

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Establishment Record

For

DRY MOUNTAIN RESEARCH NATURAL AREA

Ochoco National Forest

Harney County, Oregon



SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Dry Mountain Research Natural Area

Ochoco National Forest

Harney County, Oregon

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TITLE PAGE

**Establishment Record for
Dry Mountain Research Natural Area
within Ochoco National Forest
Harney County, Oregon**

ESTABLISHMENT RECORD FOR
DRY MOUNTAIN RESEARCH NATURAL AREA
WITHIN OCHOCO NATIONAL FOREST
HARNEY COUNTY, OREGON

INTRODUCTION

Dry Mountain Research Natural Area (RNA) is in the southern Blue Mountains of central Oregon and lies at the juncture of the Blue Mountain Physiographic Province to the north and the Great Basin Province to the south. The RNA is centered on a large mountain, Dry Mountain, that is somewhat geographically isolated from the forested uplands that lie to the north. The RNA is covered by ponderosa pine (Pinus ponderosa) dominated forests, however, the natural area is surrounded on three sides by Great Basin lowlands that are dominated by sagebrush (Artemisia species) and western juniper (Juniperus occidentalis). The pine forests contain a variety of understory communities as well as juniper woodlands, due in part to the discontinuous fire history at the site. Also present are shrublands dominated by mountain mahogany (Cercocarpus ledifolius) and ecotonal communities that are transitional between the pine forests and Great Basin sagebrush steppe.

Land Management Planning

Dry Mountain RNA was proposed as a candidate RNA by the Ochoco National Forest to meet unfilled natural area cell needs for western juniper/big sagebrush and ponderosa pine/mountain mahogany (Oregon Natural Heritage Advisory Council 1993). It was included as a candidate RNA in the FEIS for the Ochoco National Forest (USDA Forest Service 1989a), in the Forest Plan (USDA Forest Service 1989b) and in the Record of Decision (USDA Forest Service 1989c). A portion of the adjacent Bureau of Land Management lands have been designated as a Research Natural Area in order to protect the transitional natural communities present (USDI BLM 1991).

Dry Mountain includes the following RNA cell needs (or elements) in the Blue Mountains Physiographic Province (ONHAC 1993):

TERRESTRIAL ECOSYSTEMS:

3. Western juniper/big sagebrush community.
10. Ponderosa pine/mountain mahogany communities with elk sedge and bunchgrasses if possible.
51. Mountain mahogany/bunchgrass.

OBJECTIVE

The objective of the Dry Mountain RNA is to preserve in an undisturbed (by humans) condition the shrublands, woodlands, and ponderosa pine forests that lie in the transition zone between the Great Basin and the southern Blue Mountains. The RNA will serve as a reference area for study, as a baseline area for determining long-term ecological changes, as a gene pool for both plant and animal species, and as a monitoring area to determine effects of management techniques and practices applied to similar ecosystems.

JUSTIFICATION

Dry Mountain RNA was selected originally to meet unfilled RNA cell needs for ecotonal natural communities that are transitional between the Blue Mountains and the Great Basin in Oregon. The site contains a variety of slopes and aspects that range from talus slopes dominated by shrubs to shallow soiled slopes with western juniper and sagebrush to upland ponderosa pine forests. Understories are generally in excellent condition as grazing has been minimal due to a paucity of water resources at the site. Overall the RNA is in high quality condition.

PRINCIPAL DISTINGUISHING FEATURES

Dry Mountain RNA contains the following principal features:

1. Ponderosa pine/elk sedge forest. The dominant forest type in Dry Mountain RNA is the ponderosa pine/elk sedge community. Elk sedge (*Carex geyeri*) is a prominent component of the herb layer, spreading widely due to its rhizomatous habit. The pine/elk sedge community is found at the higher elevations on moderate to deep soils on all aspects. Some stands, where fire has not occurred for many years, have dense thickets of saplings or pole size timber. Western juniper and mountain mahogany (*Cercocarpus ledifolius*) can be found interspersed in this community, especially where soils tend to be shallow and rocky.
2. Ponderosa pine-western juniper transition zone. Pine-juniper woodlands occur at the lower elevations of the RNA, particularly along the southern and western edges of the natural area. Understories are varied in these sites with mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*), bitterbrush (*Purshia tridentata*), and mountain mahogany all present depending on aspect and soil depth. The mix of pine and juniper together in these sites results in a rich wildlife habitat with sufficient cover present for deer winter range.

3. Western juniper/big sagebrush-bitterbrush woodlands. Juniper woodlands are similar to pine-juniper woodlands, occurring at slightly lower elevations than the latter on warmer slopes and/or shallower soils. Within the juniper woodlands are inclusions of big sagebrush and low sagebrush flats, most notably at Dry Mountain Meadow along the southern border of the RNA.

Juniper/mountain mahogany woodlands occur along the ridges of the natural area, often where there is abundant rock in the soil or where there are talus slopes.

4. Mountain mahogany shrublands. Mountain mahogany occurs in several habitats and communities in the Dry Mountain RNA but it tends to be a dominant species in shrublands which are located along ridges and on talus slopes. Ridges and talus slopes are sites which are relatively fire-proof because of the preponderance of surface rock and thus offer secure habitat for mountain mahogany which has a low resistance to wildfire and does not stump sprout.

Understories for the mahogany communities on ridges are bluebunch wheatgrass (Agropyron spicatum) and Idaho fescue (Festuca idahoensis). Hot, south facing slopes are often dominated by shrublands which can include mountain mahogany as well as snowbrush (Ceanothus velutinus) and cherry (Prunus emarginata). The shrublands can develop into nearly impenetrable thickets that are very flammable with the result that mahogany is eliminated from the community for a while.

LOCATION

Maps 1, 2, and 3 show the location of Dry Mountain RNA. The RNA is located in the Snow Mountain Ranger District of the Ochoco National Forest. The center of the RNA is at latitude 43° 39' 55" north and longitude 119° 35' 15" west. The 2205 acre (893 hectares) site lies within Sections 10, 11, 13, 14, 15 Township 22 South, Range 26 East Willamette Meridian (Map 3).

Boundary

Basis of bearing is astronomic north. Basis of elevation is mean sea level as shown on the USGS 7.5 minute topographic quadrangle map Dry Mountain, Oreg. 1982. See boundary description attached to this document.

Area

Total area for the Dry Mountain Research Natural Area is approximately 2205 acres (893 hectares).

Elevations

Elevations range from 5100 feet (1555 m.) in the northwestern corner of the RNA to 5909 feet (1801 m.) at an unnamed hill along the southern boundary of the natural area.

Access

The Dry Mountain RNA is in the southern portion of the Ochoco National Forest (Map 2) north of the town of Riley, Oregon. It is accessible from Hwy 20 and Hwy 395 near their junction at the town of Riley by proceeding north on the Silver Creek Road (~~County Road 138~~) for 15 miles to the junction with Forest Road #4130. Follow Road #4130 east for nine miles to the junction with Forest Road #4135 and take this road south for two miles to Forest Road #4120. Take Road #4120 west for six miles to its terminus at the top of Dry Mountain near the fire lookout station. The RNA lies downslope to the southwest of the lookout.

An alternative access point is from the west off the Silver Creek Road approximately three miles south of the junction with Forest Road #4130. Follow an unmarked dirt road that heads east towards Dry Mountain across BLM lands past a livestock reservoir and continue to the east-southeast through sagebrush and western juniper lands to the boundary of the RNA. The road ends at two small reservoirs called Trespass Reservoirs on the USGS 7.5' topographic map, Dry Mountain, Oreg. The road is faint in places and difficult to negotiate in any vehicle but easy to walk along.

Maps

Dry Mountain RNA is located on the USGS 7.5 minute topographic quadrangle map, Dry Mountain, Oreg. 1982. The Ochoco National Forest Recreation Map, 1982, is useful for ownership and general access information, however, this map does not delineate the RNA boundaries.

Photos

The following aerial photos of the Dry Mountain RNA site, taken July 30, 1987, are available in the Forest Supervisor's and District Ranger's offices:

<u>Flight line</u>	<u>Photo number</u>
83	1687-33
84	1686-42, 44, 46
85	1687-118, 110
86	1687-116

AREA BY TYPES

Vegetation of the RNA has been surveyed (Vander Schaaf 1993) during initial recommendation of the site for RNA status as well in preparation of drafting this document. A rare plant survey of the area was conducted in 1995 (Maher 1995) which was also quite helpful in delineating the plant communities present at the natural area. The Ochoco National Forest also determined plant community locations on the RNA in 1995 (USDA Forest Service 1995). The following determination of cover types and natural communities and their corresponding acreages have been made from the survey information and from air photo interpretation. Map 4 depicts the locations of the natural communities described below.

The most current information regarding the forested portion of the RNA is described in the plant association guide for the Blue and Ochoco Mountains (Johnson and Clausnitzer 1993). Five plant communities have been identified in the RNA (Map 4), four of which correlate to communities noted in (Johnson and Clausnitzer 1993).

	Estimated	
	<u>Acres</u>	<u>Hectares</u>
<u>SAF Cover Types (Eyre 1980)</u>		
237 Interior Ponderosa Pine	1310	530
238 Western Juniper	<u>895</u>	<u>363</u>
Total	2205	893
 <u>Kuchler Types (Kuchler 1966)</u>		
11 Western Ponderosa forest (<u>Pinus</u>)	1310	530
24 Juniper Steppe Woodland (<u>Juniperus-Artemisia-Agropyron</u>)	846	343
55 Sagebrush Steppe (<u>Artemisia-Agropyron</u>)	<u>049</u>	<u>020</u>
Total	2205	893

Plant Associations (Johnson and Clausnitzer 1993)

1) Ponderosa pine/mountain mahogany/elk sedge	392	159
2) Ponderosa pine/elk sedge	721	292
3) Ponderosa pine/mountain big sagebrush/Idaho fescue-bluebunch wheatgrass	197	080
4) Bitterbrush/Idaho fescue-bluebunch wheatgrass	021	008
5) Mountain mahogany/Idaho fescue-bluebunch wheatgrass	846	343
6) Rocks	<u>028</u>	<u>011</u>
Total	2205	893

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

Dry Mountain RNA is located at the juncture of the Blue Mountains and the Great Basin and thus has close affinities to both regions. The RNA lies to the southwest of the top of Dry Mountain with a very steep slope separating the natural area from the mountaintop ridge. The topography of the RNA reveals that the area is basically divided in half by a series of hills that run in a southwest-northeast direction with steep sideslopes containing ephemeral drainages running perpendicular to the ridgeline (Map 3). The terrain varies from rolling small hills in the southwest corner of the natural area to steep slopes in the northeast. The unnamed hilltops range upwards to 1847 meters in elevation and the drainages bottom out at 1625 meters in the southeast corner of the site.

There are a series of narrow canyons which begin at the southern edge of the RNA and head downslope away from the Big Ridge, off the Forest. Hell Hole, the only named canyon in the area, is descriptive of the tortuous conditions present in these drainages. Large talus slopes, which contain diverse shrublands, are present in the canyons. The intermittent drainages carry

runoff into the Silver Creek system which is a closed basin system that terminates in Harney Lake on the Malheur National Wildlife Refuge.

The underlying bedrock is mostly basalt, the origins of which are unclear. The Blue Mountains to the north have arisen from a number of basalt flows that are sometimes referred to as Columbia River Basalts. These flows covered more ancient rocks of diverse origins, many of which are sedimentary and were pushed upwards due to faulting. To the south in the Great Basin the most predominant basalt flows are called the Steens Basalts dating back to the Miocene Epoch. The lowlands surrounding Dry Mountain are composed of alluvium from Pleistocene times when a great lake covered most of the Harney Basin, including portions of Silver Creek basin. There is also evidence that volcanic ash, tuff, sandstone, and siltstone are present near the site.

Climatic Conditions

The central Oregon climate is characterized by warm summers and cold winters. Most of the limited precipitation falls as snow during the winter with significant rains often falling during the spring as well. Summers are usually dry with evening thunderstorms occurring in July and August. Dry Mountain RNA lies along the southern edge of the Blue Mountains physiographic province and receives typical central Oregon weather. Summer winds are predominantly from the west and are usually light to moderate. East winds may occur in the fall and spring, blowing at higher velocities and causing drying conditions that enhance the fire hazard for the season. During the winter, storms come in from the southwest bringing snow while occasional storms from the northwest bring frigid weather.

The closest recording NOAA weather station is located in Squaw Butte Experiment Station, Oregon, 15 miles to the southwest of the RNA. Climatic conditions at the Experiment Station should be a fair approximation for Dry Mountain RNA with differences being attributed to the additional 1000 feet of elevation at the RNA. The station receives an annual precipitation of 10.87 inches (27.61 cm) and the mean annual temperature is 45.7 F° (7.6 C°). (NOAA 1991). Over half of the precipitation falls between November and February. Summer high temperatures regularly reach into the 80's, while winter lows often dip into the 20's. The monthly climatic data for Squaw Butte Experiment Station averaged over the past 50 years is listed below (NOAA 1991).

Climatic Records for Squaw Butte Experiment Station, Oregon
 Elevation 4661 feet (1421 m); 1948-1991
 (NOAA 1991)

Month	Precipitation		Temperature	
	Inches	Cm	F°	C°
January	1.40	3.56	26.80	-2.89
February	0.88	2.24	32.20	0.11
March	0.90	2.29	35.20	1.78
April	0.70	1.78	42.10	5.61
May	1.24	3.15	50.00	10.00
June	0.98	2.49	58.20	14.56
July	0.30	0.78	67.00	19.44
August	0.65	1.65	65.60	18.66
September	0.47	1.19	58.10	14.50
October	0.83	2.11	48.00	8.89
November	1.16	2.95	36.30	2.39
December	<u>1.36</u>	<u>3.46</u>	29.20	-1.56
Total Precip.	10.87	27.61		
Mean Annual Temp.			45.70	7.61

DESCRIPTION OF VALUES

Flora

The flora of Dry Mountain RNA is a mix of the floras encountered within the northern Great Basin and the southern Blue Mountains. The flora has not been systematically collected or studied other than those taxa encountered during cursory inventory of the site. A survey for federal threatened, endangered or sensitive plant species was conducted (Maher 1995) that located several occurrences of Allium campanulatum within the RNA. Observations by Vander Schaaf (1993) and the rare plant survey have resulted in the following list of plants. Species identifications were determined from Hitchcock and Cronquist (1973) and trees were determined from Little (1979).

