

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Establishment Record

For

MOSKI BUTTE RESEARCH NATURAL AREA

Deschutes National Forest

Deschutes County, Oregon



SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Mokst Butte Research Natural Area

Deschutes National Forest

Deschutes County, Oregon

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Date 12-9-96

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Date 12-12-96

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Date 12-30-96

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Date 5/1/97

TITLE PAGE

**Establishment Record for
Mokst Butte Research Natural Area
within Deschutes National Forest
Deschutes County, Oregon**

ESTABLISHMENT RECORD FOR
MOKST BUTTE RESEARCH NATURAL AREA
WITHIN DESCHUTES NATIONAL FOREST
DESCHUTES COUNTY, OREGON

INTRODUCTION

Mokst Butte Research Natural Area (RNA) is in the East Cascades pumice zone of Oregon and consists of two prominent volcanic cinder cones surrounded by recent lava flows and pumice deposits. One of the cones pre-dates the eruption of Mt. Mazama which occurred about 7600 years ago. The other cone, Mokst Butte, is of more recent origin. The area is covered by a ponderosa pine (Pinus ponderosa)¹, lodgepole pine (Pinus contorta), and white fir (Abies concolor) forest.

Land Management Planning

Mokst Butte RNA was proposed as a candidate RNA by the Deschutes National Forest to meet an unfilled natural area cell need for an undisturbed forested cinder cone, in the white fir zone which pre-dates the eruption of Mt. Mazama (Oregon Natural Heritage Advisory Council 1988)². It was included as a candidate RNA in the FEIS for the Deschutes National Forest (USDA Forest Service 1990a), in the Forest Plan (USDA Forest Service 1990b) and in the Record of Decision (USDA Forest Service 1990c). The area was included in the newly established Newberry National Volcanic Monument which continues to be managed by the U.S. Forest Service.

Mokst Butte includes the following RNA cell need (or element) in the East Slope Oregon Cascades Physiographic Province as identified by the Oregon Natural Heritage Advisory Council (1993): entire undisturbed forested cinder cone, in white fir zone; pre-Mazama. The site also contains a representative example of cinder cones, which are a unique geologic feature.

Mokst Butte lies entirely within the Newberry National Volcanic Monument boundaries. Management direction provided by this Establishment Record will be incorporated into the Monument Plan (USDA Forest Service 1994).

OBJECTIVE

The objective of the Mokst Butte RNA is to preserve in an undisturbed (by humans) condition the forested cinder cones and associated adjacent lava flows of the RNA. The RNA will serve as a reference area for study, as a baseline area for determining long-term ecological changes, and as a monitoring area to determine effects of management techniques and practices applied to similar ecosystems.

¹ Nomenclature for vascular plants follows Hitchcock and Cronquist (1973).

² Author's names in parentheses refer to references cited.

JUSTIFICATION

Mokst Butte RNA was selected originally to meet an unfilled RNA cell need for an entire undisturbed forested cinder cone, in the white fir zone which pre-dates the eruption of Mt. Mazama (about 7600 years ago). The site also contains a cinder cone which originated after the Mazama eruption and was the source of lava flows which covered much of the site. Of special interest are the remnant pockets of Mazama ash deposits that are intermixed with the more recent lava flows. Forest community types are diverse at the site, varying with elevation, aspect, geology, and soils.

PRINCIPAL DISTINGUISHING FEATURES

Mokst Butte RNA contains the following principal features:

1. Forested cinder cone, in white fir zone; pre-Mazama. Mokst Butte RNA contains a high quality example of a forested cinder cone whose origins pre-date the eruption of Mt. Mazama which occurred about 7600 years ago. This unnamed cone is located on the southern border of the RNA (Map 3) and covers approximately 90 acres (37 ha.). The cone rises 400 feet (122 m.) above the surrounding lava flow with slopes as steep as 45%, and is covered with a paleosol and about 2 feet (0.6 m.) of Mazama ash. Ponderosa pine dominated forests are found on the south slopes of the unnamed cone while white fir forests are dominant on the north slopes. Prominent shrubs in the understory include bitterbrush (Purshia tridentata) and snowbrush (Ceanothus velutinus).
2. Mazama ash. The cataclysmic eruption of Mt. Mazama produced an approximately 2-foot (0.6 m.) thick deposit of rhyolite air-fall ash over the entire Mokst Butte RNA. Subsequent local basaltic eruptions produced Mokst Butte, air-fall ash, and lava flows which buried the Mazama ash. The unnamed cinder cone along the southern border of the RNA and the area west of it is the largest area still covered by Mazama ash. The large kipuka (island of older rock surrounded by younger lavas) west of Mokst Butte is also covered with Mazama ash. The Mazama ash deposits support ponderosa pine and mixed conifer forests.
3. Graben; post-Mazama. Between Mokst Butte and the spatter cone chain is a fault bounded basin (graben). The floor of the basin is about 1000 feet (300 m.) long and 500 feet (150 m.) wide. The south end of the graben disappears beneath Mokst Butte and the north end is filled by the spatter cone chain.
4. Forested cinder cone, in white fir zone; post-Mazama. A second prominent cinder cone within the Mokst Butte RNA formed after the eruption of Mt. Mazama. This cone, Mokst Butte (Map 3), originated approximately 7000 years ago during a series of eruptive phases which also produced the lava flows which cover a large area of the RNA. Mokst Butte rises 550 feet (168 m.) above the surrounding terrain to an elevation of 6162 feet (1879 m.) with slopes as steep as 60%. The south and west slopes of Mokst Butte are dominated by sparse ponderosa pine forests while the northern slopes are covered by mixed conifer forests of ponderosa pine and white fir.

5. Forested cinder/spatter cone chain, in white fir zone; post- Mazama. To the NNW of Mokst Butte is a 2500 foot (760 m.) long alignment of cinder/spatter cones, which originated early in the Mokst Butte eruptive sequence, approximately 7000 years ago. The cones rise up to 150 feet (46 m.) above the surrounding terrain to an elevation of 5663 feet (1727 m.).

6. Recent lava flows. Mokst Butte RNA is covered by several lava flows of similar ages but different surface morphology. The youngest appearing flow is located to the southeast of Mokst Butte. It is very blocky, free of ash or cinders and has only sparse vegetative cover. The remaining recent lava flows have a rubbly surface with more fine material including ash and cinders from the eruptions of Mokst Butte. These flows are characterized by ponderosa pine and lodgepole pine forests with shrubs being the dominant form of vegetation. Prominent shrubs include gland oceanspray (Holodiscus dumosus), squaw currant (Ribes cereum), Davidson's penstemon (Penstemon davidsonii), and mountain juniper (Juniperus communis).

7. Mokst Butte ash deposits. South and west winds blowing during eruptions of Mokst Butte spread ash to the north and east of the butte. The area north of Mokst Butte is underlain by early lava flows from Mokst Butte which were deeply buried by ash and cinders from later phases of the Mokst Butte eruption.

LOCATION

Maps 1, 2, and 3 show the location of Mokst Butte RNA. The RNA is located in the Fort Rock Ranger District of the Deschutes National Forest. The center of the RNA is at latitude 43° 50' 15" north and longitude 121° 17' 30" west. The 1250 acre (506 ha.) site lies within Sections 15-17, 20-22 Township 20 South, Range 12 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 Lava Cast Forest, Oreg. 1963.

