Eastern Cascade Province

A. Terrestrial
- 3. Douglas fir/pinegrass (partial)
- 23. Englemann spruce/common horsetail
- 27. Subalpine fir/smooth woodrush (partial)
- 36. Black cottonwood/willow
- 39. Lodgepole pine forest

B. Aquatic
- 13. Mid elevation stream and riparian system
- 16. Cold spring

Major features of this RNA are derived from the way in which the Chewuch River has been blocked by talus slumping from the west cliff face, debris torrents and alluvium from Sheep, Trench and other creeks, and a rockslide and blockfield at the upper (north) end south of Thirtymile Creek. Along these blockages the channel was forced against the talus slopes, while upstream from them, the channels become meandering. Other unique features include blockfields, subalpine cliffs, subalpine peatlands and subalpine dry meadows.

LOCATION

The Chewuch RNA is located in the Okanogan National Forest on the southern boundary of the Pasayten Wilderness. The center of the RNA is at approximately Latitude 48° 48' North, Longitude 120° 2' 30" West . It includes parts of sections 19 and 30, T. 38N, R. 23E, sections 13, 14, 15, 22, 23, 24, 26, 27, and parts of sections 9, 10, 11, 12, 16, 21, 25 and 28, T. 38N, R. 22E,.

Boundary

A precise boundary description may be found in Appendix I. The RNA is located between Andrews Creek and Thirtymile Creek, the Pasayten Wilderness boundary and the North Twentymile trail.

Area and Elevation

The total area of the Chewuch RNA is 8500 acres (3400 ha). It ranges in elevation from 3280 feet (1000 m) near Andrews Creek to over 6000 feet (1800 m) on the ridgetops to the southwest.

Access

The Chewuch RNA is approximately 20 miles north of Winthrop, Washington. The most direct route to the RNA from Winthrop is north along the west side of the Chewuch River for approximately 21 miles on FS Roads 51. The road runs through the north portion of the area. It provides access to developed sites and trailheads northeast of the RNA and is used by snowmobilers in the winter. The road is generally open from May to November depending on snow conditions. The Okanogan National Forest map (scale 1/2 inch: mile) shows the general access to the RNA as does Figure 2.

Maps

The USGS 7.5 minute 1991 Coleman Peak quadrangle map includes the Chewuch RNA area.

AREA BY COVER TYPE

The below table shows the distribution of the general cover types derived from the field reconisence with cross references to both the Society of American Forestry (Eyre, 1980)and Kuchler (Hall, 1979) cover types. In addition to this the area has also been mapped by plant association groups (PAG). These PAGs are being developed by the Region Six, Area Ecology program (Kelley, 1998). Data used in describing the Forested Plant Associations of the Wenatchee National Forest (Lillybridge et al, 1995) was also incorporated into the development of the PAGs. The described plant associations are grouped according to both biolocial and physical characteristics of each. The largest percentage of the Chewuch RNA is classified as a Douglas-fir, Cool Dry Grass PAG (25%) with the second largest area being Subalpine fir, Cool to Cold, Mesic to Moist PAG (20%). Cold Alpine Parklands make up the third largest PAG at 12% of the area. For more detail refer to Appendix VI for the map, detailed descriptions of each PAG, and the plant associations most likely to be encountered within each.

TABLE 1: Chewuch RNA Vegetation Classifications.

General Classification of Cover Types	Total Acres	Total Hectares
Bottomland and Mixed Conifer	524	210
Bottomland Riparian Deciduous & Meadow	91	36
Lower Slopes with Coniferous Old Growth	61	24
Mid-montane Coniferous Seral	1732	693
Rocky Cliffs and Talus	1714	686
Subalpine Meadows	47	19
Subalpine Vegetated Cliffs	1011	404
Subalpine Zone with Spruce-fir	683	273
Subalpine Zone with Dry Lodgepole Seral	1844	738

SAF Classifications *		
206 Engelmann spruce-Subalpine fir	3897	1564
235 Cottonwood/Willow	105	42
210 Interior Douglas-fir	3697	1485
217 Aspen	8	3
Kuchler Classifications **		
K15 Western Spruce-Fir Forest (*Picea-Abies)*	2877	1155
K52 Alpine Meadows and Barrens (*Agrostis, Carex, Festuca, Poa)*	1020	410
K12 Douglas-fir Forest (*Pseudostuga)*	3810	1529

*SAF Codes taken from Eyre (1980).
**Kuchler Codes taken from Hall (1979).

CLIMATIC CONDITIONS

Summers in the Okanogan National Forest are sunny, warm, and dry with some hot days. Frequent weather changes in winter are due to Pacific weather systems and occasional invasions of arctic air masses. The daily temperature range is about 13°C in the winter and near 30°C degrees in the summer. Annual precipitation ranges from about 12 and 20 inches (30 and 50 centimeters) in the valleys and 25 inches (64 centimeters) or more along the Cascade slopes. Two-thirds of the annual precipitation falls between October and March (Donaldson, 1975).

Meteorological data are from 29 years of observations at Lemanasky Lake, Washington (elevation 3,500 feet, lat. 48°43' north, long. 119°38' west) and were recorded between 1926 and 1955. The average maximum/minimum temperatures were 50° F. / 30° F.(10° C. / -1° C.), with a mean temperature of 40° F.(4° C.). The highest recorded temperature was 89° F.(32° C.) while the lowest temperature recorded was -27° F.(-33° C.). Average annual precipitation was 19.87 inches (49.6 centimeters). Lemanasky Lake is approximately 20 miles (26 kilometers) ESE of the RNA.

DESCRIPTION OF VALUES

Flora

Historical Events Relative to Chewuch River Flora Information

- 1929. The Remmel Fire burned 40,000 acres in the Chewuch River watershed (Harris and Anderson (1943). Early livestock operations took advantage of the forage released during the ensuing decades.
- 1948. A severe spring flood washed out portions of the Chewuch, Methow, Chelan and Boulder drainages, taking with it almost all bridges between Winthrop and Pateros. US Army Corps work crews subsequently attempted to remove all sources of large woody debris, including beaver dams and log jams in all tributaries of this river system, causing irreparable bank damage to the integrity of the lower Chewuch River, which fortunately was spared the RNA.
- September, 1987. The Chewuch River RNA was originally proposed during the 1980s by local Methow Valley residents. The Forest Service sent representatives to evaluate the proposal to include the Chewuch River RNA in the Final Forest Plan. Attending were Sarah Greene, Research Natural Area Scientist, Peter Morrison, Twisp RD botanist, Rex Crawford, Washington Natural Heritage Program, Frank Hanford, Winthrop RD range specialist, and Clint Williams, Area Ecologist.

- May, 1988. The Okanogan Chapter of the Washington Native Plant Society held its first trip to the area to see *Juniperis scopulorum, Lewisia tweedyi* and large *Picea engelmanii*. Attendees were George Wooten and Linda Zbigley
- July, 1994. The Thunder Mountain Fire (Figure 4) burned through the northern part of the Okanogan Range, into the upper part of Sheep Creek in the proposed Chewuch RNA. Heavy equipment was used to clear a fireline into this part of Sheep Creek.
- July, 1995. A reconnaissance plant survey of the Chewuch RNA was conducted on the talus slopes by George Wooten.
- June, 1996. Implementation of a plan for riparian restoration on Chewuch River point bars is begun. The restoration is based on maintaining fluvial processes through point bar stabilization with large woody debris.
- August, 1996. A Mountaineers Foundation grant was awarded to Trust for Habitat Conservation to begin an amphibian breeding survey in the Thunder burn area, including upper Sheep Creek. Mary Poss and Dana Visalli completed the amphibian survey and report.
- July, 1996. Plant surveys were conducted in upper Sheep Creek by George Wooten
- 1993. Tony Basabe, Therese Bielak, Nina Braxton, David Doop, and Paul Duckick from Western Washington University completed the Biological Evaluation for sensitive plants in the Boulder Analysis Area, which covered all of North Twentymile Ridge on the RNA border (Basabe, 1995).
- July 1996. Plant surveys were conducted in the bottomlands and talus by George Wooten, in conjunction with geomorphologist Jana Mabry.

Description of Flora

During the field surveys complete species lists were compiled. Threatened, endangered, and sensitive (TES) plants lists from the Washington Natural Heritage Program and the Regional Forester's TES plant list were considered. These and all other suspected rare species were surveyed for during work on the Chewuch River RNA. No known TES species currently on the R6 Regional Forester's TES list (1993 revision) were encountered. Currently there are 3 species known to occur in the Chewuch watershed that are listed as sensitive or watch list species by the Washington Natural Heritage Program (1997). These are discussed below under the Rare Plants section. A list of all vascular plant species encountered during the field surveys can be found in Appendix II.

The plant list in Appendix II was developed from the USDA Plants Database, using an accompanying Paradox database suite written by the author to analyze plant information. The vascular plant nomenclature, most phytogeography, and other accompanying data found in PLANTS for the plants known to occur within North America were provided under a cooperative agreement by John Kartesz and his staff at the Biota of North America Program (BONAP). Portions of these data are copyrighted (© 1994, USDA, NRCS 1995) by John Kartesz, Biota of North America Program. The copyright notice must be preserved on all copies. Any user who alters any part of the Cooperator derived data cannot redistribute it as PLANTS data. All users of vascular PLANTS data are to acknowledge the contributions made by the Natural Resources Conservation Service (NRCS) and BONAP.

Earth hummocks, described by Scotter and Zoltai (1992), were found in the forest. These are low mounds spaced evenly in open, wet meadows, near rocky areas. They are believed to be associated with deposition of a layer of volcanic ash, during a period of permafrost. These are poorly formed in contrast to those of Thirtymile Meadows approximately 6 miles to the east, and appear to be in decline due to forest encroachment.

Rare plants The following plants are listed by the Washington Natural Heritage Program (WNHP, 1997) as species of concern for the state. Plot numbers are located on figure 4. There were no known Region 6 Forester's threatened, endangered or sensitive plant list (1993 revision) found in the RNA.

Arnica rydbergii (WNHP, Watch) - summit of North Twentymile Peak, plot CH400.
Carex scirpoidea var. *scirpoidea* (WNHP, Sensitive) - summit of North Twentymile Peak, plot CH400.
Penstemon washingtonensis (WNHP, Watch). This endemic plant occurs in drier areas at high elevations. Apparent hybrids between this and *Penstemon confertus* were also found. This was unexpected, since *Penstemon procerus* appears more similar morphologically to *P. washingtonensis*, however hybrids between *P. procerus* and *P. confertus* haven't been observed.

Sensitive plants of nearby areas are suspected to occur in the Chewuch River RNA, but these were not found. They include *Botrychium lanceolatum* (occurring under redcedar, *Thuja plicata*, which is absent from the RNA), *Sanicula marilandica, Salix tweedyi* and *Carex pauperculus.*

Mosses and liverworts (Lawton 1971, Schofield 1992) Some prominent mosses and liverworts were identified as follows:

Brachythecium salebrosum - uncommon in moist, open forests.
Bryum caespiticum - common in areas burned in the 1994 Thunder fire.
Dicranoweisia crispula - forested areas.
Dicranum fuscescens - dry, forested areas.
Dicranum scoparium - dry, forested areas.
Fontinalis antipyretica - submerged in deep pools in the Chewuch River.
Ceratodon purpureus - common in areas burned in the 1994 Thunder fire.
Homalothecium aenium - open forested areas.
Leptobryum pyriforme - disturbed areas and loose talus.
Marchantia polymorpha - common in areas burned in the 1994 Thunder fire.
Pleurozium schreberi - forested areas.
Polytrichum juniperinum - bare or disturbed soils at higher elevations.
Racomitrium ericoides - Dry sandy soils and talus piles.
Racomitrium lanuginosum - talus piles.
Ulota obtusiuscula - on boulders and rocks.

Lichens (Hale 1979, McCune, and Goward 1195) Many lichens occur in the Chewuch River RNA. A few notable examples were identified as follows:

Alectoria sarmentosa - uncommon on trees.
Bryoria fremontii - common and abundant on older trees throughout the area.
Cladonia cervicornis ssp. *verticillata* - sandy soil.
Cladonia deformis - talus.
Cladonia ecmocyna - talus.
Cladonia multiformis - talus.
Peltigera venosa - forested areas.
Peltigera canina - forested areas.
Parmeliopsis ambigua - on birch bark.
Parmeliopsis hyperopta - on birch bark.
Rhizocarpon geographicum - on exposed talus boulders.

Solorina crocea - common at higher elevation moist sites.
Stereocaulon alpinum - scattered in drier high elevation sites.
Umbilicaria spp. - patchy to common on stabilized talus.

In the 1997 Washington Natural Heritage Program threatened, endangered, and sensitive species list revision non-vascular species are also identified. Of the above listed mosses, lichens, and liverwarts only *Umbilicaria phaea* var. *coccinea* was listed as a Priority One for consideration. It is recently known from sightings in adjacent Chelan County and may likely be present in our area. Further idendification to species is needed to confirm which species of *Umbilicaria* is present in the RNA.

Wood decay fungi Observed in the bottomlands of the RNA include *Phaeolus schweinitzii, Fomitopsis pinicola, Fomes fomentarius*, and *Coniophora puteana*. Higher elevations typically have *Polyporus tomentosus, Fomes nigrolimitatus, Polyporus domkeyi, Polyporus abietinus, Polyporus subacida, Polyporus atropurpurea,* and *Fomes pini* (seen nearby in 1997 in Thirtymile Meadows, with identification by forest pathologist Art Partridge, Ph. D.). The Thunder fire produced prominent flushes of *Morchella elata*, a *Cortinarius* in the *cinnamomaobadius* group and a *Psathyrella* in the *hydrophila* group. References for wood decay fungi are Hagel et al, (1990) and Partridge and Miller, (1973).

Introduced Plant Species Twenty-two introduced species, or approximately 8% of the total number of vascular plants, were found in the Chewuch RNA, including the following Noxious Weeds of Washington state: *Centaurea diffusa, Cirsium arvense, Cirsium vulgare, Hypericum perforatum,* and *Verbascum thapsus*. *Centaurea maculosa* may be present, but it was not recorded on data sheets.

The road through the bottom of the RNA (Figure I) is one of the main corridors for introduced species to enter the RNA. Two of the greatest incursions are of Kentucky bluegrass (poa pratensis) and flannel mullein (verbascum thapsus). The former is ubiquitous on the Okanogan, while the latter becomes weedy in dry and rocky areas such as in the RNA. Even in the talus of Sheep Creek, and on the east-facing cliffs, neither of which is passable by sheep or cattle, one can find patches of both of these plants.

Past livestock grazing resulted in the establishment of a number of weedy introduced grasses, primarily in the bottomlands. In many cases these introduced plants have overtaken native species, so that the original character of the bottomlands has changed in an unknown way. Douglas poison-hemlock (conium maculatum) is a common herbaceous dominant in these meadows, and it is interesting to speculate if its dominance is due to past avoidance by stock.

Plant Communities

Vegetation data has been gathered in the Chewuch RNA. There is a complete species list of the scientific and common names is found in Appendix II. Plant communities described are broad groups that were visited and mapped in the Chewuch River RNA (See figure 3). The letter/number monikers refer to vegetation plots used to describe the plant communities and their locations can be found in figure 4.

1. Rocky cliffs and talus
Plant communities: vegetated talus made up of rocky bluffs. Talus and talus blockfields are heavily covered by lichens, mosses, and some vascular plants and old trees. The predominant vegetation are mosses and lichens. Vascular plants are found in minor amounts and are comprised of *Populus tremuloides, Holodiscus discolor, Juniperus communis, Amelanchier alnifolia* var. *cusickii, Clematis columbiana, Hieracium albiflorum, Acer glabrum* var. *douglasii, Pachistima myrsinites*, Oregon boxwood, and bitter cherry.

Interesting occurrences include Tweedy's Cistanthe (Lewisia) and *Allium cernuum* (**CH002, CH007, CH103A, CH103F**). Vegetated south-facing talus at 1739 m above Sheep Creek depicts areas that are open forest with about 15% conifer cover made up of *Pseudotsuga menziesii* and *Pinus engelmannii* (**CH103J**). Talus stringers found near Sheep Creek are similar to CH002 but supports a higher diversity of species because of the greater accumulation of soil between the talus. Interesting plants are a tall Sandberg's bluegrass (probably *Poa secunda* var. *gracillima*) and *Sinene parryi* (**CH103G**). Bedrock knob vegetation above the Sheep Creek fan depict sites dominated by a 30% cover of *Pinus ponderosa* and *Pseudotsuga menziesii*. In addition, *Populus tremuloides* makes up another 15% canopy cover. The understory is mix of low shrubs with no one shrub dominating. The shrub species each comprise about 5% cover and these species are *Pachistima myrsinite*, *Juniperus communis*, *Acer glabrum* var. *douglasi*, and *Salix scouleriana*. The lower understory is dominated by *Penstemon fruiticosus* and *Penstemon pruinosus*, and a number of herbaceous perennials, such as *Heuchera cylindrica* and *Lomatium brandegei*. The ground is primarily exposed bedrock, which is very different from the nearby talus. These rocks are glacially rounded and are withough the large talus crevices (**CH103D**). Outwash channels atop Cheep Creek further define this community type. These are rocky ravines scoured clean of fine soil. They may have originated from glacial meltwater. The character of the vegetation is completely different from that on the other talus blockfields. The gentler slopes, more westerly aspects, and different subsurface water flows are likely the cause for the difference. Caves are numberous in the adjacent bedrock. Specific to these higher areas are *Ledum glandulosum*, *Penstemon davidsonii*, *Tonestus lyallii*, *Arenaria capillaris*, *Vaccium scoparium*, *Rhododendron albiflorum*, and *Erigeron compositus* (**CH103K**). The spur ridges typical within the Cheep Creek talus support *Pinus albicaulis* which is at its lowest elevational range. *Gilia aggregata* is also common (**CH103I**).

2. Bottomland/riparian - deciduous and meadows

Mid elevation stream and riparian systems with mixed conifer forest and marshland-bog areas. Being a bottomland deciduous and meadow complex **(CH102),** this is one of the most interesting areas. Vegetation varies from meadow to deciduous trees to dry lodgepole, on a drier debris flow. The area occurs adjacent to the upstream side of the Sheep Creek alluvial fan where water comes to the surface. This area was grazed by livestock in the past. Notable plants are large numbers of *Spiranthes romanzoffiana* (close to 1% cover--unusual for an orchid). Overstory dominants are *Alnus incana*, 20%, *Populus tremuloides* 10%, *Salix lucida* ssp. *lasiandra*, 10%. Understory dominants are *Cicuta douglasii*, 20%, *Carex vesicaria*, 20%, and lesser amounts of *Aster occidentalis*, *Aster foliaceus* var. *parryi*, and *Poa pretensis*. This is also one of the weediest areas, probably due to having been used for a sheep bedding ground in the past. Riparian hardwoods are described from plot **CH006.** Species composition is made up of *Populus balsamifera* ssp. *trichocarpa* and *Populus tremuloides* encountered along the road. An interesting stand, apparently dating from the 1929 fire. Tree cores were aged 59 and 64 years at 5'dbh. Notable plants include the rare, but not sensitive *Botrychium multifidum*. Species cover typical of the area includes *Populus balsamifera* ssp. at about 70%, *Alnus incana* at 10%, *Populus tremuloides* at 10%, with lesser amounts of *Betula occidentalis*. Understories are dominated by *Symphoricarpos albus*, 30%, and *Elymus glaucus*, 50%. The area has sloughs and oxbows. The deciduous stand dates from the 1929 fire, however adjacent conifer stands appear only to have undergone light fire, as judged by the presence of older conifers mixed with 70-year old trees. Recent heavy snows have begun to topple the deciduous trees in this stand. Riparian hardwoods of Sheep Creek fan **CH103C** contain hardwood species mixed with conifers that are found in the ravines at the outlets of Sheep and Trench Creeks. Notable plants include *Acer glabrum, Sorbus scopulina, Alnus incana, Populus tremuloides,* and *Populus trichocarpa.* Other communities associated with this cover type are red-osier dogwood swamps **(CH101B)** that create dense, impenetrable shrublands, in sloughs. Some raised areas support the aquatic grass *Calamagrostis canadensis* where it is dominant.

3. Bottomland mixed conifer

This cover type is characteristic of *Pinus engelmannii* and *Equisetum* species. *Pseudotsuga menziesii- Pinus engelmannii -Populus trichocarpa* bottomlands **(CH101A)** are characteristic of mixed mature conifer and deciduous trees. *Pinus engelmannii* and *Equisetum* species dominate hummocky ground, apparently from past downfall of large trees. Other communities described in this cover type are characteristic of a dry mixed conifer **(CH001)** found mainly in the southeast end of RNA. *Cypripedium montanum* is found at this location. The overstory is mature *Pseudotsuga menziesii / Pachistima myrsinites*, and *Pinus engelmannii / Equisetum*. Many trees and snags (mostly ponderosa pine) to 45" dbh occur in here. *Pinus engelmannii* is dominant in the overstory (about 65% cover), followed by about 10% . *Pseudotsuga menziesii*, and 10% *Alnus incana*. The understory is dominated by Cornus stolonifera, and a number of evergreen ericaceous shrubs and *Pachistima myrsinitis*. Seral mixed conifers **(CH010)** made up of dense *Pseudotsuga menziesii* thickets below the blockfield. *Pseudotsuga menziesii, Pachistima myrsinitis*, and *Ribes viscosissimum* are the seral fire community dominants.

4. Lower slopes - coniferous old growth

Forested talus near Sheep Creek fan **(CH103B)** is similar to CH002 described in the Rocky Cliffs and Talus cover type, but is interspersed with large, isolated *Pseudotsuga menziesii* that escaped the 1929 and other fires likely due to the rockiness of the soil. Waterfalls above the rockslide **(CH008A)** is dominated by *Pinus engelmannii* (50%), and *Populus tricocarpa* (10%) to about 36" dbh. Understories are dominated by *Pachistima myrsinitis* (30%) and *Acer glabrum* var.*douglasii* (10%). Plot **CH008B** describes the vegetation in the waterfall spray zone. A unique community under a 30' tall waterfall dominated by *Pyrola uniflora* (15%), and moss, 25% (predominantly in the *Mnium* group).

5. Midmontane slopes - coniferous seral

Plant communities characteristic of steep, mixed coniferous headwater seeps **(CH105B).** Dense conifer cliffs, on west aspects 1 mile north of Sheep Creek. Dominants are *Pseudostuga menziesii, Pinus contorta* and *Alnus viridis* ssp. *sinuata*, with *Saxifraga arguta* and moss dominating the spring. Spring flows are high, approximately 20 gpm within 30 feet of the outlet.

Dense stands of *Pinus contorta* are found on steep cliffs 1 mile north of Sheep Creek **(CH106).** *Pinus contorat* makes up 85% cover. Tree spacing is 2'-3' and trees average 2"-4" dbh. *Alnus viridis* ssp.*sinuata* and *Salix scouleriana* cover each comprise 2%, and the orchid *Goodyera oblongifolia* is found in trace amounts. The forested bedrock benchs, characteristic of the area above the Sheep Creek fan are dominated by *Pinus contorta* **(CH103E).**

6. Subalpine zone dry lodgepole (seral)

Plant communities are typical of the dry *Abies lasiocarpa* zone which is dominated by early seral *Pinus contorta* **(CH104).** These *Pinus contorta* forests are atop the Sheep Creek cliffs and appear to have originated after the 1929 fire. *Pinus contorta* cover is 70%, *Vaccinium scoparium* is 50%, and *Lupinus wyethii* about 25%.

7. Subalpine zone - spruce-fir

Plant communities are characteristic of an *Abies lasiocarpa Pinus engelmannii* wet parkland. This community is a forested extension of the wet medows described in the Subalpine Meadow cover type, plot **(CH201A).** The understory vegetation is a lush and diverse herbaceous understory dominated by *Lupinus arcticus, Carex scopulorum var. prionophylla, Luzula parviflora, Senecio triangularis, Trollius laxus,*and *Valariana sitchensis* Canopy cover averages 50% and is a mixed *Abies lasiocarpa* and *Pinus engelmannii* community **(CH201B).**

8. Subalpine vegetated cliffs

Plant communities are characteristic of wet, eroding scree slopes **(CH105A)** atop the Sheep Creek cliffs. Vegetative cover is about 10%, including *Rhododendron albiflorum, Sibbaldia procumbens.* This cover type represents the vegetative communities associated with the highest points in the RNA. North Twentymile Summit, the highest point in the RNA is included in this cover type **(CH-400)**.

9. Subalpine meadows

Plant communities are characteristic of dry subalpine meadows which include portions of the Thunder Mt. Fire. The summit of peak 6954 in the Thunder fire (Figure 4) is one of the only open, dry subalpine meadows within the area. **(CH201A).** The lower part of this peak becomes a coniferous wetland, and is the only wet, subalpine spruce parkland sampled in this survey. This area was burned in the Thunder fire, but currently has regrown so thickly that it is impossible to tell where the edge of the fire was, except for the presence of blackened shrubs.

Included in this cover type are also the wet subalpine meadows **(CH202).** Upper Sheep Creek meadows and the subalpine parkland characterize this meadow complex. The meadows are a complex of riparian peatland and grassland, dominated by *Salix planifolia* and *Carex scopulorum* var. *prionophylla.* Although still considered sensitive by the R-6 Regional Forester, this sedge is a common ecosystem dominant in this area of the Okanogan National Forest. Additional examples of these wet sedge meadows, that are less than 10 acres, occur in the area but were not mapped. Two wet meadows occur south of upper Sheep Creek, and one exists between North Twentymile Peak and upper Trench Creek.

10. Aquatic, fluvial and non-forested riparian habitats encountered but not mapped

These communities are cold, upwelling springs **(CH000)** at the base of rockslide talus along the Chewuch River. Dominants are *Dodecatheon dentatum, Parnassia fimbriata, Equisetum arvense, Elymus glaucus*, and an aquatic liverwort. Riparian talus along Sheep Creek **(CH103H)** is another area of high diversity, however it represents many different communities too small and too patchy to classify. *Alnus incana* is dominant, and notable plants in the understory include *Artemisia michauxiana, Rubus leucodermis,* and a few patches of *Poa pratensis*. Other communities are associated with riparian cobble and sandbars characteristic of Trench Creek **(CH004).** These areas are dominated by *Pseudostuga menziesii* (30% cover), *Pinus ponderosa* (10% cover), with a shrubby understory of *Amelanchier alnifolia* var. *cusickii*(10%), *Pachistima myrsinites* (10%), *Spiraea betulifolia* (10%), and *Arctostaphylos uva-ursi* (10%)..

Miscellaneous plot descriptions not part of the plant communities described above. The survey dates are listed in the (). The map in Figure 4 shows plot locations.

CH003 (7/15/95). Roadside.
CH005A (7/15/95). Roadside beside 30' boulder.
CH005B (7/15/95). Roadside near cottonwood-aspen stand CH-006.
CH011 (7/15/95). Roadside across from Sheep Creek.
CH301 (5/26/88). Roadside plants just south of RNA
CH302 (5/26/88). Tonseth Lake (not in RNA). Notable for having water lily (*Nuphar polysepalum*).
CH400 (8/5/92). Boulder Plant report (data from Tony Basabe and Nina Braxton). The vegetation from this area was recorded from a past sensitive plant survey. The area is the highest in elevation in the RNA at 7417 feet, and it is located on the southeast boundary. Only xerophytic plants of the immediate summit were included in this listing, however rare and interesting plants of wet habitats were found nearby outside the RNA during the survey. These would almost certainly also occur in scattered wetlands in Sheep and Trench Creeks, and will undoubtedly reveal more Sensitive plants if visited. Notable plants here include the Sensitive *Carex scirpoidea* var. *scirpoidea,* and the Monitor plants *Penstemon washingtonensis* and *Arnica rydbergii.*

Plot installation dates are as follows:

7/15/95 - CH000, CH001, CHOO2, CH004, CH006, CH007, CH008A, CH008B, CH010.
7/13/96 - CH201A, CH201B, CH202.
7/30/97 - CH101A, CH101B.
7/31/97 - CH102, CH103A, CH103B, CH103C, CH103D, CH103E, CH103F, CH103G, CH103H, CH103I, CH103J, CH103K, CH104, CH105A, CH104B, CH106.