Scientific Name

Common Name

TREES

Juniperus occidentalis

western juniper

Pinus ponderosa

ponderosa pine

Populus tremuloides

aspen

SHRUBS AND SUBSHRUBS

Amalanchier alnifolia

serviceberry

Artemisia arbuscula

low sagebrush

Artemisia tridentata var. vaseyana

mountain big sagebrush

Berberis repens

Oregon grape

Ceanothus velutinus

common snowbrush

Cercocarpus ledifolius

mountain mahogany

Chrysothamnus nauseosus

gray rabbitbrush

Chrysothamnus viscidiflorus

green rabbitbrush

Holodiscus dumosus

gland ocean-spray

Prunus emarginata

bittercherry

Prunus virginiana

chokecherry

Purshia tridentata

bitterbrush

Ribes cereum

squaw currant

Salix scouleriana

Scouler willow

Sambucus racemosa

black elderberry

Symphoricarpos oreophilus

mountain snowberry

Tetradymia canescens

gray horsebrush

FORBS

Achillea millefolium

yarrow

Agoseris heterophylla

annual agoseris

Agoseris glauca

pale agoseris

<u>Agoseris retrorsa</u>	spear-leaved agoseris
<u>Allium campanulatum</u>	Sierra onion
<u>Amsinckia</u> sp.	amsinckia
<u>Antennaria microphylla</u>	rosy pussy-toes
<u>Arabis</u> sp.	rockcress
<u>Arnica cordifolia</u>	heart-leaved arnica
<u>Arnica soraria</u>	twin-flowered arnica
<u>Astragalus purshii</u>	woolly -pod milkvetch
<u>Blepharipappus scaber</u>	blepharipappus
<u>Brodiaea</u> sp.	brodiaea
<u>Calochortus macrocarpus</u>	sagebrush mariposa lily
<u>Castilleja</u> sp.	paintbrush
<u>Chaenactis douglasii</u>	hoary chaenactis
<u>Collinsia parviflora</u>	small-flowered blue-eyed mary
<u>Collomia grandiflora</u>	large-flowered collomia
<u>Collomia linearis</u>	narrow-leaf collomia
<u>Crepis acuminata</u>	long-leaved hawkweed
<u>Cryptantha</u> sp.	cryptantha
<u>Epilobium</u> sp.	fireweed
<u>Eriogonum heracleoides</u>	Wyeth buckwheat
<u>Eriogonum umbellatum</u>	sulfur buckwheat
<u>Eriophyllum lanatum</u>	woolly sunflower
<u>Fragaria virginiana</u>	broadpetal strawberry
<u>Fritillaria atropurpurea</u>	chocolate lily
<u>Galium</u> sp.	bedstraw
<u>Gilia aggregata</u>	scarlet gilia
<u>Geum triflorum</u>	prairie smoke avens
<u>Hackelia</u> sp.	stickseed
<u>Hieracium albiflorum</u>	white-flowered hawkweed
<u>Hesperochiron pumilus</u>	dwarf hesperochiron
<u>Heuchera cylindrica</u>	lava alumroot
<u>Hydrophyllum capitatum</u>	ballhead waterleaf
<u>Lithophragma</u> sp.	fringecup
<u>Lithospermum ruderale</u>	Columbia puccoon
<u>Lupinus</u> sp.	lupine
<u>Lupinus caudatus</u>	tailcup lupine
<u>Lupinus laxiflorus</u>	spurred lupine
<u>Mentha arvensis</u>	field mint
<u>Mertensia longiflora</u>	long-flowered bluebell
<u>Microseris troximoides</u>	false agoseris
<u>Oenothera tanacetifolia</u>	tansy-leaf evening primrose
<u>Orobanche</u> sp.	broomrape species
<u>Paeonia brownii</u>	western peony

<u>Penstemon</u> sp.	penstemon
<u>Penstemon fruticosus</u>	shrubby penstemon
<u>Phacelia heterophylla</u>	varileaf phacelia
<u>Phlox longifolia</u>	long-leaved phlox
<u>Potentilla</u> sp.	cinquefoil
<u>Senecio integerrimus</u>	western groundsel
<u>Senecio serra</u>	tall butterweed
<u>Trifolium macrocephalum</u>	big-headed clover
<u>Urtica dioica</u>	stinging nettle
<u>Viola</u> sp.	violet

GRAMINOIDS

<u>Agropyron spicatum</u>	bluebunch wheatgrass
<u>Bromus tectorum</u>	cheatgrass
<u>Calamagrostis rubescens</u>	pinegrass
<u>Carex geeyeri</u>	elk sedge
<u>Carex rossii</u>	Ross' sedge
<u>Danthonia unispicata</u>	one-spike oatgrass
<u>Elymus cinereus</u>	basin wildrye
<u>Festuca idahoensis</u>	Idaho fescue
<u>Koeleria cristata</u>	junegrass
<u>Melica</u> sp.	oniongrass
<u>Poa ampla</u>	ample bluegrass
<u>Poa nervosa</u>	Wheeler's bluegrass
<u>Poa sandbergii</u>	Sandberg's bluegrass
<u>Sitanion hystrix</u>	bottlebrush squirreltail
<u>Stipa columbiana</u>	western needlegrass
<u>Stipa thurberiana</u>	Thurber's needlegrass

Dry Mountain RNA has a number of natural plant associations represented within its boundaries (Map 4). Roughly two-thirds of the RNA is covered by ponderosa pine associations and the remaining third of the natural area is dominated by mountain mahogany and other shrub associations. The associations are distributed on the site according to soil depth and slope, mainly, with aspect playing a role in determining understory composition in some of the ponderosa pine associations. In general, pine associations are found in deeper soils on less steep slopes and the mountain mahogany associations are found on shallower, more rocky soils on steeper slopes. The steepest slopes, located in the Hell Hole region of the RNA (Map 4), are essentially talus with only minimal vegetation present.

The ponderosa pine associations range from more upland types, such as the ponderosa pine/elk sedge association, to associations which could be considered more ecotonal or transitional in nature (Franklin and Dyrness 1973). The ponderosa pine/mountain big sagebrush/Idaho fescue-bluebunch wheatgrass and the ponderosa pine/mountain mahogany/elk sedge associations are examples of ecotonal types. Ponderosa pine is found predominantly in the southwestern portion of the RNA, below Big Ridge which contains the fire lookout. Pine is mixed with western juniper throughout much of the RNA but the juniper is sub-dominant in most of the stands. At the lower elevations on southern aspects, such as around Dry Mountain Meadow (Map 4) and along the western edge of the RNA, juniper is more prominent in the stands and assumes some canopy dominance.

Understories in the pine associations are often dominated by elk sedge in the herb layer. This rhizomatous sedge is a hardy, low growing species that is common in the Blue Mountains and has a broad ecological amplitude (Hall 1973). Shrubs are varied in the pine associations with nearly half RNA considered to be in a ponderosa pine/elk sedge association that has no shrub species with more than 10% cover (Johnson and Clausnitzer 1992). This association contains relatively high cover of elk sedge and bunchgrasses and is located in the central portion of the RNA which is less steeply sloped than much of the rest of the natural area. A related pine association has mountain mahogany in the shrub layer forming a two layered forest stand with pine in the overstory and mahogany creating a valuable thermal cover for big game. The ponderosa pine/mountain mahogany/elk sedge association also has high cover of elk sedge in the herb layer. In the RNA, the pine/mahogany association is centered on a small, unnamed hill and adjacent slopes in the southwest corner of the site.

Mountain big sagebrush dominates the understory in the ponderosa pine/mountain big sagebrush/Idaho fescue-bluebunch wheatgrass association which occurs as a forest savanna in several small stands in the RNA. This association is located on steep ground below Big Ridge, as well as along the western edge of the natural area on moderate slopes. The herb layer is dominated by bunchgrass species.

The steep slopes of Big Ridge and Hell Hole are dominated by the mountain mahogany/Idaho fescue-bluebunch wheatgrass association which is also prominent on the lower slopes on the western and southern edges of the RNA. This shrub-dominated association is prominent in the shallow, rocky soil areas of the natural area which are burned less frequently than other areas. Mountain mahogany decreases with fire but the bunchgrasses in the association can increase with more frequent fire. The mahogany is very important forage for big game species as well as providing critical thermal cover in winter months. A relatively large amount of the RNA is covered with this association and with mountain mahogany in general, belying the importance of these ecotonal areas for wildlife and landscape diversity in the Blue Mountains.

The bitterbrush/Idaho fescue-bluebunch wheatgrass association only occurs on nearly level terrain near Trespass Reservoirs along the southern edge of the RNA. This association is sometimes transitional to ponderosa pine association but in this instance is likely more related to the

downslope western juniper and sagebrush steppe natural communities. Because of its proximity to the reservoirs, this site has some of the greatest concentrations of weedy species found on the RNA. Cheatgrass is common here.

Fauna

Faunal species have not been systematically studied or inventoried in Dry Mountain RNA. Observations of animal species taken during surveys conducted at the site as well as surveys on nearby areas are included below. The following terrestrial vertebrates are among those either observed (Vander Schaff 1993; Roberts 1996; David 1996) or suspected to occur in the RNA, nomenclature follows Burt and Grossenheider 1976 and Corkran and Thomas 1996:

<u>Scientific name</u>	<u>Common name</u>	<u>Presence</u>
REPTILES AND AMPHIBIANS		
Anguidae		
<u>Elgaria coerulea</u>	Northern alligator lizard	possible
Iguanidae		
<u>Sceloporus graciosus graciosus</u>	Northern sagebrush lizard	yes
<u>Phrynosoma douglassi douglassi</u>	Pygmy horned lizard	yes
<u>Sceloporus occidentalis</u>	Western fence lizard	yes
<u>Sceloporus occidentalis biseriatus</u>	Great Basin fence lizard	yes
Boidae		
<u>Charina bottae utahensis</u>	Rubber boa	yes
Colubridae		
<u>Coluber constrictor</u>	Western racer	yes
<u>Contia tenuis</u>	Sharptail snake	possible
<u>Thamnophis ordinoides</u>	Northwestern garter snake	yes
<u>Thamnophis sirtalis</u>	Common garter snake	yes
<u>Pituophis melanoleucus deserticola</u>	Great Basin gopher snake	yes
Viperidae		
<u>Crotalus viridus</u>	Western rattlesnake	yes
Ambystomatidae		
<u>Ambystoma macrodactylum</u>	Long-toed salamander	yes
Pelobatidae		
<u>Scaphiopus intermountanus</u>	Great Basin spadefoot toad	yes

Bufonidae		
<u>Bufo boreas</u>	Western toad	yes
Hylidae		
<u>Hyla regilla</u>	Pacific treefrog	yes
Scincidae		
<u>Eumeces skiltonianus</u>	Western skink	yes
BIRDS		
Cathartidae		
<u>Cathartes aura</u>	Turkey vulture	yes
Accipitridae		
<u>Accipiter gentilis</u>	Northern goshawk	yes
<u>Accipiter striatus</u>	Sharp-shinned hawk	yes
<u>Aquila chrysaetos</u>	Golden eagle	yes
<u>Haliaeetus leucophalus</u>	Bald eagle	yes
<u>Buteo jamaicensis</u>	Red-tailed hawk	yes
<u>Buteo regalis</u>	Ferruginous hawk	possible
<u>Buteo swainsoni</u>	Swainson's hawk	yes
Phasianidae		
<u>Callipepla californica</u>	California quail	yes
<u>Centrocercus urophasianus</u>	Sage grouse	yes
<u>Oreortyx pictus</u>	Mountain quail	unlikely
Columbidae		
<u>Zenaida macroura</u>	Mourning dove	yes
Strigidae		
<u>Bubo virginianus</u>	Great horned owl	yes
Caprimulgidae		
<u>Chordeiles minor</u>	Common nighthawk	yes
Apodidae		
<u>Chaetura vauxi</u>	Vaux's swift	yes
Trochilidae		
<u>Selasphorus rufus</u>	Rufous hummingbird	yes

Picidae		
<u>Colaptes auratus</u>	Northern flicker	yes
<u>Picoides pubescens</u>	Downy woodpecker	yes
<u>Picoides villosus</u>	Hairy woodpecker	yes
<u>Picoides albolarvatus</u>	White-headed woodpecker	yes
Tyrannidae		
<u>Contopus sordidulus</u>	Western wood-pewee	yes
<u>Empidonax oberholseri</u>	Dusky flycatcher	yes
Alaudidae		
<u>Eremophila alpestris</u>	Horned lark	yes
Hirundinidae		
<u>Tachycineta bicolor</u>	Tree swallow	yes
<u>Tachycineta thalassina</u>	Violet-green swallow	yes
Corvidae		
<u>Perisoreus canadensis</u>	Gray jay	yes
<u>Cyanocitta stelleri</u>	Steller's jay	yes
<u>Cyanocephalus cyanocephalus</u>	Pinyon jay	yes
<u>Corvus brachyrhynchos</u>	American crow	possible
<u>Corvus caurinus</u>	Northwestern crow	possible
<u>Corvus corax</u>	Common raven	yes
<u>Nucifraga columbiana</u>	Clark's nutcracker	yes
Paridae		
<u>Parus atricapillus</u>	Black-capped chickadee	possible
<u>Parus gambeli</u>	Mountain chickadee	yes
Sittidae		
<u>Sitta canadensis</u>	Red-breasted nuthatch	yes
<u>Sitta carolinensis</u>	White-breasted nuthatch	yes
<u>Sitta pygmaea</u>	Pygmy nuthatch	yes
Strigidae		
<u>Colaptes auratus</u>	Northern flicker	yes
<u>Octus flammeolus</u>	Flammulated owl	yes
Sturnidae		
<u>Sturnus vulgaris</u>	Starling	yes

Certhiidae		
<u>Certhia americana</u>	Brown creeper	yes
Troglodytidae		
<u>Troglodytes aedon</u>	House wren	yes
<u>Salpinctes obsoletus</u>	Rock wren	yes
Sylviidae		
<u>Regulus calendula</u>	Ruby-crowned kinglet	yes
<u>Regulus satrapa</u>	Golden-crowned kinglet	yes
Vireoridae		
<u>Vireo solitarius</u>	Solitary vireo	yes
Muscicapidae		
<u>Sialia currucoides</u>	Mountain bluebird	yes
<u>Sialia mexicana</u>	Western bluebird	yes
<u>Catharus ustulatus</u>	Swainson's thrush	yes
<u>Catharus guttatus</u>	Hermit thrush	yes
<u>Turdus migratorius</u>	American robin	yes
<u>Ixoreus naevius</u>	Varied thrush	yes
Emberizidae		
<u>Dendroica coronata</u>	Yellow-rumped warbler	yes
<u>Piranga ludoviciana</u>	Western tanager	yes
<u>Spizella passerina</u>	Chipping sparrow	yes
<u>Melospiza melodia</u>	Song sparrow	yes
<u>Zonotrichia leucophrys</u>	White-crowned sparrow	yes
<u>Junco hyemalis</u>	Dark-eyed junco	yes
<u>Agelaius phoeniceus</u>	Red-winged blackbird	yes
<u>Euphagus cyanocephalus</u>	Brewer's blackbird	yes
<u>Molothrus ater</u>	Brown-headed cowbird	yes
Fringillidae		
<u>Carpodacus cassinii</u>	Cassin's finch	yes
<u>Loxia curvirostra</u>	Red crossbill	yes
<u>Carduelis pinus</u>	Pine siskin	yes
<u>Coccothraustes vespertinus</u>	Evening grosbeak	yes
<u>Chlorura chlorura</u>	Green-tailed towhee	yes

MAMMALS

Verpertilionidae

Myotis lucifugusMyotis yumanensisMyotis evotisMyotis volansMyotis californicusAnthrozous pallidusLasionycteris noctivagansEptesicus fuscusLasiurus cinereusPlecotus townsendii

Little brown myotis

Yuma myotis

Long-eared myotis

Long-legged myotis

California myotis

Pallid bat

Silver-haired bat

Big brown bat

Hoary bat

Townsend's big-eared bat

yes

yes

yes

yes

yes

possible

yes

yes

possible

possible

Ochotonidae

Ochotona princeps

Pika

yes

Leporidae

Lepus californicusSylvilagus nuttalli

Blacktailed jackrabbit

Mountain cottontail

yes

yes

Sciuridae

Eutamias townsendiiEutamias minimusCitellus beldingiCitellus lateralisTamiasciurus douglasii

Townsend's chipmunk

Least chipmunk

Belding ground squirrel

Golden-mantled squirrel

Douglas' squirrel

yes

yes

yes

yes

yes

Cricetidae

Peromyscus maniculatusNeotoma cinereaLagurus curtatus

Deer mouse

Bushy-tailed woodrat

Sagebrush vole

yes

yes

possible

Erethizontidae

Erethizon dorsatum

Porcupine

yes

Canidae

Canis latrans

Coyote

yes

Ursidae

Ursus americanus

Black bear

yes

Mustelidae

Martes americana

Marten

possible

<u>Mustela frenata</u>	Long-tailed weasel	yes
<u>Mustela vison</u>	Mink	possible
<u>Spilogale gracilis</u>	Western spotted skunk	yes
<u>Mephitis mephitis</u>	Striped skunk	possible
<u>Taxidea taxus</u>	Badger	yes
Antilocarpadae		
<u>Antilocarpa americana</u>	Pronghorn	yes
Felidae		
<u>Felis concolor</u>	Cougar	yes
<u>Felis rufus</u>	Bobcat	yes
Cervidae		
<u>Cervus elaphus</u>	Elk	yes
<u>Odocoileus hemionus</u>	Mule deer	yes

Yes: Known siting within proposed RNA boundaries.
Possible: No known siting but suitable habitat or sitings either in adjacent areas with similar habitat or no sitings in adjacent habitat but known potential habitat exists.

Aquatic

Aquatic habitats are not present on Dry Mountain RNA.

Geology

The Blue Mountains were formed in a series of uplifting episodes during the late Cenozoic Era (65 million years ago) and subsequent folding and faulting of the terrain. Prior to the uplifting, in the Paleozoic Era (250 million years ago), the region was covered with shallow seas and the underlying geologic materials consisted of sandstones, shale, cherts, and localized limestone. Immediately preceding the uplifting, vast areas of the inland Pacific Northwest were inundated by successive flows of Columbia basalt forming a thick cap over the underlying sedimentary layers (Baldwin 1964). Columbia basalt caps much of the Blue Mountains, including sites near the Dry Mountain RNA, and the weathering of this upper layer has made a significant contribution to the soils in the area. The underlying bedrock at Dry Mountain is predominantly welded tuff, a relatively soft rock that is created by hot flows of volcanic ash and pumice that fuse or weld together when they cool. The rock can be porous, generally has little crystalline structure, and readily breaks down into soil.

The process of weathering of the numerous layers of rock in the Blue Mountains has been quite active, resulting in a dissected landscape with considerable regional differences in soils. The basalt has eroded down to the underlying layers in many areas of the Blue Mountains, revealing important fossil finds in the John Day Basin to the north of the RNA. The erosion of the sedimentary layers and their eventual weathering has made the geology of the region more complex, especially in light of the fact that the underlying sedimentary layers have been altered due to the effects of pressure from folding and faulting.