The boundary for Mokst Butte Research Natural Area as proposed by Forest Plan was agreed upon by Forest/District personnel; and begins at the northeast corner of section 16, Township 20 South, Range 12 East, Willamette Meridian. The boundary is based on a digitized State Plane Coordinate, NAD 1927, in the Oregon South Zone, on the aforementioned section corner and has the following values.

Latitude:	43°50'52.2" North
Longitude:	121°17'10.1" West

X-Coord. (Easting):	1,792,609 feet
Y-Coord. (Northing):	795,896 feet

Theta (mapping) Angle:	-00°32'16.2"
Scale Factor:	0.999965

The entire boundary was digitized from the Lava Cast Forest 7-1/2 Minute Primary Base Series Quadrangle Map. The narrative legal was written by the Deschutes National Forest Land Surveyor. All pertinent records and maps for future surveys on this administrative boundary will be on file in the Survey Section of Engineering located in the Supervisor's Office.

MOKST BUTTE RESEARCH NATURAL AREA BOUNDARY DESCRIPTION

In the following description, bearings and distances shown are Grid Bearings and Grid Distances based on the Oregon Coordinate System of NAD 1927, South Zone. Where called, Public Land Survey System land boundaries; natural or semi-permanent features; record bearing, distances, and monuments; and X and Y coordinates as described in the narrative DESCRIPTION portion of this document will prevail.

POINT NO.	BEARING	DISTANCE FEET	POINT DESCRIPTION	QUAD SHEET NAME
MOKST BUTTE RESEARCH NATURAL AREA				
1			Beginning at the northeast corner, sec. 16, T. 20 S., R. 12 E., W.M., and a digitized coordinate value 795896 (N), 1792609 (E) with an equivalent value of Latitude 43°50'52.2" North, Longitude 121°17'10.1" West.	Lava Cast Forest Map No. 1
	S24/09/19.8E	2004.90	Thence, southeasterly to;	
2			A point 30 feet westerly of and perpendicular to the centerline of USFS Road No. 9710-490, and 30 feet southerly of and perpendicular to the centerline of USFS Road No. 9710-491.	
3	N84/03/27.7E	94.53	Thence, easterly along a line parallel with said road 30 feet southerly of and perpendicular to the centerline to;	
4	N58/54/32.8E	88.81		
5	N77/47/06.1E	65.51		
6	S77/05/00.4E	199.05		
7	S68/24/27.6E	372.09		
8	S89/51/54.6E	160.04		
	N57/37/18.2E	260.68		

9	S89/51/53.8E	120.03
10	S63/18/18.2E	268.59
11	S81/06/58.1E	263.18
12	S89/51/54.7E	340.07
13	N79/49/17.4E	447.20
14	S77/46/04.4E	286.52
15	N86/02/47.8E	280.74
16	S78/33/09.9E	102.04
17	S39/42/31.5E	156.41
18	S56/11/19.6E	144.38
19	S75/49/38.5E	247.54
20	N78/48/55.3E	101.97
21	N61/02/46.9E	205.85
22	N45/04/32.4E	282.76
23	S89/51/54.0E	60.01

Thence, easterly along a line parallel with said road 30 feet southerly of and perpendicular to the centerline to;

24	A point 30 feet southeasterly of and perpendicular to the centerline of said road and 30 feet westerly of and perpendicular to the centerline of USFS Road 9710-000.	
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25	S17/26/19.3W	174.00
26	S12/02/38.6W	423.42
27	S39/52/22.0W	156.17
28	S72/45/47.8W	335.20
29	S45/04/26.7W	113.10
30	S24/00/38.3W	393.99
	S06/22/58.5W	362.42

Thence, southerly and westerly along a line parallel with said road 30 feet westerly and northerly from and perpendicular to the centerline to;

31	S00/02/42.5W	480.36
32	S05/57/34.1E	382.44
33	S05/14/14.4W	221.04

34	A point 30 westerly of and perpendicular to the centerline of said road, and 30 feet northwesterly of and perpendicular to the centerline of USFS Road 9720-000.	
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	S37/56/10.1W	227.99	Thence, southerly and westerly along a line parallel with said road at 30 feet northwesterly from and perpendicular to the centerline to;
35	S54/32/52.4W	171.99	
36	S76/04/51.8W	82.45	

37	S55/42/24.5W	184.11
38	S43/19/53.8W	186.71

39	S14/04/38.9W	247.48
40	S18/22/17.2E	189.95

41	S08/10/16.8W	141.50
42	S17/16/59.0W	607.47

Thence, southerly and westerly along a line parallel with said road at 30 feet northwesterly from and perpendicular to the centerline to;

43	S38/43/07.9W	256.08
44	S54/11/55.9W	115.98

45	S46/54/02.5W	309.78
46	S33/44/31.2W	216.31

47	S09/04/42.9W	89.16
48	S02/03/09.7W	114.15

49	S73/55/13.1W	64.55
50	N89/52/23.7W	300.04

51	S75/10/48.0W	310.42
52	N34/14/34.8W	99.42

53	N55/15/26.1W	102.18
54	N77/23/10.0W	268.47
55	N82/49/26.0W	179.41
56	N63/18/32.1W	89.52
57	S84/24/41.7W	200.99
58	S70/27/01.9W	297.24
59	S61/28/45.7W	250.51
60	S50/58/41.3W	412.18
61	S82/46/00.9W	625.10
62	S65/39/03.3W	241.58
63	S60/09/12.4W	761.31
64	S70/26/50.1W	297.24
65	S62/36/47.5W	563.36
66	S47/37/34.4W	94.82
67	S33/54/50.5W	175.84

68	A point 30 feet northwesterly of and perpendicular to the centerline of said road and being S45°00'00"E of the southeast corner of sec. 16, T. 20 S., R. 12 E., W.M.	
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N44/39/42.2W	4604.25	Thence, N45°00'00"W along a line to; southeast corner of said section.
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S88/24/04.4W	350.08	Thence, westerly along the south line of said section to;
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70	The intersection with a lava flow.	
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S30/17/36.3W	166.72	Thence, westerly, northerly, and easterly along the edge of said lava flow to;
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71	N89/52/15.1W	360.05
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72	S63/31/29.0W	178.82
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73		
	S73/43/04.7W	354.32
74		
	N89/52/16.1W	100.01
75		
	N21/44/14.3W	107.86
76		
	N00/01/59.3E	120.13
77		
	N45/03/19.9E	84.83
78		
	N07/09/12.2E	161.38
79		
	N56/11/11.3W	216.59
80		
	N79/33/33.8W	671.15
81		
	S79/48/45.7W	223.58
82		
	S57/36/22.4W	521.35
83		
	N81/44/05.9W	141.48
84		
	N35/26/52.2W	172.32
85		
	N06/22/00.5E	181.27
86		
	N68/17/47.8E	215.34
87		
	N32/02/27.6E	377.38
88		
	N53/12/00.0E	99.97
89		
	N73/24/32.3E	208.76
90		
	S73/55/03.8E	145.70
91		
	S56/11/09.0E	144.40
92		
	S82/44/22.7E	161.31
93		
	N56/23/12.7E	288.34
94		
	N82/59/53.0E	161.24
95		
	S81/44/02.5E	282.96
96		
	N66/17/27.5E	743.00
97		