Plants in this area are adapted to fire, however the numerous talus fields and riparian areas attenuate the effects of fire. For instance, the Thunder fire, approximately 5 miles to the east of the area burned the Thirtymile cliffs in a patchy and underburn fashion, whereas they tended to burn lodgepole in larger mosaics of crown fires. Research on the Thunder fire has revealed that plants such as fireweed (Epilobium sp.), Scouler willow (Salix scouleriana) lodgepole (Pinus contorta), and pinegrass (Calamogrostis rubescens) grow rapidly after a fire, primarily from sprouting, but also from seeding. Less is known on the effects of fireline construction on soils, hydrology, and the potential increased access it creates for recreational use such as snowmobiling.

Fauna

No detailed wildlife surveys have been conducted in the RNA. However, a list of wildlife species thought to be present within the RNA was provided by Kent Woodruff, a wildlife biologist on the Okanogan National Forest. The list can be found in Appendix III. Several rare wildlife species are likely to occur as transients or residents including the western big-eared bat, grizzly bear, gray wolf, North American lynx, northern goshawk, boreal owl, great gray owl, spruce grouse, olive sided flycatcher, boreal chickadee, spotted frog, and tailed frog.

A brief inventory of bats and their habitat was conducted by Ralph Anderson in 1997. Detailed information is provided in Appendix IV. Anderson found the following:

1. The RNA provides a diverse set of habitats and habitat elements for at least 12 bat species.

2. Important habitat elements include: cliffs, crevices, caves, talus, large live and dead trees, old-growth characteristic decadence and hollow trees, large woody debris, vegetative diversity and open surface water.

3. Adjacent, managed lands provide habitat elements that facilitate access to bats for investigative and educational purposes.

4. Emerging investigative technologies including radio telemetry will tie bat use of habitats outside the RNA to habitats inside.

5. The "reservoir effect" of intact habitats serving bats in the RNA may be buffering management impacts in adjacent lands.

6. Educational opportunities associated with bats and their habitats range from "discovery" within the RNA itself to "manipulated and manipulative" in adjacent managed ground.

Geology
(This information was provided by Jana J.Mabry, Central Washington University)

The lithology of the bedrock within the Chewuch RNA is described as Cretaceous and Jurassic mixed metamorphic and igneous rocks. The igneous rocks are Jurassic in age and are described as directionless to weakly foliated, medium to coarse grained, equigranular to porphyroblastic, leucocratic hornblende-biotite tonalite, quartz diorite, and granodiorite with abundant discontinuous layers (Stoffel et al., 1991). Metamorphics consist of the Chewack River Gneiss Complex (Hawkins, 1968), schist, amphibolite, meta-gabbro, meta-diorite, migmatite, and minor calc-silicate rocks (Stoffel et al., 1991).

The Chewuch RNA is surrounded and intruded by Early Cretaceous plutons and dikes of tonalite. They are described as fine to coarse-grained, equigranular to weakly porphyritic, leucocratic biotite (±hornblende and muscovite) tonalite, granodiorite, and minor diorite; mafic minerals commonly concentrated in clots: generally directionless and weakly foliated (Stoffel et al., 1991).

Surficial rock deposits consist of Pleistocene glacial drift composed of sand, silt and gravel including rock flour and boulders; Holocene older alluvium of dissected sand, silt, and gravel, in part reworked from Pleistocene glacial drift; Holocene colluvium slopewash and talus; and Holocene younger alluvium of undissected sand, silt, and gravel, in part reworked from Pleistocene glacial drift (Todd, 1995).

Glacial Processes

The Chewack River Valley was carved by two glacial stages. In a summary of glacial stages in the region Barksdale (1941) cites work by Bretz and Walters. The first stage, called the Chewack Creek Glacier, joined the Methow glacial lobe designated by Bretz as "Spokane" in age. The second stage was an ice sheet that moved in from Canada covering all but the highest peaks in the region and coined by Bretz as being "pre-Wisconsin," and "early-Wisconsin," by Walters. Erosional and depositional features from this second glacial stage probably destroyed much of the evidence left by earlier alpine glaciers, and accounts for the lack of glacial terraces and obvious lateral moraine materials and features within the valley.

Features within the Chewuch River Valley consist of a U-shaped valley, though very subtle due to filling of the trough with outwash debris, a terminal moraine approximately 3 miles south of Thirtymile Creek, and scattered patches of lateral moraines that can be found within the Chewuch, north of Eightmile Creek (Barksdale, 1941).

Geomorphology

All the geomorphic features in this valley have been derived from some process of water. The following features and processes were observed and are described in detail in the subsequent sections: 1) fluvial-glacial processes exibited in the glacial tills within the Chewuch RNA; 2) stream, including the present river channel processes of meandering and braided channel segments and the alluvial-debris fan morphologies; 3) physical (fracturing of bedrock by ice wedging and vegetation) and chemical weathering and erosion of bedrock slope faces by springs and seeps and 4) hillslope creep as exhibited throughout the valley in the bent features in trunks of trees of various species and ages.

Many of the processes affecting the geomorphology of the Chewuch RNA are related in some part to the glacial tills which in the past, and currently in some areas, blanketed the valley where bedrock has not yet been exposed. Most of the glacial till is now overlain by angular talus debris delivered either as dry rock fall accumulations from steep slopes or in debris flow events associated with runoff of snowmelt or rainfall. This is evident in many of the alluvial debris fans.

Refer to figure 5 for the following discussion of the major geomorphic processes at work within the Chewuch RNA.

Talus Slopes Talus slopes are defined as rock fragments, usually coarse and angular, lying at the base of a cliff or steep slope from which they have been derived; also, the heap or mass of such broken rock is considered as a unit. All of the talus slopes viewed in the field were those along the northern side of the river. Since all of the bedrock within the Chewuch RNA area is described as being homogenous the assumption made is that processes affecting these slopes (slope angle, fracturing, and chemical and physical weathering) are similar to other bedrock surfaces within the Chewuch RNA. An important factor related to the chemical and physical weathering, and erosion of the bedrock is the high percentage of biotite at 12% to 22% (Hawkins, 1968; Hibbard, 1971); this would make these rocks highly susceptible to deterioration and fracturing, due to swelling, when biotite and water interact.

All of the talus slopes measured in the field had bedrock slipfaces of $90f$ and debris slopes angles of between $35f$ to $38f$. The bedrock faces, from which talus debris were derived, exhibit jointing parallel or near parallel to the angle of the bedrock faces. The surface area of the exposed bedrock faces appears very similar, decreasing upstream where greater accumulations of debris is evident, which is consistent with increased precipitation and erosion in the upper reaches. Another line of evidence supporting this interpretation is the revegetation of the upper talus slopes of similar age and species of plants.

Debris material is blocky or angular in nature with the largest material and blocks accumulating at the base of the slope, and some of the largest blocks making it into the river. Several slopes had small terrace-like protrusions below the main bedrock face. Movement on top of the bedrock faces is seen as soil creep and supported by evidence of bent tree trunks. Soil creep is defined as the slow, imperceptible downslope movement of mineral, rock, and soil particles under gravity. Debris delivery from the bedrock face is from physical and chemical weathering, with rock either directly falling then sliding. Debris accumulations at the base of the bedrock face are transported by mass movement (hillslope creep). Accumulations of materials are redistributed as new materials are added, by the mass movement processes of hillslope creep or surface and subsurface water action (Ritter, 1995). Large freshly broken blocks can be seen on many of the slopes. As you progress up the stream valley the talus slopes exhibit upslope extension along the bedrock slipfaces. Once these bedrock faces are buried, the processes affecting talus debris delivery by rock fall will cease.

River Channel Observation of the Chewuch River channel was made from aerial photos and field reconnaissance. Features observed in the field were from along the road running along the northern side of the river from the NW1/4, sec. 21, T.38N, R.22E to the SW1/4, sec.1, T38N, R.22E. There are many increases in slope across short distances that occur within the river valley, five of which occur within the Chewuch RNA. The longitudinal section of the Chewuch River resembles a staircase profile, the origin possibly from glacial step or fluvial step-pool processes. Further field work would be required to determine the absolute origin, as no bedrock was viewed within the river channel.

The first area of interest is from just below Trench Creek to an area just above Sheep Creek, five increases in slope totaling approximately 160 feet (50 meters) in elevation occur within a distance of approximately 4500 feet (1370 meters). Braiding features between the Trench and Sheep Creek fans are observed in aerial photos (F2 on Map), but not confirmed in the field due to difficulty of accessibility. Materials in the channel range in size from sand to boulders and the channel is forced to the north by materials delivered from Trench and Sheep Creek alluvial-debris fans (D1 on Map). Above the Sheep Creek fan the valley widens and the river channel begins to meander across its width (E2 on Map). This area exhibits basin-like features and acts as a catchment for finer materials derived from upstream. This feature is possibly the result of carving by the valley glacier upon retreat or damning by debris fans. The area is highly vegetated and contains numerous relic channels and oxbow features. Slope in this area dramatically decreases and the river is relatively shallow and quiet. Materials in and around this area range from silt, in over bank areas, to fine and medium grained sand in the channel with numerous sand bars and small islands.

The few large boulder size rocks found in the channel are derived from talus slopes that run along the northern side of the river. There are numerous examples of woody debris in and around the channel, as well as large downed trees whose roots cannot be supported in the silty soils. Woody debris within the channel can in part contribute to meandering by deflecting flow. Some evidence of bank calving is seen, although very few examples were observed.

Change in the channel begins as slope increases at the NW1/2, sec. 11 T.38N., R22E, and large materials again begin to become more evident. Just above this area a debris fan from two unnamed tributaries on the south side of the river has pushed the river toward the north (D2 on Map). The river channel again smoothes out as the river channel slope decreases, again a basin like feature is evident (E2 on Map). The area is highly vegetated with many examples of woody debris in and around the channel. Evidence of accumulations of trapped flood debris can be found in this reach.

A marked change occurs in the channel at the NE1/4, sec. 12, T.38N., R.22E., across from Thirtymile Creek which exhibits a small debris fan, active tributary, and numerous springs (D3 on Map). Materials in the channel become large again and continue to be so upstream and throughout the remaining channel segment to the RNA boundary in the northernmost corner. The valley width narrows in this area and the debris fan from Thirtymile Creek utilizes the space pushing the river along the northern boundary. Extensive channel braiding in the downstream part of this reach in the N1/2, sec.12, T38N, R22E, is evident in aerial photographs (F3 onMap).

Alluvial-Debris Fans The alluvial fans in the Chewuch RNA are probably the most significant means of transporting debris and sediment into the Chewuch River. This is in part due to the overall lithology (rock type and glacial tills) of the region, high precipitation rates (rain, snow, and rain on snow events not uncommon to the region), and steepness of the slopes.

The movement of sediment from source areas to depositional sites involves a variety of flow types, ranging from highly viscous debris or mudflows to normal water flow. The type of flow during any given event depends primarily on the lithology of the basin and its degree of weathering, and secondly on the magnitude of the precipitation causing the flow. In ephemeral channels flow results in spasmodic rather than continuous flow and depositional sites change repeatedly. However, in humid regions with perennial streams, abnormally high precipitation may reactivate erosion and deposition on fan surfaces that have been stable for some time (Ritter et al., 1995). This is probably true in the Chewuch RNA, especially in areas where forest fires have occurred. Lost vegetation plays a significant role in the stability of soils, and erosional processes can be accelerated in and downslope of these areas.

All of the tributary fans viewed in the field exhibit features of debris fans (D 1,2,3 & 4 on Map), the most significant is the Sheep Creek fan (D1 on Map). The fan exerts a control on the Chewuch River in a number of ways as it extends across the valley, first by essentially pushing the river to the north, second having a damning effect and causing water to pool behind it across the valley (which would account for the very swampy conditions directly upstream), and thirdly the braided and meandering channel effects seen between the Sheep Creek Fan and the Trench Creek Fan (F2 & E1 on Map). The Sheep Creek fan shows evidence of relic channels and the main tributary channel has migrated from its 1969 mapped channel position, as evident in aerial photos and field observation.

Debris flows or mudflows usually follow more well-defined channels because the confining limits of the channel ensure the depth of flow needed to offset the high viscosity of the fluid, however debris flows also may overtop banks and spread out as sheets (Bull, 1993). Debris flows are so dense and viscous that only the very largest particles can settle from the flow. Nonetheless, they are capable of transporting extremely large boulders for considerable distances on lower gradients than normal stream flow would require (Ritter et al., 1995).

Highland Plateau All of the features in the higher elevations were interpreted from aerial and oblique photography and have not been field checked. Looking northeast from Twentymile Peak the overall topography is one of a hummocky plateau devoid of sharp ridge features and containing numerous meadows and wetlands (B on Map). Relief in this area decreases significantly to approximately 837 feet (255 meters) across a broad area. Twentymile Peak (Figure 5) is the highest elevation at 7437 feet (2267 meters) above sea level, and the average ridge elevation above the river being 6600 feet (2000 meters) above sea level. Very subtle, possibly hanging valley features exist to the east, but all are well out of the Chewuch RNA. Another feature of interest, as relayed by George Wooten. It is an ice marginal channel or glacial cirque, is located in the NE1/4, sec.34, T38 N, R22E. It is consistent with the break in slope along the ridge and the general trend of the river valley and glacial retreat, but requires further field work to determine if it is bedrock or glacial till material. There are two possible interpretations for the features of meadows and wetlands seen in this segment, both are related to the documented retreat of ice sheets in the area. The first possibility is of a large erosional surface overlain by glacial till from the retreating Cordilleran Ice Sheet. The second, is related to large ice blocks left by the retreating glacier, that became surrounded by glacial till, leaving small basins when the ice blocks melt. Again further field work would be required to determine the exact origin of these features.

Soils

Soils in the area are derived from granitic glacial till, volcanic ash, or pumice over residual bedrock. Side slope soils have a component of volcanic ash of varying thickness (thicker on the north slopes and shallower on south and southwest slopes). Coarser textured surface soils have granitic parent material and are composed of glacial till. Residual soils are mostly shallow, relatively undeveloped, and contain 35 to 80 percent gravel and cobbles. Subsurface soils are generally coarse textured sands and loamy sands with 30 to 80 percent rock (Figure 6).

Soils in valley bottoms are composed of glacial till, alluvium and colluvial material from upslope. These soils are higher in organic matter and often have peat and muck in depressions where water is prevalent during most of the year. Water infiltration is low to moderate, being controlled by a shallow groundwater table. There are seven soil series identified within the Chewuch RNA. A map of these soils can be found in Figure 6. These soil series are described as follows:

CHEWACK: These are very deep, well drained soils formed in mixed volcanic ash and granitic colluvium over ablation till. These soils ae on back slopes of mountains. Slopes are between 40 to 65 percent, typically.

CROCAMP: These are deep, well drained soils formed in colluvium from granitic and metaigneous rock with a compenent of volcanic ash in the upper portion. These soils are on back slopes and shoulders of mountains. Slopes are typically between 15 and 65 percent..

CRYOFLUVENTS: Are very deep, moderately well to somewhat poorly drained soils. Typical of mountain valleys and floodplains and low stream terraces. Parent material is made up of alluvium from mixed sources with a compenent of volcanic ash in the upper portion. Slopes are gental, rarely exceeding 10 percent.

DEVORE: These are moderately deep, well drained soils fromed in residuum and colluvium from gneiss, schist, and granodiorite mixed with volcanic ash. Devore soils are on back slopes of mountains that commonly have a southerly aspect. Slopes range between 30 to 75 percent, typically.

LITHIC CRYOCHREPTS: These are very shallow or shallow, well drained soils. They are found mainly on the backlopes, schoulder, and ridges in the mountains. Parent materials are residuum, colluvium, or glacial till from granitic rock with a thin mantle of volcanic ash.

MYERSCREEK: These are very deep, well drained soils formed in compact glacial till with a mantle of valcanic ash. These soils are on back slopes, foot slopes, and toe slopes of mountains. Slopes range between 0 and 65 percent.

WAPAL: These are deep, somewhat accessively drained soils onn eskers, terraces, and terrace escarpments. These soils formed in glacial outwash with a minor component of volcanic ash and loess. Slopes are between 0 and 65%, typically.

Lands

The lands within and surrounding the RNA are administered by the Okanogan National Forest.

Heritage Resources

A tower lookout and an older D6 cupula lookout are on the top of Twentymile Peak. The latter is eligible for the National Register of Historic Places. A cultural survey for the area has not been done.

IMPACTS AND POSSIBLE CONFLICTS

Mineral Resources

There is a moderate to low minerals potential for uranium within the RNA boundary in the Trench Creek and Chris Creek area. The area encompassed by the RNA will be withdrawn from mineral entry upon approval of the establishment record.

Grazing

The RNA is not located within a grazing allotment however there are allotments adjacent to the area. Cattle and sheep have been in the area along the road. Sheep will only be moved on the road under the NEPA review process. Cattle will be controlled as they move on the road through the research area.

Timber

Approximately 2400 acres (960 hectares) 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.

Watershed Values

The RNA lies within the Chewuch watershed. A road traverses the northern portions of the area where regular maintenance has occurred. Otherwise the RNA retains an unroaded and undeveloped character and has not been logged. Firewood has been removed near the road. Fire has occurred periodically through portions of the RNA.

Recreation

The area within and surrounding the RNA is a popular location for hiking, hunting, fishing, and other recreational activities. Establishment of the RNA should not significantly impact those activities. There are a number of dispersed recreation sites along the Chewuch River Road within the RNA. This existing use is allowed but will not be encouraged and should not significantly increase over time. Other dispersed recreation such as hunting and hiking will continue.

Wildlife and Plant Values

Currently there are approximately 30 species of sensitive plants known to occur in the Chewuch watershed that are either on the Regional Forester's sensitive list or are listed as sensitive by the Washington Natural Heritage Program (1994). These and all other suspected rare species were surveyed during work on the Chewuch River RNA.

Spring chinook are on the Regional Foresters Sensitive Species List. Summer steelhead are on the endangered species list and bull trout are proposed for listing. All are present in the Chewuch River within the study area.

There is a spring along the river which is important for spring chinook habitat.

The grizzly bear is threatened and the gray wolf is on the endangered species list. The wolverine and lynx are on the Sensitive Species List. There are several wildlife candidates for listing. These are noted in the Fauna section of this document.

Wild and Scenic Rivers

The segment of the Chewuch River running through the RNA has been recommended for inclusion in the National Wild and Scenic Rivers System. The potential and recommended classification is "Scenic."

Transportation Plan

No new roads or trails are planned for this area. Establishment of the RNA will have no impact on the forest transportation system.

MANAGEMENT PRESCRIPTION

No vegetation management is planned for the RNA, however, regular road maintenance will occur and noxious weed management may occur. The Forest Plan guidelines are: 1) Control noxious weeds to the extent possible. 2) New infestations of noxious weeds should be the first priority for eradication. 3) Emphasis on noxious weed control shall be on prevention of infestations, especially in unroaded area and wilderness. Integrated treatment strategies will be used. Management practices must provide a closer approximation of the naturally occurring vegetation and the natural processes governing the vegetation than would be possible without management.

Fire behavior and its management are poorly understood, and often represented as "catastrophic", without definition. Studies of fire behavior, and its effects in time and space have been initiated in the Thunder Mountain burn by Trust for Habitat Conservation under a Mountaineers Foundation Grant while baseline data is still available in areas burned by the fire. Research on this topic is proposed for publication.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of Chewuch RNA will be the responsibility of the Okanogan National Forest. The District Ranger, Methow Valley Ranger District, has direct responsibility.

The Director of the Pacific Northwest Research Station will be responsible for any studies or research conducted in the area. Requests to conduct research in the RNA will come to the Okanogan National Forest and then be forwarded with a recommendation to Pacific Northwest Research Station for a decision. The Director will evaluate research proposals and coordinate all studies and research in the area with the District Ranger. All plant and animal specimens collected in the course of research conducted within the area will be properly preserved and maintained within university or federal agency herbaria and museums, approved by the Pacific Northwest Research Station.

Records for the Chewuch RNA will be maintained in the the following offices:

Regional Forester, Portland, Oregon
Forest Supervisor, Okanogan National Forest, Okanogan, Washington
District Ranger, Methow Valley Ranger District, Twisp, Washington
Director, Pacific Northwest Research Station, Portland, Oregon
Forest Sciences Laboratory, Corvallis, Oregon

Archiving

The Portland office of the Pacific Northwest Research Station will be responsible for maintaining the Chewuch RNA research data file and list of herbarium and species samples collected. The Forest Sciences Lab in Corvallis, Oregon is establishing a database for maintaining research data and lists of species for all RNAs in the region. Computerized files for the RNA will be maintained at the Forest Sciences Lab.

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APPENDIX I

Boundary Description

Chewuch Research Natural Area

Definition of Intent

The legal description of the Chewuch Research Natural Area is as shown on the exhibits attached hereto. The approximate courses of the map boundaries are identified in the following legal description. Where the boundary is described as following a topographical feature, the actual location of the features will control the course identifying that part of said boundary. Unless specified in the description, calls to a stream shall be to the thread and calls to a ridge shall be to the crest, calls to a point or elevation shall be to the prominent point in that vicinity.

Section, Township and Range lines and Section corners established by the United States Public Land Survey, shall determine the actual location of these portions of the boundary so described. Section subdivision lines and corner positions will be established under the rules as stated in the Manual of Surveying Instructions 1973 published by the U.S. Department of Interior, Bureau of Land Management.

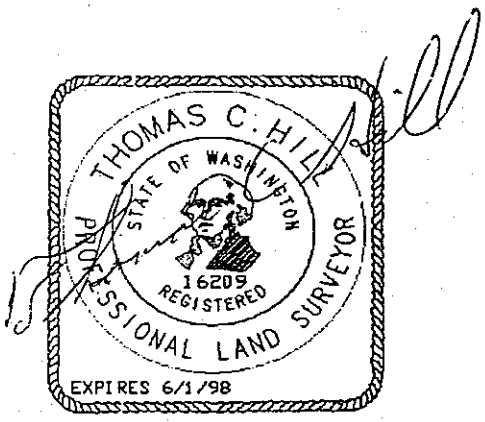
The location of the Chewuch Research Natural Area has been established based on the proposed description of the Okanogan National Forest Land and Resource Management Plan. Priorities for the location are as follows: The information from the proposed description, hydrographic divides, prominent points, and straight line course & distance between two prominent points. The data resources used were: United States Geological Survey Quadrangle Coleman Peak, 1992 aerial photos at 1:16000 resolution, and a USGS digital orthophoto Coleman Peak with a 2 meter resolution.

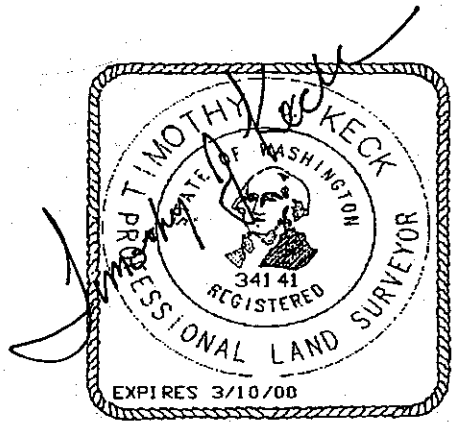
The methods used to locate the boundary were by using AutoCAD R13 with GSX Cad overlay software to digitize the described location. The aerial photos were used with the orthophoto to identify certain points noted on the map. Contours shown on the map were derived from a USGS Digital elevation model with a resolution of 30 meters. The contours are projected at 100 meter intervals and should only be used as a reference to general land features noted in the description. The result is published as a metes and bounds description. Courses in the descriptions are shown as grid bearings and are to the nearest minute. Distances are grid distances and are to the nearest decimeter; equivalent imperial measure is in parenthesis.

The attached boundary description and maps were prepared by me or under my direct supervision, and depict a true representation of the definition of intent as stated herein for the proposed Chewuch Research Natural Area.

Thomas C. Hill
Professional
Land Surveyor Date: 4-29-98
WA. #16209

Timothy J. Keck
Professional
Land Surveyor Date: 4/29/98
WA. #34141





CHEWUCH RESEARCH NATURAL AREA BOUNDARY DESCRIPTION

All bearings and distances shown in the following description are based on the Washington State Plane coordinate grid system, North Zone, and are included for descriptive purposes only. International, State, Indian Reservation, National Park, Mineral Claim, Wilderness Boundary, Sectional land boundaries, natural or semi-permanent features, and record bearing, distance and monuments as described in the Description portion of this document will prevail.