Pleistocene glaciation did not affect the southern Blue Mountains but there was increased erosion of the landscape during this time. Deposition of alluvium likely had some affect on Dry Mountain, at least indirectly, as the Harney Basin to the southeast and the Riley--Silver Lake basin to the southwest collected substantial amounts of alluvial and lacustrine sediments during high water periods. During drier periods during and after the Pleistocene some of these sediments may have been deposited in the Dry Mountain area as loess soils as well.

The most recent contribution to the geology of Dry Mountain RNA occurred as a result of the explosion of Mt. Mazama 6800 year ago. The ash ejected during the event blanketed the Blue Mountains, sometimes to significant depths as the deposits were re-worked by the forces of wind, water, and gravity. These ash deposits have remained an important part of the soil in many parts of the Blue Mountains but they are especially noticeable on the north-facing slopes where erosion has been less.

Soils

Soils in the RNA are primarily composed of residuum and therefore derived from the primary bedrock in the area, welded tuffs. On the lower slopes there may be some soils that are eolian in origin having been derived from the lacustrine sediments formed in nearby basins during the Pleistocene. At the higher elevations, along the Dry Mountain ridgeline, the soils may also be derived from basalts. The steep slopes in the RNA indicate that some soils may be more colluvial in nature, having arrived on site from upper slope positions.

The primary variable in the soils present at the RNA is soil depth to bedrock. Many of the soils are shallow and quite rocky, supporting mostly woody shrubs such as mountain mahogany and sagebrush. Where there are moderately deep soils conifers are prominent with ponderosa pine stands found on the deepest soils which occur on the more level terrain below the steep ridge of Dry Mountain.

There has been no intensive soil survey undertaken within the RNA to date but soils have been classified into general mapping units that are adequate for soil descriptions. The mapping units are mapped and described in the Ochoco National Forest Soil Resource Inventory, a document prepared by the U.S. Forest Service (USDA Forest Service 1977).

The soil mapping units present in Dry Mountain RNA are portrayed on Map 5. The mapping units are described below.

Mapping Unit 6 Soil Mapping Unit 6 is located in the central portion of the RNA, occupying the most level terrain in the natural area. Soils range from thin to moderately thick, 12-30 inches (30-76 cm) depth to bedrock, and have gravelly loam textures. The soils are derived from residuum with bedrock composed of basalt and andesite and softer tuffaceous interflow material. One of the distinguishing characteristics of the mapping unit is that slopes are less than 30 percent and generally south-facing. The soil supports ponderosa pine communities with graminoid dominated understories.

Mapping Unit 7 Soil Mapping Unit 7 is located in the southwestern corner of the RNA on mostly north-facing slopes between 3600-6000 feet (1097-1829 m) elevation. Soils are shallow to very shallow with gravelly and cobbly loam textures. Bedrock is similar to mapping unit 6 with basalt, andesite, and softer tuffaceous materials present; depth to bedrock is 8-15 inches (20-38 cm). Mapping unit 7 is found on slopes that are generally less than 30 percent. These soils have considerable surface rock and support western juniper, mountain mahogany, and scattered big sagebrush.

Mapping Unit 8 Soil Mapping Unit 8 occupies a small site in the northwest corner of the RNA on moderate gradient north and west facing slopes. The soil is very shallow, being only 4-12 inches (10-30 cm) deep to bedrock, and 40-90 percent of the soil surface is covered by surface rock. Bedrock is composed of basalt, andesite, and tuffaceous interflow material. The mapping unit supports low sagebrush and mountain mahogany.

Mapping Unit 45 Soil Mapping Unit 45 is complex of mapping units 4 and 5. This mapping unit complex is located along and includes the steep slope and ridge of Dry Mountain, covering nearly a third of the RNA. Slopes are south-facing in the mapping unit and steep, varying from 30-70 percent. Soil origins are primarily colluvium with some residuum present as well. Soil depths range from 8-30 inches (20-76 cm) which is surprising given the steep slopes. The mapping unit supports a variety of vegetation including mountain mahogany, western juniper, and ponderosa pine.

Lands

Dry Mountain RNA is surrounded on three sides by lands administered by the Bureau of Land Management, Burns District. Lands to the north, east, and partially to the south have been formally designated by the BLM as the Dry Mountain Research Natural Area/Area of Critical

Environmental Concern (RNA/ACEC) to protect the lower elevation transitional plant communities at the site (Map 6). The RNA/ACEC administered by the BLM contains communities dominated by western juniper, big sagebrush, low sagebrush, and bitterbrush, complementing the proposed Dry Mountain RNA managed by the Ochoco National Forest. Grazing is allowed on the BLM managed RNA/ACEC but due to the lack of water at the site the effects of grazing are minor in most areas.

Lands to the northeast of the proposed RNA are administered by the Ochoco National Forest. These lands are designated as MAF-20 Winter Range in the Ochoco National Forest Plan (USDA 1989a). The management emphasis for these adjacent Forest Service lands is to manage for big game winter range habitat with particular attention being paid to restricting other management activities and human intervention from December 1 to May 1. Potential management activities in the area will focus on improving thermal cover and reducing road densities. Vegetation treatments will be prescribed in the Winter Range area to maintain forage and browse species for big game; treatments will utilize prescribed fire and vegetation manipulation. Grazing may be a compatible use in some winter range areas if it is determined to meet management objectives.

Cultural

Minor cultural resources have been observed within the Dry Mountain RNA. Obsidian flakes were found during the 1995 botanical survey (Maher 1995) in the Trespass Reservoir area and in both of the low saddles in the NW 1/4 of section 14 (see Map 3). Obsidian flakes indicate that the area was used for hunting by Native Americans but they do not indicate habitation. Due to the lack of water on Dry Mountain, it is not expected that habitation sites are present within the RNA. A complete cultural inventory of the site has not been conducted to date.

Grazing Resources

Dry Mountain RNA is within the Green Butte grazing allotment on the Snow Mountain Ranger District of the Ochoco National Forest but, because of the isolated nature of the site, cattle grazing of the RNA was not planned by the District. During surveys of the RNA conducted in preparation of the establishment record no evidence of recent livestock use was found. Trespass Reservoir, along the southern border of the RNA, was created and likely named for past grazing activities in the area. The National Forest boundary is not fenced along the southern boundary of the RNA and livestock can easily stray onto the RNA from adjacent BLM lands. Such trespass grazing would under most circumstances go unnoticed as Forest Service personnel infrequently patrol the area. Stony ground along the boundary discourages most grazing trespass as cattle generally dislike rocky scabland habitats.

Mineral Resources

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

Timber

Timber resources are present on the RNA but there have been no scheduled or unscheduled timber harvests in the area to date. Difficult access was likely a deterrent to harvest activities in the past but with the current stumpage prices, harvest would now be economically feasible for the site. The RNA has not been cruised to determine the volume of timber present but approximately half of the site contains 150-200 year old ponderosa pine in low to moderate densities. Older harvest units on comparable sites near the RNA have clearcut large stands of trees using an extensive system of roads and skid trails within the stands. More recent harvests in similar forests use more selective tree harvest techniques.

While scheduled timber harvest will not occur on the RNA there is a potential for impact to the RNA when timber is cut adjacent to the RNA. Human caused wildfires related to logging operations or to forest recreation along logging roads are the greatest threat to the natural area. Roads can also act as vectors for invasive exotic plants and plant diseases. Timber trespass in the form of firewood cutting is unlikely in the RNA because of the poor road access.

Watershed Values

There are minor watershed values present at Dry Mountain RNA as the natural area contains the headwaters of several unnamed seasonal tributaries which eventually feed into the Silver Creek drainage. Silver Creek flows southeast from the southern Blue Mountains through the Silver Creek valley and eventually terminating in Harney Lake on the Malheur National Wildlife Refuge.

Recreation Values

Dry Mountain RNA receives almost no recreation use. Hunting is the most common recreation use of the area; there is an old hunter camp located near Trespass Reservoir at the edge of the RNA that has occasional use. Casual recreation use has not seriously impacted the RNA to date. Recreational use and identification of the site as an RNA on general forest recreation maps should be discouraged.

Wildlife and Plant Values

There have been no federally listed threatened or endangered wildlife species located within the RNA to date. Six sites for Allium campanulatum, the Sierra onion, which is a Watch List species as determined by the Oregon Natural Heritage Program (Oregon Natural Heritage Program 1993), have been found on the natural area in a recent survey (Maher 1995). The Sierra onion has no federal status under the Endangered Species Act.

Adjacent Private Lands

There are no private lands adjacent to the RNA.

MANAGEMENT PRESCRIPTION

Management and protection of Dry Mountain RNA will be directed toward maintaining natural ecological processes. No human activities will be permitted that disturb or modify ecological processes that are not in conjunction with RNA objectives.

Dry Mountain RNA is included, along with other RNAs, in the Ochoco National Forest Plan in Management Area F5 Research Natural Areas (USDA Forest Service 1989b). Standards and guidelines for management are noted in the Forest Plan for the Management Area MA-F5.

Vegetation Management

The overall management direction for all RNAs is to preserve the naturally occurring physical and biological processes at the site (USDA Forest Service 1989b). The primary reason for allowing natural processes is for research purposes and education. Baseline studies in the RNA may occasionally be visible with regards to temporary placement of equipment but human-caused changes to the site will be minimized.

Wildfire will be actively suppressed unless plans approved by the Director of the Pacific Northwest Research Station provide for letting natural fires burn. Fire suppression will use methods and equipment that will minimize disturbance to the special features of the area. Development of a wildfire management plan with prescriptions for natural and human caused ignitions is strongly recommended for the RNA. Natural fires occurred with regularity in the past at Dry Mountain RNA as evidenced by the presence of several different ponderosa pine stand densities and age classes in the natural area. Some sites within the RNA have not burned for upwards of 100 years (Maher 1995); mountain mahogany is dying out in these areas and western juniper is replacing it. Prescribed burning will be used as specified in approved Research Natural Area management goals.

Introduced species and weedy native species are also a concern at the RNA. At this time there are no known significant weed infestations or populations of introduced species in the RNA except for cheatgrass which occurs sporadically in the juniper woodlands at lower elevations. Cheatgrass is prominent near Trespass Reservoir in the southwest corner of the RNA due to past livestock grazing. Monitoring in the form of annual surveys of the RNA should be conducted to detect additional weedy invasions of exotic species.

Transportation Plan

No new roads or trails are planned for this area. A primitive dirt road enters the RNA from the southwest which terminates near Trespass Reservoir.

Fences and Protective Barriers

The RNA is unfenced and unsigned. Fences may be required along the south boundary of the RNA to restrict livestock grazing.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of Dry Mountain RNA will be the responsibility of the Ochoco National Forest. The District Ranger, Snow Mountain Ranger District, has direct responsibility for the natural area.

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 should be referred to the Director. The RNA Scientist in the Research Station is designated as the lead contact person for all such requests. 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 in 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 Dry Mountain RNA will be maintained in the following offices:

Regional Forester, Portland, Oregon
Forest Supervisor, Ochoco National Forest, Prineville, Oregon
District Ranger, Snow Mountain Ranger District, Prineville, Oregon
Director, Pacific Northwest Research Station, Portland, Oregon
Forest Sciences Laboratory, Oregon State University, Corvallis, Oregon

Archiving

The Portland office of the Pacific Northwest Research Station will be responsible for maintaining the Dry Mountain RNA research data file and list of herbarium and species samples collected. The Forest Sciences Lab has a data base 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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KEY

□ □ □ Ponderosa pine/mahogany/
elk sedge

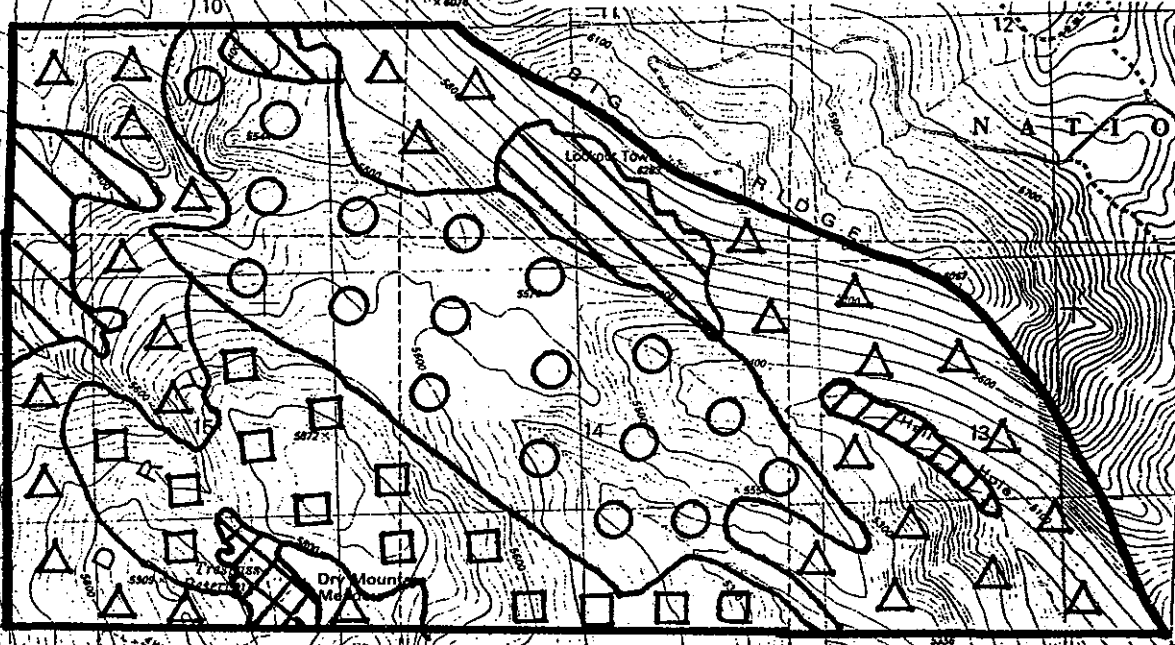
○ ○ ○ Ponderosa pine/elk sedge

/// Ponderosa pine/big sage/
bunchgrass

XXXX Bitterbrush/bunchgrass

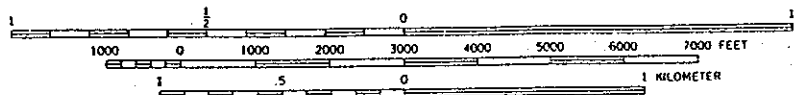
△ △ △ Mountain mahogany/
bunchgrass

//// Rocks



Map 4. Map of Plant Associations
of Dry Mountain Research
Natural Area

Dry Mountain, Oreg. 1982
7.5' quadrangle



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United States
Department of
Agriculture

Forest
Service

Ochoco
National Forest

P.O. Box 490
Prineville, OR 97754
(541) 416-6500

File Code: 4060
Route To: Files

Date: October 23, 1996

Subject: Dry Mtn. RNA Legal Description

To: Lisa Croft
RNA Coordinator
Ochoco National Forest

Attached you will find a copy of the legal description which I have prepared for the Dry Mountain Resource Natural Area. This description has been reviewed and approved by the Regional Land Surveyor, Tim Kent. The description is to be used in conjunction with the map that you provided me in preparation of the written description.

Jay E. Alway

JAY E. ALWAY
Forest Land Surveyor
Ochoco National Forest



Caring for the Land and Serving People

FS-6200-28 (7-82)

DRY MOUNTAIN RNA

Beginning at the Section corner common to sections 13 and 24, T. 22 S. R. 26 E., W.M., which is the TRUE POINT OF BEGINNING; thence Westerly approximately three miles along the South boundary of Sections 13, 14, and 15 to the corner common to Sections 15, 22, 21 and 16; thence northerly along the West boundary of Section 15 and Section 10 to the 1/4 section corner of Section 10 and Section 9; thence easterly along the E-W centerline of Section 10 for approximately one mile to the 1/4 section corner to Sections 10 and Section 11; thence East approximately 850 feet to the top of ridge on the Northwesterly slope of "Big Ridge"; thence Southeasterly along the top of "Big Ridge" passing through the Dry Mtn. Lookout Tower; thence continuing Southeasterly along the top of "Big Ridge" to the approximate location of spot elevation 6057 as depicted on the 1982 USGS quadrangle for Dry Mtn.; thence continuing South Southeasterly down the top of ridge until intersection with the section corner common to Section 13 and 24, T. 22 S. R. 26 E., W.M., which is the TRUE POINT OF BEGINNING.