Thence, westerly, northerly, and easterly
along the edge of said lava flow to;

N08/09/33.4E	283.06
98	
N21/44/14.2W	107.86

99	A point on the westerly edge of said lava flow with a northerly coordinate of 792170 (N).
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N47/17/41.5E	1089.46	Thence, northeasterly to;
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100	A point on the edge of said lava flow at its most northerly extent in the NW1/4SW1/4 of sec. 16, T. 20 S., R. 12 E., W.M.
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S89/52/01.1E	180.04	Thence, southeasterly and northerly along the edge of said lava flow to;
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101	S51/13/23.1E	128.23
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102	S73/55/01.0E	174.85
-----	--------------	--------

103	S57/08/23.5E	133.31
-----	--------------	--------

104	S52/18/47.0E	656.90
-----	--------------	--------

105	S84/40/12.8E	220.98
-----	--------------	--------

106	N31/00/20.6E	116.62
-----	--------------	--------

107	N04/55/43.8W	462.25
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108	N07/27/49.5E	464.24
-----	--------------	--------

109	N21/50/10.4E	107.73
-----	--------------	--------

110	N41/14/35.7E	212.56
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111	N61/02/18.2E	205.84
-----	--------------	--------

112	N76/04/56.2E	82.45
-----	--------------	-------

113	S83/09/08.5E	342.49
-----	--------------	--------

114	N45/03/53.2E	56.55
-----	--------------	-------

115	N22/33/12.3W	260.37
-----	--------------	--------

116	N01/23/59.4E	168.20
-----	--------------	--------

117	N26/36/20.5E	125.23
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118

	N49/38/57.8W	68.21	
119			
	N79/33/19.0W	89.49	
120			
	N79/33/20.8W	223.73	
121			
	N24/22/28.4W	242.02	
122			
	N14/04/08.4E	165.01	
123			Thence, southeasterly and northerly
	N28/06/51.0E	340.03	along the edge of said lava flow to;
124			
	N11/15/40.8W	204.22	
125			
	N39/42/28.0W	156.44	
126			
	N00/02/12.4E	40.04	
127			
	N51/13/21.0W	256.48	
128			
	N73/54/51.0W	437.14	
129			
	N36/46/39.1W	200.31	
130			
	N00/02/09.4E	40.04	

131	A point on the edge of said lava flow, and being on the intersection with the north line of said section 16.		
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N89/09/39.5E	1387.09	Thence, easterly along the north line of said section 16 to;
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132	The north 1/4 corner of said section 16.		
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N89/01/12.0E	2678.98	Thence, easterly along the north line of said section 16 to;
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133	Point of Beginning.		
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traverse length = 41723.39 feet

traverse area = 56820448 sq. feet = 1304.42 acres

Area

Total area for the Mokst Butte Research Natural Area is approximately 1250 acres (506 hectares).

Elevations

Elevations range from 5200 feet (2104 m.) at the western edge of the RNA to 6162 feet (2494 m.) at the summit of Mokst Butte.

Access

The Mokst Butte RNA is in the central portion of the Deschutes National Forest (Map 2) near the Lava Cast Forest. It is accessible from Hwy 97 south of Bend, Oregon via two Forest Service Roads. Forest Road #9710 exits Hwy 97 seven miles south of Bend and leads to Mokst Butte after approximately nine miles. An unsigned road, #9720, branches to the west off road #9710 and forms the southern boundary of the RNA. Forest Road #9720 also exits Hwy 97 approximately 13 miles south of Bend and is the main access to the Lava Cast Forest. After nine miles it junctions with Forest Road #950 which leads to the Lava Cast Forest Campground, while road #9720 continues again forming the southern boundary of the RNA.

Maps

Mokst Butte RNA lies within the area covered by the USGS 7.5 minute topographic quadrangle map, Lava Cast Forest, Oregon. 1963. The Deschutes National Forest Recreation Map, 1982, is useful for ownership and general access information, however, this map does not delineate the RNA boundary.

Photos

The following aerial photos of the Mokst Butte RNA site are available in the Forest Supervisor's and District Ranger's offices:

1991 USDA nos. 991-63 and 1191-75

1991 USDA nos. 991-62 and 1191-76 (stereo pairs for above photos)

AREA BY TYPES

Vegetation of the RNA has been surveyed during initial recommendation of the site for RNA status as well in preparation of drafting this document (Vander Schaaf 1992). The following determination of cover types and habitat types and their percent covers 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 of Volland (1976). Five plant communities have been identified in the RNA (Map 4), four of which correlate to communities noted in Volland (1976).

	Estimated Acres	Hectares
<hr/>		
<u>SAF Cover Types</u> (Eyre 1980)		
237 Interior Ponderosa Pine.....	1250	506
<u>Kuchler Types</u> (Kuchler 1966)		
10 Ponderosa shrub forest..... (<u>Pinus</u>)	1250	506
<u>Forested Plant Associations</u> (Volland 1976)		
1) Lodgepole/currant-bitterbrush/needlegrass (<u>Pinus contorta/Ribes Cereum-Purshia</u> <u>tridentata/Stipa thurberiana</u>).....	50	20
2) Ponderosa/bitterbrush-manzanita/needlegrass (<u>Pinus ponderosa/Purshia tridentata-</u> <u>Arctostaphylos patula/Stipa thurberiana</u>).....	100	41
3) Ponderosa/bitterbrush-snowbrush/needlegrass (<u>Pinus ponderosa/Purshia tridentata-</u> <u>Ceanothus velutinus/Stipa thurberiana</u>).....	10	4
4) Mixed conifer/snowbrush (<u>Abies concolor-Pinus ponderosa/</u> <u>Ceanothus velutinus</u>).....	340	138
5) Lava community.....	750	304
Total.....	1250	506

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

The central feature of the Mokst Butte RNA is Mokst Butte, a steep-sided cinder cone. The RNA also includes several smaller cinder/spatter cones, one of which pre-dates the Mt. Mazama eruption. Also included within the Mokst Butte RNA are 865 acres (353 ha.) of a 5900 acre (2408 ha.) lava flow that emanated from Mokst Butte. These post-Mazama flows vary from blocky lavas barren of vegetation to lavas deeply buried by fine cinders and ash, which are now well vegetated. Other than the cinder cones, the terrain shows relatively little relief on an overall scale; however, small ridges and mounds up to 50 feet (15 m.) in height occur throughout the area. Soil textures range from coarse cinders and scoria to pumiceous loamy sands and sand. A small area of Mt. Mazama ash is located within the lava flows as well as on top of the unnamed cinder cone at the southern border of the RNA.

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 dry with evening thunderstorms occurring in July and August. Mokst Butte RNA is within the east Cascades physiographic province and receives typical central Oregon weather. Summer winds are predominantly from the northwest 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 Bend, Oregon, 20 miles to the northwest of the RNA. Climatic conditions at Bend should be a fair approximation for Mokst Butte RNA with differences attributed to an additional 2000 feet (610 m.) of elevation at the RNA. The Bend station receives an average annual precipitation of 11.53 inches (292.86 mm) and the mean annual temperature is 45.8 degrees F (7.7 degrees C). (NOAA 1989). Over half of the precipitation falls between November and February. Summer high temperatures regularly reach into the 80's F (27-31 degrees C), while winter lows often dip into the 20's (-6.6 to -1.6 degrees C). The monthly climatic data for Bend, Oregon averaged over the past 84 years is listed below (National Oceanographic and Atmospheric Administration 1989).