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
Coleman Peak	1			A point between #438 and #439 on the Pasayten Wilderness boundary as described on September 09, 1987. The point being S59°40'E 993 m from the confluence of Kay Creek and the Chewuch River. Thence along the Pasayten Wilderness Boundary
		S 44-18 W	1159.12 (3803)	
	2			A point at the confluence of two unnamed tributaries, 0.45 miles northwest of the Chewuch River. This is point # 439 of the Pasayten Wilderness Boundary. Thence following the wilderness boundary
		S 74-30 W	3184.70 (10448)	
	3			A point which is 1.05 miles N29°45'W of the confluence of Sheep Creek and the Chewuch River and 1.80 miles N36°E of the confluence of Andrews Creek and the Chewuch River. This is point # 440 of the Pasayten Wilderness Boundary. Thence
		S 56-58 W	42.26 (139)	following the wilderness boundary
	4			
		S 60-44 W	50.31 (165)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
	5			
		S 38-58 W	47.37 (155)	
Coleman Peak	6			
		S 28-20 W	41.37 (136)	
	7			
		S 44-57 W	34.49 (113)	
	8			
		S 32-31 W	26.04 (85)	
	9			
		S 25-50 W	55.72 (182)	
	10			
		S 55-36 W	49.13 (161)	
	11			
		S 38-22 W	56.90 (187)	
	12			
		S 43-27 W	60.83 (200)	
	13			
		S 50-19 W	54.54 (179)	
	14			
		S 54-22 W	31.15 (102)	
	15			
		S 42-38 W	56.31 (185)	
	16			
		S 20-25 W	65.64 (215)	
	17			
		S 21-40 W	69.18 (227)	
	18			Along the ridge between the Chewuch River and Little Andrews Creek.
		S 22-54 W	56.90 (187)	
	19			
		S 36-11 W	30.86 (101)	
	20			
		S 43-37 W	149.76 (491)	
	21			
		S 41-59 W	138.66 (455)	
	22			
		S 39-24 W	64.07 (210)	
	23			
		S 29-33 W	32.92 (108)	
	24			
		S 27-32 W	49.14 (161)	
	25			
		S 48-37 W	57.19 (188)	
	26			
		S 51-59 W	53.66 (176)	
	27			
		S 55-54 W	71.54 (235)	
	28			
		S 36-18 W	56.01 (184)	
	29			
		S 42-38 W	56.31 (185)	
	30			

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
		S 44-19 W	91.10 (299)	
Coleman Peak	31			
		S 51-15 W	54.23 (178)	
	32			A point on said ridge between the Chewuch River and Little Andrews Creek, which is 0.72 miles N36°E of Andrews Creek and the Chewuch River and 1.36 miles N86°W of the confluence of Sheep Creek and the Chewuch River. Point # 469 on the Pasayten Wilderness Boundary. Thence
		S 40-06 W	672.40 (2206)	along the Pasayten Wilderness Boundary
	33			A high point North of Tonseth Lake, elevation of 1037m. Point # 470 on the Pasayten Wilderness Boundary. Thence
		S 38-13 E	2083.71 (6836)	leaving the Pasayten wilderness boundary and crossing the Chewuch River
	34			To a point S30°22'W 2617 m from the confluence of the Chewuch River and Trench Creek on an unnamed ridge bearing northeasterly, Thence
		S 03-10 E	123.85 (406)	
	35			To a point on said ridge with an elevation of 1673 m. Thence
		S 40-20 W	412.56 (1354)	
	36			
		S 25-49 W	448.68 (1472)	Following said ridge southwesterly acending
	37			
		S 48-46 E	174.17 (571)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
Coleman Peak	38			To a point on said ridge with an elevation of 1894 m. Thence
		S 61-48 E	541.04 (1775)	
	39			
		S 36-10 E	65.79 (216)	follow ridge southeasterly
	40			
		S 18-04 E	338.63 (1111)	
	41			
		S 03-11 E	312.84 (1026)	
	42			To a point on said ridge. Thence continue through a saddle
		S 48-40 E	206.84 (679)	
	43			
		S 35-12 E	184.57 (606)	
	44			
		S 50-15 E	130.39 (428)	
	45			To a point on said ridge with an elevation of 2051m. Thence
		S 81-40 E	163.10 (535)	
	46			decend through a saddle
		S 86-57 E	321.33 (1054)	that is at the headwaters
	47			of No Snake Creek to the
		N 69-26 E	300.09 (984)	southwest and acend
	48			To a Monument Stamped N TWENTYMILE 1950, A First Order position established by the National Geodetic Survey (PID TQ 0429), Thence
		N 15-31 E	243.55 (799)	
	49			
		N 26-38 E	239.80 (787)	Along the divide between
	50			Chewuch and Twenty mile
		N 43-42 E	112.79 (370)	drainage (6th order watershed)
	51			To a Point on said divide. Thence

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
		S 79-51 E	290.04 (952)	
Coleman Peak	52			
		N 78-48 E	150.87 (495)	continuing easterly along the divide between Chewuch and Twentymile drainages
	53			
		N 67-37 E	146.48 (481)	
	54			
		N 71-33 E	133.16 (437)	
	55			To a point on said divide. Thence
		S 52-21 E	263.51 (865)	
	56			
		S 66-56 E	109.44 (359)	
	57			
		N 79-09 E	210.32 (690)	
	58			
		N 82-34 E	135.27 (444)	
	59			
		S 88-10 E	91.54 (300)	continuing easterly along said divide
	60			
		S 50-23 E	58.85 (193)	
	61			
		S 56-48 E	89.31 (293)	
	62			
		S 79-21 E	95.83 (314)	
	63			
		N 85-44 E	194.80 (639)	
	64			
		N 71-26 E	216.37 (710)	
	65			
		N 70-46 E	156.75 (514)	
	66			
		N 75-30 E	113.04 (371)	
	67			To a point on said divide with an elevation of 2088 m. Thence
		N 82-19 E	404.38 (1327)	
	68			
		N 75-22 E	165.37 (543)	continuing easterly along said divide
	69			
		N 50-22 E	334.49 (1097)	

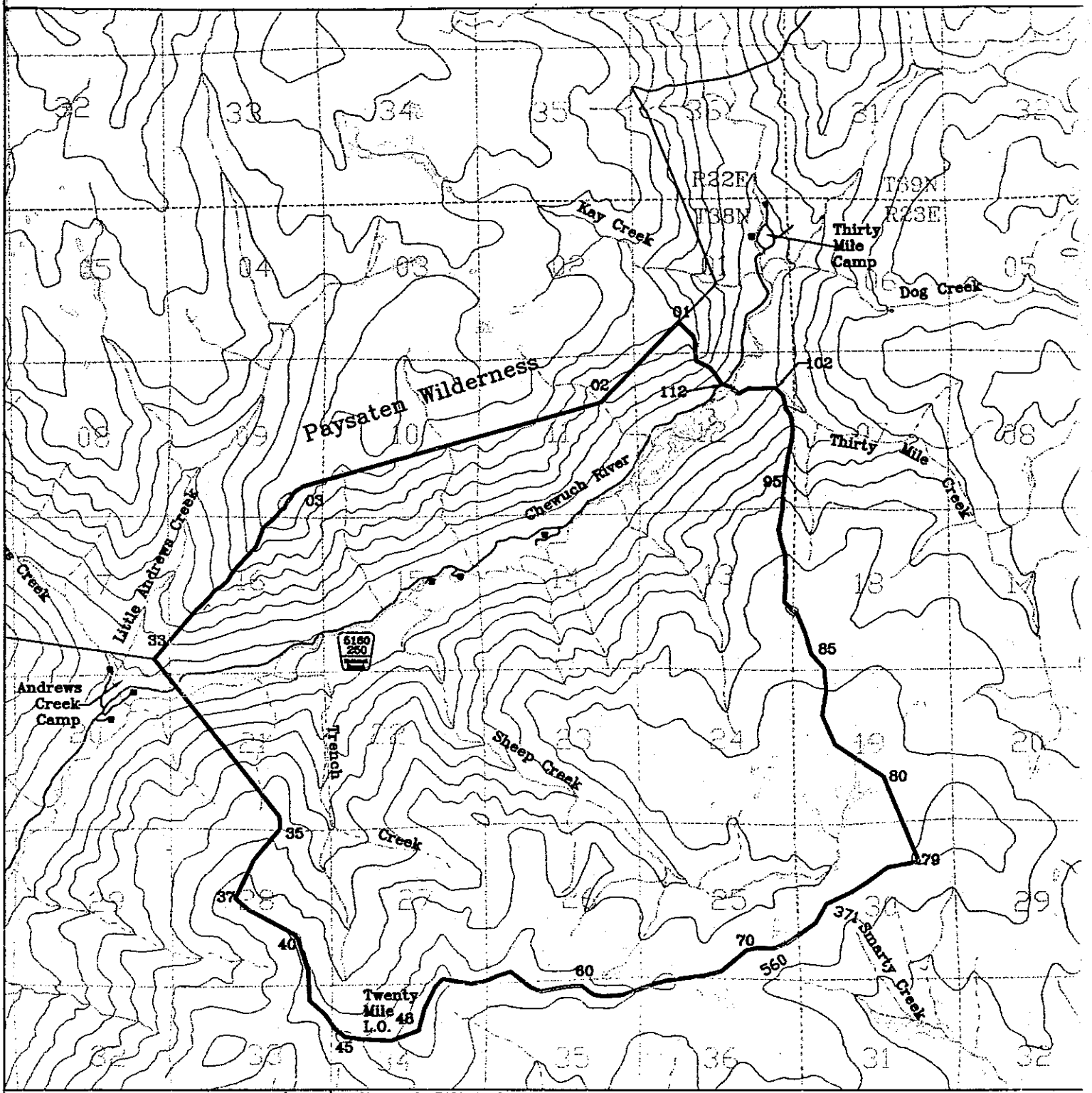
QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
	70			To a Point on the divide between Chewuch and Twentymile drainage where a spur ridge decends northerly to Sheep Creek. Thence
		N 76-16 E	109.44 (359)	
	71			
		S 88-32 E	175.69 (576)	Decend northeasterly through a saddle located on said divide
	72			
		N 68-03 E	154.92 (508)	
	73			
		N 54-50 E	356.41 (1169)	
	74			To a point on said divide with an elevation of 2010 m North Westerly of the headwaters of Smarty Creek. Thence
		N 29-57 E	223.78 (734)	
	75			
		N 64-35 E	294.25 (965)	
	76			
		N 57-35 E	199.90 (656)	northeasterly along said divide
	77			
		N 53-15 E	241.29 (792)	
	78			
		N 79-24 E	333.22 (1093)	
	79			To a point where a spur ridge heads southerly to Smarty Creek. Thence
		N 22-57 W	948.37 (3111)	across general undulating terrain across the head waters of Sheep Creek
	80			To a Point on the Divide between Chewuch and Thirtymile drainage (6th order). The point being East of a meadow located on an east facing slope
		N 56-47 W	595.69 (1954)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
	81			To a point on the divide between Chewuch and Thirtymile watershed(6th order watershed).
		N 23-43 W	329.14 (1080)	
	82	N 09-27 E	264.39 (867)	Thence northerly following said divide
	83	N 05-11 W	227.34 (746)	
	84	N 41-50 W	203.53 (668)	
Coleman Peak	85	N 15-18 W	216.89 (712)	
	86	N 22-40 W	216.67 (711)	
	87	N 51-40 W	67.55 (222)	
	88			To a point on said divide with an elevation of 1952 m.
		N 42-08 W	119.26 (391)	
	89	N 03-34 E	231.47 (759)	
	90	N 01-30 W	257.96 (846)	
	91	N 17-29 W	150.80 (495)	
	92	N 10-03 W	114.34 (375)	
	93	N 10-03 E	204.17 (670)	
	94	N 03-50 E	314.89 (1033)	Thence northerly descending along said
	95	divide N 08-51 E	243.02 (797)	
	96	N 12-47 E	144.32 (473)	
	97	N 05-56 E	145.27 (477)	
	98	N 10-06 W	139.14 (465)	
	99	N 38-41 W	72.12 (237)	
	100	N 12-17 W	145.85 (478)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
Coleman Peak	101			
		N 45-54 W	103.84 (341)	
	102			
		N 88-30 W	110.45 (362)	
	103			To Thirtymile Creek. Thence
		S 81-08 W	60.83 (200)	
	104			
		N 86-04 W	109.20 (358)	
	105			
		S 60-02 W	56.94 (187)	
	106			
		S 64-44 W	59.48 (195)	following said Creek westerly
	107			
		N 51-33 W	34.77 (114)	
	108			
		N 60-15 W	31.35 (103)	
	109			
		N 13-20 W	29.27 (96)	
	110			
		N 74-42 W	51.70 (170)	
	111			To the Confluence of Thirtymile Creek with the Chewuch River Main Channel. Thence
		N 74-42 W	62.20 (205)	
	112			Crossing the existing Chewuch Road. Thence
		N 33-42 W	73.30 (242)	
	113			
		N 31-19 W	53.35 (175)	acending northwesterly following a rock chute
	114			
		N 39-16 W	81.15 (266)	
	115			
		N 63-27 W	161.67 (530)	

QUAD SHEET NAME	ANGLE POINT	BEARING	DISTANCE METERS (FEET)	DESCRIPTION
Coleman Peak	116			To a point at the head of said chute with an elevation of 1490 m. Thence
		N 03-48 W	119.06 (391)	
	117			
		N 03-00 W	93.59 (307)	following a ridge northerly
	118			
		N 23-44 W	50.59 (166)	
	119			
		N 46-15 W	202.74 (665)	
	01			To the point of beginning
				Containing 35118167.9532 square meters or 3512 hectares (8678 acres).

Chewuch RNA
Okanogan National Forest



LEGEND
Forest Road
RNA Boundary
Control Point 45

Scale in meters

Chewuch RNA is located in unsurveyed township 38 North and ranges 22 & 23 East W.M.. Quadrangles used were: Coleman Peak, Wash.; Corral butte; and Spur Peak.

Point #48 is a USGS monument named N Twentymile. It is a first order monument established in 1950. It's coordinates are: State Plane Washington North N 195,029.228 E 556,252.821 meters
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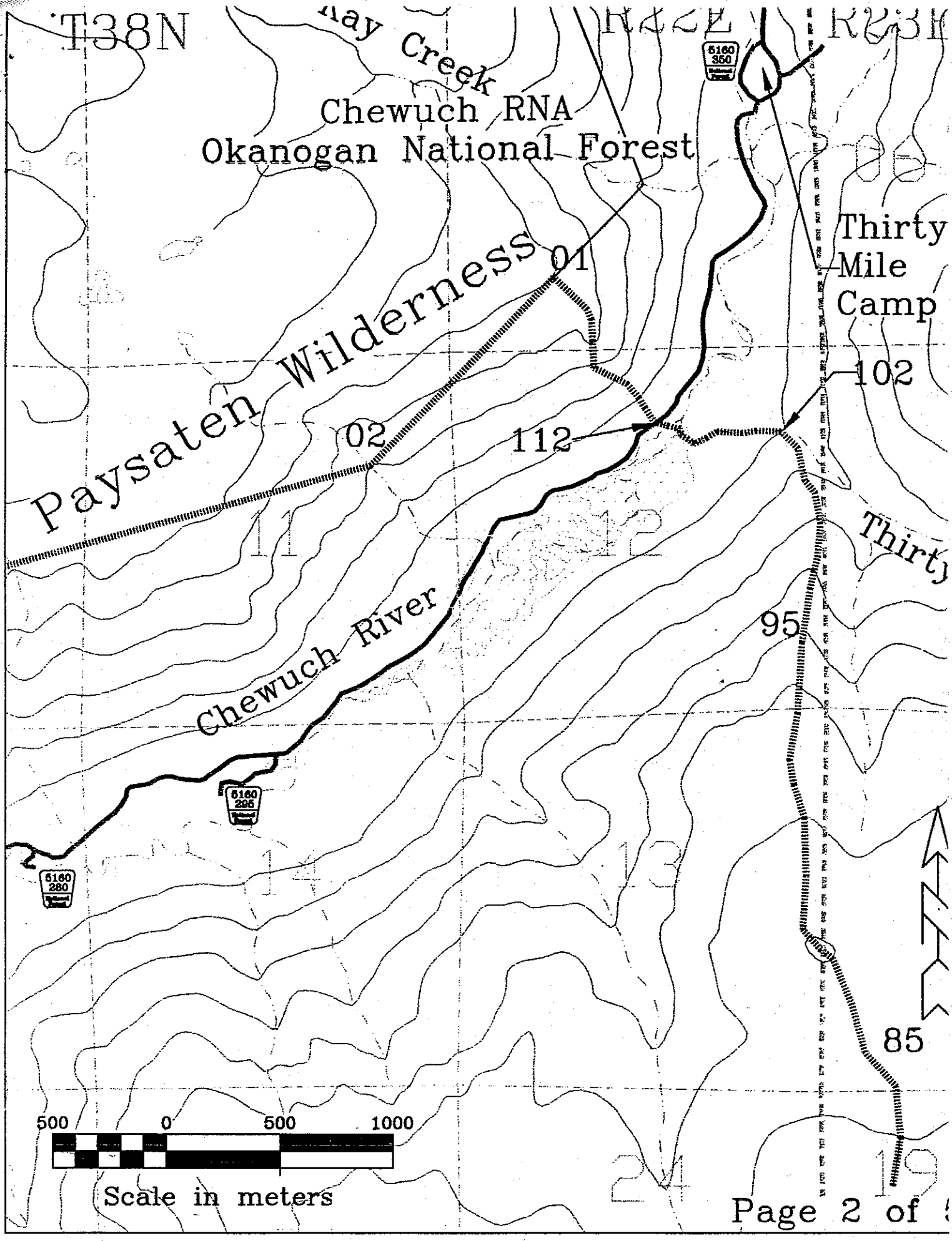
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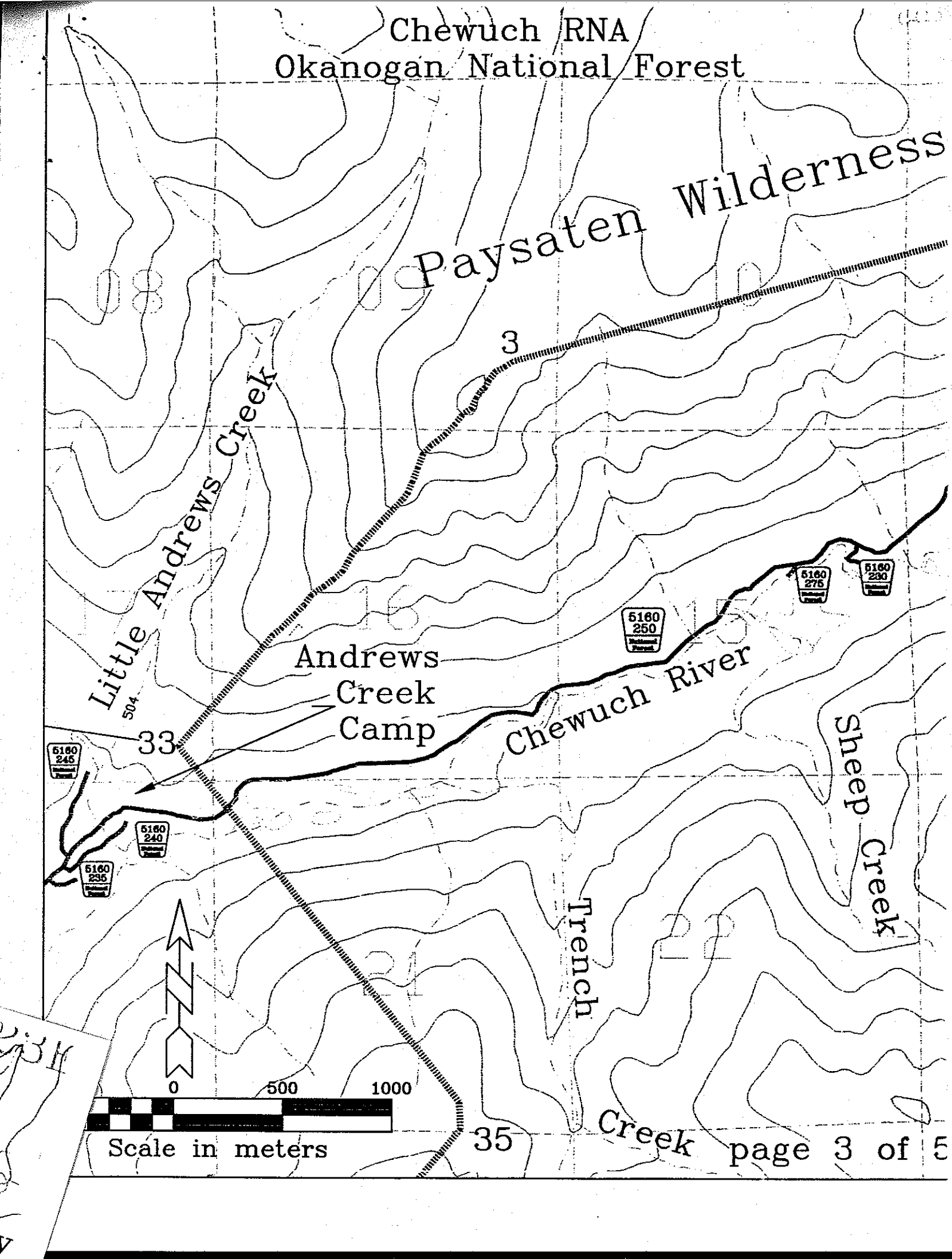
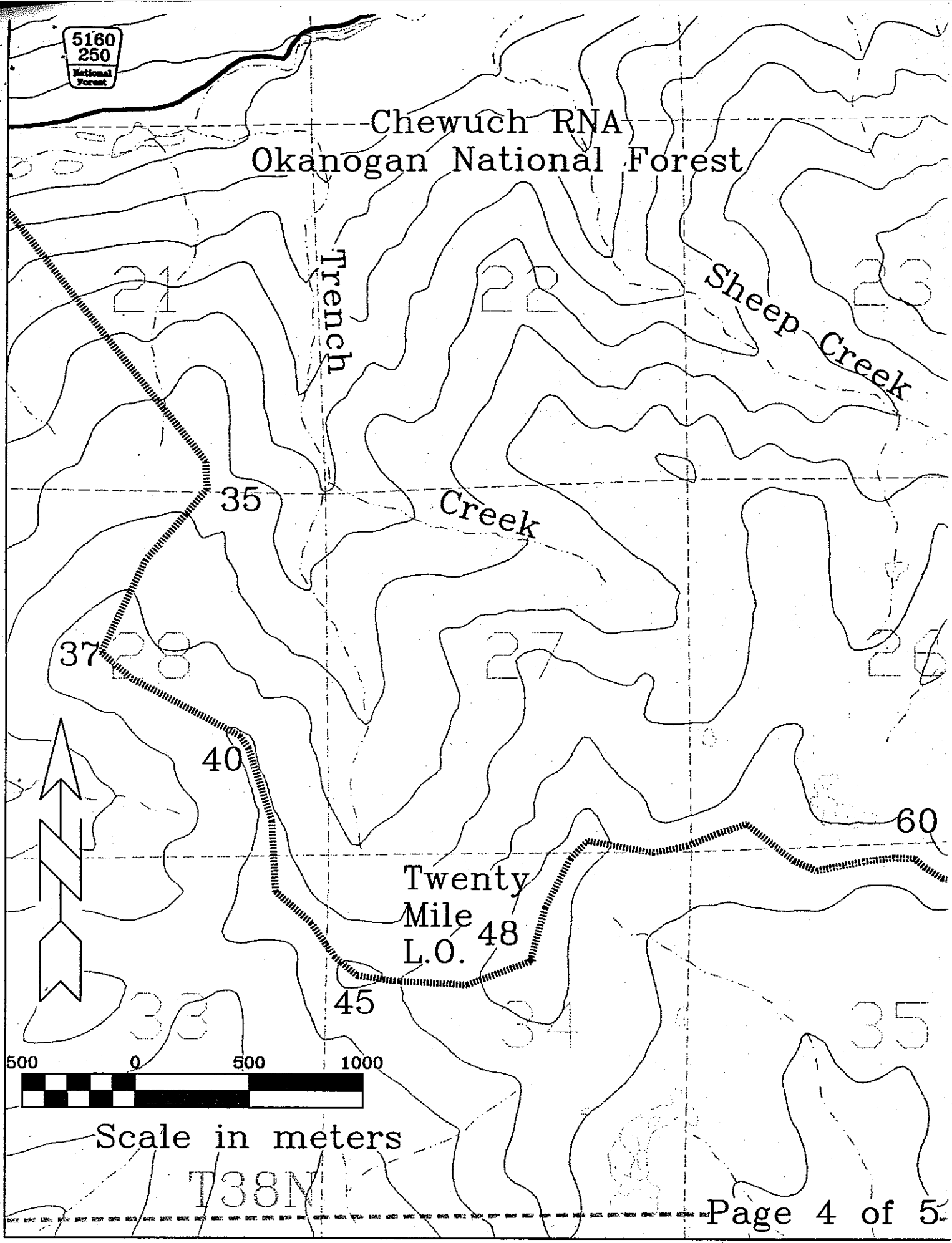
R22E
R23E
Ray Creek
Chewuch RNA
Okanogan National Forest
Paysaten Wilderness
01
02
Thirty
Mile
Camp
102
112
Thirty
95
Chewuch River
85
5160
350
5160
295
5160
280
500
0
500
1000
Scale in meters


Chewuch RNA
Okanogan National Forest
Paysaten Wilderness
3
Little Andrews Creek
504
Andrews
Creek
Camp
33
Chewuch River
Sheep Creek
Trench
Creek
35
5160
245
5160
240
5160
235
5160
250
5160
275
5160
290
0
500
1000
Scale in meters


5160
250
National Forest
Chewuch RNA
Okanogan National Forest
Trench Creek
Sheep Creek
21
22
23
35
37
28
27
26
40
60
Twenty Mile L.O.
48
45
33
34
35
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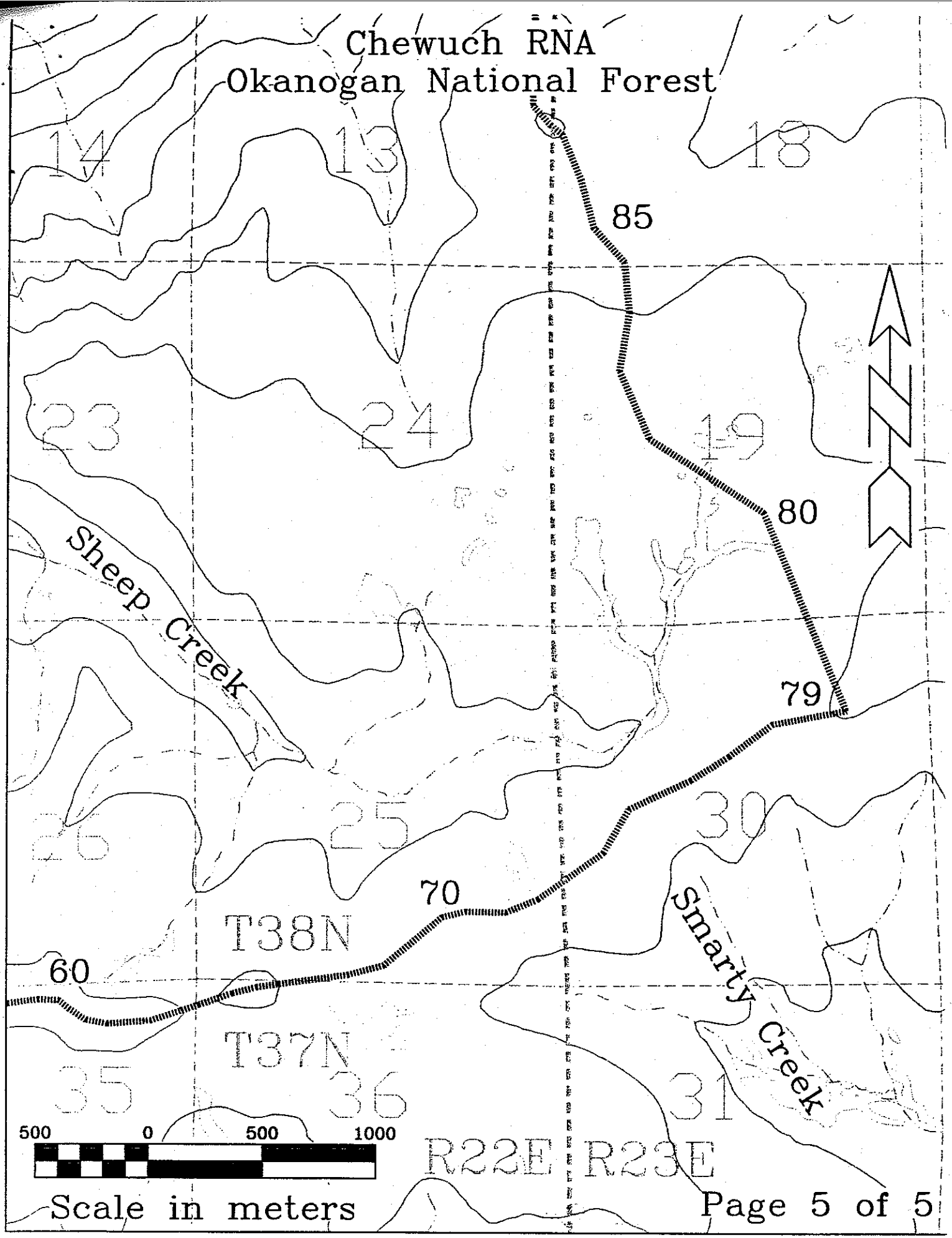
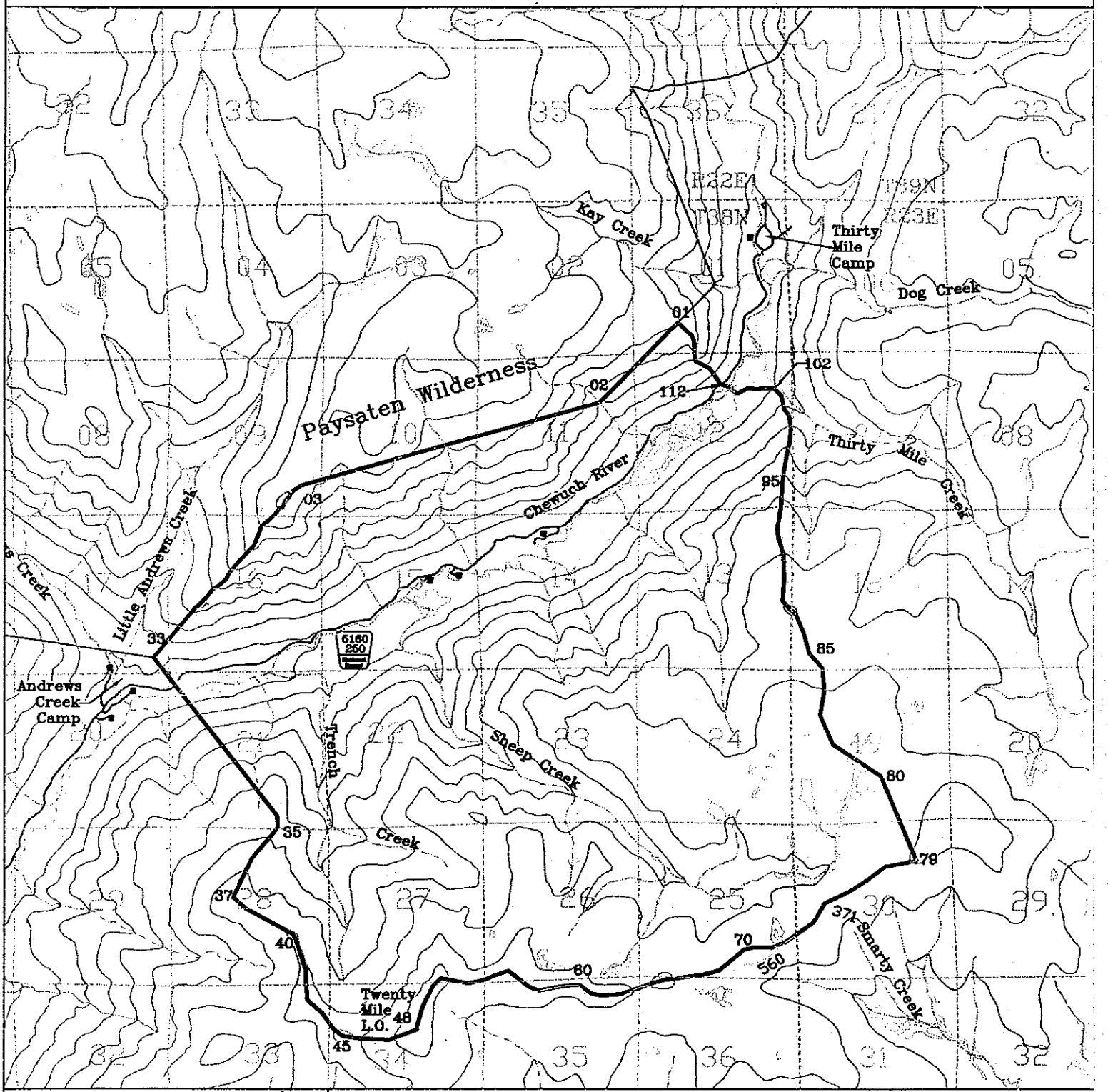
1000
Scale in meters
T38N