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

ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

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

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

Table 1: Research Natural Area Locations

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

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

SELECTED ALTERNATIVE

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

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

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

OTHER ALTERNATIVE CONSIDERED

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

FINDING OF NO SIGNIFICANT IMPACT

Based on the environmental analysis documented in the Environmental Assessment, it has been determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment, therefore, an environmental impact statement is not needed. This determination is based on the following factors [40 CFR 1508.27]:

CONTEXT

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

INTENSITY

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

and are not likely to be highly controversial.

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

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

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

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

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

NOTIFICATION and IMPLEMENTATION

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

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

APPEAL RIGHTS

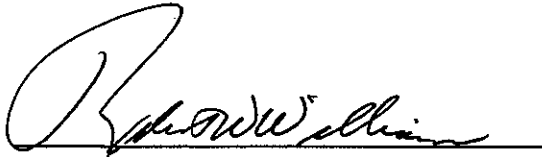
This decision is subject to appeal pursuant to 36 CFR Part 217. A copy of the Notice of Appeal must be in writing and must be submitted to:

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

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

CONTACT PERSON

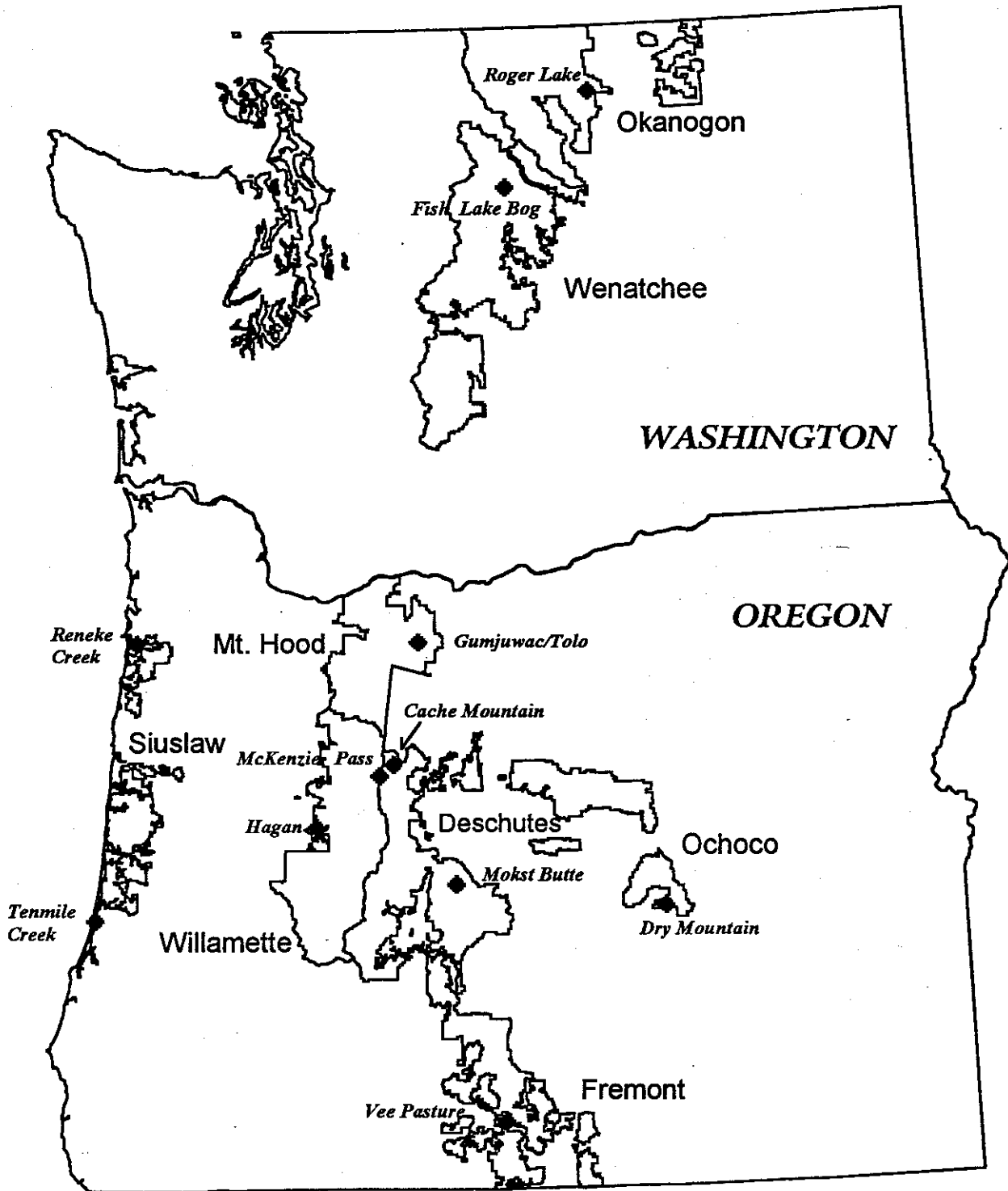
For further information regarding this decision contact Sarah Greene,
RNA Coordinator, Pacific Northwest Research Station, 3200 S.W. Jefferson
Way, Corvallis, Oregon 97331, Phone 541-750-7360.



ROBERT W. WILLIAMS
Regional Forester

6/9/97
Date

Research Natural Area Locations



50 0 50 Miles



ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

ENVIRONMENTAL ASSESSMENT

Pacific Northwest Region
USDA Forest Service
Oregon and Washington

Lead Agency:

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

Responsible Official:

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

Prepared by:

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

Abstract:

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

ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

USDA FOREST SERVICE PACIFIC NORTHWEST REGION OREGON AND WASHINGTON

ENVIRONMENTAL ASSESSMENT

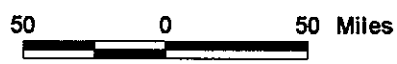
Proposed Action

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

Table 1: Research Natural Area Locations

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

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

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

Public Involvement

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

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

Alternatives and Environmental Consequences

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

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

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

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

Table 3: Land Management Plan References

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

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

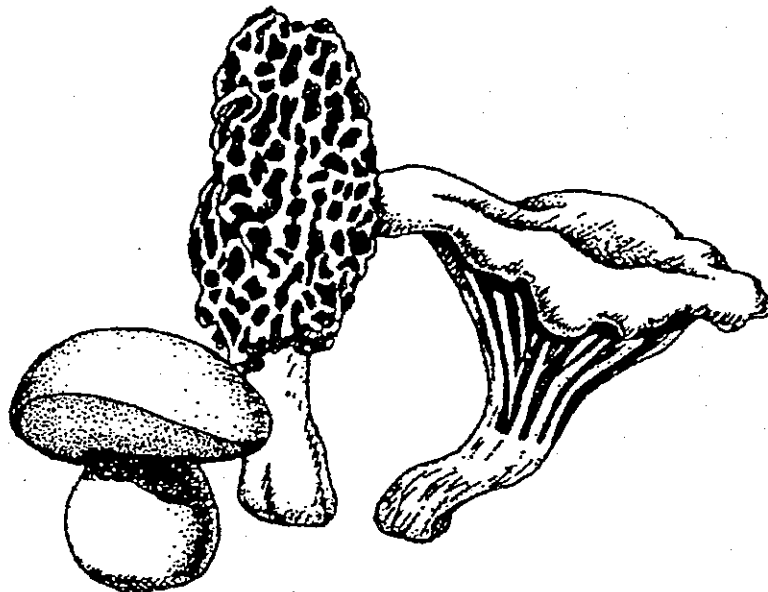
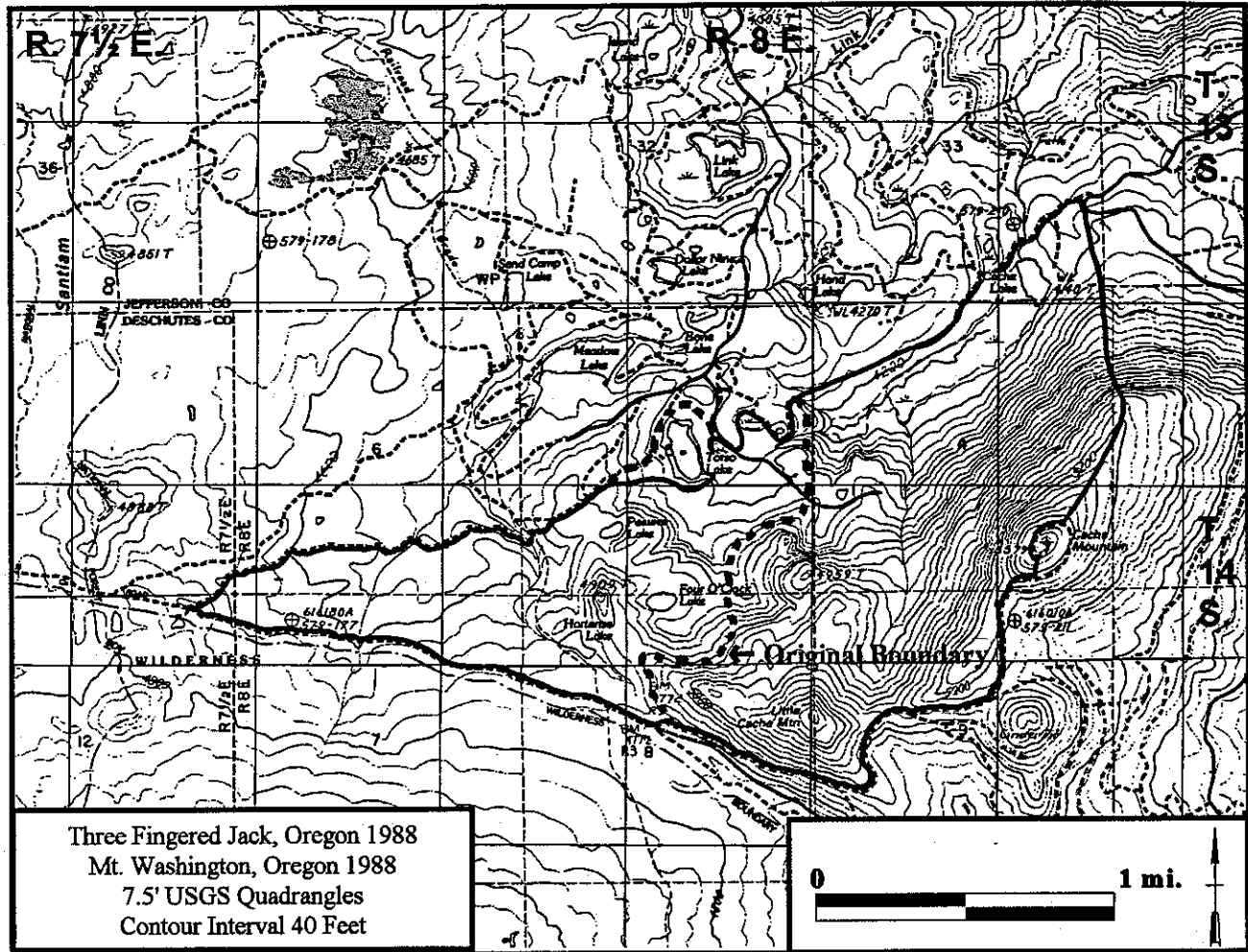


Figure 2: Cache Mountain RNA



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

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

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

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

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

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

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

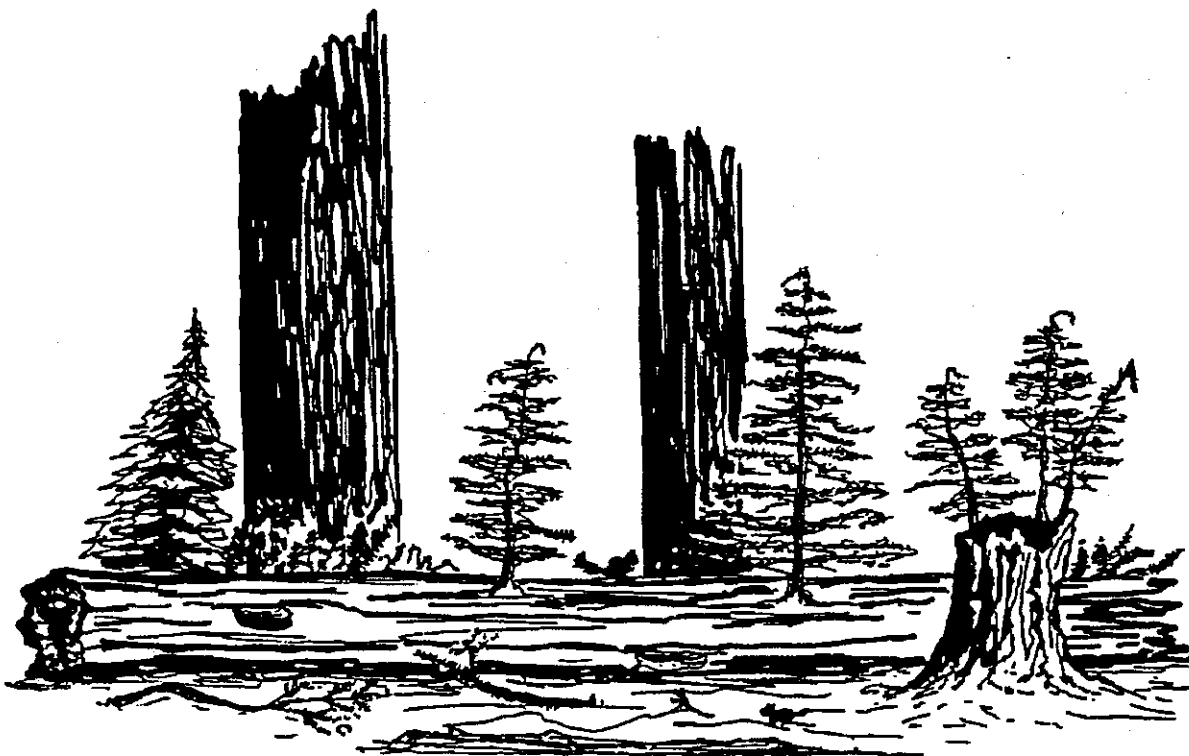
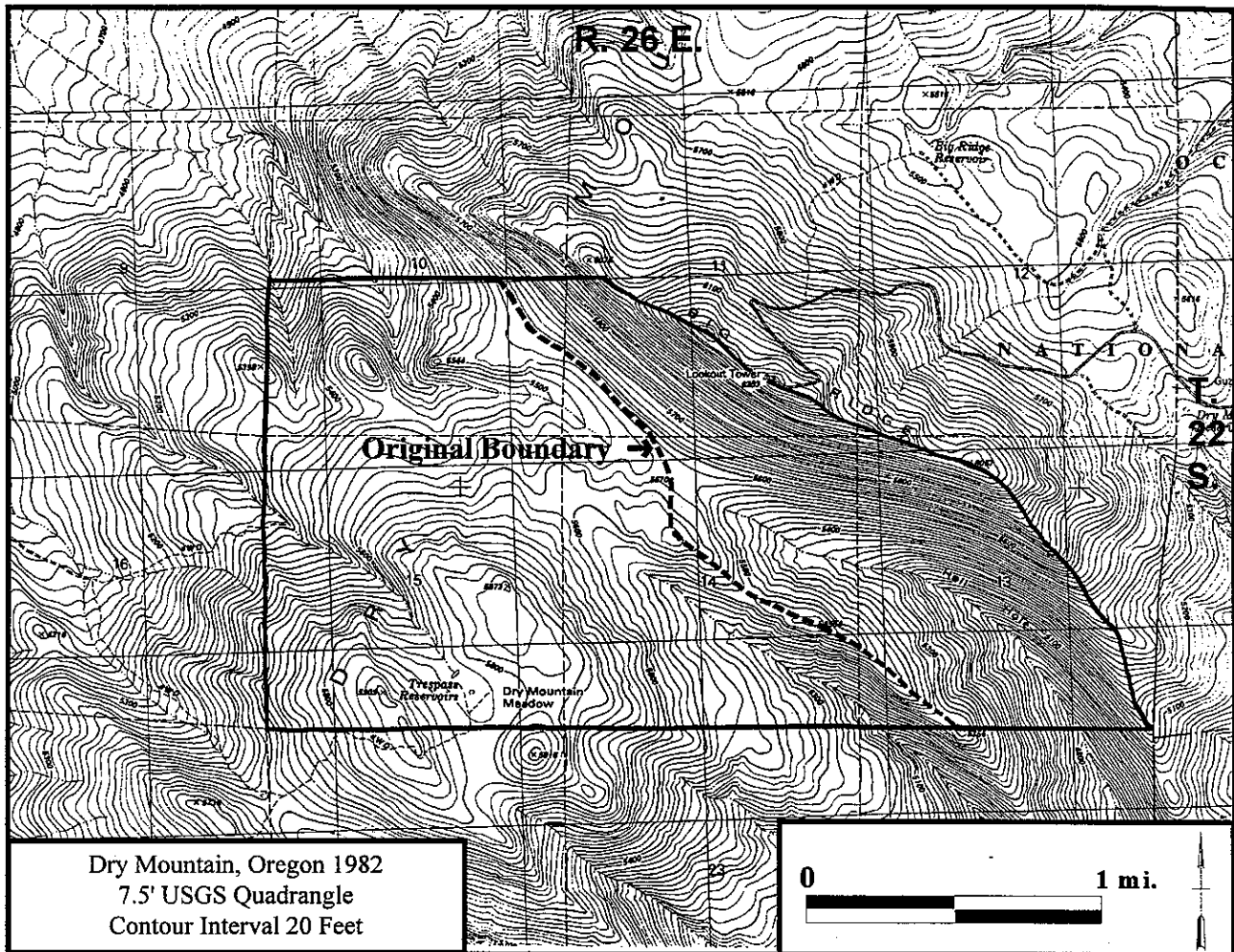