Climatic Records for Bend, Oregon
Elevation 3660 feet (1116 m); 1905-1988
(NOAA 1989)

Month	Mean Temperature		Mean Precipitation	
	<u>°F</u>	<u>°C</u>	<u>inches</u>	<u>mm</u>
January	30.8	-0.7	2.04	51.82
February	34.9	1.6	0.97	24.64
March	37.2	2.8	0.83	21.08
April	42.6	5.9	0.53	13.46
May	49.6	9.8	0.96	24.38
June	56.6	13.7	0.95	24.13
July	63.2	17.3	0.30	7.62
August	61.7	16.5	0.54	13.72
September	55.4	13.0	0.35	8.89
October	46.9	8.3	0.67	17.02
November	37.7	3.2	1.48	37.59
December	33.1	0.6	1.91	48.51
Mean Annual	45.8	7.7	11.53	292.86

DESCRIPTION OF VALUES

Flora

The flora of Mokst Butte RNA is representative of the central Oregon pumice zone and adjacent lava lands, being relatively simple with few numbers of taxa present. The flora has not been systematically collected or studied other than those taxa encountered during the establishment of inventory plots. No state or federal threatened, endangered or sensitive plant species are known to occur within the RNA. Observations by Vander Schaaf (1992) have resulted in the following list of plants. The **Habitat-types listed below** correspond to plant associations noted on page 8 with **Habitat-type 1** including the lodgepole pine association together with the two ponderosa pine associations; **Habitat-type 2** is equivalent with the mixed conifer plant association; and **Habitat-type 3** is the bare lava community. Species identifications were determined from Hitchcock and Cronquist (1973) and trees were determined from Little (1979).

Scientific Name	Common Name	Habitat-types		
		1	2	3
TREES				
<u>Abies concolor</u>	white fir	X	X	X
<u>Pinus albicaulis</u>	whitebark pine		X	X
<u>Pinus contorta</u>	lodgepole pine	X	X	X
<u>Pinus monticola</u>	western white pine		X	X

<u>Pinus ponderosa</u>	ponderosa pine	X	X	X
<u>Populus tremuloides</u>	quaking aspen		X	

SHRUBS AND SUBSHRUBS

<u>Amelanchier alnifolia</u>	western serviceberry			X
<u>Arctostaphylos nevadensis</u>	pinemat manzanita	X	X	X
<u>Arctostaphylos patula</u>	green-leaf manzanita	X	X	X
<u>Ceanothus velutinus</u>	common snowbrush	X	X	
<u>Chimaphila umbellata</u>	prince's-pine		X	
<u>Chrysothamnus viscidiflorus</u>	green rabbitbrush		X	X
<u>Holodiscus dumosus</u>	gland ocean-spray	X	X	X
<u>Juniperus communis</u>	mountain juniper			X
<u>Purshia tridentata</u>	bitterbrush	X	X	
<u>Ribes cereum</u>	squaw currant	X	X	X
<u>Ribes viscosissimum</u>	sticky currant		X	
<u>Salix scouleriana</u>	Scouler willow		X	
<u>Symphoricarpos albus</u>	common snowberry	X	X	

FORBS

<u>Arabis</u> sp.	rockcress species	X		
<u>Castilleja</u> sp.	paintbrush species	X	X	X
<u>Epilobium angustifolium</u>	western fireweed		X	
<u>Epilobium</u> sp.		X	X	
<u>Eriogonum umbellatum</u>	sulfur buckwheat			X
<u>Fragaria virginiana</u>	broadpetal strawberry		X	
<u>Hieracium albertinum</u>	western hawkweed	X	X	X
<u>Heuchera cylindrica</u>	lava alumroot			X
<u>Orobancha</u> sp.	broomrape species	X	X	X
<u>Penstemon cinicola</u>	ash penstemon	X		X
<u>Penstemon davidsonii</u> var. <u>davidsonii</u>	Davidson's penstemon	X	X	X
<u>Pterospora andromedea</u>	pinedrops		X	
<u>Pyrola asarifolia</u>	alpine pyrola		X	
<u>Pyrola dentata</u>	toothleaf pyrola	X	X	
<u>Pyrola picta</u>	whitevein pyrola	X	X	
<u>Pyrola secunda</u>	sidebells pyrola		X	

GRAMINOIDS

<u>Carex pensylvanica</u>	long stolon sedge		X	
<u>Carex rossii</u>	Ross' sedge		X	
<u>Festuca idahoensis</u>	Idaho fescue		X	
<u>Sitanion hystrix</u>	bottlebrush squirreltail		X	
<u>Stipa thurberiana</u>	Thurber's needlegrass	X	X	

Mokst Butte RNA has several natural communities represented within its boundaries (Map 4). Over half of the RNA is covered by recent lava flows which are sparsely vegetated. Scattered ponderosa pine are growing in pockets of cinders and soil throughout the flow, some attaining diameters of 24 inches DBH (Diameter at Breast Height). The most prominent plant species found in the lava flow community is gland ocean-spray (Holodiscus dumosus). To the northeast of Mokst Butte growing in sandy, pumiceous and lapilli soils is the lodgepole pine/currant-bitterbrush/needlegrass plant association. The soils within this association are very young and hence the association is successional to ponderosa pine and mixed conifer forests.

The dominant forest plant association is the mixed conifer/ snowbrush type. This type occurs over much of the two prominent cinder cones within the RNA, preferring the higher elevations and the cooler north slopes. Western white pine occurs within this association where white fir and ponderosa pine are the canopy dominants. The shrub cover is varied ranging from very dense in canopy openings to sparse within closed forests that have thickets of white fir saplings in the regeneration layer. Much of the mixed conifer association has been selectively cut in the past with large ponderosa pines being removed approximately 80 years ago and smaller pines being harvested more recently.

The two remaining ponderosa pine dominated plant associations occur as edaphic climaxes within the RNA. On shallow stony soils northeast of Mokst Butte ponderosa pine/bitterbrush-manzanita/needlegrass is found. On deeper soils located on the rims and south slopes of the cinder cones the ponderosa pine/ bitterbrush-snowbrush/needlegrass association occurs. These deeper soils are composed of coarse cinders, ash and pumice and can be found on slopes upwards to 50 percent.