Chewuch RNA
Okanogan National Forest
14
13
18
85
23
24
19
80
Sheep Creek
79
26
25
30
70
T38N
60
Smarty Creek
T37N
35
36
31
500 0 500 1000
R22E R23E
Scale in meters

Chewuch RNA
Okanogan National Forest



LEGEND

Forest Road

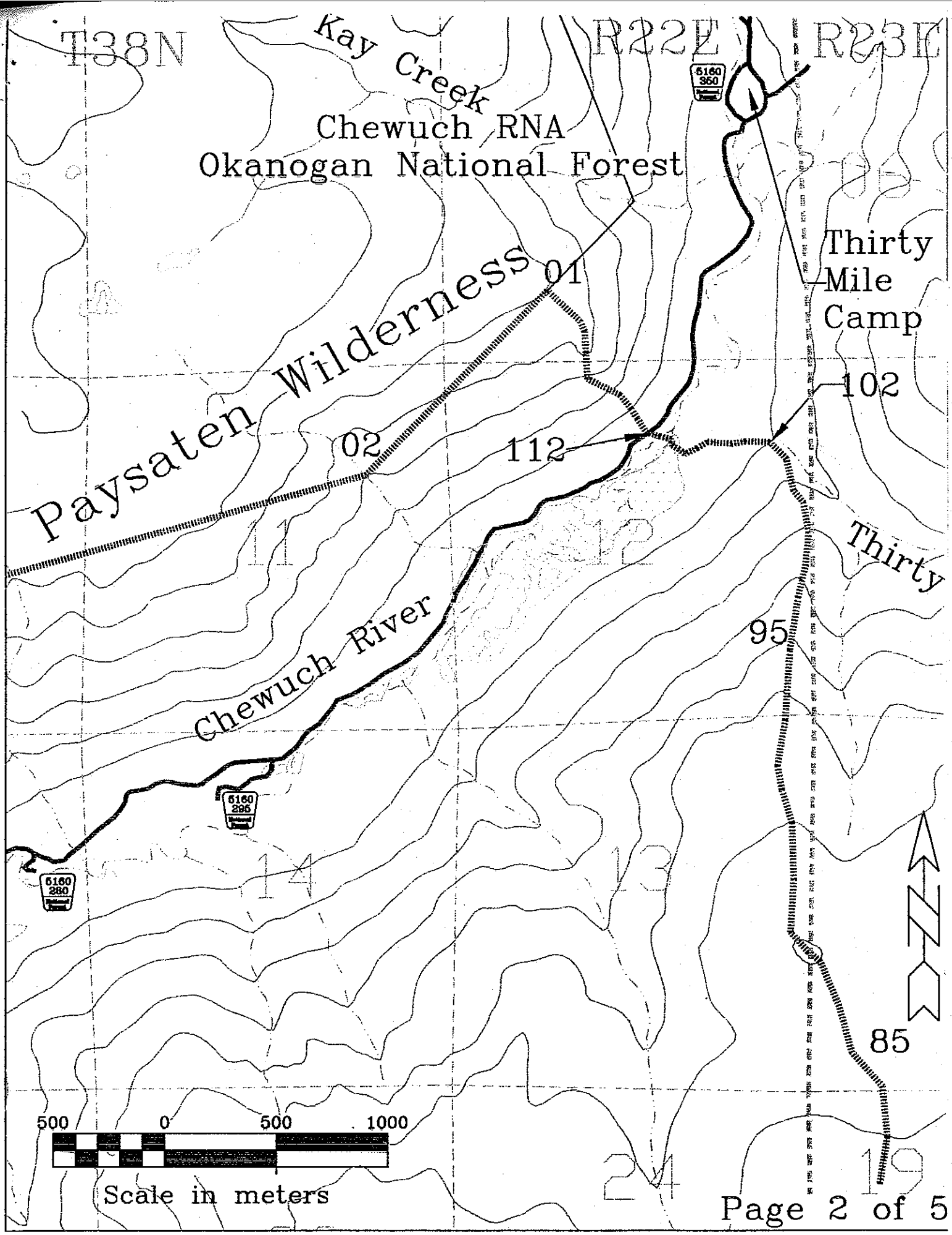
RNA Boundary

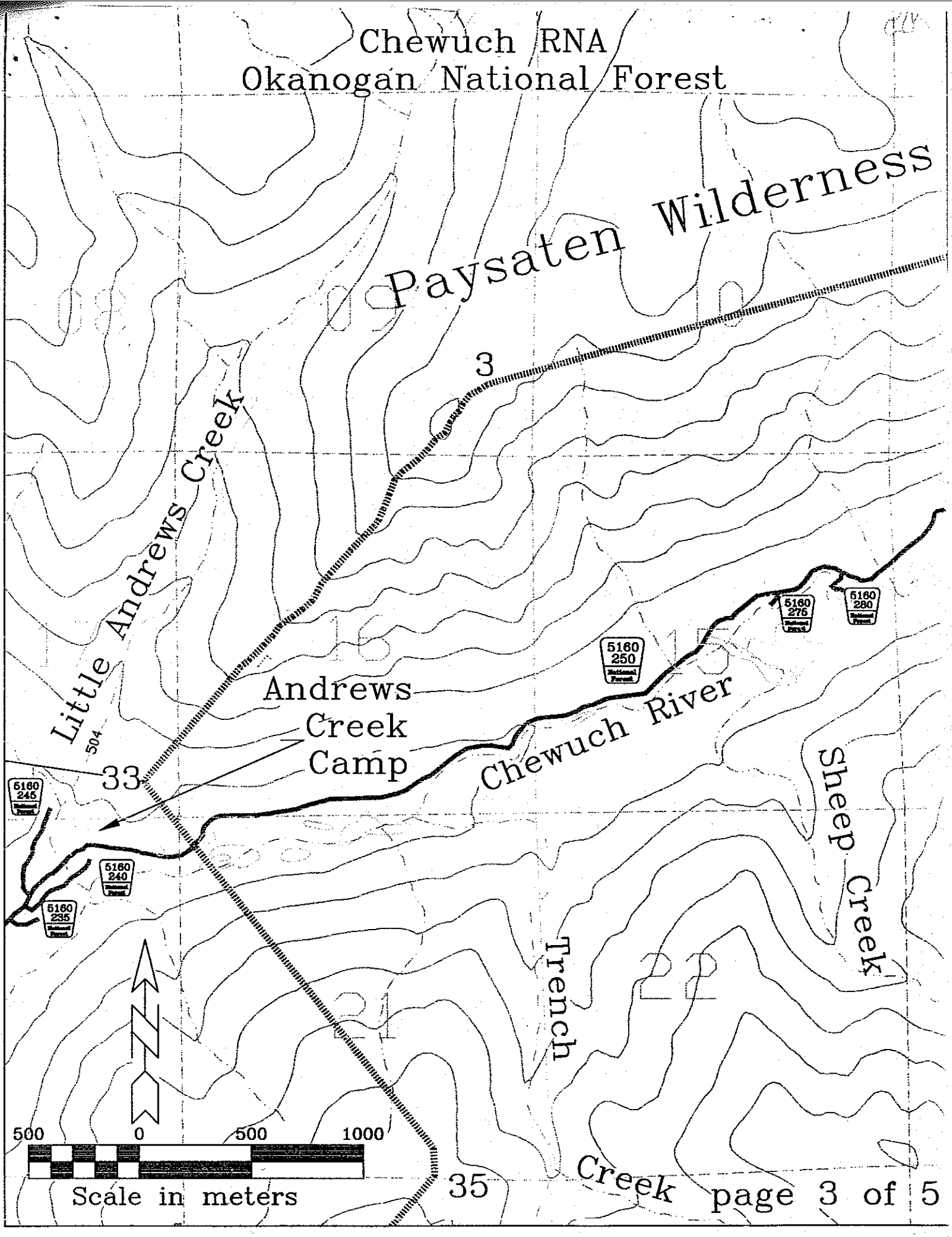
Control Point 45

Scale in meters

Chewuch RNA is located in unsurveyed township 38 North and ranges 22 & 23 East W.M.. Quadrangles used were: Coleman Peak, Wash.; Corral butte; and Spur Peak.

Point #48 is a USGS monument named N Twentymile. It is a first order monument established in 1950. It's coordinates are: State Plane Washington North N 195,029.228 E 556,252.821 meters
scale: 1.00000348 convergence +0°34'10.4"


T38N
R22E
R23E
Kay Creek
Chewuch RNA
Okanogan National Forest
Paysaten Wilderness
01
02
112
102
Thirty Mile Camp
Thirty
95
85
Chewuch River
5160 360
5160 295
5160 280
500 0 500 1000
Scale in meters


Chewuch RNA
Okanogan National Forest
Paysaten Wilderness
3
Little Andrews Creek
504
Andrews Creek Camp
33
Chewuch River
5160 245
5160 240
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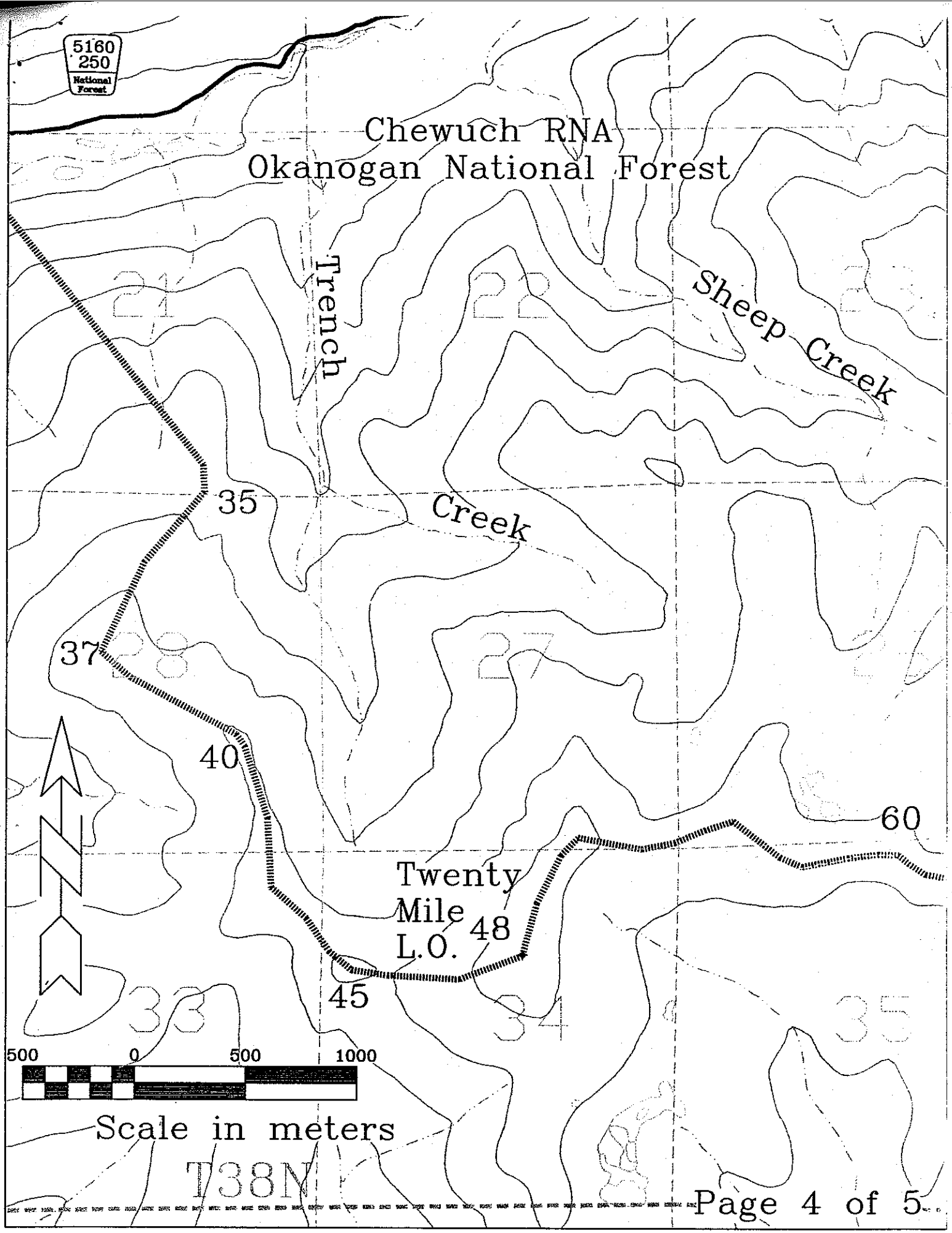
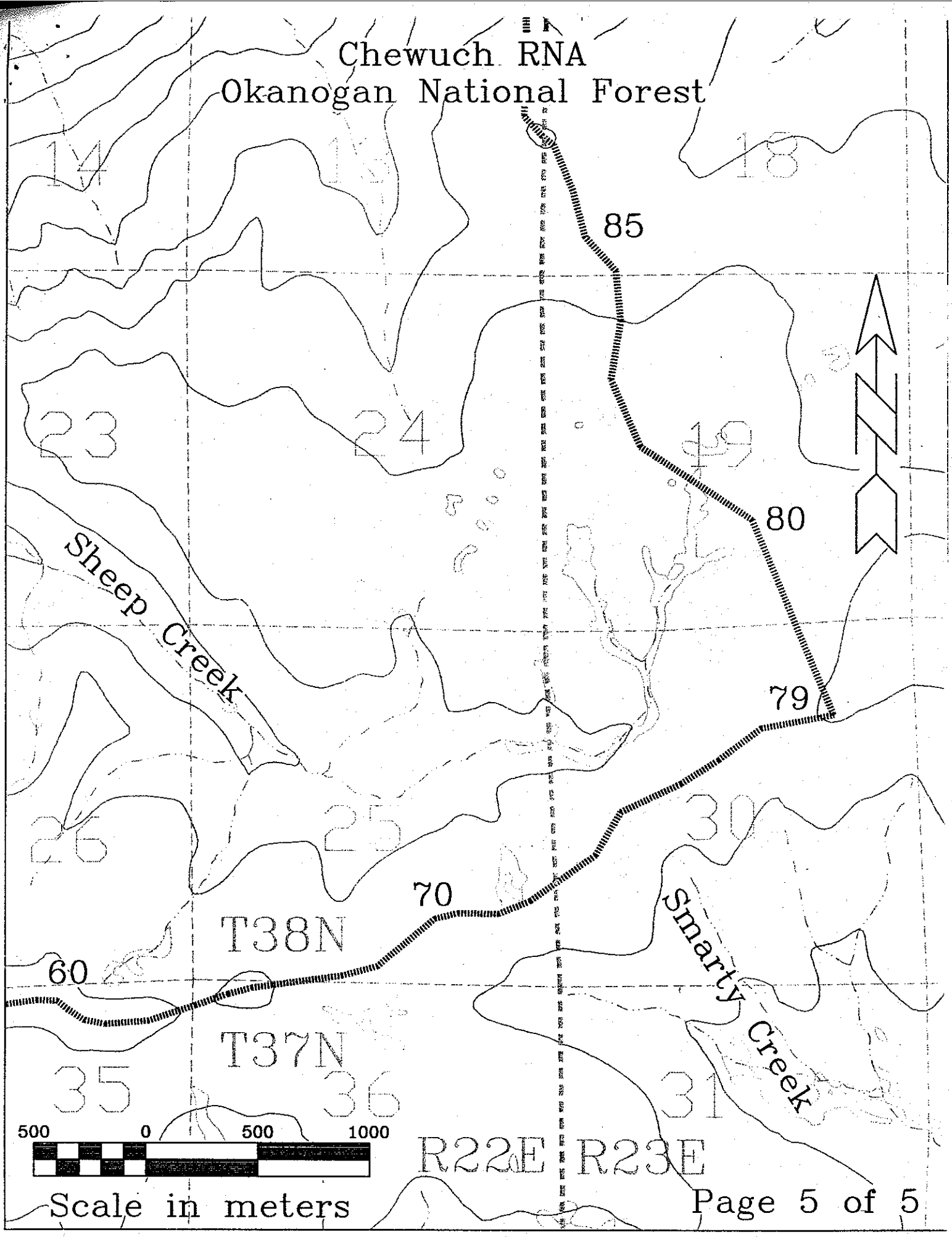
5160 250
5160 275
5160 280
Sheep Creek
Trench
22
500 0 500 1000
Scale in meters
35
Creek


5160
250
National Forest
Chewuch RNA
Okanogan National Forest
Trench
Sheep Creek
Creek
35
37
40
60
Twenty
Mile
L.O.
48
45
500
0
500
1000
Scale in meters
T38N


Chewuch RNA
Okanogan National Forest
14
13
18
85
23
24
19
80
Sheep Creek
79
26
25
30
70
T38N
60
Smarty Creek
T37N
35
36
31
500
0
500
1000
R22E
R23E
Scale in meters

APPENDIX II

Botany and Plant Ecology Report

A total of 272 vascular plant species were found. This is one of the most biologically diverse plant assemblages on the Okanogan National Forest. Names follow Douglas et. al. (1989); Hitchcock et al. (1955-1964); Hitchcock and Cronquist (1973); and Little (1979).

ALPHABETICAL LIST OF SPECIFIC, IDENTIFIED TAXA:

Latin Name	Species Codes #	Common Name	Family
Abies lasiocarpa	ABLA2	subalpine fir	Pinaceae
Acer glabrum	ACGL	Rocky Mountain maple	Aceraceae
Acer glabrum var. douglasii	ACGLD	Rocky Mountain maple	Aceraceae
Achillea millefolium	ACMI	common yarrow	Asteraceae
Actaea rubra	ACRU	red baneberry	Ranunculaceae
Adenocaulon bicolor	ADBI	American trailplant	Asteraceae
Agoseris aurantiaca	AGAU	orange agoseris	Asteraceae
Agrostis gigantea	AGGI2*	redtop	Poaceae
Agrostis scabra	AGSC	rough bentgrass	Poaceae
Allium cernuum	ALCE	nodding onion	Liliaceae
Alnus incana	ALIN	mountain alder	Betulaceae
Alnus viridis ssp. sinuata	ALSI	Sitka alder	Betulaceae
Alopecurus aequalis	ALAE	shortawn foxtail	Poaceae
Amelanchier alnifolia var. cusickii	AMALC	Cusick's serviceberry	Rosaceae
Anaphalis margaritacea	ANMA	pearly everlasting	Asteraceae
Anemone drummondii	AMDR	Drummond's anemone	Ranunculaceae
Angelica arguta	ANAR2	Lyall's angelica	Apiaceae
Antennaria lanata	ANLA	woolly pussytoes	Asteraceae
Antennaria microcephala	ANMI	rosy pussytoes	Asteraceae
Antennaria racemosa	ANRA	raceme pussytoes	Asteraceae
Antennaria umbrinella	ANUM	umper pussytoes	Asteraceae
Apocynum androsaemifolium	APAN	spreading dogbane	Apocynaceae
Aquilegia formosa	AQFO	western columbine	Ranunculaceae
Arabis holboellii var. retrofracta	ARHOR	Holboell's rockcress	Brassicaceae
Arabis sparsiflora	ARSP	sicklepod rockcress	Brassicaceae
Arctostaphylos nevadensis	ARNE	pinemat manzanita	Ericaceae
Arctostaphylos uva-ursi	ARUV	bearberry, kinnickinnick	Ericaceae
Arenaria capillaris	ARCA2	mountain sandwort	Caryophyllaceae
Arnica cordifolia	ARCO	heartleaf arnica	Asteraceae
Arnica diversifolia	ARDI2	rayless arnica	Asteraceae
Arnica rydbergii *WNHP-Watch	ARRY	Rydberg's arnica	Asteraceae
Artemisia michauxiana	ARMI	Michaux's sagebrush	Asteraceae
Aster conspicuus	ASCO	showy aster	Asteraceae
Aster foliaceus var. parryi	ASFOP	leafy aster	Asteraceae
Aster occidentalis	ASOC	western aster	Asteraceae
Athyrium filix-femina	ATFI	common ladyfern	Polypodiaceae
Betula nana	BENA	bog birch	Betulaceae
Betula occidentalis	BEOC	western, or water birch	Betulaceae
Betula papyrifera	PEPA	paper birch	Betulaceae
Botrychium multifidum	BOMU	leathery grapfern	Ophioglossaceae
Bromus carinatus	BRCA	California brome	Poaceae
Bromus inermis	BRIN	smooth brome	Poaceae
Bromus vulgaris	BRVU	Columbia brome	Poaceae
Calamagrostis canadensis	CACA	blue reedgrass	Poaceae
Caltha leptosepala ssp. howellii	CALE2	Howell's marsh-marigold	Ranunculaceae
Calamagrostis rubescens	CARU	pinegrass	Poaceae

Carex concinnoides	CACO	northwestern sedge	Cyperaceae
Carex deweyana	CADE	roundfruit sedge	Cyperaceae
Carex hoodii	CAHO	Hood's sedge	Cyperaceae
Carex lenticularis	CALE5	lakeshore sedge	Cyperaceae
Carex multicostata	CAMU	manyrib sedge	Cyperaceae
Carex nigricans	CANI2	black alpine sedge	Cyperaceae
Cardamine oligosperma	CAOL	western bittercress	Brassicaceae
Carex phaeocephala	CAPH	dunhead sedge	Cyperaceae
Carex rossii	CARO	Ross' sedge	Cyperaceae
Carex scirpoidea var. scirpoidea	CASCS	Canadian single-spike sedge	Cyperaceae
Carex scopulorum var. prionophylla *WNHP-Sensitive	CACSP	saw-leaved sedge	Cyperaceae
Carex stipata	CAST	stalkgrain sedge	Cyperaceae
Carex utriculata,		beaked sedge	Cyperaceae
Carex vesicaria var. vesicaria	CAVEV	bladder sedge	Cyperaceae
Castilleja elmeri	CAEL2	Wenatchee Indian paintbrush	Scrophulariaceae
Castilleja miniata	CAMI2	great red Indian paintbrush	Scrophulariaceae
Ceanothus velutinus	CEVE	buckbrush	Rhamnaceae
Centaurea diffusa	CEDI	diffuse knapweed	Asteraceae
Cerastium fontanum ssp. vulgare		mouse-ear chickweed	Caryophyllaceae
Chimaphila umbellata	CHUM	prince's pine	Ericaceae
Cicuta douglasii	CIDO	western water hemlock	Apiaceae
Cinna latifolia		slender woodreed	Poaceae
Cirsium arvense	CIAR	Canada thistle	Asteraceae
Cirsium edule	CIED	edible thistle	Asteraceae
Cirsium vulgare	CIVU	bull thistle	Asteraceae
Cistanthe tweedyi		Tweedy's Lewisia	Portulacaceae
Clematis columbiana	CLCO	Columbian virgin's bower	Ranunculaceae
Clematis ligusticifolia	CLLI	deciduous traveler's joy	Ranunculaceae
Collomia grandiflora	COGR2	large-flowered mountaintrumpet	Polemoniaceae
Collinsia parviflora	COPA	smallflower blue-eyed Mary	Scrophulariaceae
Cornus stolonifera	COST	red-osier dogwood	Cornaceae
Cornus unalaschkensis		western cordilleran bunchberry	Cornaceae
Cypripedium montanum	CYMO	mountain lady's slipper	Orchidaceae
Cystopteris fragilis	CYFR	brittle bladder fern	Polypodiaceae
Danthonia intermedia	DAIN	timber oatgrass	Poaceae
Deschampsia cespitosa	DECA	tufted hairgrass	Poaceae
Deschampsia elongata	DEEL	slender hairgrass	Poaceae
Descurainia sophia	DESO	flixweed	Brassicaceae
Disporum hookeri	DIHO	drops of gold	Liliaceae
Disporum trachycarpum	DITR	roughfruit fairybells	Liliaceae
Dodecatheon dentatum	DODE	white shootingstar	Primulaceae
Elymus elymoides	ELEL	bottlebrush squirreltail	Poaceae
Elymus glaucus	ELGL	blue wildrye	Poaceae
Elytrigia repens var. repens		quackgrass	Poaceae
Epilobium anagallidifolium		alpine willowherb	Onagraceae
Epilobium angustifolium	APAN	fireweed	Onagraceae
Epilobium halleanum		Hall's willowherb	Onagraceae
Equisetum arvense	EQAR	field horsetail	Equisetaceae
Equisetum hyemale	EQHY	scouring rush	Equisetaceae
Erigeron aureus	ERAU	alpine yellow fleabane	Asteraceae
Erigeron compositus var. glabratus	ERCOG	dwarf mountain fleabane	Asteraceae
Eriogonum heracleoides	ERHE	parsnip-flower wild buckwheat	Polygonaceae
Erigeron peregrinus	ERPE	wandering daisy	Asteraceae
Erigeron speciosus	ERSP	aspen fleabane	Asteraceae
Eriogonum umbellatum var. majus	ERUMM	subalpine wild buckwheat	Polygonaceae
Festuca brachyphylla		alpine fescue	Poaceae
Festuca occidentalis	FEOC	western fescue	Poaceae
Filago arvensis	FIAR	field cotton-rose	Asteraceae
Fragaria vesca	FRVE	woodland strawberry	Rosaceae
Fragaria virginiana	FRVI	Virginia strawberry	Rosaceae
Fragaria virginiana ssp. platypetala	FRVIP	Virginia strawberry	Rosaceae