Figure 3: Dry Mountain RNA



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

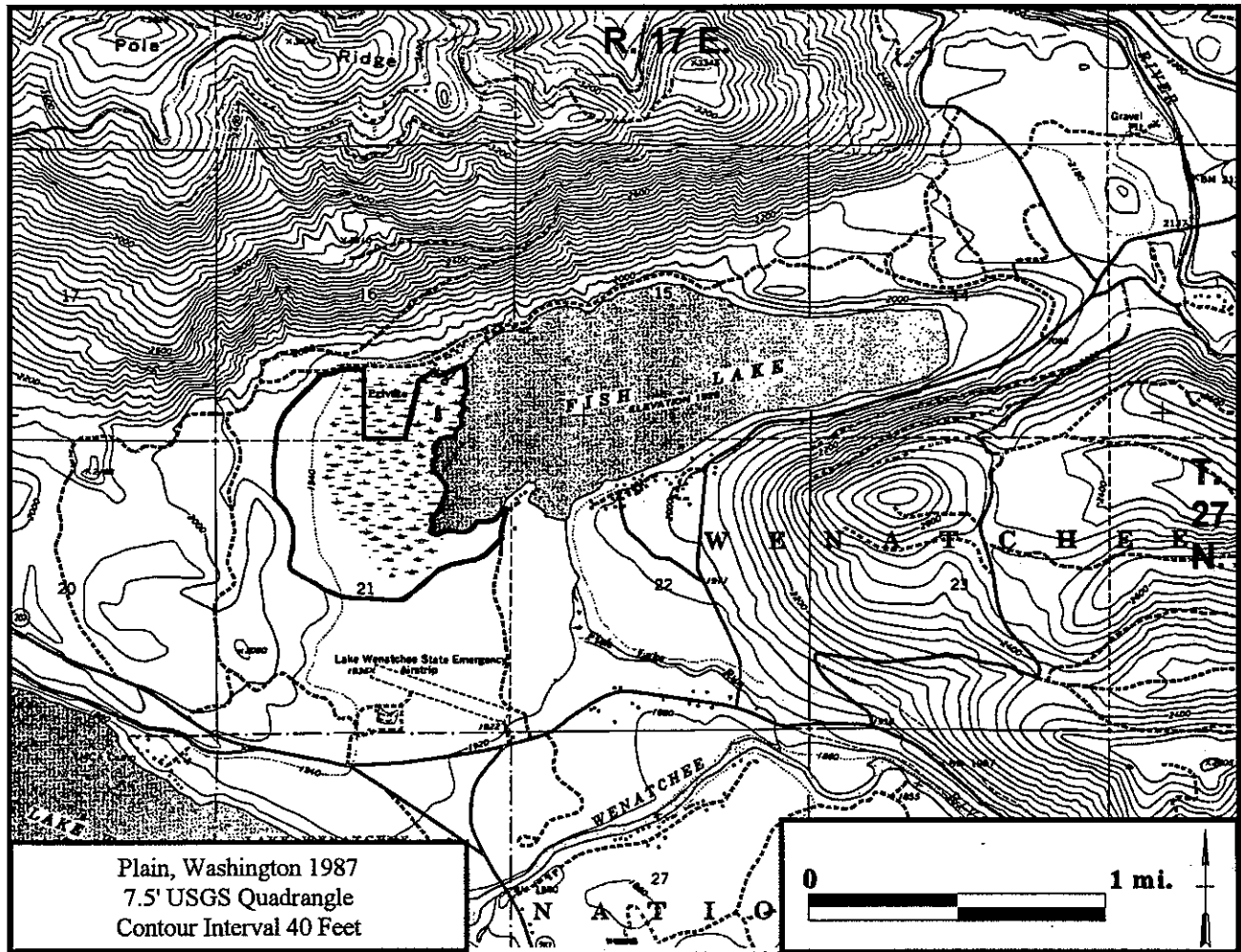
Mineral Resources: There are no reported hardrock mining claims in the RNA. The geology of the area does not lend itself to valuable mineral claims. Salable minerals, such as gravel, are potentially available on the RNA but recovery of these resources would be difficult due to the limited access to the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

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

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

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

Figure 4: Fish Lake Bog RNA



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

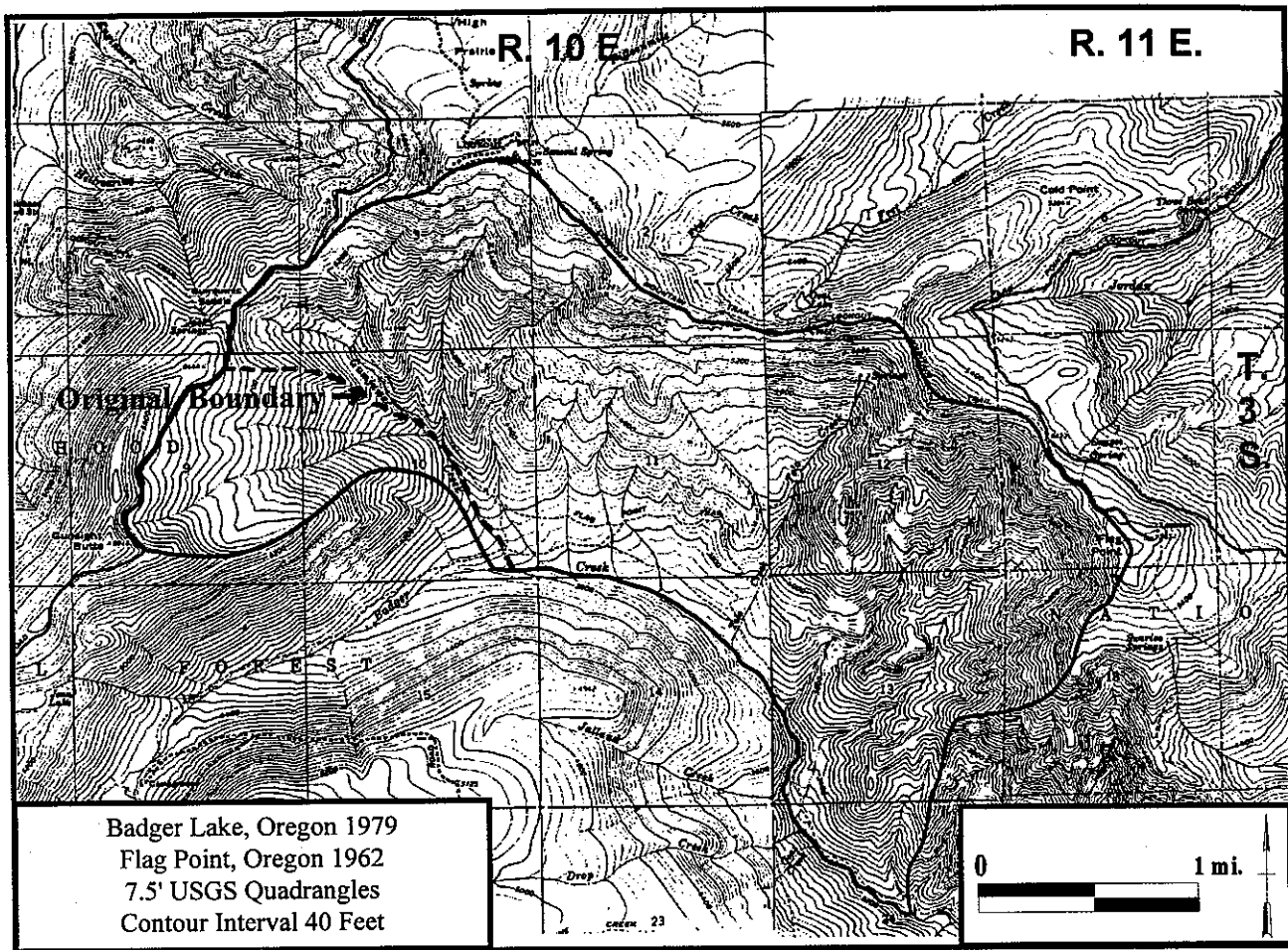
Grazing: There is no grazing allotment or potential for grazing associated with this RNA.

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

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

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

Figure 5: Gumjuwac/Tolo RNA



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

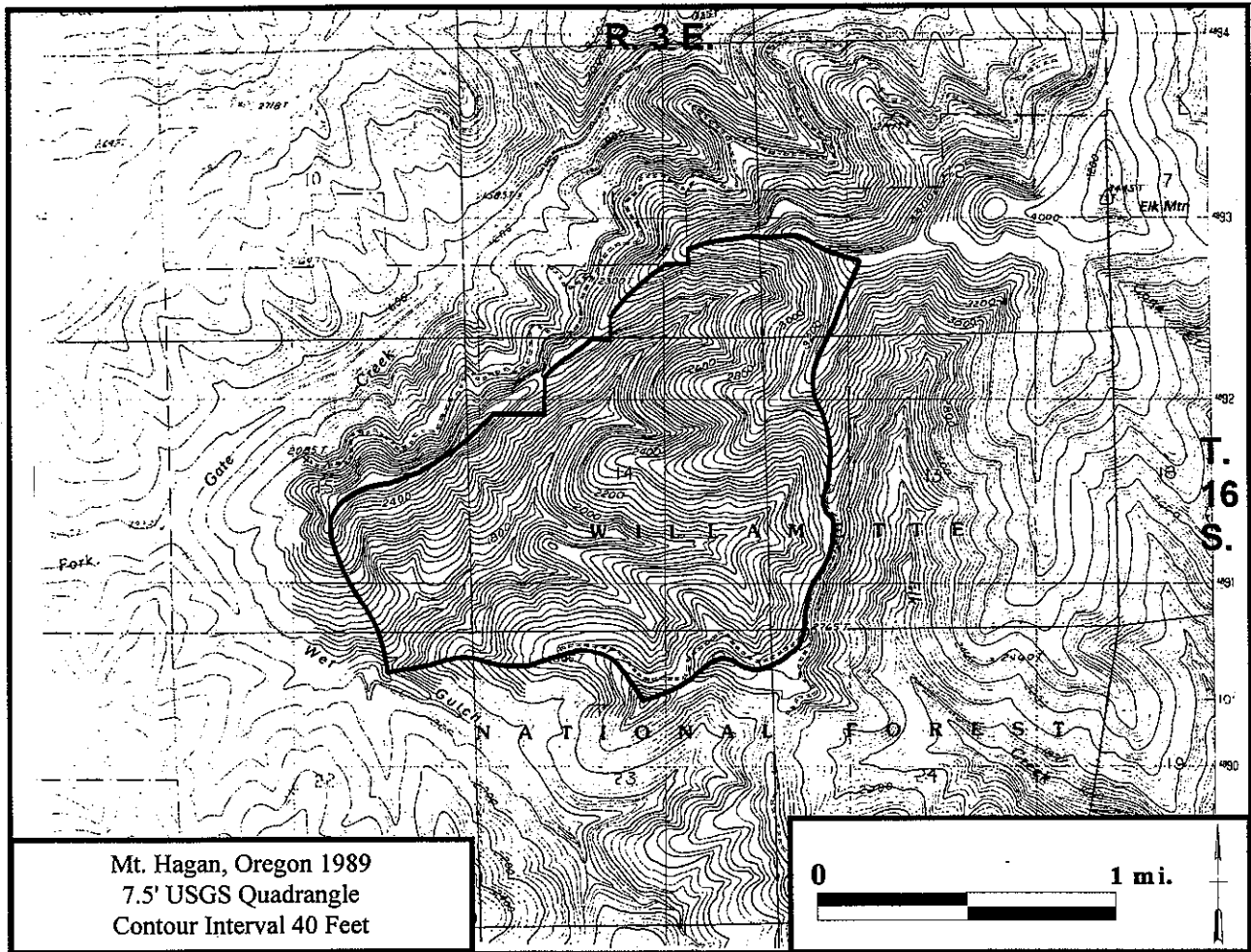
Mineral Resources: This area is considered to have low to very low potential for economic deposits of all minerals except construction rock. The RNA has already been withdrawn from future locatable mineral entry in conjunction with designation of the wilderness.

Grazing: No grazing allotments currently exist within the area.

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

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

Figure 6: Hagan RNA



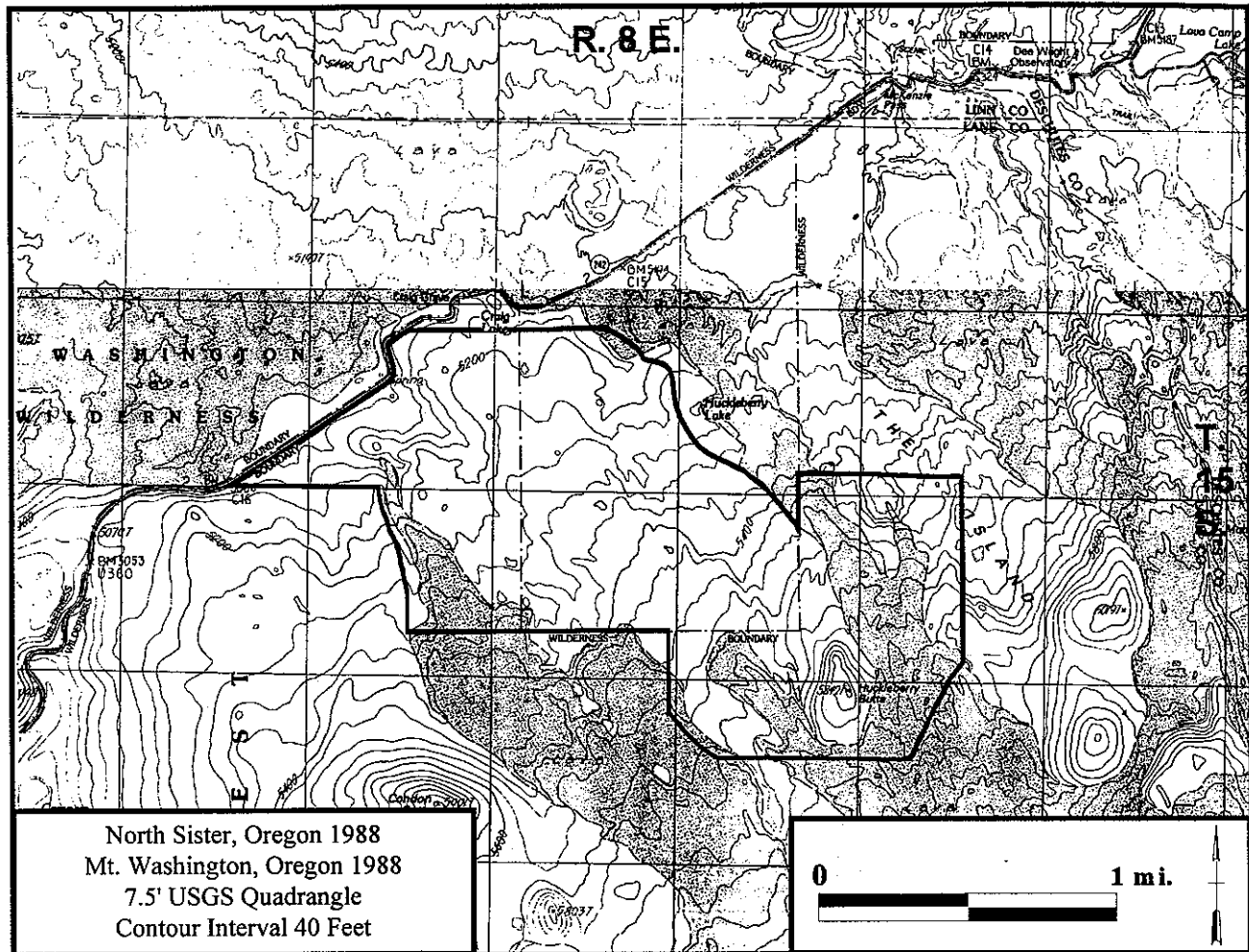
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