Fauna

Faunal species have not been systematically studied or inventoried in Mokst Butte RNA. Observations of animal species taken during surveys conducted at the site as well as surveys on nearby areas are included below. Identifications follow Burt and Grossenhieler (1976), Hall and Kelson (1959), Nussbaum et. al. (1983), and Robbins et. al. (1966). The following terrestrial vertebrates are most likely to be found in the RNA (Vander Schaaf 1992):

Scientific Name	Common Name
Anguidae	
<u>Elgaria coerulea</u>	Northern alligator lizard
Iguanidae	
<u>Sceloporus occidentalis</u>	Western fence lizard
Colubridae	
<u>Contia tenuis</u>	Sharptail snake
<u>Thamnophis ordinoides</u>	Northwestern garter snake
<u>Thamnophis sirtalis</u>	Common garter snake
Ambystomatidae	
<u>Ambystoma gracile</u>	Northwestern salamander

Ambystoma macrodactylum

Long-toed salamander

Plethodontidae

Aneides ferreus

Clouded salamander

Ensatina eschscholtzii

Ensantina

Plethodon dunni

Dunn's salamander

Plethodon vehiculum

Western redback salamander

Salamandridae

Taricha granulosa

Roughskin newt

Dicamptodontidae

Dicamptodon ensatus

Pacific giant salamander

Rhyacotriton olympicus

Olympic salamander

Ascaphidae

Ascaphus truei

Tailed frog

Buфонidae

Bufo boreas

Western toad

Hylidae

Hyla regilla

Pacific treefrog

Ranidae

Rana aurora

Red-legged frog

Cathartidae

Cathartes aura

Turkey vulture

Accipitridae

Accipiter striatus

Sharp-shinned hawk

Accipiter gentilis

Northern goshawk

Buteo jamaicensis

Red-tailed hawk

Phasianidae

Callipepla californica

California quail

Oreortyx pictus

Mountain quail

Columbidae

Zenaida macroura

Mourning dove

Strigidae

Bubo virginianus

Great horned owl

Caprimulgidae

Chordeiles minor

Common nighthawk

ApodidaeChaetura vauxi

Vaux's swift

TrochilidaeSelasphorus rufus

Rufous hummingbird

PicidaePicoides pubescens

Downy woodpecker

Picoides villosus

Hairy woodpecker

Colaptes auratus

Northern flicker

TyrannidaeContopus sordidulus

Western wood-pewee

AlaudidaeEremophila alpestris

Horned lark

HirundinidaeTachycineta bicolor

Tree swallow

Tachycineta thalassina

Violet-green swallow

CorvidaePerisoreus canadensis

Gray jay

Cyanocitta stelleri

Steller's jay

Corvus brachyrhynchos

American crow

Corvus caurinus

Northwestern crow

Corvus corax

Common raven

Nucifraga columbiana

Clark's nutcracker

ParidaeParus atricapillus

Black-capped chickadee

Parus gambeli

Mountain chickadee

SittidaeSitta carolinensis

White-breasted nuthatch

Sitta canadensis

Red-breasted nuthatch

CerthiidaeCerthia americana

Brown creeper

TroglodytidaeTroglodytes aedon

House wren

Salpinctes obsoletus

Rock wren

SylviidaeRegulus calendula

Ruby-crowned kinglet

Regulus satrapa

Golden-crowned kinglet

Muscicapidae

Sialia currucoides
Sialia mexicana
Catharus ustulatus
Catharus guttatus
Turdus migratorius
Ixoreus naevius

Mountain bluebird
Western bluebird
Swainson's thrush
Hermit thrush
American robin
Varied thrush

Emberizidae

Dendroica coronata
Piranga ludoviciana
Spizella passerina
Melospiza melodia
Zonotrichia leucophrys
Junco hyemalis
Agelaius phoeniceus
Euphagus cyanocephalus
Molothrus ater
Icterus galbula

Yellow-rumped warbler
Western tanager
Chipping sparrow
Song sparrow
White-crowned sparrow
Dark-eyed junco
Red-winged blackbird
Brewer's blackbird
Brown-headed cowbird
Northern oriole

Fringillidae

Carpodacus cassinii
Loxia curvirostra
Carduelis pinus
Coccothraustes vespertinus
Chlorura chlorura

Cassin's finch
Red crossbill
Pine siskin
Evening grosbeak
Green-tailed towhee

Soricidae

Sorex vagrans

Vagrant shrew

Verperilionidae

Myotis lucifugus
Myotis yumanensis
Myotis evotis
Myotis volans
Myotis californicus
Anthrozous pallidus
Lasionycteris noctivagans
Eptesicus fuscus
Lasiurus cinereus
Plecotus 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

Ochotonidae

Ochotona princeps

Pika

Leporidae

Sylvilagus nuttalli

Mountain cottontail

SciuridaeEutamias townsendii

Townsend's chipmunk

Eutamias minimus

Least chipmunk

Citellus beldingi

Belding ground squirrel

Citellus lateralis

Golden-mantled squirrel

Tamiasciurus douglasii

Douglas' squirrel

CricetidaePeromyscus maniculatus

Deer mouse

Neotoma cinerea

Bushy-tailed woodrat

Lagurus curtatus

Sagebrush vole

ErethizontidaeErethizon dorsatum

Porcupine

CanidaeCanis latrans

Coyote

UrsidaeUrsus americanus

Black bear

MustelidaeMartes americana

Marten

Mustela frenata

Long-tailed weasel

Mustela vison

Mink

Spilogale gracilis

Western spotted skunk

Mephitis mephitis

Striped skunk

Taxidea taxus

Badger

FelidaeFelis rufus

Bobcat

CervidaeOdocoileus hemionus

Mule deer

Aquatic

Aquatic habitat types are not present on Mokst Butte RNA.

Geology

The geology of the Mokst Butte RNA is largely associated with the eruption of the Northwest Rift Zone of Newberry Volcano with an important contribution from the eruption of Mt. Mazama, about 80 miles (130 km) to the southwest.

The entire RNA was originally covered by lava flows that poured out the sides of cinder cones on the north flank of Newberry Volcano. The small cinder cone along the southern boundary of

the RNA and the area west of it are examples of these. The older cones and flows are probably 50,000 to 100,000 year old. A soil of widely variable thickness accumulated on these cones and flows, largely from windblown sediments from the LaPine Basin and air fall tephra from nearby eruptions.

About 7600 calendar years ago the eruption of Mt. Mazama resulted in the deposition of about 2 feet (0.6 m.) of rhyolitic pumice and ash over the entire RNA. About 600 years later, eruptions along the Northwest Rift Zone of Newberry Volcano began. This eruptive zone extended from the north shore of East Lake northward to the location of lava Butte, with eruptions occurring from at least 15 segments of the rift. One of the larger eruptions occurred at Mokst Butte.

The first feature to form was probably a small graben (fault bounded depression) about 2500 feet (760 m.) long, which formed as the magma (molten rock) neared the surface. As the magma reached the surface eruptions began at both the north and south ends of the graben. At the north end, the eruptions formed a chain of small cinder and spatter cones with individual cones as high as 150 feet (45 m.) A similar chain of small cinder and spatter cones probably formed at the south end of the graben at the same time. As the eruption continued, activity began to concentrate at the south end of the graben and activity waned at the north end of the graben. The first lava flows from the eruption appear to have come from the southern vent area and flowed northeastward toward Ikt Butte as a result of the initial topography of the southern vent area. As the eruption continued, a large cinder cone (Mokst Butte) began to form over the southern vent area, with the prevailing winds blowing much of the material ejected from the vent to the northeast. This resulted in diversion of the flows to the southwest and burial of the early flows by windblown cinders and ash from the vent. As the cinder cone continued to build, large sections of the cone would occasionally slump into the vent and then be rafted away on the surface of the flowing lava resulting in large cinder masses scattered over the surface of the flow west of Mokst Butte. These cinder masses rise 20 to 30 feet (6 to 9 m.) above the surface of the flow and are some of the most heavily vegetated areas on the flow.