Galium bifolium	GABI	twin-leaf bedstraw	Rubiaceae
Galium triflorum	GATR	sweet-scented bedstraw	Rubiaceae
Geum macrophyllum	GEMA	large-leaf avens	Rosaceae
Glyceria elata	GLEL	tall mannagrass	Poaceae
Gnaphalium microcephalum	GNMI	white cudweed	Asteraceae
Goodyera oblongifolia	GOOB	rattlesnake plantain	Orchidaceae
Hackelia micrantha		Jessica's stickseed	Boraginaceae
Heracleum lanatum	HELA	cow-parsnip	Apiaceae
Heuchera cylindrica	HECY	poker alumroot	Saxifragaceae
Hieracium albiflorum	HIAL	white-flowered hawkweed	Asteraceae
Hieracium canadense	HICA	Canadian hawkweed	Asteraceae
Hieracium gracile	HIGR	low alpine hawkweed	Asteraceae
Hieracium scouleri	HISC	woollyweed	Asteraceae
Hieracium umbellatum	HIUM	Canadian hawkweed	Asteraceae
Holodiscus discolor	HODI	ocean spray	Rosaceae
Hypericum perforatum	HYPE	common St. John's wort	Hypericaceae
Ipomopsis aggregata ssp. aggregata		scarlet skyrocket	Convolvulaceae
Juncus articulatus	JUAR	joint-leaf rush	Juncaceae
Juncus balticus var. balticus	JUBAB	Baltic rush	Juncaceae
Juniperus communis	JUCO4	common juniper	Cupressaceae
Juniperus communis var. depressa		common juniper	Cupressaceae
Juncus drummondii	JUDR	Drummond's rush	Juncaceae
Juncus parryi	JUPA	Parry's rush	Juncaceae
Juniperus scopulorum		Rocky Mountain juniper	Cupressaceae
Koeleria macrantha		prairie junegrass	Poaceae
Ledum glandulosum	LEGL	false Labrador tea	Ericaceae
Linnaea borealis	LIBO	twinflower	Caprifoliaceae
Lomatium brandegei	LOBR	Brandegee's desert-parsley	Apiaceae
Lonicera involucrata	LOIN	four-line honeysuckle	Caprifoliaceae
Lupinus arcticus		arctic lupine	Fabaceae
Lupinus latifolius	LULA2	broad-leaf lupine	Fabaceae
Lupinus polyphyllus	LUPO	big-leaf lupine	Fabaceae
Lupinus wyethii	LUWY	Wyeth's lupine	Fabaceae
Luzula glabrata var. hitchcockii	LUGLH	Hitchcock's smooth woodrush	Juncaceae
Luzula parviflora	LUPA	smallflowered woodrush	Juncaceae
Luzula spicata	LUSP	spiked woodrush	Juncaceae
Mahonia aquifolium		holly-leaf Oregon-grape	Berberidaceae
Mahonia repens		low Oregon grape	Berberidaceae
Maianthemum stellatum		starry Solomon's plume	Liliaceae
Mentha canadensis	MECA	field mint	Lamiaceae
Mimulus guttatus	MIGU	common monkey flower	Scrophulariaceae
Mitella pentandra	MIPE	five-stamen bishop's-cap	Saxifragaceae
Moehringia macrophylla	MOMA	large-leaf grove-sandwort	Caryophyllaceae
Moneses uniflora ssp. uniflora	MOUNU	single-delight, wood-nymph	Ericaceae
Myosotis laxa	MYLA	bay forget-me-not	Boraginaceae
Orthilia secunda		sidebells pyrola	Ericaceae
Oryzopsis exigua	OREX	little ricegrass	Poaceae
Osmorhiza chilensis	OSCH	mountain sweet Cecily	Apiaceae
Osmorhiza depauperata	OSDE	blunt-fruit sweet Cecily	Apiaceae
Pachistima myrsinites	PAMY	Oregon boxwood, mountain lover	Celastraceae
Parnassia fimbriata	PAFI	fringed grass-of-Parnassus	Saxifragaceae
Pedicularis bracteosa	PEPR	greater wood-betony	Scrophulariaceae
Penstemon confertus	PECO	lesser yellow beardtongue	Scrophulariaceae
Penstemon davidsonii	PEDA	timberline beardtongue	Scrophulariaceae
Pentaphylloides floribunda		shrubby cinquefoil, yellow rose	Scrophulariaceae
Penstemon fruticosus	PEFR2	shrubby penstemon	Scrophulariaceae
Penstemon procerus	PEPR	small-flowered penstemon	Scrophulariaceae
Penstemon pruinosus	PEPR2	Chelan, or frosty penstemon	Scrophulariaceae
Penstemon washingtonensis *WNPS-Watch	PEWA	Washington penstemon	Scrophulariaceae
Phalaris arundinacea	PHAR	reed canarygrass	Poaceae
Phacelia hastata	PHHA	silver-leaf scorpion-weed	Hydrophyllaceae

Philadelphus lewisii	PHLE	Lewis' mock orange	Hydrangeaceae
Phleum alpinum	PHAL	alpine fescue	Poaceae
Phleum pratense	PHPR	timothy	Poaceae
Picea engelmannii	PIEN	Engelmann's spruce	Pinaceae
Pinus albicaulis	PIAL	whitebark pine	Pinaceae
Pinus contorta	PICO	lodgepole pine	Pinaceae
Pinus ponderosa	PIPO	ponderosa pine	Pinaceae
Platanthera dilatata		scentbottle	Orchidaceae
Plantago major	PLMA	great plantain	Plantaginaceae
Poa annua	POAN	annual bluegrass	Poaceae
Poa interior	POIN	inland bluegrass	Poaceae
Poa pratensis	POPR	Kentucky bluegrass	Poaceae
Poa secunda	POSE	Sandberg's bluegrass	Poaceae
Poa secunda var. gracillima	POSEG	tall sandberg's bluegrass	Poaceae
Poa trivialis	POTR3	rough bluegrass	Poaceae
Polemonium elegans	POEL	elegant Jacob's-ladder	Polemoniaceae
Polygonum viviparum	POVI2	serpent-grass	Polygonaceae
Populus balsamifera ssp. trichocarpa	POTR2	black cottonwood	Salicaceae
Populus tremuloides	POTR	quaking aspen	Salicaceae
Potentilla arguta ssp. convallaria	POARC	tall cinquefoil	Rosaceae
Potentilla diversifolia	PODI	mountain-meadow cinquefoil	Rosaceae
Potentilla diversifolia var. diversifolia	PODID	mountain-meadow cinquefoil	Rosaceae
Potentilla drummondii	PODR	Drummond's cinquefoil	Rosaceae
Potentilla glandulosa	POGL	sticky cinquefoil	Rosaceae
Potentilla glandulosa ssp. pseudorupestris	POGLP	sticky cinquefoil	Rosaceae
Prunus emarginata	PREM	bitter cherry	Rosaceae
Prunus virginiana	PRVI	choke cherry	Rosaceae
Prunella vulgaris	PRVU	selfheal, healall	Lamiaceae
Pseudoroegneria spicata ssp. spicata		bluebunch wheatgrass	Poaceae
Pseudostuga menziesii	PSME	Douglas-fir	Pinaceae
Pterospora andromedea	PTAN	woodland pinedrops	Ericaceae
Pteridium aquilinum	PTAQ	western brackenfern	Polypodiaceae
Pyrola asarifolia	PYAS	pink wintergreen	Ericaceae
Pyrola chlorantha	PYCH	green wintergreen	Ericaceae
Pyrola minor	PYMI	lesser wintergreen	Ericaceae
Ranunculus aquatilis	RAAQ	white water-buttercup	Ranunculaceae
Ranunculus macounii	RAMA	Macoun's buttercup	Ranunculaceae
Ranunculus sceleratus	RASC	blister buttercup	Ranunculaceae
Ranunculus uncinatus	RAUN2	hooked buttercup	Ranunculaceae
Rhododendron albiflorum	RHAL	Cascade azalea	Ericaceae
Ribes cereum	RICE	white squaw currant	Grossulariaceae
Ribes lacustre	RILI	swamp, black, or prickly gooseberry	Grossulariaceae
Ribes viscosissimum	RIVI	sticky currant	Grossulariaceae
Rosa nutkana	RONU	Nootka rose	Rosaceae
Rosa woodsii	ROWO	Woods' rose	Rosaceae
Rubus idaeus	RUID	red raspberry	Rosaceae
Rubus leucodermis	RULE	white-stem raspberry	Rosaceae
Rubus parviflorus	RUPA	western thimble-berry	Rosaceae
Rumex acetosella	RUAC	sheep sorrel	Polygonaceae
Rumex crispus	RUCR	curly dock	Polygonaceae
Salix boothii	SABO	Booth wilow	Salicaceae
Salix drummondiana	SADR	Drummond's willow	Salicaceae
Salix exigua	SAEX	coyote willow	Salicaceae
Salix lucida ssp. lasiandra	SALUL	Pacific willow	Salicaceae
Salix lutea	SALU	Watson willow	Salicaceae
Salix planifolia	SAPL2	diamondleaf willow	Salicaceae
Salix scouleriana	SASC	Scouler's willow	Salicaceae
Sambucus racemosa	SARA	red elderberry	Caprifoliaceae
Saxifraga bronchialis ssp. austromontana	SABRA	yellow-spot saxifrage	Saxifragaceae
Scirpus microcarpus	SCMI	small-fruited bulrush	Cyperaceae
Sedum lanceolatum	SELA2	lance-leaf stonecrop	Crassulaceae
Sedum stenopetalum	SEST	worm-leaf stonecrop	Crassulaceae

Selaginella densa	SEDE3	dense spike-moss	Selaginellaceae
Senecio integerrimus	SEIN	lamb-tongue ragwort	Asteraceae
Senecio streptanthifolius	SEST2	Rocky Mountain ragwort	Asteraceae
Senecio triangularis	SETR	arrowleaf groundsel	Asteraceae
Shepherdia canadensis	SHCA	russet buffalo-berry	Eleagnaceae
Sibbaldia procumbens	SIPR	creeping sibbaldia	Rosaceae
Silene douglasii	SIDO2	seabluff catchfly	Caryophyllaceae
Silene menziesii	SIME	white catchfly	Caryophyllaceae
Silene parryi	SIPA	Parry's silene	Caryophyllaceae
Smilacina racemosa	SMRA	Solomon's plume	Liliaceae
Solidago multiradiata	SOMU	northern goldenrod	Asteraceae
Sorbus scopulina	SOSC2	Cascade mountain-ash	Rosaceae
Spiraea betulifolia	SPBE	shiny-leaf meadowsweet	Rosaceae
Spiraea douglasii	SPDO	Douglas' meadowsweet	Rosaceae
Spiranthes romanzoffiana	SPRO	western ladies'-tresses	Orchidaceae
Stellaria longipes var. monantha	STLOM	long-stalk starwort	Caryophyllaceae
Stenanthium occidentale	STOC2	bronze bells	Liliaceae
Symphoricarpos albus	SYAL	common snowberry	Caprifoliaceae
Taraxacum officinale	TAOF	common dandelion	Asteraceae
Thalictrum occidentale	THOC	western meadowrue	Ranunculaceae
Tonestus lyallii		Lyall's serpentweed	Asteraceae
Trimorpha acris var. debilis		northern daisy	Asteraceae
Trisetum cernuum var. canescens	TRCEC	tall oatgrass	Poaceae
Trifolium pratense	TRPR	red clover	Fabaceae
Trifolium repens	TRRE	Dutch clover	Fabaceae
Trisetum spicatum	TRSP	spike trisetum	Poaceae
Trollius laxus	TRLA4	American globeflower	Ranunculaceae
Vaccinium caespitosum	VACA	dwarf huckleberry	Ericaceae
Vaccinium membranaceum	VAME	thinleaf blueberry, tall huckleberry	Ericaceae
Vaccinium scoparium	VASC	grouseberry, dwarf whortleberry	Ericaceae
Valeriana dioica	VADI	marsh valerian	Valerianaceae
Valeriana sitchensis	VESI	Sitka valerian	Valerianaceae
Veronica americana	VEAM	American-brooklime	Scrophulariaceae
Veronica serpyllifolia var. humifusa	VESEH	thyme-leaf speedwell	Scrophulariaceae
Verbascum thapsus	VETH	great, or flannel mullein	Scrophulariaceae
Veratrum viride	VEVI	American false hellebore	Liliaceae
Veronica wormskjoldii	VEWO	American alpine speedwell	Scrophulariaceae
Viburnum edule	VIED	squashberry	Caprifoliaceae
Viola glabella	VIGL	pioneer violet, wood violet	Violaceae
Viola orbiculata	VIOR2	round-leaved, or evergreen violet	Violaceae
Viola palustris	VIPA2	alpine-marsh violet	Violaceae
Woodsia oregana	WOOR	Oregon cliff fern	Polypodiaceae
Woodsia scopulina	WOSC	Rocky Mountain cliff fern	Polypodiaceae

* WNHP = Washington Natural Heritage Program Endangered, Threatened and Sensitive Vascular Plants of Washington, 8/97 revision.
# Species codes taken from Garrison and Skovlin (1976) NW Plant Names and Symboles for Ecosystem Inventory and Analysis. Forth Edition (where they apply).

FINDINGS - ECOSYSTEMS

Sites visited. Numerous survey trips were conducted in the area by a number of groups (see historical summary). These trips were primarily conducted in the bottomlands, however floristic data for upper Sheep Creek, North Twentymile summit, and a loop survey of the center of the area are included.

Because of the difficulty in accessing specific areas in this mosaic of forests, cliffs and riparian areas, prominent on-the-ground locations are referenced below, based on the road mileage (FS5160) past Tonseth Lake, just south of the RNA:

Mile 0.0 Tonseth Lake.
Mile 0.2 Approximate western boundary of RNA.
Mile 0.4 20' angular boulder beside road in old growth Douglas fir stand CH001, where mountain lady's slipper (*Cypripedium montanum*) was located.
Mile 1.1 Closest road approach to Trench Creek.
Mile 1.4 12' angular boulder on road.
Mile 1.6 Beginning of downcutting through Sheep Creek fan, opposing debris flow channel coming from NW side of road.
Mile 1.7 Access for crossing to wet deciduous forest and meadow complex.
Mile 2.5 Even-aged cottonwood-aspen stand, where *Botrychium multifidum* was located. Oxbows and sloughs throughout area, some disturbed by camping or past livestock use.
Mile 3.0 Willow/grass meadow in dispersed campsite.
Mile 3.1 Location of rockslide deposit and cold, upwelling springs across river from road.
Mile 3.6 Extensive Engelmann spruce stand with 30"-40" dbh trees and red-osier dogwood thickets.
Mile 4.3 Red osier dogwood stand is adjacent to road, across river. One old growth Spruce / Equisetum stand lies between this area and Thirtymile Creek alluvial fan.
Mile 4.7 Angular 15' boulders in river at NE end of RNA mark beginning of user trail up Thirtymile Creek.

During field surveys it was found that the outlet of Sheep Creek is mapped incorrectly wrong on USGS maps. The creek actually goes west when it reaches the bottomlands, rather than curving east as depicted. The meadow complex at the east end of the alluvial fan results from subsurface flows, and is hydrologically isolated from Sheep Creek by a prominent bedrock knob.

Species determinations. The following species presented difficulties in determination for the reasons stated:

Aster occidentalis / A. foliaceus. Material from the RNA is intergradient.

Betula papyrifera / B. occidentalis. Material in the RNA has the acuminate leaf tips of the latter, and the slightly lobed leaves and pale bark of the former. Hybrids are referable to *Betula* X *piperi*. All three of these entities were determined separately in different areas.

Caltha leptosepala / C. biflora. Our material may be referable to *C. biflora* var. *biflora*, however the Plants database has lumped this together with *C. leptosepala* var. *howellii.* Review of material at the University of Washington Herbarium reveal that our material is certainly not the taller, more largely- and evenly-toothed *C. howellii*, so the specificity of the name change suspiciously resembles some confusion between *C. howelli* (*C. leptosepala* var. *howellii*) and a similar endemic of northern coastal Washington which was collected by Menzies and later named *C. biflora* var. *rotundifolia.* For this paper we have retained the proposed name change.

Hieracium scouleri / Hieracium albertinum. Material here is intermediately long-hairy. The latter has been subsumed by the former, and the former may be referable to *H. scouleri* var. *griseum.*

Hieracium umbellatum var. *canadensis / H. umbellatum* var. *umbellatum.* One specimen of the former growing in a forested situation appeared distinct from the latter, indicating maintenance of separate species may be preferable, in contrast to recent treatments.

Mahonia aquifolium / M. repens. Material from the RNA is commonly ambiguous.

Lupinus arcticus / L. latifolius / L. polyphyllus / L. wyethii. Field collections within this group reveal that *L. latifolius* may be distinct from *L. arcticus* (in previous studies referred to as *L. polyphyllus* var. *burkei*), which prefers wet areas. *L. wyethii* fits pubescent, thin-leaved material of drier areas with stems branching below the caudex underground. All four of these entities were determined separately in different areas.

APPENDIX III

Wildlife Species List

Species List Provided by Kent Woodruff, Okanogan National Forest (1997)
Listing Status from the Code of Federal Regulations (50 CFR, Vol. 1 Part 17.11) and FSM 2670.42

Mammals		Listing Status
Corynorhinus townsendii	**Western big-eared bat**	***candidate****
Eptesicus fuscus	Big brown bat	
Myotis californicus	California myotis	
Myotis ciliolabrum	**Small footed myotis**	
Myotis evotis	**Western long-eared myotis**	
Myotis lucifugus	Little brown myotis	
Myotis septentrionalis	Northern long-eared myotis	
Myotis thysanodes	**Fringed myotis**	
Myotis yumanensis	**Yuma myotis**	
Myotis volans	**Long-legged myotis**	
Lasiurus cinereus	Hoary bat	
Lasionycteris noctivagans	Silver-haired bat	
Euderma maculatum	**Spotted bat**	
Sorex vagrans	Vagrant shrew	
Ochotona princeps	Pika	
Lepus americanus	Snowshoe hare	
Citellus columbianus	Columbia ground squirrel	
Citellus lateralis	Golden-mantled squirrel	
Eutamias townsendi	Townsend chipmunk	
Peromyscus maniculatus	Deer mouse	
Neotoma cinerea	Bushy-tailed wood rat	
Synaptomys borealis	Northern bog lemming	
Clethrionomys gapperi	Boreal redbacked vole	
Erethizon dorsatum	Porcupine	
Ursus americanus	Black bear	
Ursus arctos	**Grizzly bear**	***threatened***
Canis lupus	**Gray wolf**	***endangered***
Canis latrans	Coyote	
Martes americana	Marten	
Mustela frenata	Longtail weasel	
Mustela vison	Mink	
Gulo Gulo	**Wolverine**	***sensitive***
Felix concolor	Mountain lion	
Lynx Lynx	**Lynx**	***sensitive/candidate****
Odocoileus hemionus	Mule deer	
Alces alces	Moose	
Birds		
Anas platyrhynchos	Mallard	

Charadrius vociferus	Killdeer
Tachycineta thalassina	Violet-green Swallow
Tachycineta bicolor	Tree Swallow
Accipiter gentilis	Northern Goshawk
Accipiter cooperii	Cooper's Hawk
Accipiter striatus	Sharp-shinned Hawk
Buteo jamaicensis	Red-tailed Hawk
Aquila chrysaetos	Golden Eagle
Falco sparvarius	American kestrel
Aegolius funereus	Boreal Owl
Strix nebulosa	Great gray owl
Bubo virginianus	Great Horned Owl
Otus kennicottii	Western Screech-Owl
Aegolius acadicus	Northern Saw-whet Owl
Glaucidium gnoma	Northern Pygmy Owl
Dendragapus obscurus	Blue Grouse
Dendragapus canadensis	Spruce Grouse
Chordeiles minor	Common Nighthawk
Selasphorus rufus	Rufous Hummingbird
Stellula calliope	Calliope Hummingbird
Chaetura vauxi	Vaux's Swift
Cypseliodes niger	Black swift
Colaptes auratus	Northern Flicker
Sphyrapicus thyroideus	Williamson's Sapsucker
Sphyrapicus nuchalis	Red-naped sapsucker
Melanerpes lewis	Lewis' Woodpecker
Dryocopus pileatus	Pileated Woodpecker
Picoides villosus	Hairy Woodpecker
Picoides pubescens	Downy Woodpecker
Picoides tridactylus	Three-toed Woodpecker
Picoides arcticus	Black-backed woodpecker
Contopus borealis	Olive-sided Flycatcher
Contopus sordidulus	Western wood pewee
Empidonax oberholseri	Dusky Flycatcher
Empidonax hammondii	Hammond's Flycatcher
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Nucifraga columbiana	Clark's Nutcracker
Perisoreus canadensis	Gray Jay
Pica pica	Black-billed Magpie
Cyanocitta stelleri	Stellar's Jay
Parus atricapillus	Black-capped Chickadee
Parus gambeli	Mountain Chickadee
Parus hudsonicus	Boreal Chickadee
Sitta canadensis	Red-breasted Nuthatch
Troglodytes troglodytes	Winter Wren
Certhia americana	Brown Creeper
Ixoreus naevius	Varied Thrush
Myadestes townsendi	Townsend's Solitaire

Catharus fuscescens	Veery
Catharus guttatus	Hermit Thrush
Catharus ustulatus	Swainson's Thrush
Turdus migratorius	American Robin
Regulus calendula	Ruby-crowned Kinglet
Regulus satrapa	Golden-crowned Kinglet
Bombycilla cedrorum	Cedar Waxwing
Molothrus ater	Brown-headed Cowbird
Vireo solitarius	Solitary Vireo
Vireo olivaceous	Red-eyed Vireo
Vermivora celata	Orange-crowned Warbler
Vermivora ruficapilla	Nashville Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica townsendi	Townsend's Warbler
Dendroica petechia	Yellow Warbler
Oporonis tolmiei	MacGillivray's Warbler
Wilsonia pusilla	Wilson's Warbler
Agelaius phoeniceus	Red-winged Blackbird
Piranga ludoviciana	Western Tanager
Carduelis pinus	Pine Siskin
Loxia curvirostra	Red Crossbill
Loxia leucoptera	White-winged Crossbill
Pinicola enucleator	Pine Grosbeak
Pipilo erythrophthalmus	Spotted Towhee
Coccothraustes vespertinus	Evening Grosbeak
Melospiza melodia	Song Sparrow
Passerella iliaca	Fox Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Junco hyemalis	Dark-eyed Junco
Zonotrichia leucophrys	White-crowned Sparrow

Reptiles

Charina bottae	Rubber Boa
Elegaria coerulea	N. Alligator Lizard
Thamnophis elegans	W. Terrestrial Garter Snake
Thamnophis sirtalis	Common Garter Snake

Amphibians

Ambystoma macrodactylum	Long-Toed Salamander
Pseudacris regilla	Pacific Tree Frog
Rana pretiosa	Spotted Frog
Ascaphus truei	Tailed Frog

*Being considered for listing by the US Fish and Wildlife Service.

APPENDIX IV

Bat Report Details - For Information Only - Includes Observations in the Chewuch River Valley Surrounding the RNA

Proposed Chewuch Research Natural Area (RNA)
Methow Ranger District, Okanogan NF
An Assessment for Bats, Habitat and Research Opportunities

August 26-29, 1997

Ralph G. Anderson
Wallowa Valley Ranger District,
Wallowa-Whitman National Forest

The questions I was asked to assess in this study were:

What are the habitat characteristics of the area of value to bats?
What bat research/educational opportunities present themselves in the proposed RNA?

Review of available bat records and published literature indicate that little work has been done to sample or assess bats on the Methow Ranger District, the Chewuch River or the proposed RNA. Only 2 species were listed as occurring in the immediate vicinity; big brown bat (Eptesicus fuscus) and Townsend's big-eared bat (Corynorhinus townsendii). David Nagorsen and Mark Brigham (1993) identify 12 species as occurring in the "Southern Interior" and "Central Interior Mountains" of British Columbia, about 12 miles to the north of the proposed RNA. These include; California Myotis (Myotis californicus), Western small-footed Myotis (M. ciliolabrum), Western Long-eared Myotis (M. evotis), Little Brown Myotis (M. lucifugus), Northern Long-eared Myotis (M. septentrionalis), Fringed Myotis (M. thysanodes), Yuma Myotis (M. yumanensis), Long-legged Myotis (M. volans), Hoary Bat (Lasiurus cinereus), Silver-haired Bat (Lasionycteris noctivagans), Big Brown Bat (Eptesicus fuscus), Spotted Bat (Euderma maculatum) and Townsend's Big-eared Bat (Corynorhinus townsendii).

On Tuesday, August 26, I proceeded up the Chewuch River road looking for points at which to encounter signs of bat use and/or bats themselves. I encountered heavy rain, lightning, thunder and very cool temperatures while traveling up the river. Strong and swirling winds and temperatures in the low 50's (Fahrenheit) continued until at least 2100 hours and no bats were noted flying anywhere. Wednesday, August 27, I continued with searching for bat sign, points at which to encounter bats and bats, along the Chewuch River. The evening of August 27, I looked at the Forest Service Barn at Early Winters Visitors Center with Kent Woodruff and several other folks to identify and count bats he had noted using that facility. We counted 26 Townsend's big-eared bats, hand-netted one to confirm that it was a male and that the balance of the animals in that structure were likely males, and released it at the same site. We also looked under the closest highway bridge where Kent had earlier noted bats, counting 2-3 myotids flying and hand-netting one sub-adult male Long-legged Myotis. Thursday I compiled this report and Thursday evening Kent Woodruff and I

sampled bats at several sites (bridges) on and near the Chewuch River. Appendix 1, attached contains the site specific information on monitoring sites located, evidence found, bats encountered, etc..

While examining the specific area of the proposed RNA I noted a number of features that are likely of particular significance to a number of the species of bats that are probably using this area. There are great exposed lithic faces with both south exposures and north, including talus falls with large-block talus in many locations.