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

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

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

Figure 7: McKenzie Pass RNA



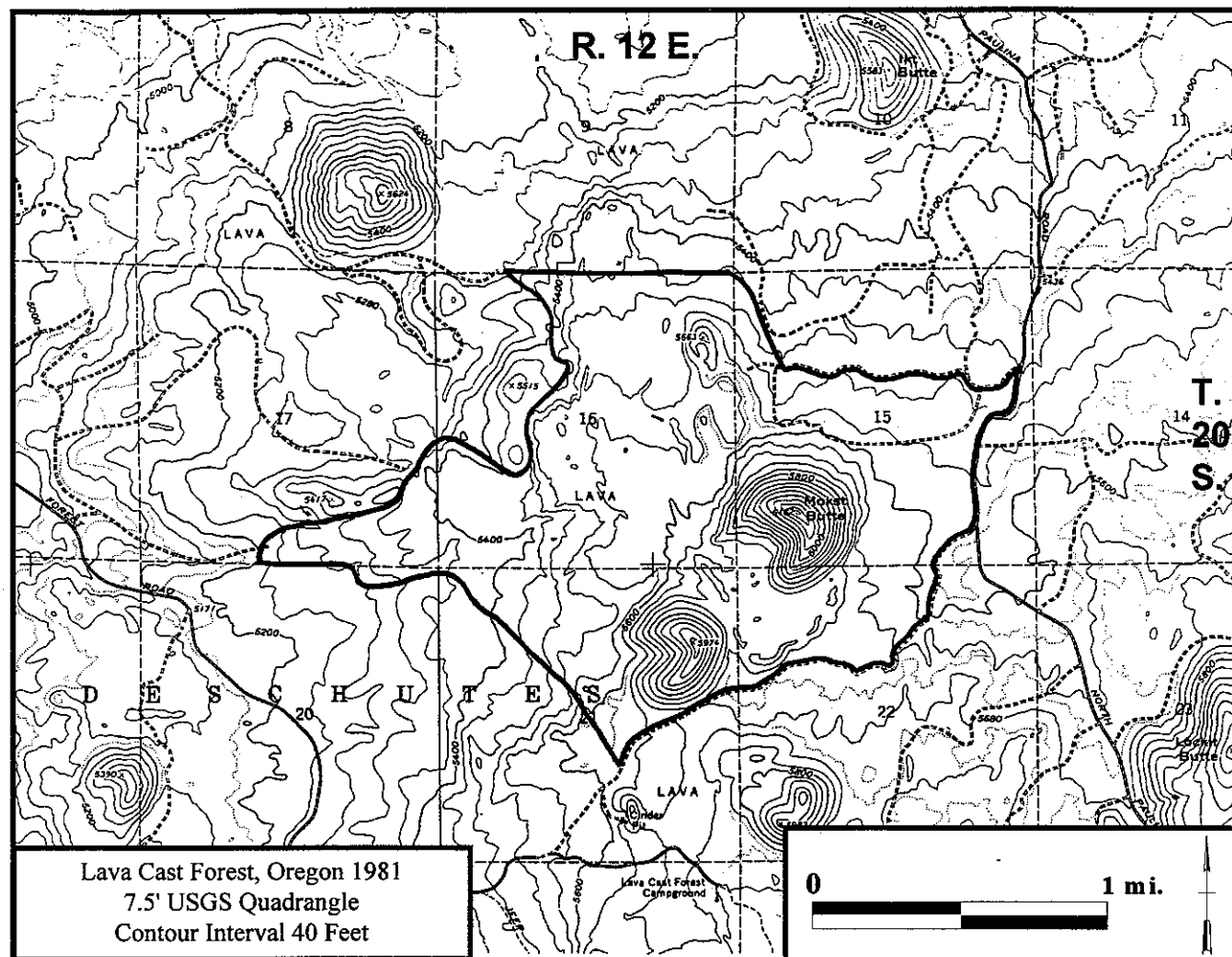
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

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

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

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

Figure 8: Mokst Butte RNA



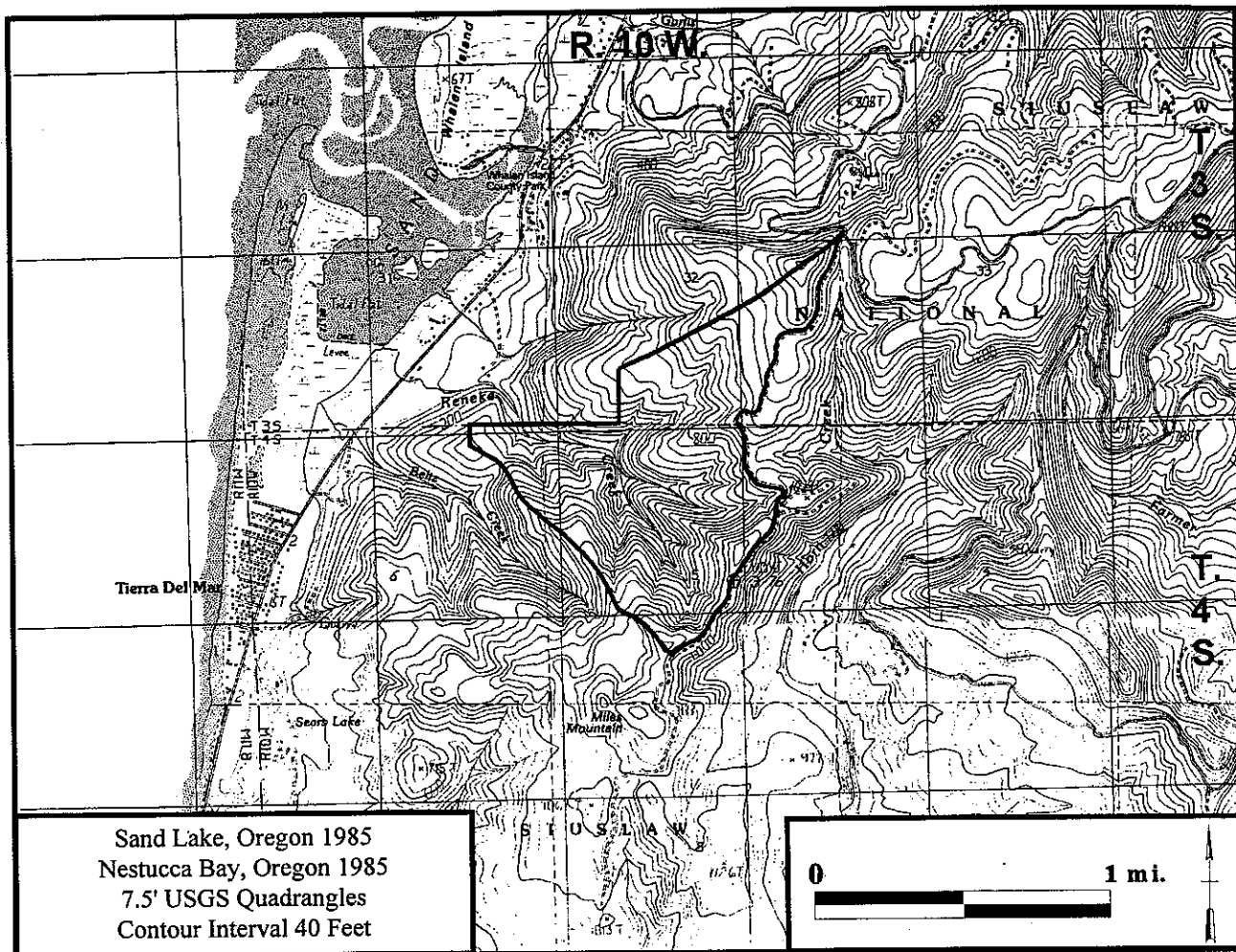
Mineral Resources: The State of Oregon has a mineral reservation covering 480 acres in section 16 of the RNA. The area is also withdrawn from mineral entry under the Newberry Crater National Volcanic Monument enabling legislation.

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

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

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

Figure 9: Reneke Creek RNA



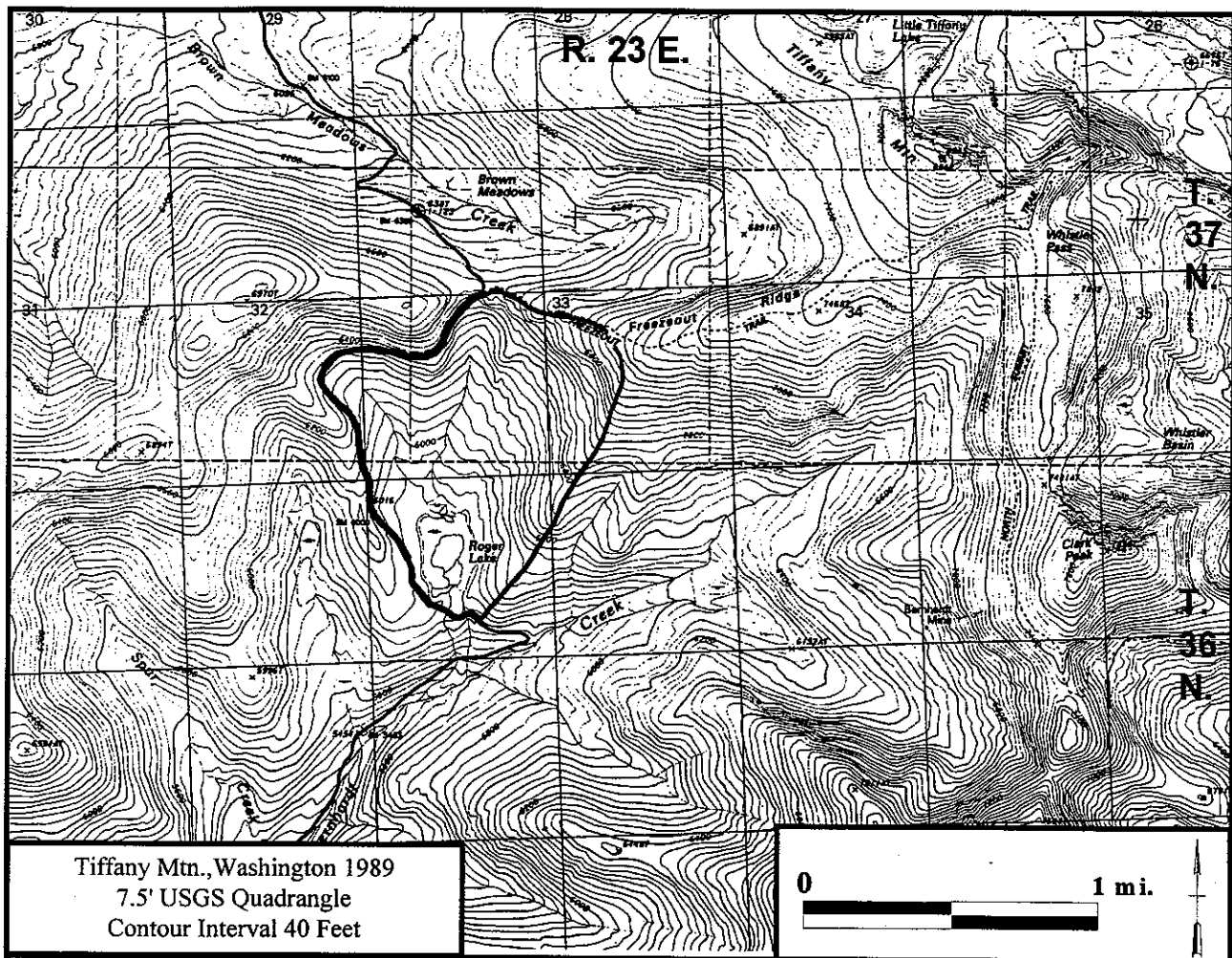
Mineral Resources: There are no known mineral resources in the RNA.

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

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

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

Figure 10: Roger Lake RNA



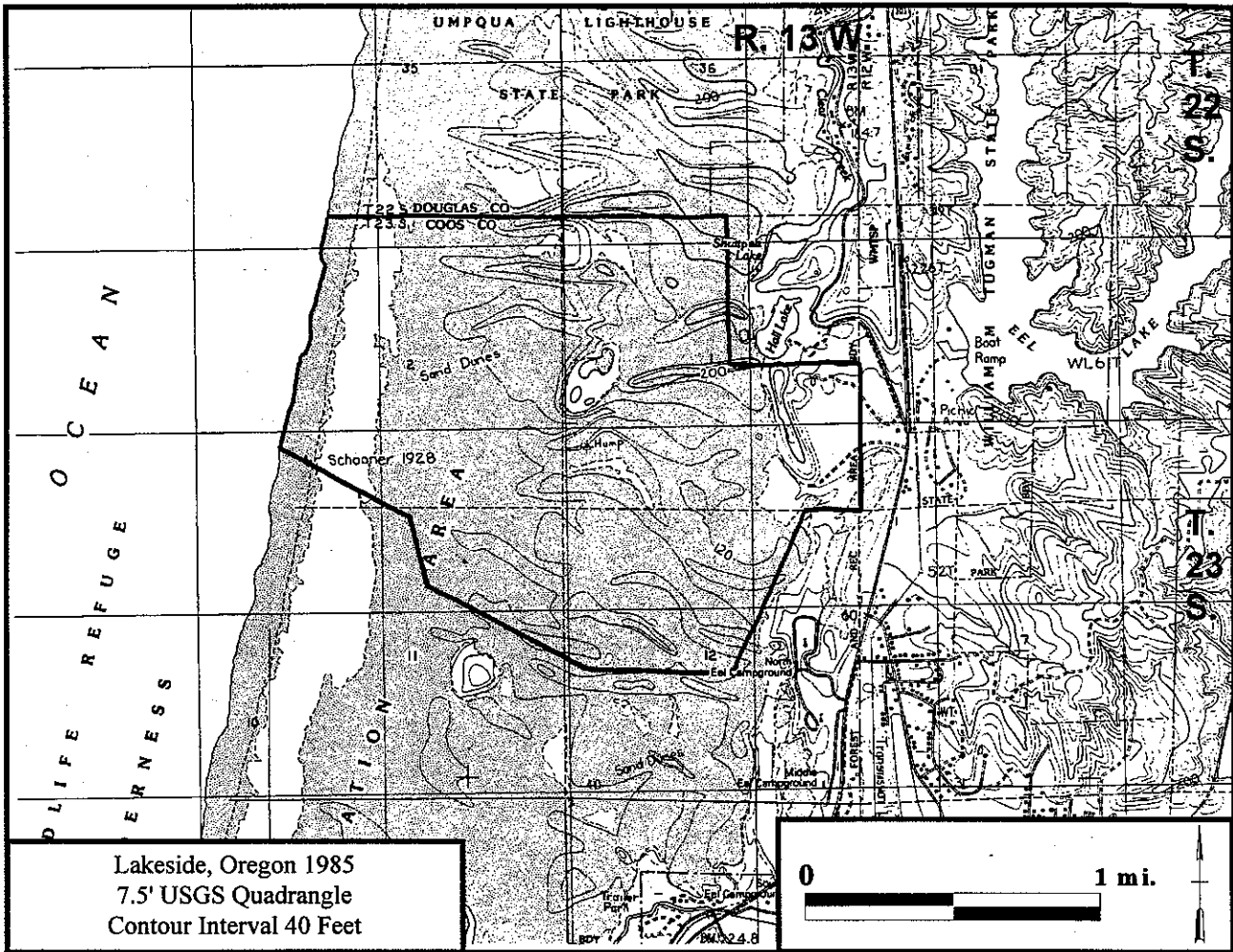
Mineral Resources: There are no known mineral resources in the RNA.