Map #6 shows the location of the RNA in relation to the extent of flows and tephra deposits from the Mokst Butte eruption. Map # 7 shows the various geologic units that effect the vegetative communities of the RNA.

Areas of various geologic units within Mokst Butte are:

	Acres	Hectares
Post-Mazama units		
Mokst Butte cinder cone	125	51
Cinder/spatter cone chain	35	14
Barren Mokst flows SE of Mokst Butte	95	39
Main flows of Mokst Butte	600	245
Mokst flows covered by tephra from Mokst Butte	170	69
Subtotal	1025	418
Pre-Mazama units		
Kipuka of pre-Mazama lavas W of Mokst Butte	15	6
Pre-Mazama flows W of pre-Mazama cinder cone	80	33

Pre-Mazama flows - with tephra from Mokst Butte	100	41
Pre-Mazama cone - without tephra from Mokst Butte	15	6
Pre-Mazama cone - with tephra from Mokst Butte	65	26
Subtotal	275	112
Total Area	1300	531

Soils

Soils information is based on the Soil Resource Inventory prepared by the U.S. Forest Service (USDA Forest Service 1976). Nine soil types have been identified at the RNA (Map 5). Over half of the RNA has virtually no soils being recent lava flows or cinders. The soils in the RNA are derived from Mt. Mazama pumice and ash that overlay bare lava or soils derived from basaltic ash and lava. In general the soils are very young, displaying little soil profile development. Consequently, productivity at the site is relatively low.

The soil type mapping units and their descriptions are as follows:

<u>Mapping Unit</u>	<u>Description</u>
1	Barren Lava Flows. Fresh lava flows essentially barren of vegetation. Slopes are rugged and uneven.
9	Barren Cinder Cones. Unvegetated cinder cones with soils consisting of coarse-textured cinders and scoria. Cones usually more recent in origin than mazama pumice and have no soil development.
65	Uneven Lava Plains. Soils are derived from moderately thick deposits of pumice and volcanic ash over residual soils on basaltic lavas. Surface soils are pumiceous loamy sands. Slopes are gentle ranging from 0 to 30 percent. Mixed conifer forests typify the vegetation.
70	Gently Sloping Lava Plains. Similar to Mapping Unit #65 except slope percent is less, usually less than 10 percent. Soils derived from thick deposits of pumice and ash. Lodgepole pine/bitterbrush forests predominate in the vegetation layer.
74	Rough, Uneven Lava Flows. Slopes usually low 7 to 10 percent but may be steep for short pitches. Soils derived from pumice and ash layer over rough, broken lavas. Soils are characterized by their very cobbly nature. Vegetation is mixed conifer forest types.
81	South Slopes on Cinder Cones. Soils derived from moderately thick layer of pumice and ash over cinders. Surface soils are typically pumiceous loamy sands. Slopes range from 25 to 70 percent. Ponderosa pine forests dominate the vegetation.
82	North Slopes on Cinder Cones. Similar to Mapping Unit #81 except for slope aspect. Vegetation is mixed conifer forest.
LD	A complex soil mapping unit comprised of units # 1 and 76. Soils derived from pumice and ash and found in pockets surrounded by

LY

fresh lava flows on uneven lands. Ponderosa and lodgepole pine dominate the vegetation layer.

A complex soil mapping unit comprised of units # 70,76,77.

Typically gently sloping lands with soils derived from pumice and ash. Soils are very cobbly loamy sands. Vegetation is dominated by lodgepole and ponderosa pines forest.

Lands

Mokst Butte RNA is completely within the Newberry National Volcanic Monument which is managed by the Deschutes National Forest. The Monument was created on November 5, 1990 to preserve and protect Newberry's remarkable geologic landforms. The Newberry National Volcanic Monument Comprehensive Management Plan (USDA Forest Service 1994) provides management direction for Mokst Butte RNA in Standard and Guideline TZ-1 (p. 68):

"Manage Mokst Butte Research Natural Area (RNA) in accordance with provisions of the final Establishment Report and Designation Order for this RNA. Until the Establishment Report is adopted, the standards and guidelines for Management Area 2 in the 1990 Forest Plan for the Deschutes National Forest will provide management direction."

Surrounding the RNA on the north, west, and east are Deschutes National Forest lands designated as General Forest lands (Management Area 8) in the Forest Plan (USDA 1990b) which are in various stages of harvest. The goal of General Forest lands is to emphasize timber production while providing for other forest resources. To date, timber harvest has focused on selective cutting of ponderosa pine with very little clearcut harvest evident.

Cultural

There are no known cultural resources located within the Mokst Butte RNA. Cultural resource inventories of timber sales which bordered the RNA and/or included small portions of the site turned up large numbers of cultural sites. Because of the existence of the lava flow which is a central feature of the RNA there is a high potential for numerous, significant sites within the RNA. Cultural sites are often associated with the edges of lava flows in central Oregon. Within the RNA there are 5 sites which are potentially eligible for the National Register. Several historical sites are suspected from the RNA as well. A complete cultural inventory of the site has not been conducted to date.

IMPACTS AND POSSIBLE CONFLICTS

Grazing Resources

There are two range allotments adjacent to the RNA. The Coyote Allotment which lies generally north and east of the RNA and the Sugarpine Allotment to the west and southwest. Both allotments are vacant. The RNA is entirely within the boundaries of the Newberry National Volcanic Monument. The Monument Management Plan (USDA Forest Service 1994) eliminated domestic livestock grazing allotments within the Monument (Monument-wide Standard and Guideline M-9, p.22). If the allotments ever became active, fences would have to

be constructed to prevent cattle from entering the Monument, therefore also protecting the RNA.

Mineral Resources

There are no reported hardrock mining claims in Mokst Butte RNA. The State of Oregon has a mineral reservation covering 480 acres in section 16 within the RNA. This is subject to valid existing rights, as stated in the legislation that established the Monument. Technically, if the State wanted to, they could utilize their mineral reservation. However, it is the intent of the Forest Service to acquire mineral rights to this area from the State through a future land exchange (Meyer 1996).

Timber

Before designation, portions of the RNA were subjected to timber harvest. Approximately 70 years ago the Shevlin-Hixon Timber Company logged the southern portion of the area with railroad methods. More recently logging has occurred on much of the area north and northeast of Mokst Butte and the kipuka in section 16 was logged while in private ownership. Previous logging in the area utilized selective cutting techniques with ponderosa pine being the target species.

Timber trespass in the form of firewood cutting is possible in the RNA because the area is unsigned, easily accessible by roads, and close to a metropolitan area.

Watershed Values

There are no substantial watershed values present at Mokst Butte RNA.

Recreation Values

Mokst Butte RNA receives limited recreation use. The site is close to the Lava Cast Forest Interpretive Site and is inviting to the hiking public because it affords views from the easily climbed cinder cones along the southern boundary of the RNA. Old logging skid roads and game trails provide access to the RNA from the south, east and west. There is a campsite at the edge of the RNA near Mokst Butte that has occasional use. Casual recreation use has not seriously impacted the RNA to date, however, use does increase fire danger in the area. 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 listed threatened or endangered wildlife species located within the RNA to date. Vegetation of the area was surveyed in 1992 by The Nature Conservancy and no threatened, endangered, or sensitive plant species were located.