The juxtaposition of these lithic formations which provide fissures and caves for maternity colony sites for the cave-using species (M. californicus, M. ciliolabrum, M. lucifugus, Corynorhinus townsendii and Euderma maculatum) to the abundant water in the Chewuch River itself, particularly in the upper third of the proposed RNA, is optimal for these species. All 12 of the species listed above are likely users of this proposed RNA. Several other species rely on the presence of caves, fissures and/or mine tunnels for hibernacula (hibernating sites), also. These include M. evotis, M. septentrionalis, M. thysanodes and M. volans. Eptesicus fuscus is at least an occasional user of caves and tunnels for hibernacula. Townsend's big-eared bats have also been recorded using large-block talus for day-roosts during non-hibernating seasons.

There is an abundance of varied forest conditions and associated habitats which are particularly significant to different bat species for a variety of purposes including large old trees both live and dead which are used as day roosts by Silver-haired bats, hoary bats, long-legged bats and at least occasionally by a number of the others. Woodpecker cavities, over 80% of which occur in large dead trees (Madsen 1985), provide maternity colony sites and aggregating/staging sites for silver-haired bats, big brown bats and long-legged bats. Both live and dead hollow trees are very significant to most of these species of bats as roost sites (Gellman et al. 1996). Hoary bats in particular seem inclined to take maximum advantage of the kinds of snags created by fire, which covers about 1/4 of the proposed RNA in it's southeast corner.

The availability of the thermal and higher moisture regime habitats provided by exposed lithic structure and open surface water serves the hatching and flying of many species of invertebrate prey for all these species of bats. The variety of young and old coniferous forest and the interspersion of deciduous ecotones in riparian, talus garlands and dry-land deciduous situations adds greatly to a broad diversity of invertebrate prey species that similarly serves the predator complex of 12 bat species. An abundance of large rocks emerging from the river channel itself and the presence of large woody debris (logs and stumps) in and adjacent to the river accommodate the hot season roosting by M. evotis particularly, and occasional use by other species.

What seems somewhat limited in the proposed RNA itself is the opportunity to actually intercept and/or encounter the using bats. That is likely more a function of available techniques and technology than it is a limitation on the ecology or habitat conditions for the bats themselves. This is where... the down-river opportunities seem most complimentary to the RNA. Down river there are a variety of situations created by management that allow researchers to encounter bats and include; bridges, outhouses and ranch buildings that are currently used as night roosts and some of which can also be modified to constitute day roosts for some of the species, managed forest conditions containing "superior/cone selection trees" with collars which are often used by bats, and the opportunity to erect a number of bat-specific structures that can both serve the bats themselves as well as provide the opportunities for researchers to more easily encounter them for monitoring.

The juxta-position of natural or more passively managed habitats which accommodate bats adjacent to an area of more active management, which bats also use and can be manipulated to some degree to favor specific kinds of bat use, provides the greatest value for investigation and research.

Several techniques which can begin the process of building a knowledge base that will support active bat investigation and management include:

1) Building a data base of monitorable bat use points, including;
    a) Bridges by construction type and design,
    b) Buildings that can or may be used for day roosts, night roosts,

hibernacula, staging sites and/or maternity colony sites,

c) Superior Trees/Cone Collecting Trees... from it's own GIS database These sites are often used by several species of bats and are easily accessed.

d) Mines... with lateral and vertical adits, from the developed Minerals data base

e) Caves... from Cultural Resources and Special Interest Areas dB's

f) Ponds and troughs - These are sites that can be sampled for bat use using mist nets and/or ultra-sonic detection systems for activity records.

f) Bat specific structures, bat boxes, modifications to existing buildings and bridges, etc. These may constitute the most accessible populations from which to build research programs and telemetry projects.

2) Systematically add monitoring notes to this same developed data base that will indicate what has actually been searched, by whom, when and with what appropriate techniques.

3) Develop an independent data base of "bats actually encountered," and "bat use detected..." suggesting the kinds of use that bats are making of each site. Some caves and mines are used in various areas for hibernacula and maternity colony sites and more casual day-roosting. Others are single use in single limited seasons. Some sites are sensitive enough to warrant gating and other protection measures. Proposed Chewuch Research Natural Area (RNA), Methow Ranger District, Okanogan NF, An Assessment for Bats, Habitat and Research Opportunities

Listing of site-specific bat investigations and records:

35N~T35NR21E02 421 Chewuch River bridge between county roads 1213 & 9137
(nee: Johnson Corner bridge):
8/27/97 - <1/2 mile south of FS boundary and 100 yds. west of
Washington Department of Fish and Game - Winter Game Range
A good concrete box structured bridge to be used as a night hang-up, not inspected at this time.
8/28/97 - 1955 hrs - Ralph Anderson and Kent Woodruff conducted a
physical exam in the daylight and noted guano of COTO, MYOT-large, MYOT-small in excellent abundance and distributed at both ends
2103 - Ralph Anderson and Kent Woodruff noted a single MYOT flying beneath the bridge. We hand-netted it and recorded an Adult female Myotis lucifugus (forearm 34.2 mm., thumb 4.0 mm, unkeeled calcar)

36N~T36NR19E26 144 Early Winters Visitor Center barn
8/27/97 - 2030 - Ralph Anderson, Kent Woodruff and 2 others
Counted 26 Townsend's big-eared bats hanging inside this building at the station where Kent had reported seeing possible Townsend's a few days earlier (10 days). Eight animals were huddled together near the peak which may simply have been for warmth... since the previous night and this day have been cool. The other animals were scattered throughout the available roof space. We hand-netted a single, hanging alone to confirm species, age and sex. It was an adult male and was released on site. We presumed that the rest of the animals here were adult males. We looked in all (5 adjacent buildings) for the females and noted a little Myotis sp.-small guano in the old shop building.

T36NR19E26 444 Early Winters Creek bridge #1
8/27/97 - 2120 - Ralph Anderson, Kent Woodruff and 2 others

Looked under this bridge where Kent had reported seeing several species of bats and numbers in the several of tens. We noted 2-3 flying bats and were able to hand-net a single sub-adult male Myotis volans. We released it within 1/4 mile of the bridge about 2200 hours.

T36NR21E01 232 slow-moving water in roadside ditch on south side of Leroy Creek... This is a potential mist-netting site.

T36NR21E12 314 Falls Creek bridge, concrete, box construction
8/27/97 - Ralph Anderson
There is abundant bat use evident documenting night roost use under the end spans, particularly on the southwest side (both ends), with some use scattered everywhere. Great knots of harvest-man spiders, everywhere. Good site to hand net - log clearance under ends. Looks like there is abundant EPFU, MYOT-large and MYOT-small at this structure. Proposed Chewuch Research Natural Area (RNA), Methow Ranger District, Okanogan NF, An Assessment for Bats, Habitat and Research Opportunities

T36NR21E12 314 Falls Creek campground... outhouses
8/27/97 - Ralph Anderson
Outhouse number 1: MYOT-small use near "Men's door". Detected use is night-hang-up. There may be day use in "attic-space" accessed via 1/2"+ crack under the eaves on the men's side.
Outhouse number 2: No detected use. Construction sealed access to the attic spaces in this one... Could be opened up.

T36NR21E13 442 campground (unnamed)
8/27/97 - 1100 hrs. - Ralph Anderson
There is a new aggregate slab toilet... checked for bat use and found none. This one is a poor design to accommodate bats... could be improved with 1-3 bat boards.

T36NR21E23 222 8-Mile Ranch... buildings
8/27/97 - 0900 - Ralph Anderson
Outhouse: Inspection failed to reveal any use.
Equipment/tack building: Easy access to large attic space, for bats and myself. Guano indicated common night hang-up use and perhaps occasional day-roosting. There are 4-6 recent barn swallow nests and current day/night roosting by barn swallows in here.
This could be an excellent site... attic space in which to add some specific structures to accommodate one or more maternity colonies and more consistent day roosting. Recommend several large, multi-sheet plywood structures which can actually be mounted on roof trusses. Pick a location where spreading a plastic ground sheet to catch the guano will facilitate keeping the site clean, salvaging the guano for educational/outreach purposes and collecting dead bats for skull ID's and reference collections. A ground sheet can also allow for controlled collections to estimate the volume/quantity of insects being consumed by season/year for monitoring purposes.
Looked at the hay barn, noting the feeding by Crossbills and Siskins on the salted soil below the feeders. No detected bat use... this is pretty light and open and probably gets at least some night roosting.

T36NR21E35 122 Boulder Creek bridge on 5010 road
8/27/97 - 1615 - Ralph Anderson
A concrete, box-construction bridge. A quick check shows substantial COTO guano under the SE corner and MYOT-large. This site is worth a night check with a hand net and is about 1 mile from another excellent concrete bridge over the Chewuch River itself.
8/28/97 - 2008 - Ralph Anderson and Kent Woodruff
A physical examination of the bridge under both ends revealed 3 bats flying (Myotis sp.) apparently foraging rather than night roosting.
- 2140 - hand-netted a single MYVO, adult female (not lactating, keeled calcar, FA-39.5, HF-8.5)
- 2205 - hand-netted a single MYLU, adult male (no keel, FA-37.5, E-9.6, thumb-6.0)

- 2225 - hand-netted a single MYCI, adult female (keeled calcar, has raised young this season, FA-39.25, E-15.1, broken & healed left finger #2 first joint)

37N~T37NR22E07 221 bridge across Chewuch River at Campground 4
concrete with "box-like" structure underneath
8/26/97 - 1600 hrs - Ralph Anderson, noted abundant recent guano of Eptesicus and Myotis sp.-large (M. evotis, M. septentrionalis, M. thysanodes, M. volans) with a small amount of Corynorhinus guano under the west end. This is an excellent structure to add day-roost modifications with 1x12's.
1615 note similar to lighter use on the East end of the bridge. Access for netting (mist or hand) is best on the West side. A 40' and an 18' net may be good under here.

T37NR22E07 221 Camp Four campground
8/27/97 - Ralph Anderson... Looked here and found no monitorable structures.

T37NR22E08 343 Superior Tree #327 (Ponderosa pine)
8/27/97 - 1510 - Ralph Anderson
Collected a live, adult male Silver-haired bat (Lasionycteris noctivagans) from beneath the aluminum tree band on this tree. He was in a furrow in the bark on the sunny side of the tree in full sun. Entry was from the bottom of the band. He was about 6 inches up. Location is about 100 yards south of July Creek, above the road, seven feet up the tree in a pure ponderosa pine ecotype.

T37ER22E19 124 paved ford through Brevicomis Creek on road 5010
8/27/97 - 1538 - Ralph Anderson
A possible mist-netting site. Would require a 60' net set kitty-corner across the ford.
Proposed Chewuch Research Natural Area (RNA), Methow Ranger District, Okanogan NF, An Assessment for Bats, Habitat and Research Opportunities

T37NR22E30 134 Chewuch campground
8/27/97 - Ralph Anderson... Looked here and found no monitorable structures

38N~38NR21E24 441 Lake Creek corrals and new aggregate construction outhouse
8/26/97 - 1650 hrs - Ralph Anderson - Note there is an "un-screened owl-trap/vent" here, and a small amount of small Myotid (M. californicus, M. ciliolabrum, M. lucifigus, M. yumanensis) guano on the door side under the eaves and alongside the vent stack in back. Apparently some bats have been using this structure for a night roost attracted by the thermal mass. A little modification... on the back side with a 1x12 could turn this into an excellent bat habitat and monitoring point.

T38NR22E12 134 slow meanders of Chewuch River below Thirtymile Creek
8/27/97 - 1315 - Ralph Anderson
Ate lunch overlooking river and large-block talus, watching for bats and other wildlife. Noted cedar waxwings feeding on Cornus berries, pika's speaking from the talus, no signs of bats.

T38NR22E15 342 Large block talus overhangs
8/27/97 - Ralph Anderson... Examined 3-4 large rock (talus) overhangs for any bat guano/use and found none.

T38NR22E20 144 Andrews Creek bridge on the 5160 road
8/26/97 - 1712 hrs - Ralph Anderson - This is a low, creosote treated timber bridge, not checked for bat use.
Tonseth Lake - 1715 hrs - Ralph Anderson. The thunder and lightning is wonderful in here... and the rain is not. There seems little surface water available here for bats to drink out of.

T38NR22E30 233 Lake Creek bridge on 5160 road is of creosote treated timber which is not usable by bats.
8/26/97 - 1635 hrs - Ralph Anderson - Inspection revealed no sign of use.

APPENDIX V

Region 6 Area Ecology , Area 2 Plant Association Group Classification (B. Kelley 3/98 Draft)

ACRES	% OF RNA	SERIES PAG CODE	PLANT ASSOCIATIONS *	BIOPHYSICAL ENVIRONMENT
442	5	*Pseudotsuga menziesii*	*Pseudotsuga menziesii/Agropyron spicatum-Aspidotis densa*	hot dry shrub/grass
		1401	*Pseudotsuga menziesii/Purshia tridentata*	
			Pseudotsuga menziesii/Agropyron spicatum	
			Pseudotsuga menziesii/Calamagrostis rubescens-Agropyron spicatum	
417	5	*Pseudotsuga menziesii*	*Pseudotsuga menziesii/Symphoricarpos albus*	warm/cool mesic shrub/ herb
		1404	*Pseudotsuga menziesii/Symphoricarpos albus/Calamagrostis rubescens*	
			Pseudotsuga menziesii/Spirea betulifolia var.lucida/Calamagrostis rubescens	
2091	25	*Pseudotsuga menziesii*	*Pseudotsuga menziesii/Carex geyeri*	cool dry grass
		1403	*Pseudotsuga menziesii/Calamagrostis rubescens*	
			Pseudotsuga menziesii/Pachistima myrsinities/Calamagrostis rubescens	
			Pseudotsuga menziesii/Pachistima myrsinities	
73	1	*Pseudotsuga menziesii*	*Pseudotsuga menziesii/Vaccinium caespitosum*	cool mesic shrub/herb
		1405	*Pseudotsuga menziesii/Vaccinium myrtillus*	
			Pseudotsuga menziesii/Vaccinium myrtillus/Calamagrostis rubescens	
445	5	*Abies lasiocarpa*	*Abies lasiocarpa/Calamagrostis rubescens*	cool dry grass
		2501	*Abies lasiocarpa/Pachistima myrsinities/Calamagrostis rubescens*	
580	7	*Abies lasiocarpa*	*Abies lasiocarpa/Vaccinium scoparium*	cool dry shrub
		2502	*Abies lasiocarpa/Vaccinium scoparium/Calamagrostis rubescens*	
834	10	*Abies lasiocarpa*		cool mesic shrub/herb
		2503	*Abies lasiocarpa/Pachistima myrsinities*	
			A *Abies lasiocarpa/Linnaea borealis var. longiflora*	
			Abies lasiocarpa/Vaccinium caespitosum	
			Abies lasiocarpa/Vaccinium membranaceum	
663	8	*Abies lasiocarpa*	*Abies lasiocarpa/Rhododendron albiflorum*	cold mesic tall shrub
		2504		
1706	20	*Abies lasiocarpa*	*Abies lasiocarpa// Arnica latifolia -Polemonium pulcherrimum*	cool to cold, mesic to moist
		2505 & 2506	*Abies lasiocarpa/Rubus lasiococcus*	
			Abies lasiocarpa/Vaccinium scoparium/Arnica latifolia	
			Abies lasiocarpa/Luzula hitchockii	
			Abies lasiocarpa/ Rhododendron albiflorum/Luzula hitchcockii	
			Abies lasiocarpa/Vaccinium scoparium/Luzula hitchcockii	
130	2	*Abies lasiocarpa*	*Abies lasiocarpa/Trautvetteria caroliniensis*	wet shrub/herb
		2507	*Pinus engelmannii/Equisetum species*	
1049	12	PARKLAND	not yet defined	cold alpine parkland
		3201		
7	trace	ALPINE	not yet defined	cold alpine
		3301		

APPENDIX VI

Forest Plan Standards and Guidelines

Research Natural Area Prescription
The following is taken from the Research Natural Areas section of the Okanogan National Forest Land and Resource Management Plan.

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

Desired Future Condition: Plant communities will be allowed to exist and develop without human intervention to provide representative examples of unaltered communities. Animal populations native to the areas will be allowed to exist.

Recreation

MA8-8A The visual quality objective is retention.

MA8-8B Roaded natural and semiprimitive non-motorized recreational opportunities shall be provided during the summer and fall seasons. Semiprimitive motorized recreational may be provided on designated routes and areas during the winter.

MA8-8C If recreational uses threaten research or educational values, closures or permits should be instituted.

MA8-8D Education use of a RNA will generally be directed toward the graduate level, but may be approved for any educational level.

MA8-8E Avoid publicizing research natural areas on recreation maps and in recreation brochures.

MA8-8F On site interpretive signs may be installed where they contribute to better understanding of or protection for the research natural area.

MA8-8G No new trails shall be constructed, except those needed for research purposes. Existing trails may be allowed where the goals for the RNA are not compromised.

Fish and Wildlife

MA8-6A Introduction of exotic plant or animal species shall be prohibited.

MA8-6B Reintroduction of native species may be permitted as long as the goals of the RNA are met (including fish stocking).

MA8-6C Control of animal populations may be considered where they threaten the RNA goals.

MA8-6D Habitat improvement projects may be approved if they meet the goals of the RNA.

Range

MA8-11A Where grazing is needed to maintain the vegetative communities, the grazing objectives shall be defined in the establishment report.

Timber

MA8-20A Scheduled and non-scheduled timber harvest, including wood gathering activities shall be prohibited.

Lands

MA8-16A Temporary gauging stations and instrument shelters may be approved by the Pacific Northwest Research Station Director.

MA8-16B Rights-of-way easements existing prior to the establishment of the RNA shall be honored. Upgrading these facilities shall be discouraged where the compromise the goals of the RNA.

MA8-16C Recommend against Federal Energy Regulatory Commission licenses or permits that compromise the goals of the RNA.

MA8-16D The proposed Chewuch RNA shall be recommended for withdrawal from locatable mineral entry upon approval for its inclusion into the RNA system.

Facilities

MA8-18A No new road construction should be allowed unless it is developed for preserving or enhancing the RNA values.

MA8-18B Hazard tree felling is permitted along trails or roads for safety. Felled trees shall remain in place unless lying across a trail or road.

MA8-18C Buildings, other than temporary gauging stations and instrument shelters shall be prohibited. Allow existing buildings to deteriorate without replacement.

Fire and Fuels

MA8-19A The preferred suppression strategy is confinement. The appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable.

MA8-19B Minimum impact suppression techniques shall be used for all suppression activities. The use of chemical fire retardant should be avoided where possible.

MA8-19C Prescribed fire may be used to perpetuate the ecosystems of research natural areas if consistent with the purposes for which the RNA was established. Either natural or planned ignitions may be used. Prescriptions should be designed to mimic natural fire.

Insect and Disease

MA8-19D Where pest management activities are prescribed, they shall be specific against the target organism and induce minimal impact to other components of the ecosystem.

DECISION NOTICE / DESIGNATION ORDER
and
FINDING OF NO SIGNIFICANT IMPACT

ESTABLISHMENT OF SEVEN 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

RNA	National Forest	Ranger District	County	Acres
Oregon				
Cummins/Gwynn Creeks	Siuslaw	Waldport	Lane & Lincoln	6530
Hoover Gulch	Siskiyou	Illinois Valley	Josephine	1264
Lemmingsworth Gulch	Siskiyou	Chetco	Curry	1224
Wildcat Mt.*	Willamette	McKenzie and Sweet Home	Linn	525
Washington				
Chewuch River	Okanogan	Methow Valley	Okanogan	8500
Steamboat Mt.*	Gifford Pinchot	Mt. Adams	Skamania	40
Idaho				
Little Granite**	Nez Perce	Hells Canyon NRA	Idaho	6259

*Additions to previously established RNAs
**Administered by the Wallowa-Whitman National Forest, Region 6

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 one case, Wildcat Mt., areas were recommended for addition to the proposed RNA to better accomplish the original purpose of the RNA. 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 seven 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 area 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 pursuance 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.

/s/ Nancy Graybeal

ROBERT W. WILLIAMS
Regional Forester
Pacific Northwest Region

May 17, 1999
Date

(For) Nancy Graybeal
Deputy Regional Forester

THE OREGONIAN ◆ FRIDAY, MAY 21, 1999

PUBLIC NOTICES
CLASS 8

Public Notices 8

Public Notices 8

NOTICE OF DECISION

On May 17, 1999, USDA, Forest Service, Regional Forester for the Pacific Northwest Region (Portland, Oregon) made a decision to establish 7 Research Natural Areas. RNA's are part of a national network of field ecological areas designated for research and education. They also provide gene pool preserves for plant and animal species, especially rare and endangered species. RNA's also preserve a prime example of common communities that can serve as a baseline for comparison. All seven areas were previously allocated as "proposed" RNA's during forest planning. This decision formalizes their designation for that use. The RNA's established with this decision are: CUMMINS/GWYNN CREEKS (Siuslaw NF, OR, 6530 acres); HOOVER GULCH (Siskiyou NF, OR, WA, 1264 acres); LEMMINGSWORTH GULCH (Siskiyou NF, OR, 1224 acres); WILDCAT MOUNTAIN ADDITION (Willamette NF, OR, 525 acres); CHEWUCH RIVER (Okanogan, NF, WA, 8500 acres); STEAMBOAT MOUNTAIN ADDITION (Gifford Pinchot NF, WA, 40 acres); and LITTLE GRANITE (Nez Perce NF, Hells Canyon National Recreation Area, ID, 6259 acres).

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

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

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

Seattle Post-Intelligencer

Friday, May 21, 1999

PUBLIC NOTICES

380 Legal Notices

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ESTABLISHMENT OF SEVEN 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 SEVEN RESEARCH NATURAL AREAS

USDA FOREST SERVICE
PACIFIC NORTHWEST REGION
OREGON AND WASHINGTON

ENVIRONMENTAL ASSESSMENT

Proposed Action

The proposed action is to establish seven Research Natural Areas (RNAs) as proposed in the Land and Resource Management Plans (Forest Plan) of each respective National Forest. 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				
Cummins/Gwynn Creeks	Siuslaw	Waldport	Lane & Lincoln	6530
Hoover Gulch	Siskiyou	Illinois Valley	Josephine	1264
Lemmingsworth Gulch	Siskiyou	Chetco	Curry	1224
Wildcat Mt.*	Willamette	McKenzie and Sweet Home	Linn	525
Washington				
Chewuch River	Okanogan	Methow Valley	Okanogan	8500
Steamboat Mt.*	Gifford Pinchot	Mt. Adams	Skamania	40
Idaho				
Little Granite**	Nez Perce	Hells Canyon NRA	Idaho	6259

*Additions to previously established RNAs
**Administered by the Wallowa-Whitman National Forest, Region 6

Figure 1: Vicinity Map

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		
Chewuch River	East Slope WA Cascades	Engelmann spruce/horsetail	Mid-elevation riparian with mixed conifer, hardwoods, and marshland-bog	
Cummins/Gwynn Creeks	Oregon Coast Range	Douglas-fir/Western hemlock	Sitka spruce	Coastal aquatic systems
Hoover Gulch	Klamath Mountains	Doug-fir/canyon liveoak	Douglas-fir-tanoak-canyon live oak	
Lemmingsworth Gulch	Klamath Mountains	Port-Orford-cedar/ western azalea	Dougla-fir-tanoak/ salal	Douglas-fir-tanoak-canyon live oak
		Tanoak/California buckthorn on serpentine	Jeffrey pine-western white pine/ manzanita-beargrass	Knobcone pine
Little Granite	Seven Devils	Subalpine fir/grouse huckleberry	Douglas-fir/ ponderosa pine/ snowberry	Spruce-subalpine fir/ false huckleberry
		Snake River greenbush rims	Ponderosa pine/ bluebunch wheat-grass	Low, mid and high elevation streams
Steamboat Mt.	East Slope WA Cascades	Pacific silver fir-mountain hemlock-Engelmann spruce		
Wildcat Mt.	West slope Oregon Cascades	Pacific silver fir/ foamflower	Pacific silver fir/ vinemaple/foamflower	

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 these RNAs. The proposed RNAs were also subjected to public review and comment during the land management planning process that resulted in the Forest Plans.

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 the RNA addition with a boundary change (Wildcat Mt.) there is a possible loss of research potential in the area that was not included in this RNA addition 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) (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 - 8. A summary of the consequences associated with a particular RNA are listed below the map for that RNA. The summary for Wildcat Mt. also discusses any additional environmental consequences not covered by the Forest Plan Final EIS for the proposed boundary changes.