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

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

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

Figure 11: Tenmile Creek RNA



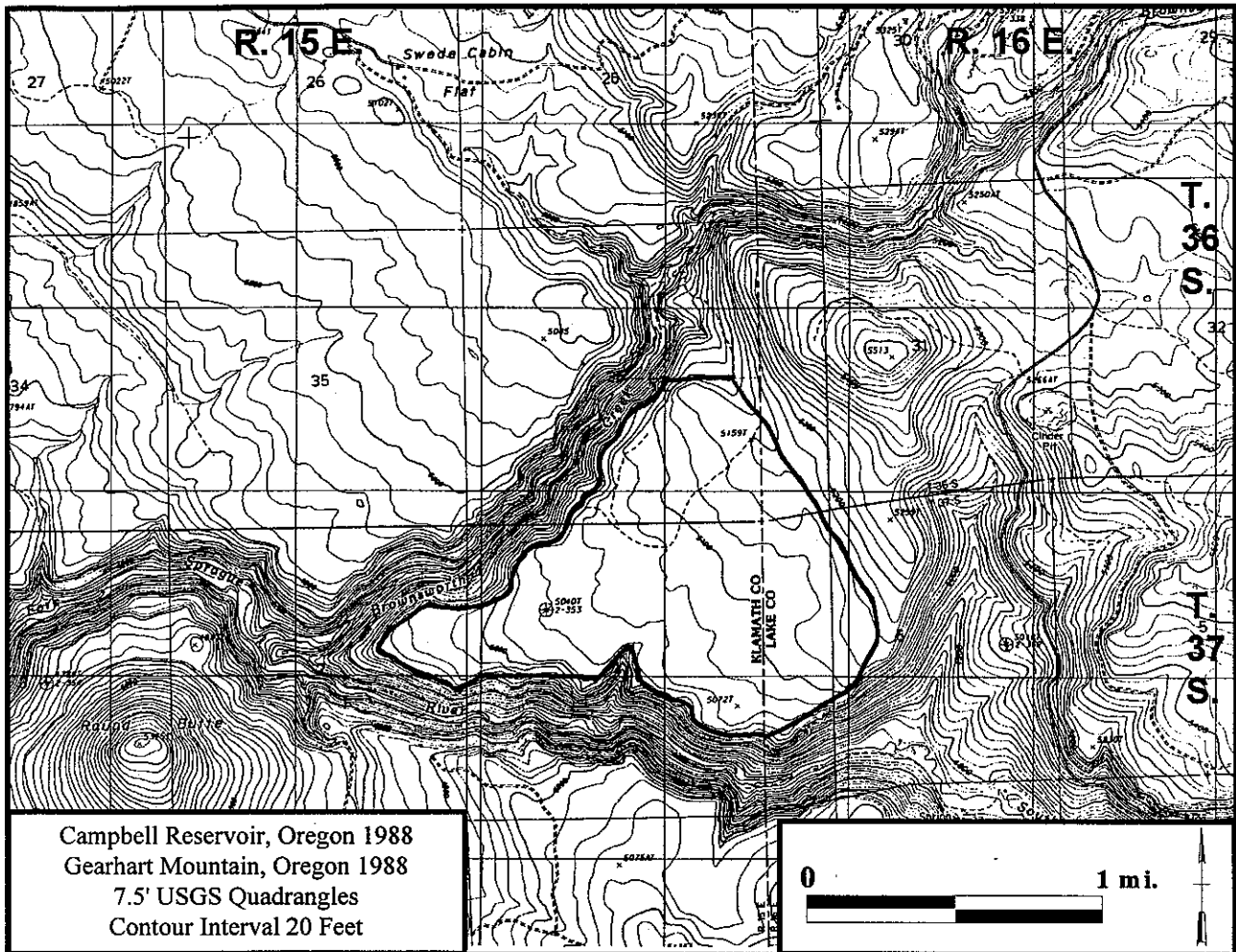
Mineral Resources: This area has been withdrawn from mineral entry as part of the Oregon Dunes National Recreation Area.

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

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

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

Figure 12: Vee Pasture RNA

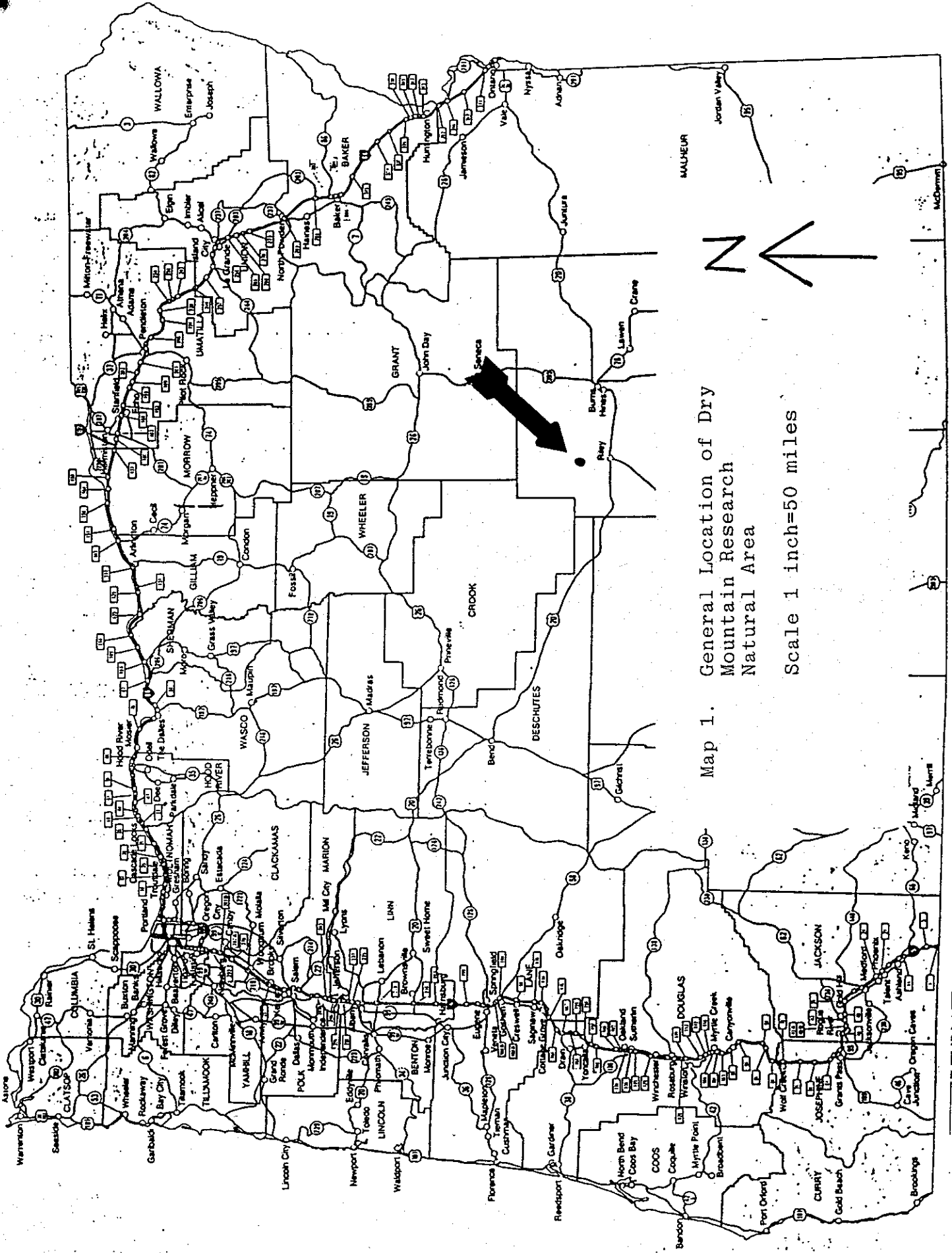


Mineral Resources: There are no known mineral resources in this RNA.

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

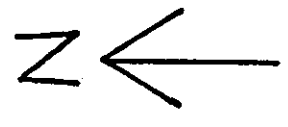
Timber: This RNA is covered with grasslands therefore, establishment will have no effect on timber outputs.

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



Map 1. General Location of Dry Mountain Research Natural Area

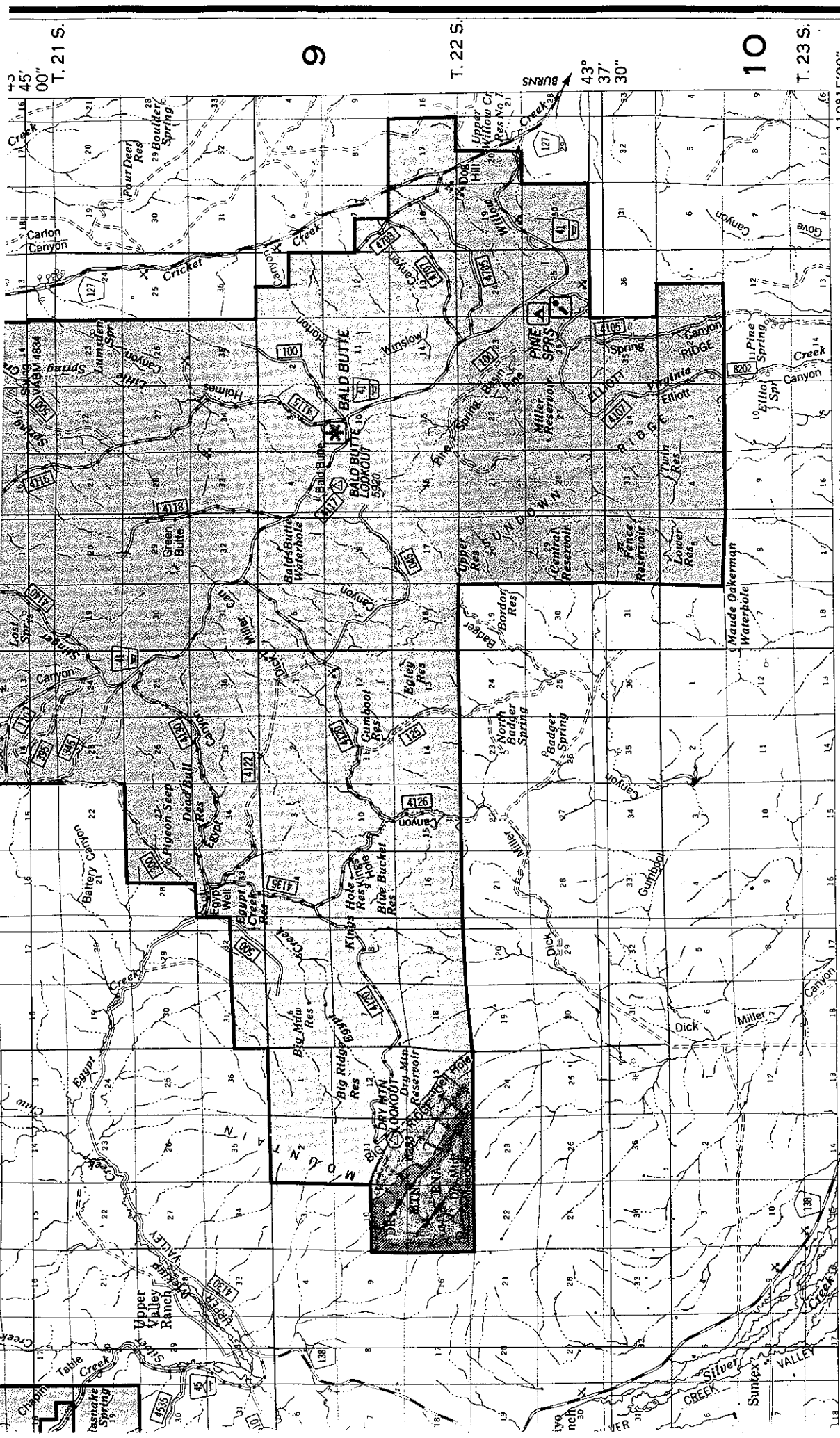
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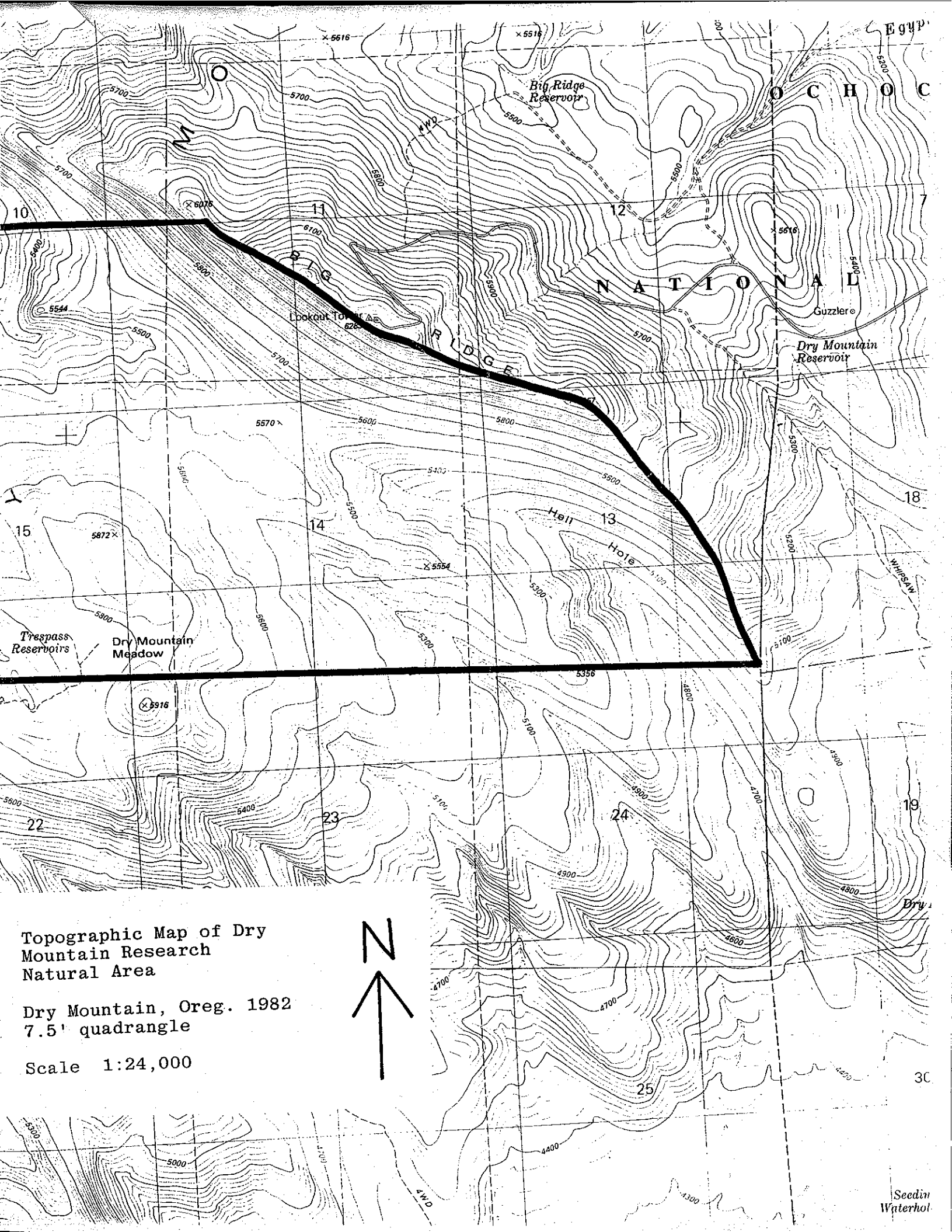


Map 2. Specific Location of Dry Mountain Research Natural Area
 Ochoco National Forest Recreation Map, 1977.