Adjacent Private Lands

There are no private lands adjacent to the RNA.

MANAGEMENT PRESCRIPTION

Management and protection of Mokst Butte RNA will be directed toward maintaining natural ecological processes. Activities that disturb or modify natural ecological processes, as they relate to the objectives of the RNA, will not be allowed. However, fire is a natural ecological process that will be suppressed unless a Prescribed Natural Fire Plan is developed and approved (see Vegetation Management section below). Mokst Butte RNA is included, along with other RNAs, in the Deschutes National Forest Plan in Management Area 2 (USDA Forest Service 1990b). Unless a specific management plan is developed for Mokst Butte RNA, management will follow the standards and guidelines for Research Natural Areas (USDA Forest Service 1990b) and must be compatible with management of the surrounding Newberry National Volcanic Monument (USDA Forest Service 1994). The Regional RNA Scientist and the Deschutes National Forest RNA Coordinator should be consulted when research and management activities are proposed.

Vegetation Management

Standards and guidelines for RNAs, Management Area 2, address vegetation management under several different headings (USDA Forest Service 1990b). The overall management direction for all RNAs is to preserve the naturally occurring physical and biological processes at the site.

Unplanned ignitions (e.g. fire starts from lightening, arson, cigarettes, escaped campfires, etc.) will be actively suppressed unless a Prescribed Natural Fire Plan is completed by the Deschutes National Forest and approved by the Director of the Pacific Northwest Research Station that would provide a strategy for letting natural fires burn. To the extent practical, fire suppression will use low impact methods and equipment that will minimize disturbance to the special features of the area (USDA Forest Service 1990b). High impact methods, such as dozer line and retardant drops, should not be used where low impact methods will serve.

A special concern at Mokst Butte RNA is insect infestation. Bark beetle infestations are occurring in epidemic proportions in central Oregon forests. Lodgepole pine stands have been particularly hard hit as hundreds of thousands of acres now stand dead or highly infected. The standing dead has created a tremendous fire hazard in the region. Mokst Butte and the immediate surrounding forest currently have no significant insect infestations but there is no guarantee this healthy condition will remain. Monitoring forest health in the RNA and the surrounding forest is recommended.

Noxious weeds 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. Monitoring in the form of annual surveys of the RNA should be conducted to detect weedy invasions.

Transportation Plan

Based on the assumptions used in the Comprehensive Management Plan for Newberry National Volcanic Monument (USDA Forest Service 1994), there are no new roads planned

within the RNA, but Rd. #9720 along the southeast boundary will be upgraded for safety. Several low standard roads currently exist within the RNA and provide valuable access to important geologic features. The Comprehensive management Plan also recommends pursuing a potential trail easement across the narrow western portion of the RNA. There has been no action on this proposed trail to date.

Fences and Protective Barriers

Fences are not required at the RNA unless the adjacent range allotments become active. Signs on the RNA boundaries along Forest roads may be needed to prevent firewood cutting.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of Mokst Butte RNA will be the responsibility of the Deschutes National Forest. The District Ranger, Bend/Fort Rock 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, and requests to conduct research in the RNA should be referred to her/him. 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 Mokst Butte RNA will be maintained in the following offices:

- Regional Forester, Portland, Oregon
- Forest Supervisor, Deschutes National Forest, Bend, Oregon
- District Ranger, Bend/Fort Rock Ranger District, Bend, 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 Mokst Butte RNA research data file and list of herbarium and species samples collected. The Forest Sciences Lab in Corvallis, Oregon is establishing 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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MOKST BUTTE RESEARCH NATURAL AREA

I certify the enclosed boundary description of the Mokst Butte Research Natural Area was prepared under my direct supervision.

OREGON PLS #2111
State Reg. No.

Walt Miller
Walt Miller
Forest Land Surveyor

Date 1/7/97

**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

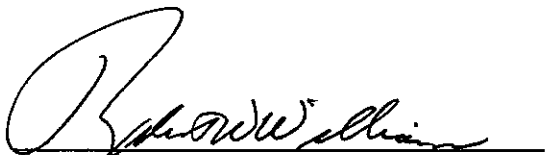
This decision is subject to appeal pursuant to 36 CFR Part 217. A copy of the Notice of Appeal must be in writing and must be submitted to:

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

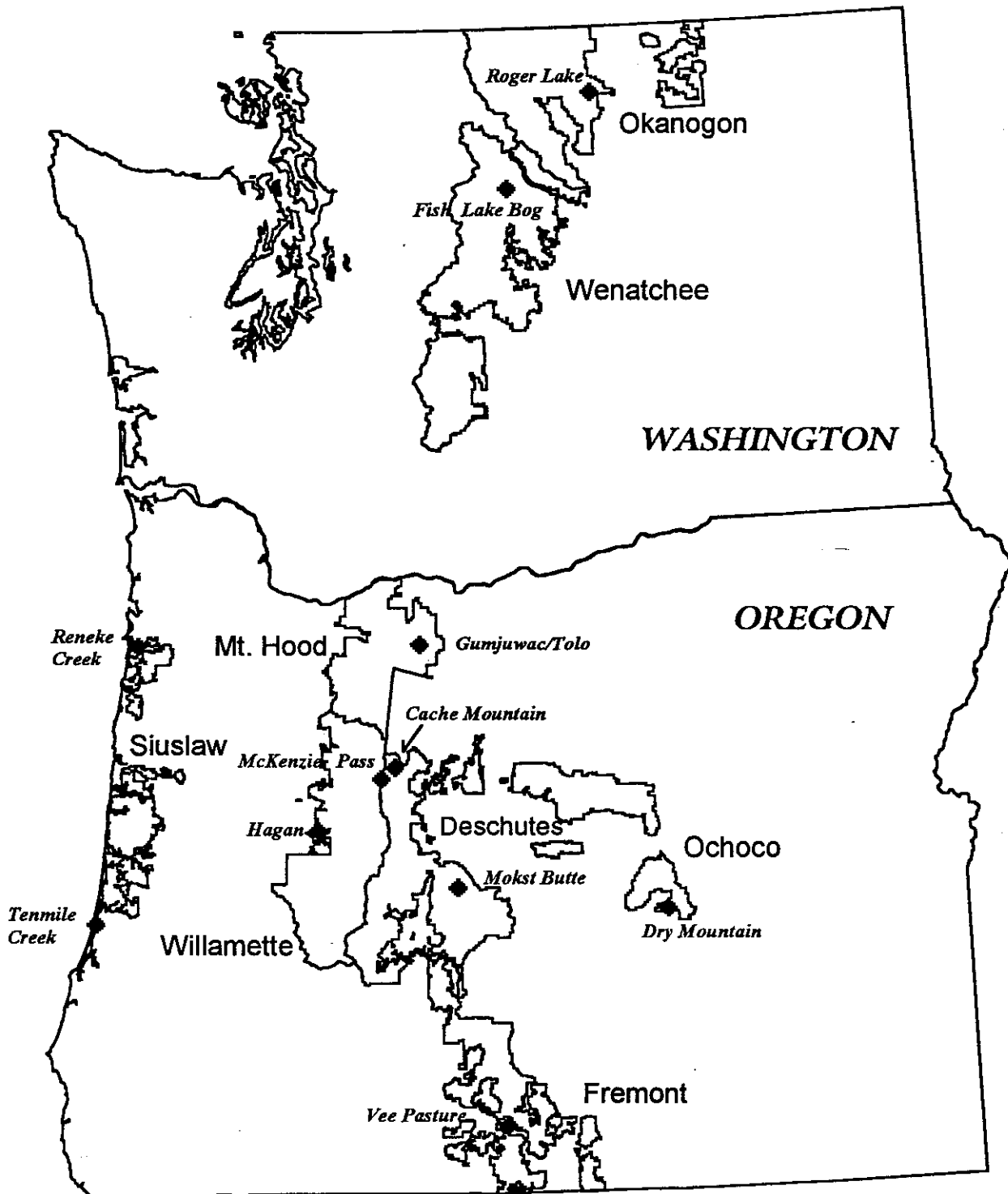
For further information regarding this decision contact Sarah Greene,
RNA Coordinator, Pacific Northwest Research Station, 3200 S.W. Jefferson
Way, Corvallis, Oregon 97331, Phone 541-750-7360.