Table 3: Land Management Plan References

RNA	National Forest	Standards and Guidelines in Land and Resource Management Plan	Environmental Consequences in Final EIS
Chewuch River	Okanogan NF	Chapter 4 - pages 92-93	Chapter IV - pages 69-70
Cummins/Gwynn Creeks	Siuslaw NF	Chapter IV - pages 104-107	Chapter IV - pages 77-80
Hoover Gulch	Siskiyou NF	Chapter IV - pages 81-84	Chapter IV - pages 9,20,77
Lemmingsworth Gulch	Siskiyou NF	Chapter IV - pages 81-84	Chapter IV - pages 9,20,77
Little Granite	Wallowa-Whitman NF	Chapter 4 - page 12, 83	Chapter IV - pages 7,61,72, 78,83,85
Steamboat Mt.	Gifford Pinchot	Chapter IV - page 138	Chapter IV - pages 6,43,53, 87,96,98,100,106,120,135
Wildcat Mt.	Willamette NF	Chapter IV - pages 134-137	Chapter IV - pages 166-169

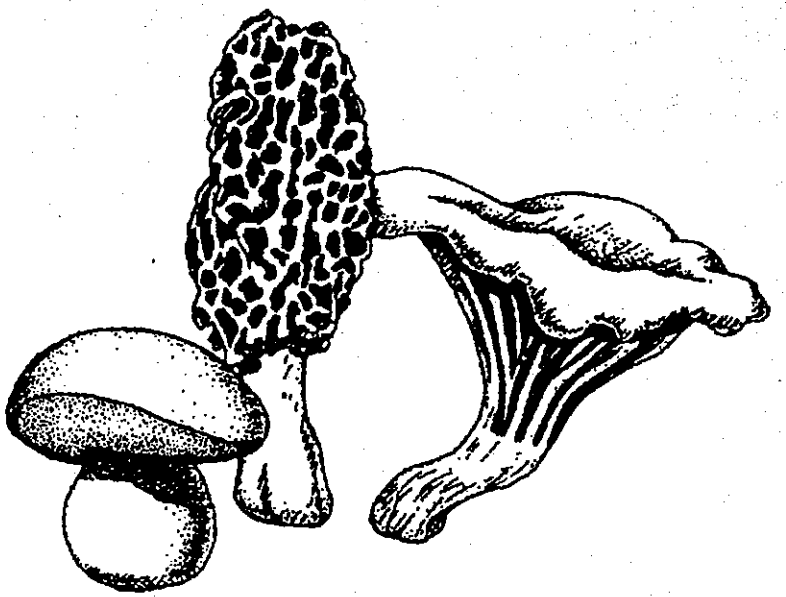
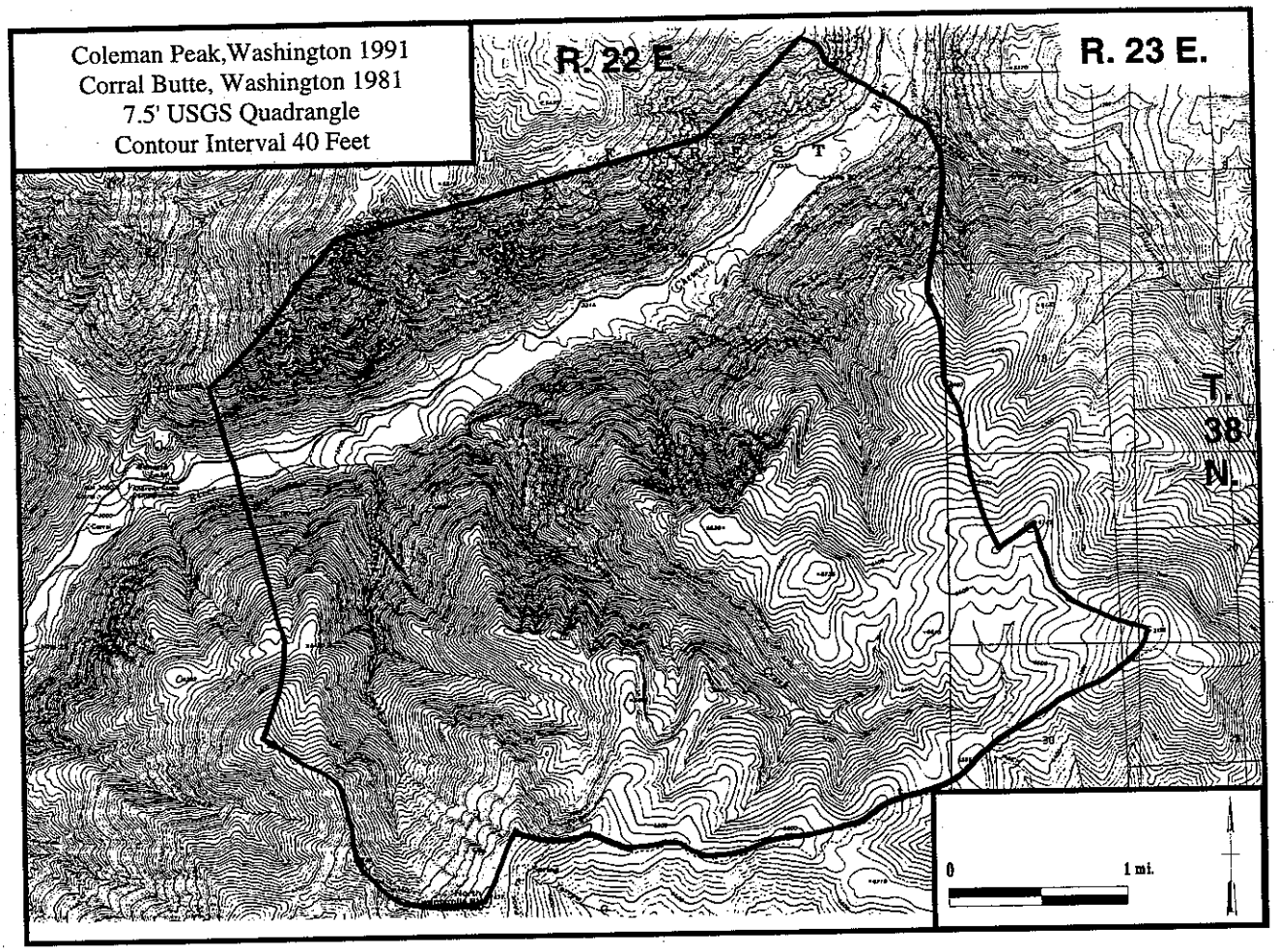


Figure 2: Chewuch River RNA



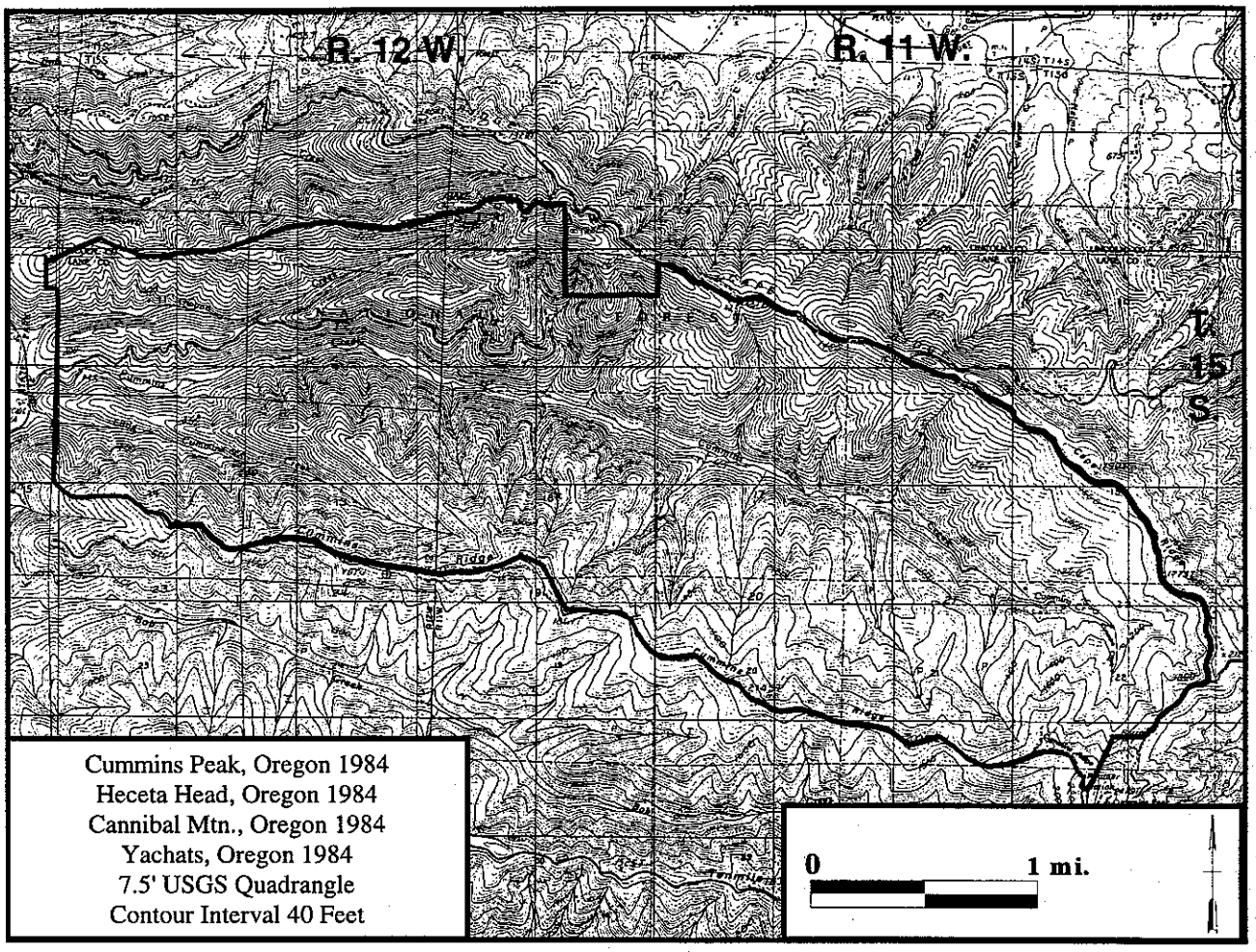
Mineral Resources: There are no known mineral resources in this RNA.

Grazing: There is currently no grazing in this RNA although there have been cattle and sheep in the area along the road in the past and there are allotments adjacent to the area.

Timber: Approximately 2400 acres are covered by 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 is adjacent to the Pasayten Wilderness. The area within and surrounding the RNA is a popular location for hiking, hunting, fishing and other recreational activities. Establishment of the RNA should not significantly impact those activities. There are a number of dispersed recreation sites along the Chewuch River Road within the RNA. This existing use will still be allowed but not encouraged.

Figure 3: Cummins/Gwynn Creeks RNA



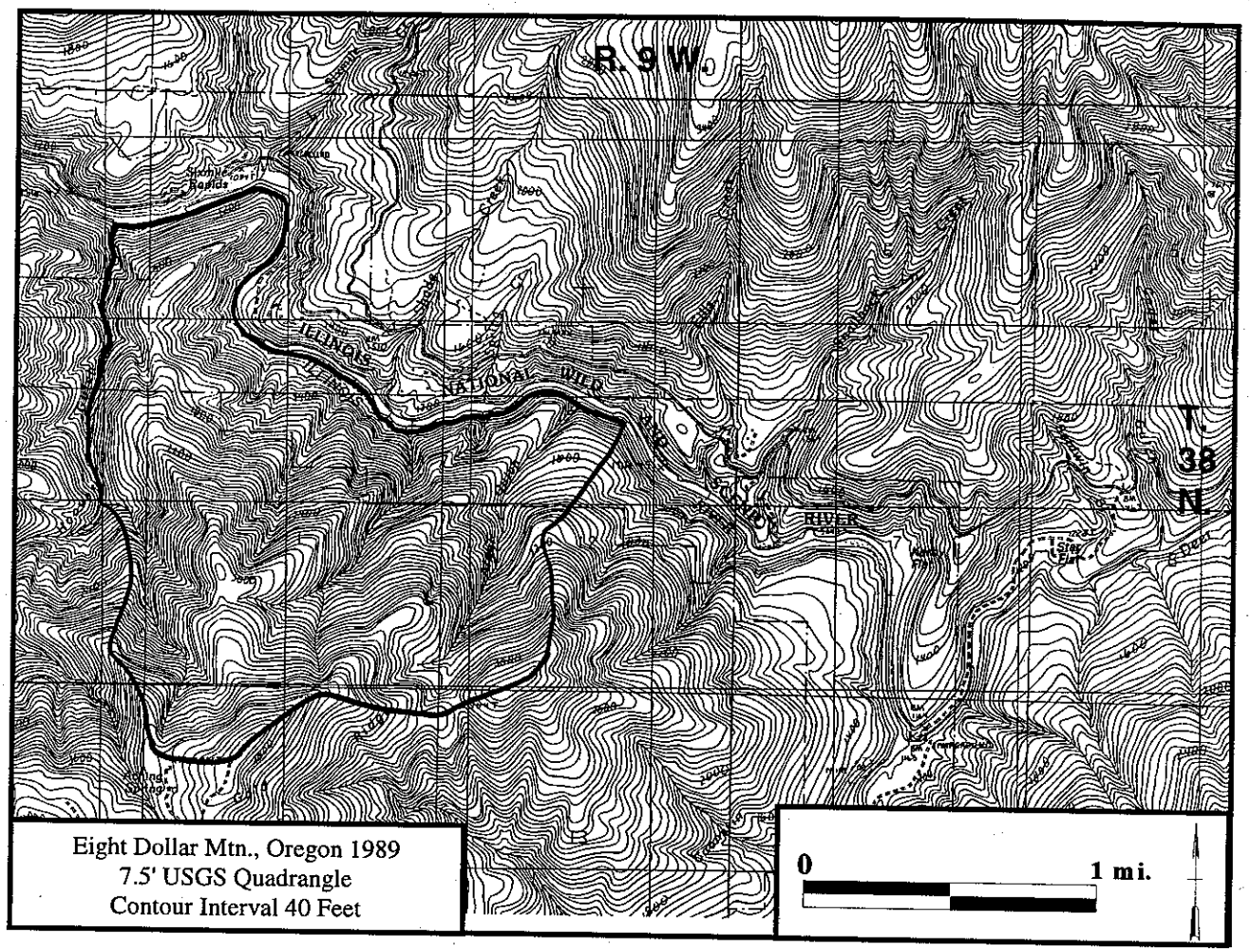
Mineral Resources: There are no known mineral resources in this RNA.

Grazing: There is no grazing in this RNA.

Timber: The entire area of the RNA is forested lands that exceed the productivity requirements for timber management. However, all most all the RNA is in the Cummins Creek Wilderness. This designation precludes timber harvest and these lands were not included in the timber base for the Forest Plan. Therefore, establishment will have no effect on probable sale quantity.

Recreation: The RNA receives some dispersed recreation such as fishing, hunting and hiking. There several trails and there are plans to build additional trails and create isolated campsites off the trails in the Wilderness. It is expected that this recreational use will increase in the future but this use is not expected to create conflicts with RNA values.

Figure 4: Hoover Gulch RNA



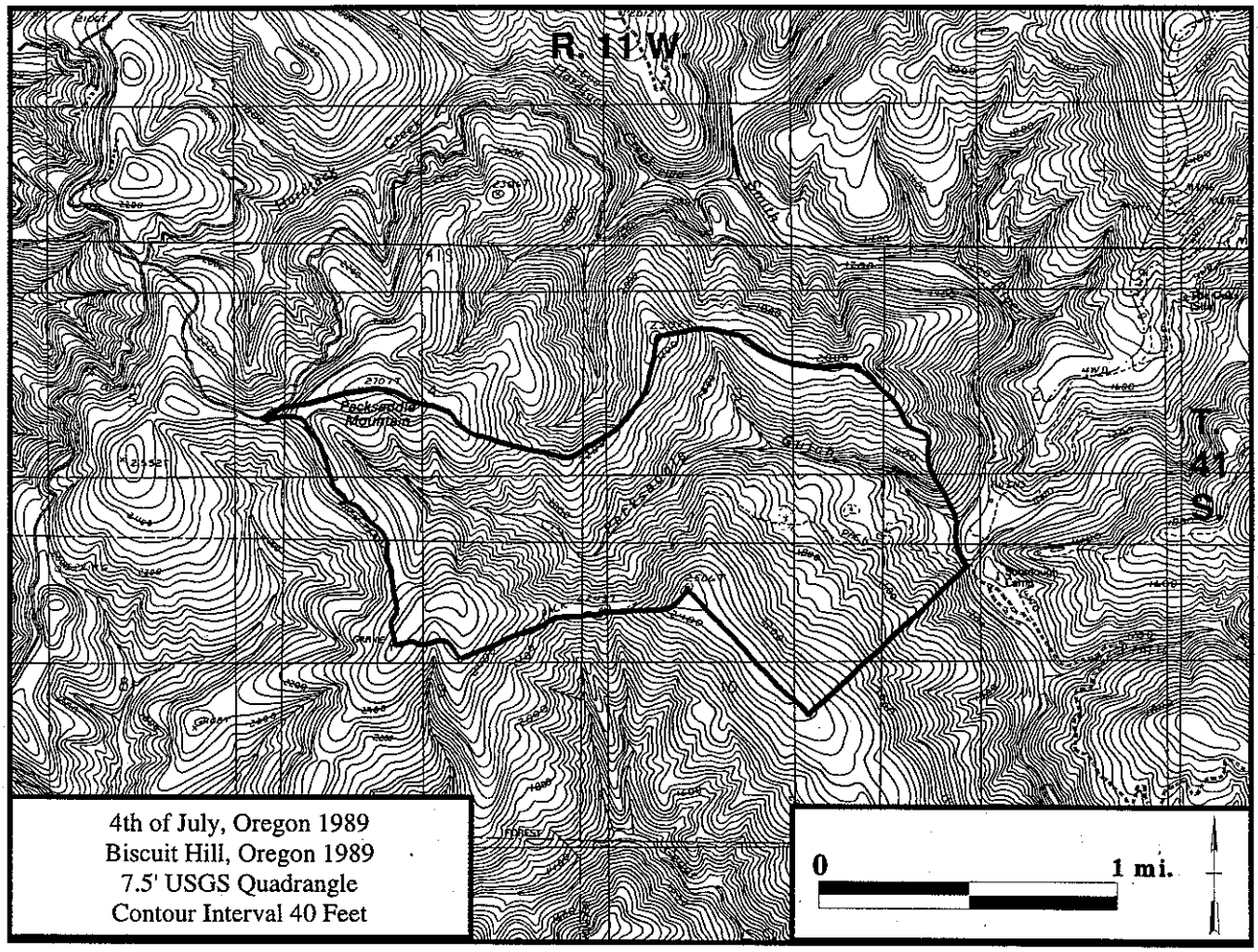
Mineral Resources: There are no valid mining claims in this RNA.

Grazing: There is no grazing in this RNA.

Timber: That portion of the RNA within 1/4 mile of the Illinois River, approximately 3/4 of the RNA, is in the Wild and Scenic River corridor and is not included in the allowable cut base. Only 70 acres of the remainder has forest land suitable 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: Most current use is immediately adjacent to the Illinois River. The RNA itself receives a little use during the summer and this use is likely to continue without affecting the research or educational values of the RNA.

Figure 5: Lemmingsworth Gulch RNA



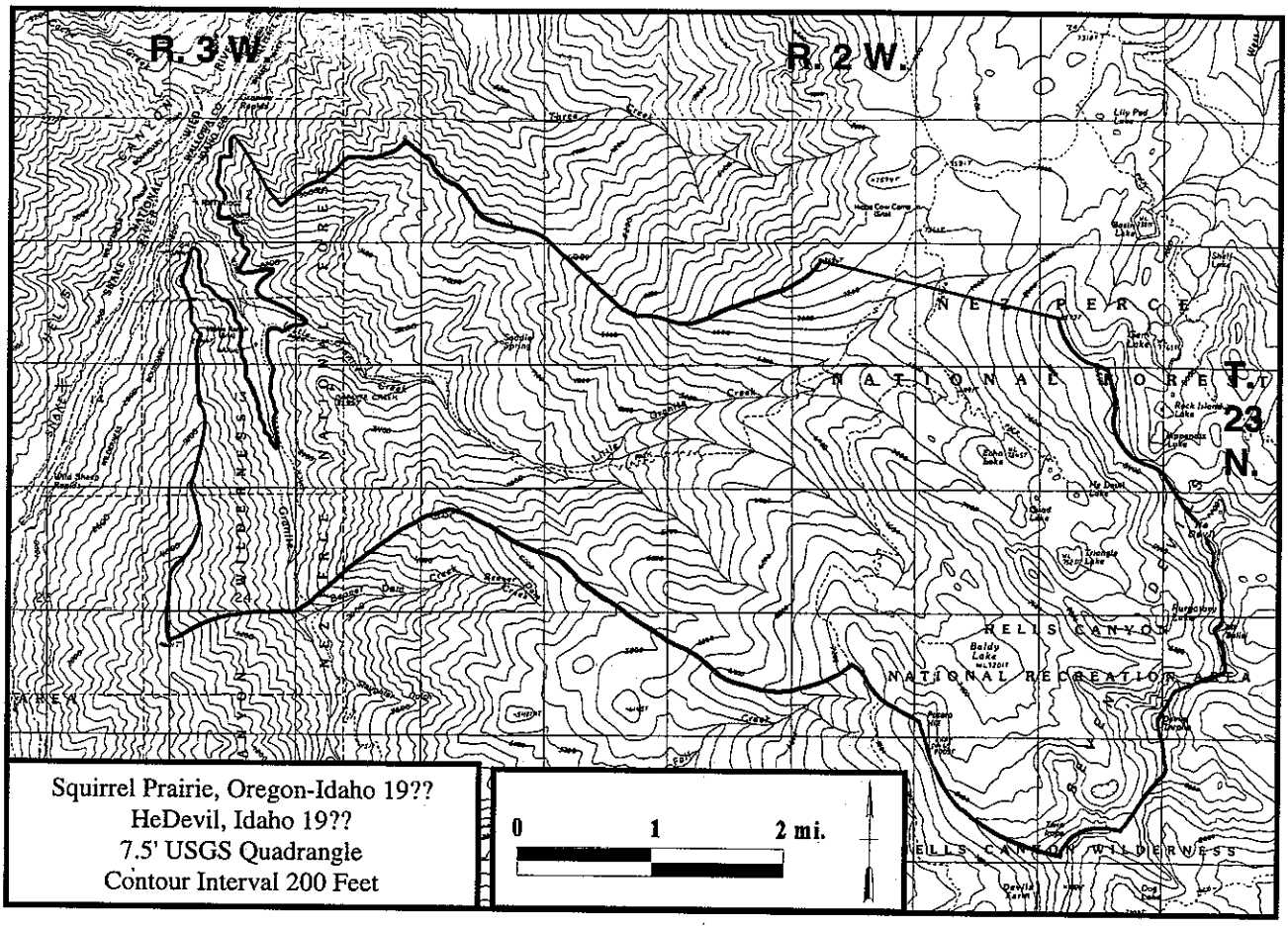
Mineral Resources: There are nine valid mining claims on record in this area. They are not expected to become active, but if they were to begin operations the operating plans would require mitigation measures to protect RNA values. If these mitigation measures prove inadequate then withdrawal from mineral entry may be recommended.

Grazing: There is no grazing in this RNA.

Timber: Timber resource values are low as most of the RNA has unsuitable soils for producing commercial timber. This land was not included in the timber base for the Forest Plan. Therefore, establishment will have no effect on probable sale quantity.

Recreation: Current use is occasional and mostly restricted to the trail corridor. This use is expected to continue unless it negatively impacts the fragile rare plant communities found in the RNA.

Figure 6: Little Granite RNA



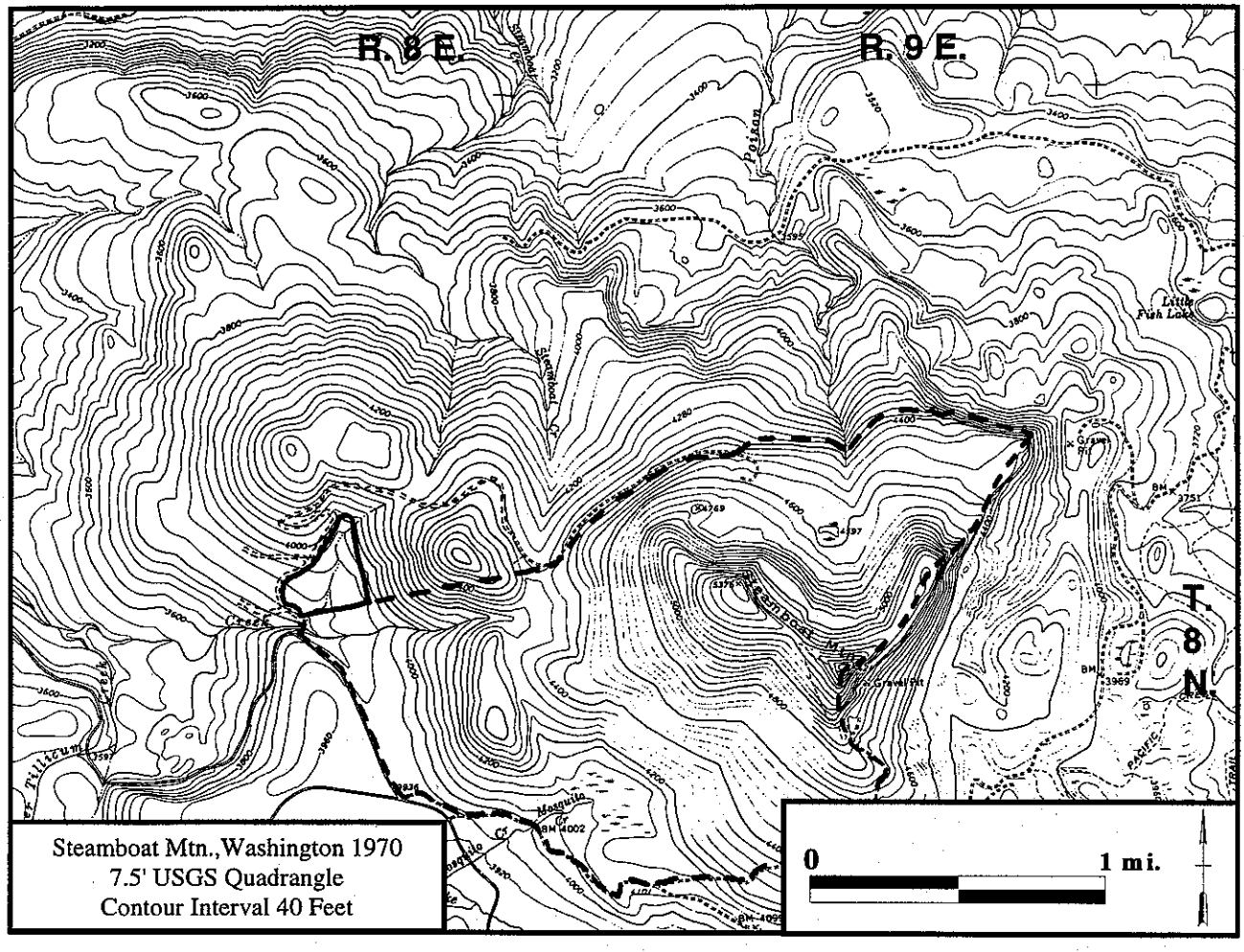
Mineral Resources: There are no active hardrock mining claims in this RNA. There has been gold mining activity north of this RNA and is likely that some exploratory mining has taken place in the RNA in the past.

Grazing: There are no grazing allotments in this RNA. There is some incidential grazing from pack and saddle stack during the summer and fall. This limited use is expected to continue unless it creates unforeseen conflicts with RNA educational or research objectives.

Timber: This RNA is entirely within the Hells Canyon Wilderness so timber management is precluded by that designation. Therefore, establishment will have no effect on allowable sale quantity.

Recreation: There is substantial recreation use in the upper lakes basin from backpackers and horse packers during the summer months, with use concentrated around the lakes themselves. There are two trails through the RNA and the lower end also receives occasional use by river runners during the spring season. There is some use of the upper elevations in the fall from hunters. Increased recreational use is expected over time but it is not expected to impact RNA values and no changes in management of recreation are proposed at this time.

Figure 7: Steamboat Mt. RNA Addition



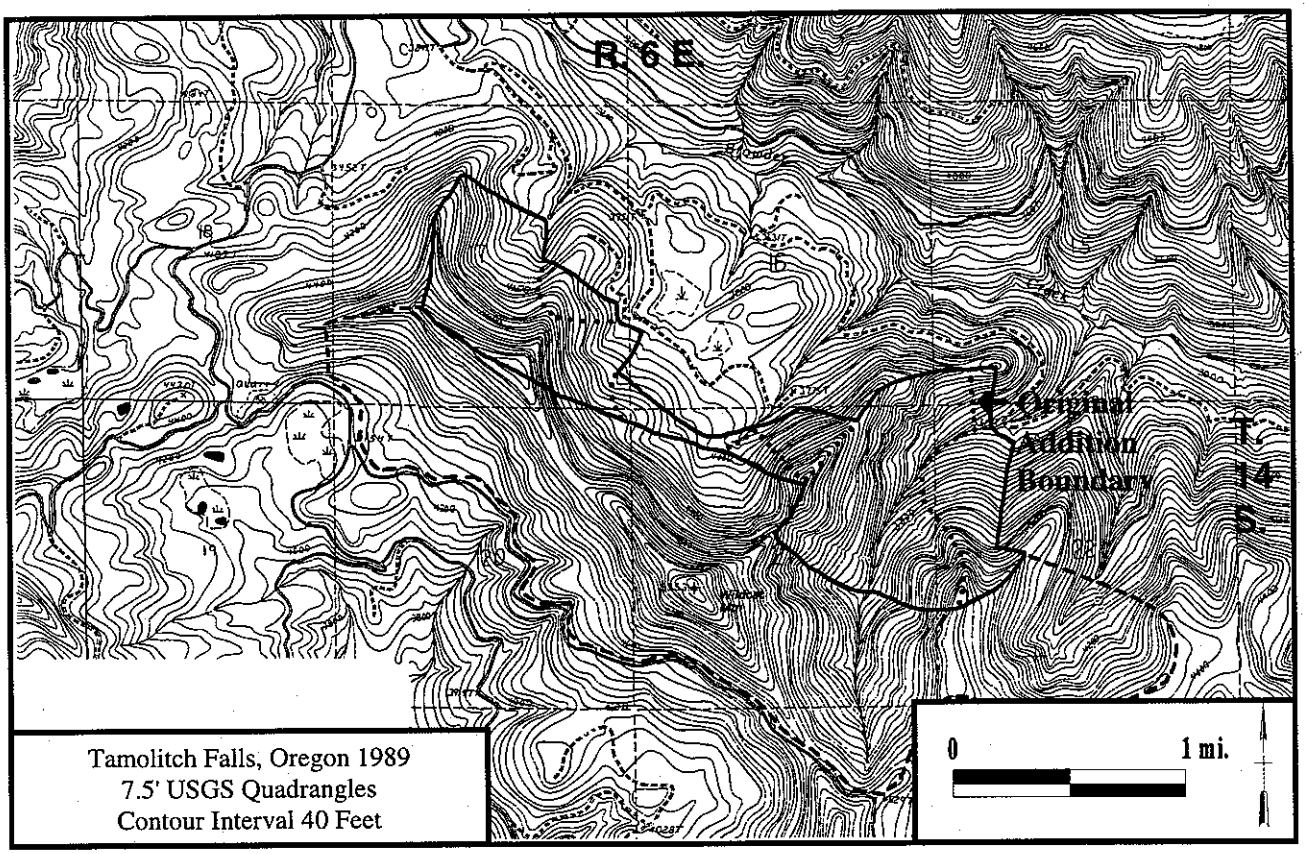
Mineral Resources: There are no known mineral resources in this addition to the RNA.