Scale 1 inch=2 miles



119°37'30" R. 26 E. 119°30'00" R. 27 E. 119°22'30" R. 28 E. 119°15'00" R. 29 E.
 1927 North American datum

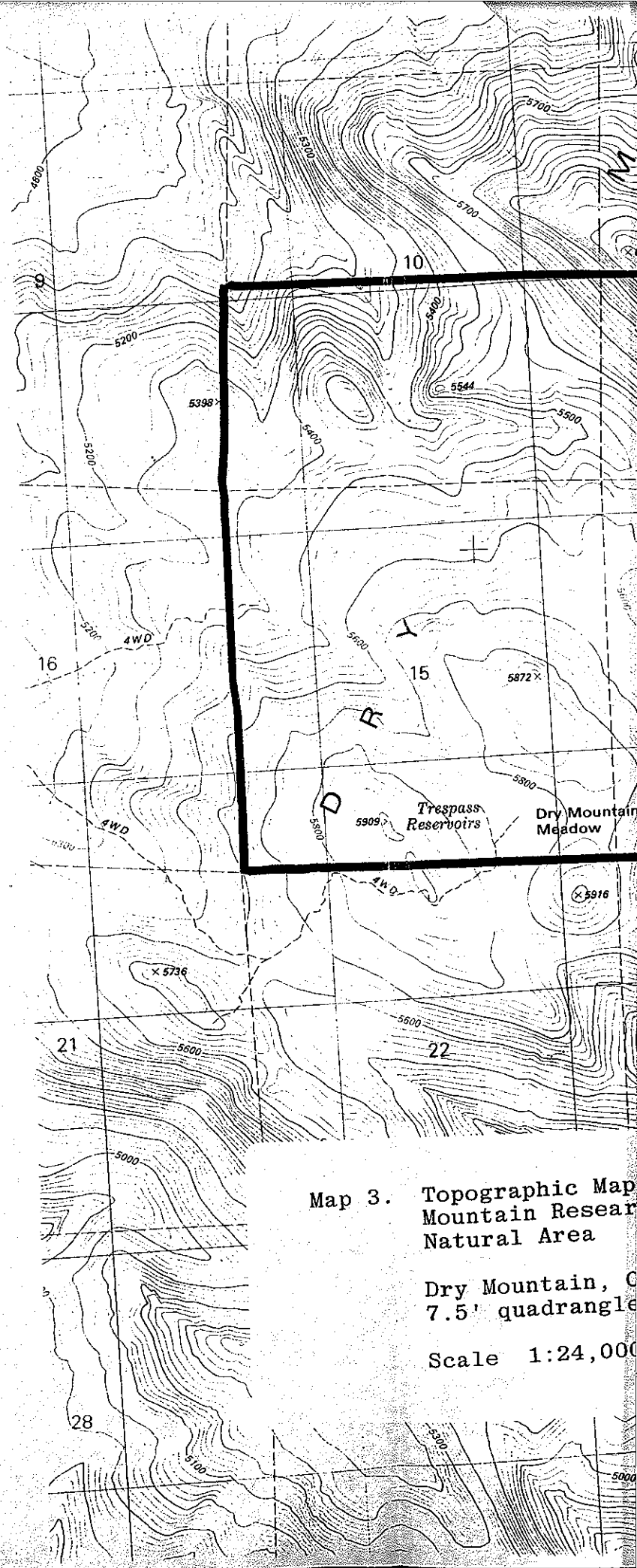


Topographic Map of Dry Mountain Research Natural Area

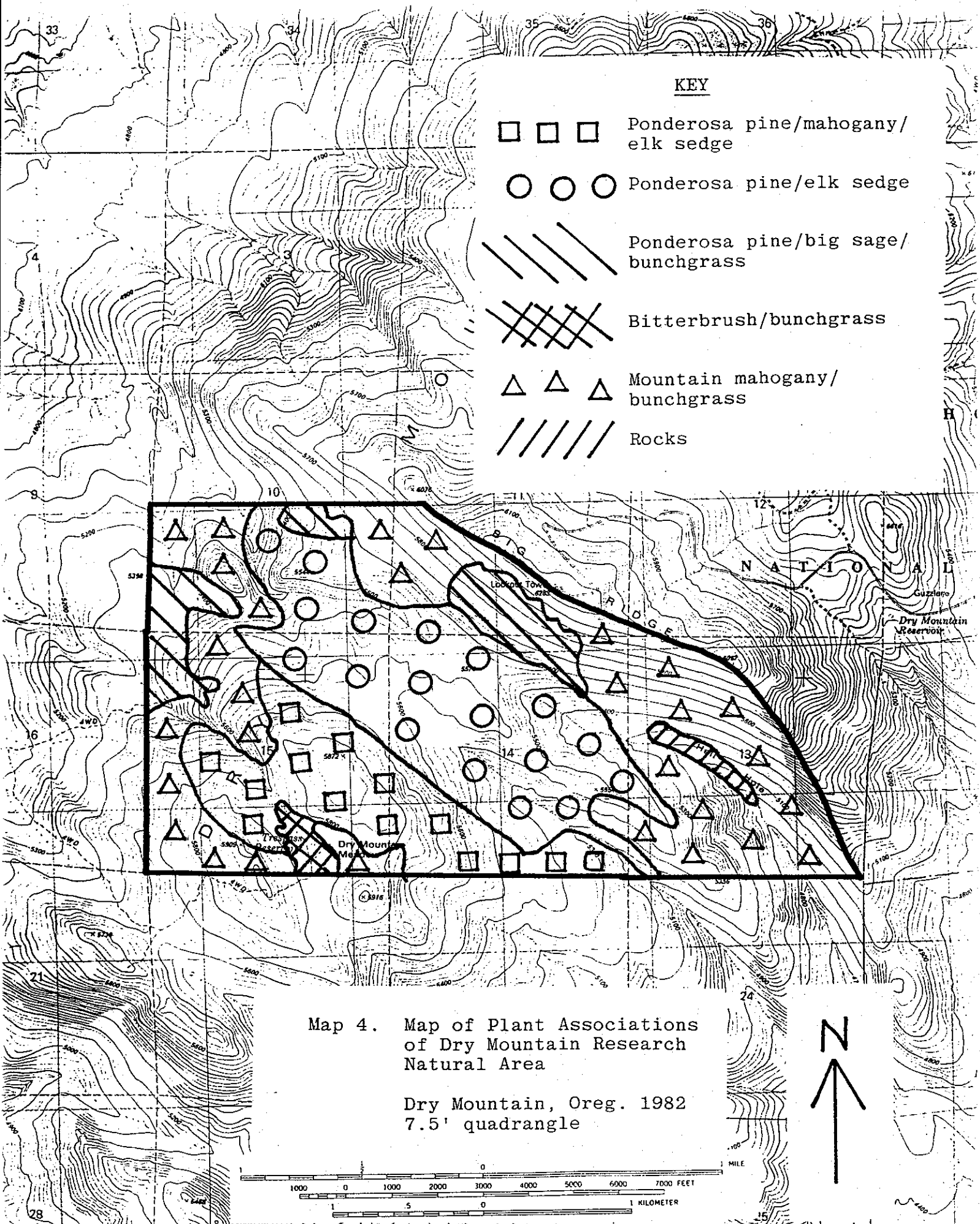
Dry Mountain, Oreg. 1982
7.5' quadrangle

Scale 1:24,000



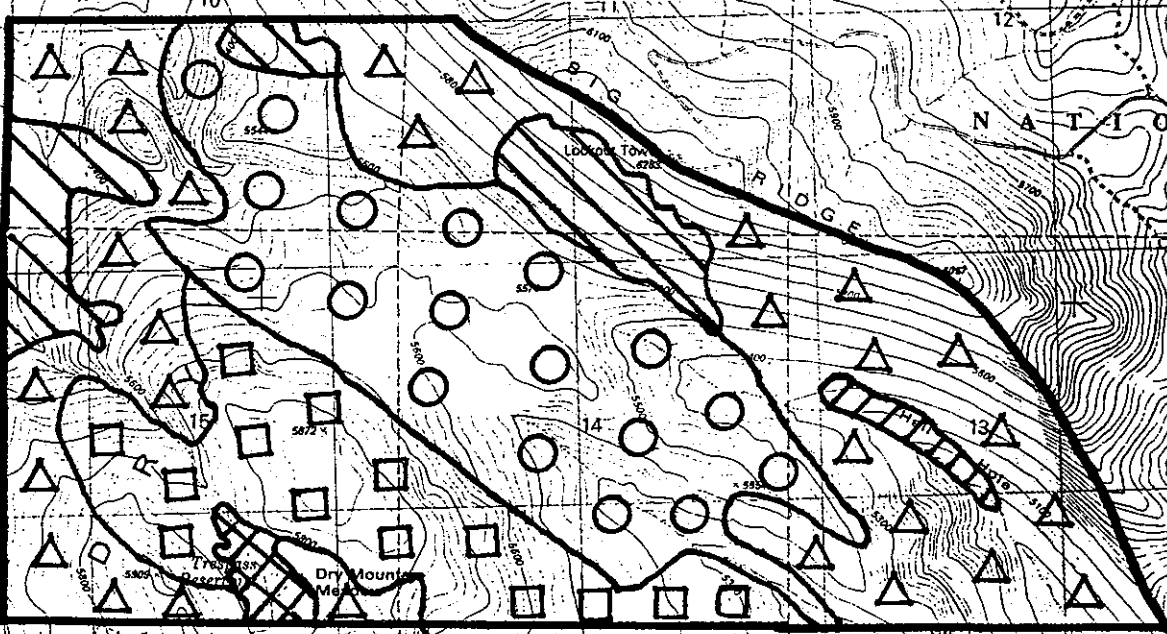


Map 3. Topographic Map
Mountain Research
Natural Area
Dry Mountain, O
7.5' quadrangle
Scale 1:24,000



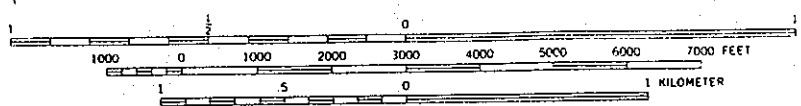
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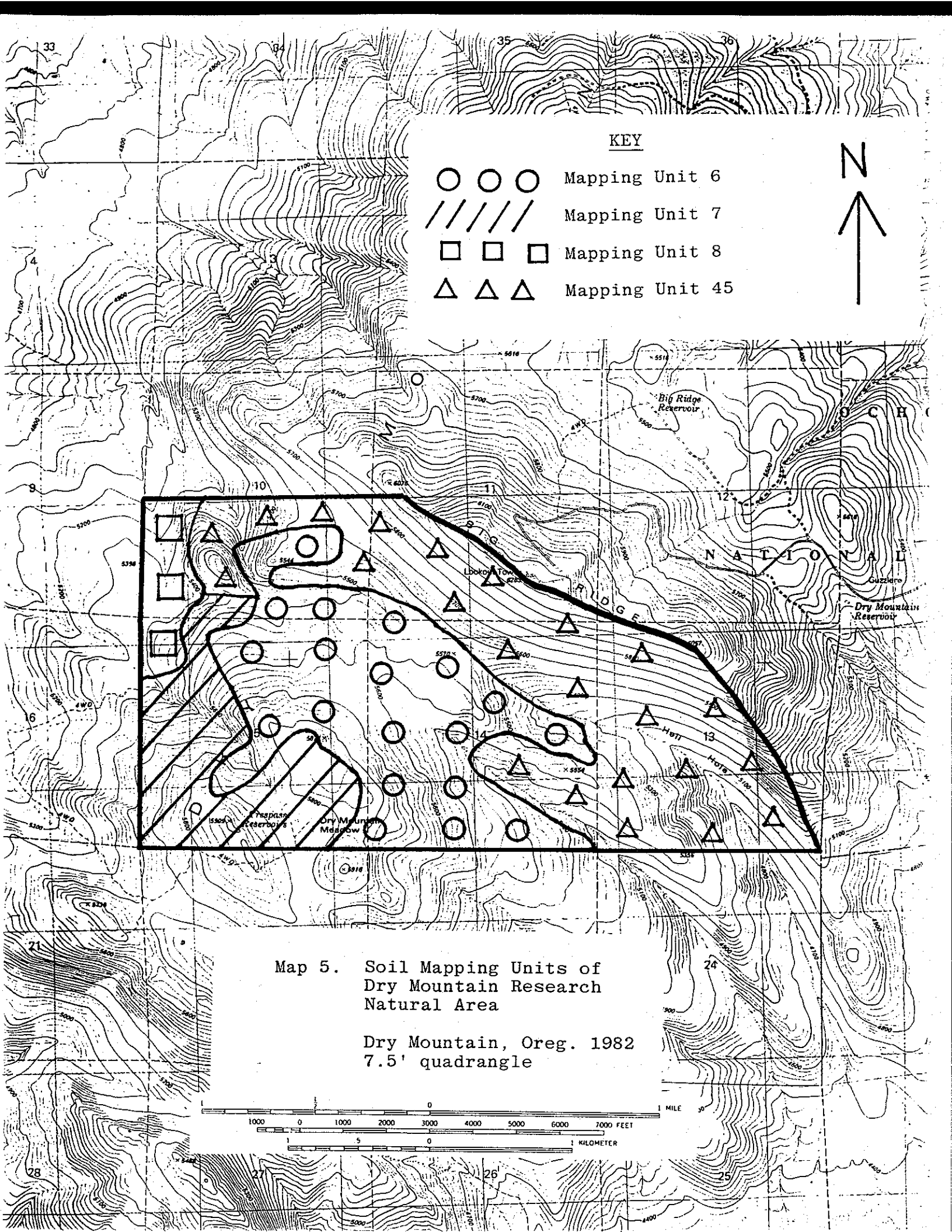
- □ □ Ponderosa pine/mahogany/
elk sedge
- ○ ○ Ponderosa pine/elk sedge
- /// Ponderosa pine/big sage/
bunchgrass
- XXXX Bitterbrush/bunchgrass
- △ △ △ Mountain mahogany/
bunchgrass
- //// Rocks



Map 4. Map of Plant Associations
of Dry Mountain Research
Natural Area

Dry Mountain, Oreg. 1982
7.5' quadrangle





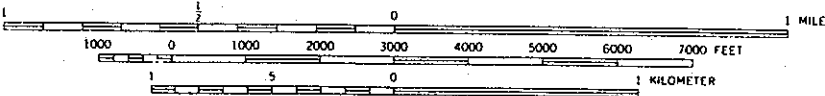
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- ○ ○ Mapping Unit 6
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- □ □ Mapping Unit 8
- △ △ △ Mapping Unit 45

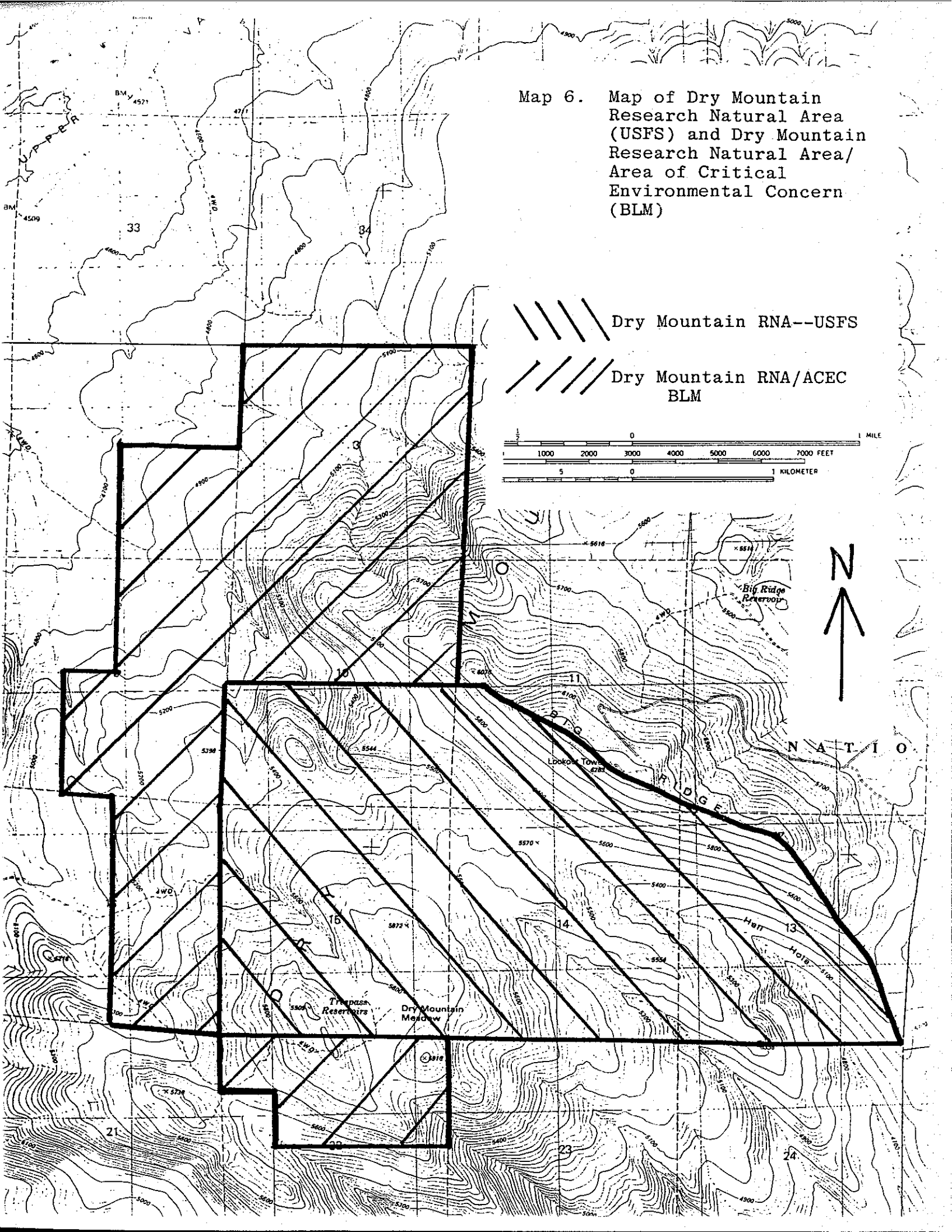


Map 5. Soil Mapping Units of
Dry Mountain Research
Natural Area

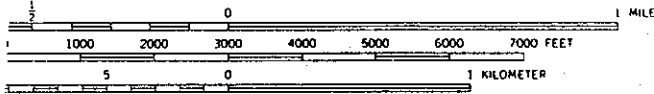
Dry Mountain, Oreg. 1982
7.5' quadrangle



Map 6. Map of Dry Mountain Research Natural Area (USFS) and Dry Mountain Research Natural Area/Area of Critical Environmental Concern (BLM)



/// Dry Mountain RNA--USFS
/ / / / Dry Mountain RNA/ACEC
BLM



N A T I O