Grazing: There is no grazing in this RNA.

Timber: Approximately 35 acres out of 40 are within a Riparian Reserve. These lands are not available 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: Dispersed recreation such as hunting and hiking will continue unless it reduces the research or educational values of the RNA.

Figure 8: Wildcat Mt. RNA Addition



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

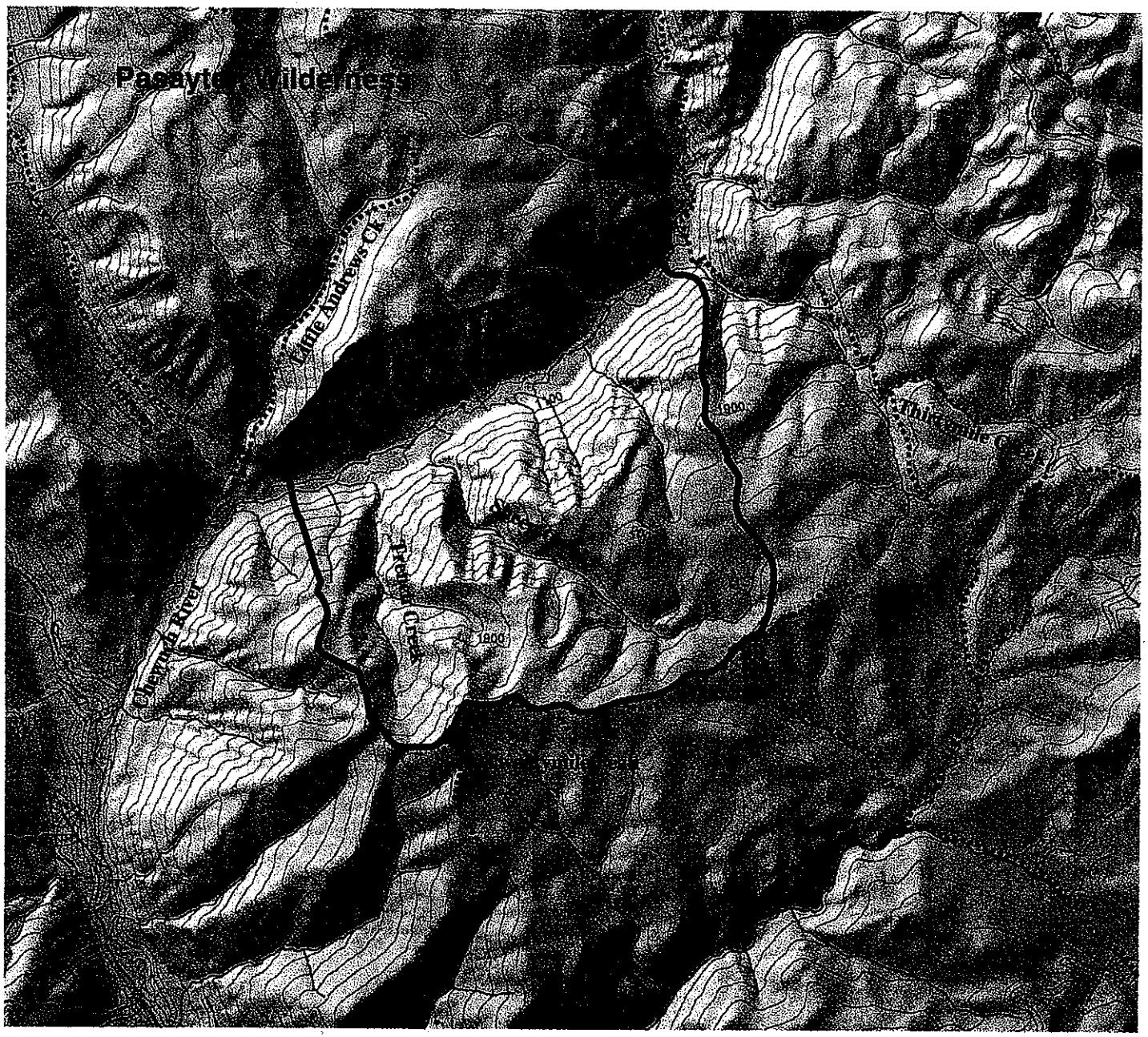
Grazing: There is no grazing in this RNA.

Timber: The addition proposed in the 1990 Willamette National Forest Land Management Plan totaled 384 acres. The current proposed addition totals 525 acres. The current proposed addition to the RNA contains approximately 178 acres of forest suitable for timber management, approximately 51 acres more than the original proposed addition. Of the 178 acres only 50 are available for timber harvest due to other concurrent land management allocations such as Riparian Reserves, a Late-Successional Reserve, and Special Habitat. This reduction in suitable and available acres was accounted for in calculation of probable sale quantity during the development of the Northwest Forest Plan, therefore there will be no effect from establishment.

Recreation: There is very limited recreational use within the RNA due to its lack of trails or any other recreational facilities. The most likely use is some hunting which is limited by the steep slopes and Sitka alder/devil's club patches. This use is not expected to conflict with the research or educational values of the RNA or be affected by designation of this addition to the RNA.

Chewuch RNA

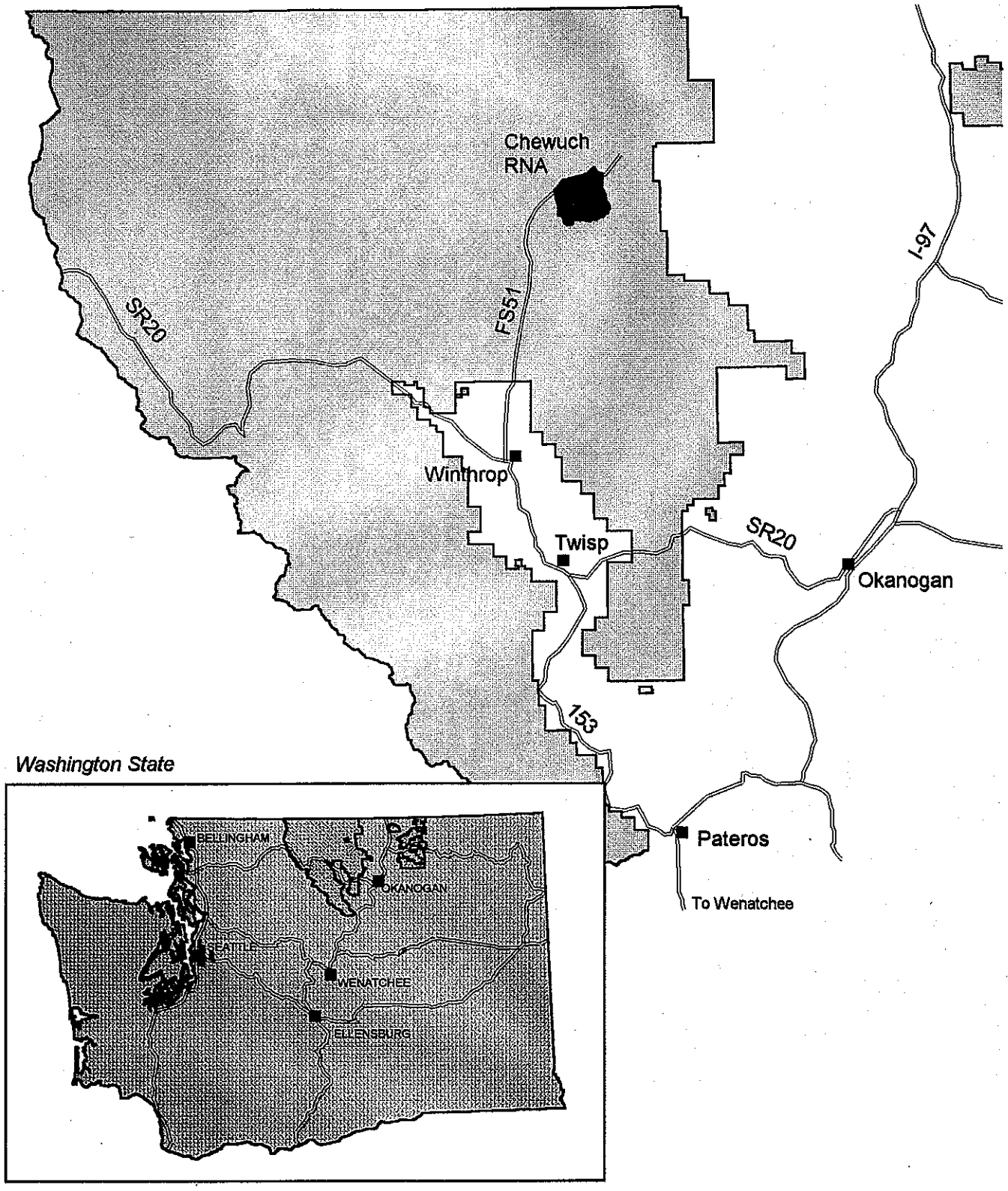
Figure 1-Vicinity Map



Methow Valley
Ranger District
March 1998

Chewuch Research Natural Area

Figure 2 - Vicinity Map

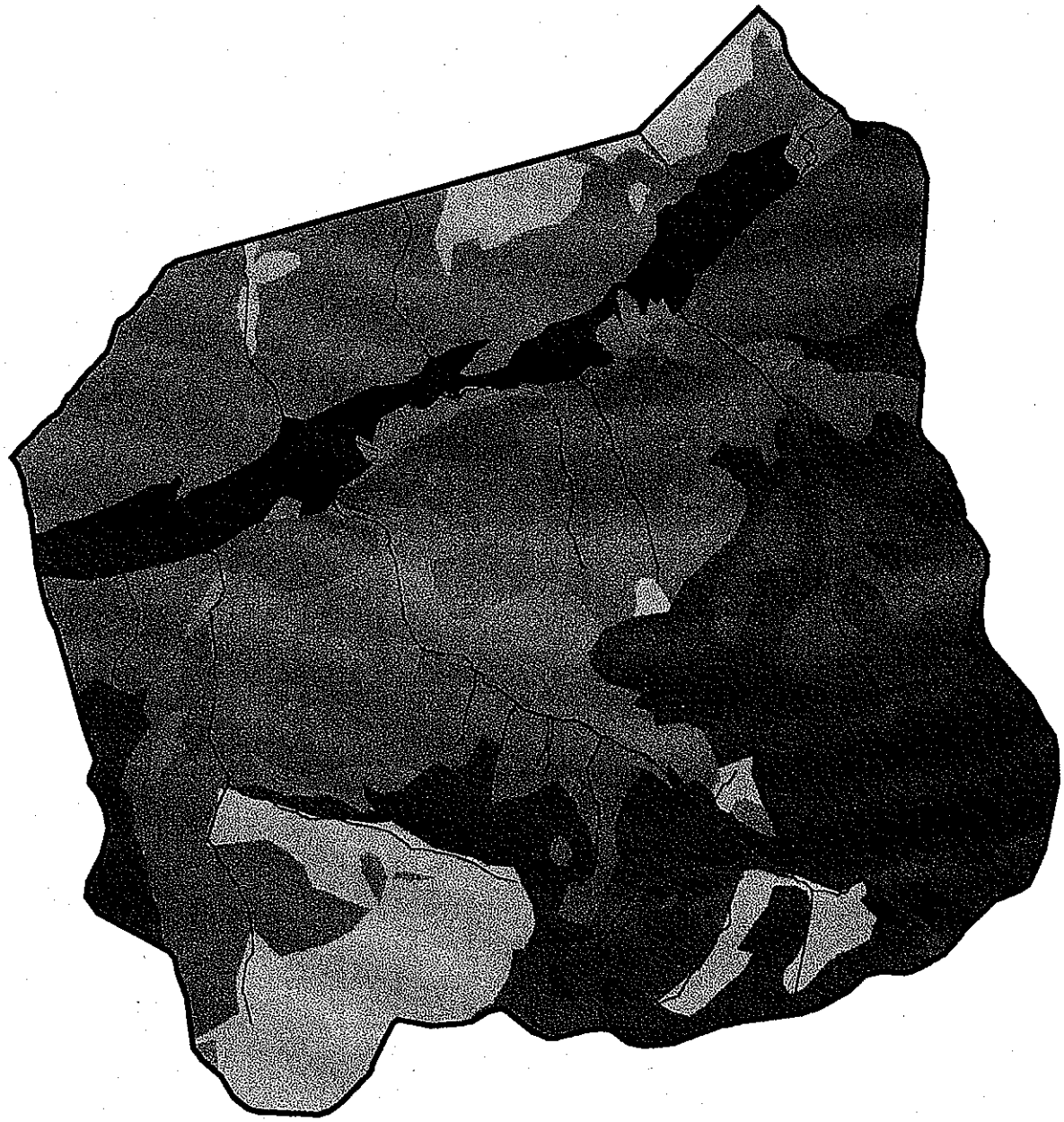


Okanogan National Forest

October 1997

Chewuch RNA

Figure 3 - Vegetation



Streams
RNA Boundary

Vegetation Groups

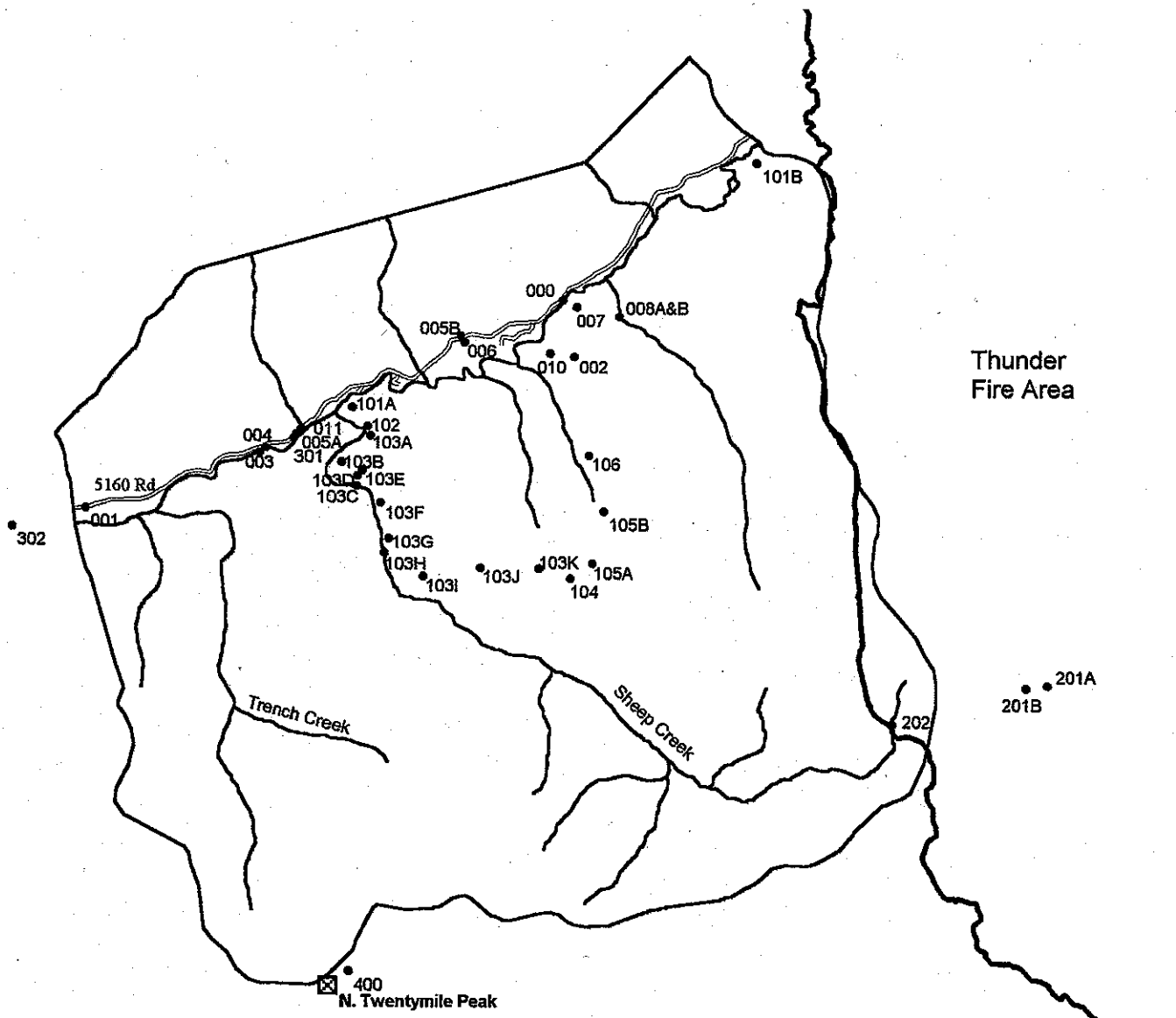
- Bottomland mixed conifer
- Bottomland/riparian - deciduous & meadow
- Lower slopes - coniferous old growth
- Mid-montane - coniferous seral
- Rocky cliffs and talus
- Subalpine meadows
- Subalpine vegetated cliffs
- Subalpine zone - spruce-fir
- Subalpine zone dry lodgepole (seral)

0 1 Miles

Methow Valley
Ranger District
March 1998

Chewuch Research Natural Area

Figure 4 - Vegetation Plots

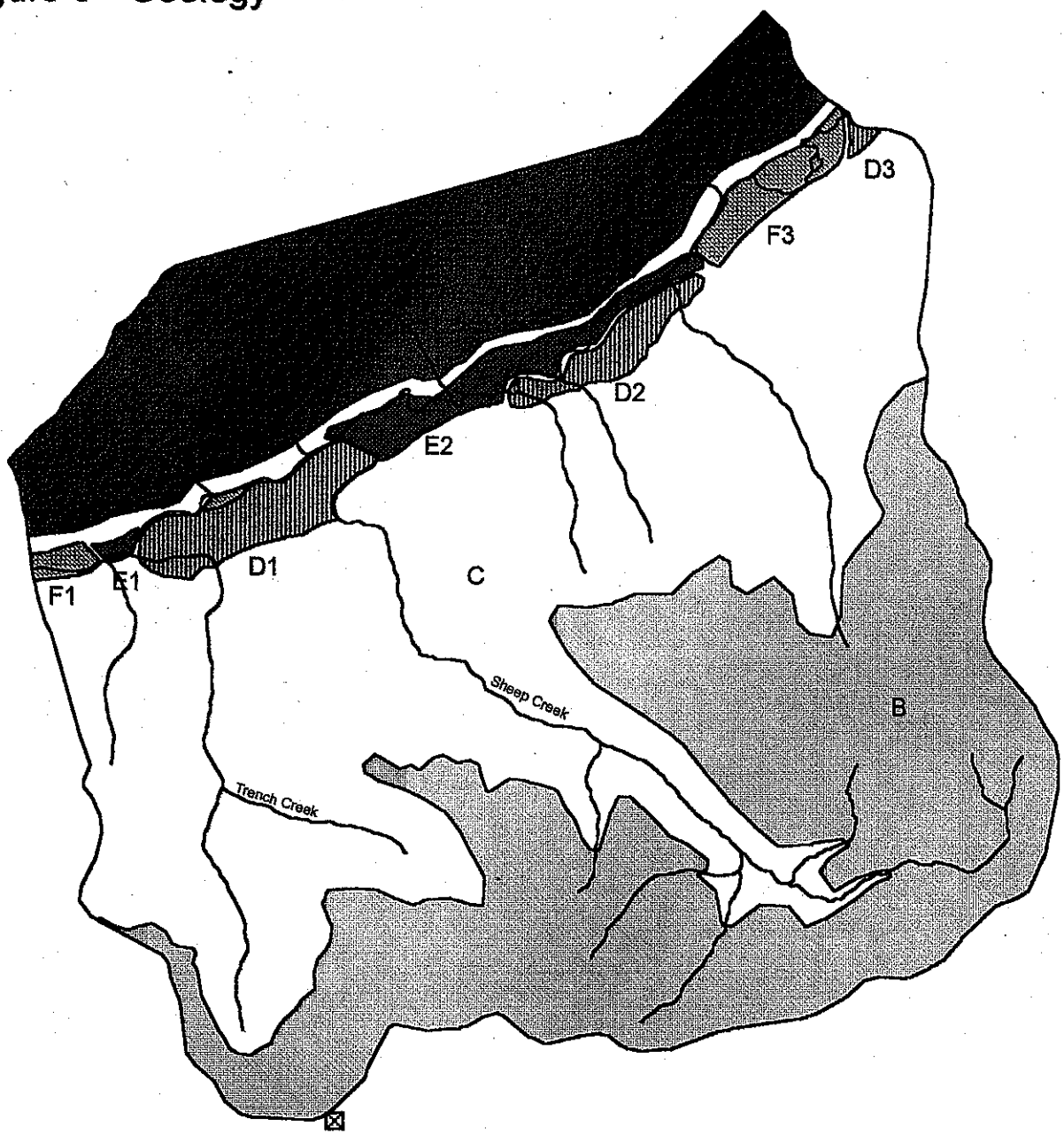


Okanogan National Forest

October 1997

Chewuch Research Natural Area

Figure 5 - Geology



Streams

Geology

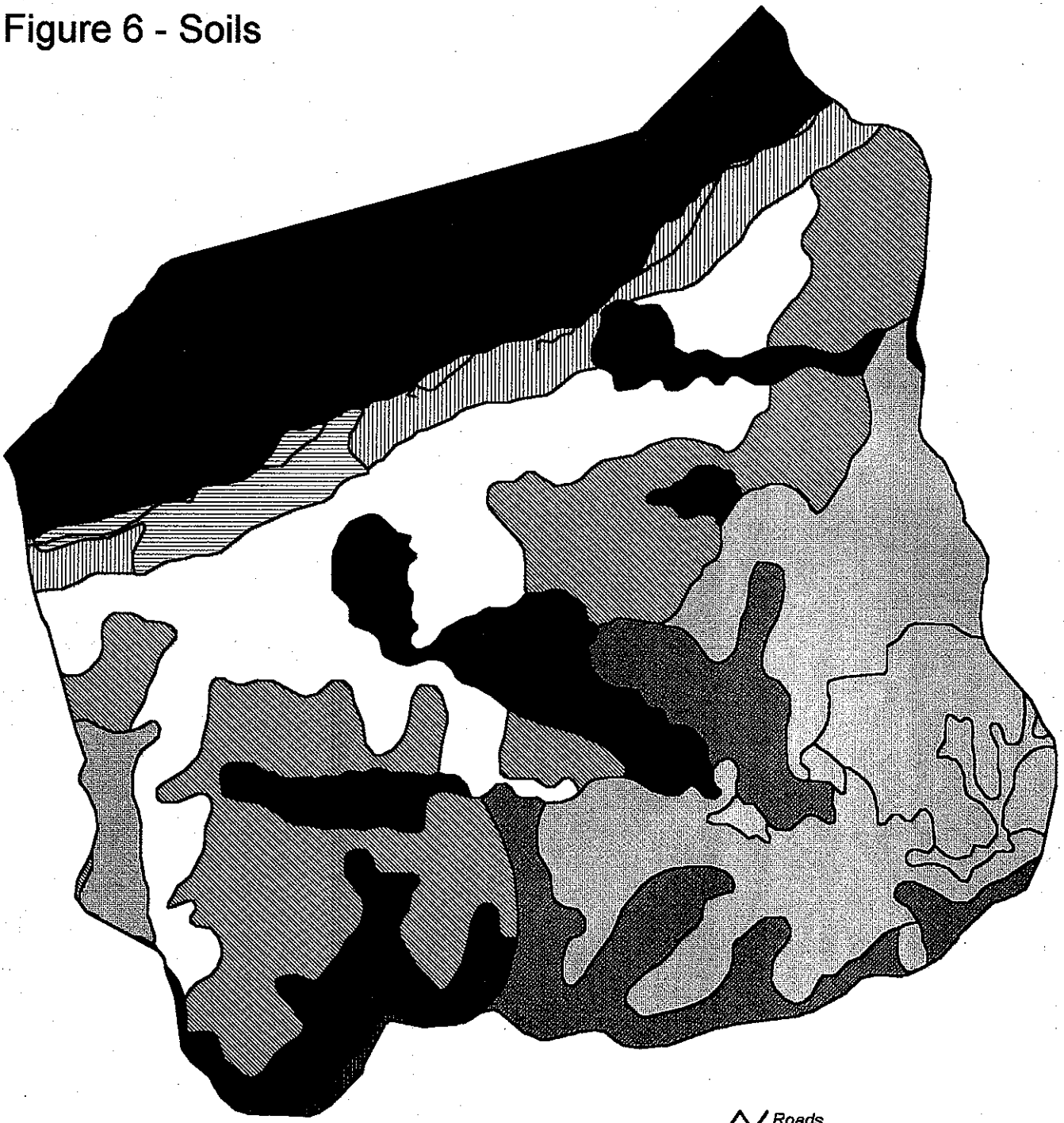
- Alluvial Debris Fan
- Braided Channel Segments
- Highland Plateau
- Meandering Channel Segments
- Talus Slopes
- Vegetated Slopes & Cliffs

Okanogan National Forest

October 1997

Chewuch Research Natural Area

Figure 6 - Soils

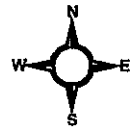


Okanogan National Forest

October 1997

Chewuch RNA

Figure 7
Plant Association Groups



Plant Association
- no data
- hot dry Pseudostuga menziesii
- warm to cool mesic shrub/herb Pseudostuga menziesii
- cool dry grass Pseudostuga menziesii
- cool mesic shrub/herb Pseudostuga menziesii
- cool dry grass Abies lasiocarpa
- cool mesic shrub/herb
- cool dry shrub Abies lasiocarpa
- cold mesic tall shrub Abies lasiocarpa
- cool to cold mesic to moist Abies lasiocarpa
- wet shrub/herb Abies lasiocarpa
- cold alpine parkland
- cold alpine
- RNA Boundary

0 1 Miles

Methow Valley
Ranger District
March 1998