A handwritten signature in dark ink, appearing to read "Robert W. Williams", is written over a horizontal line.

ROBERT W. WILLIAMS
Regional Forester

6/9/97
Date

Research Natural Area Locations



ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

ENVIRONMENTAL ASSESSMENT

Pacific Northwest Region
USDA Forest Service
Oregon and Washington

Lead Agency:

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

Responsible Official:

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

Prepared by:

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

Abstract:

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

ESTABLISHMENT OF ELEVEN RESEARCH NATURAL AREAS

USDA FOREST SERVICE PACIFIC NORTHWEST REGION OREGON AND WASHINGTON

ENVIRONMENTAL ASSESSMENT

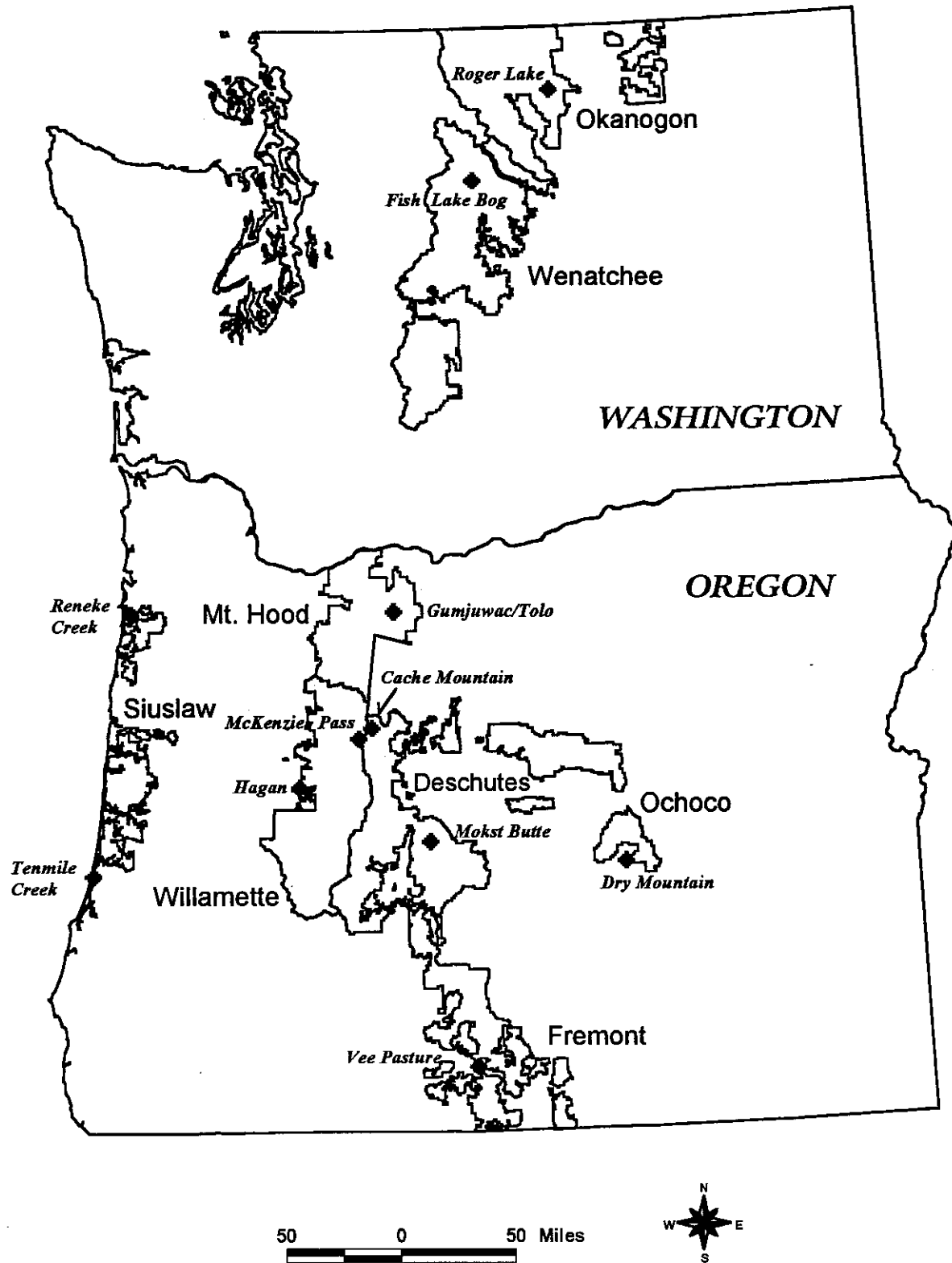
Proposed Action

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

Table 1: Research Natural Area Locations

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

R N A	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-spice 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.

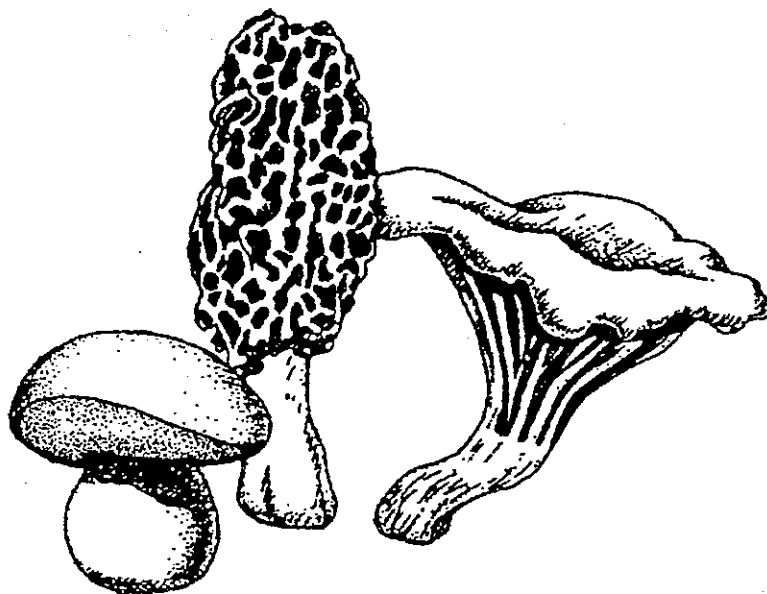
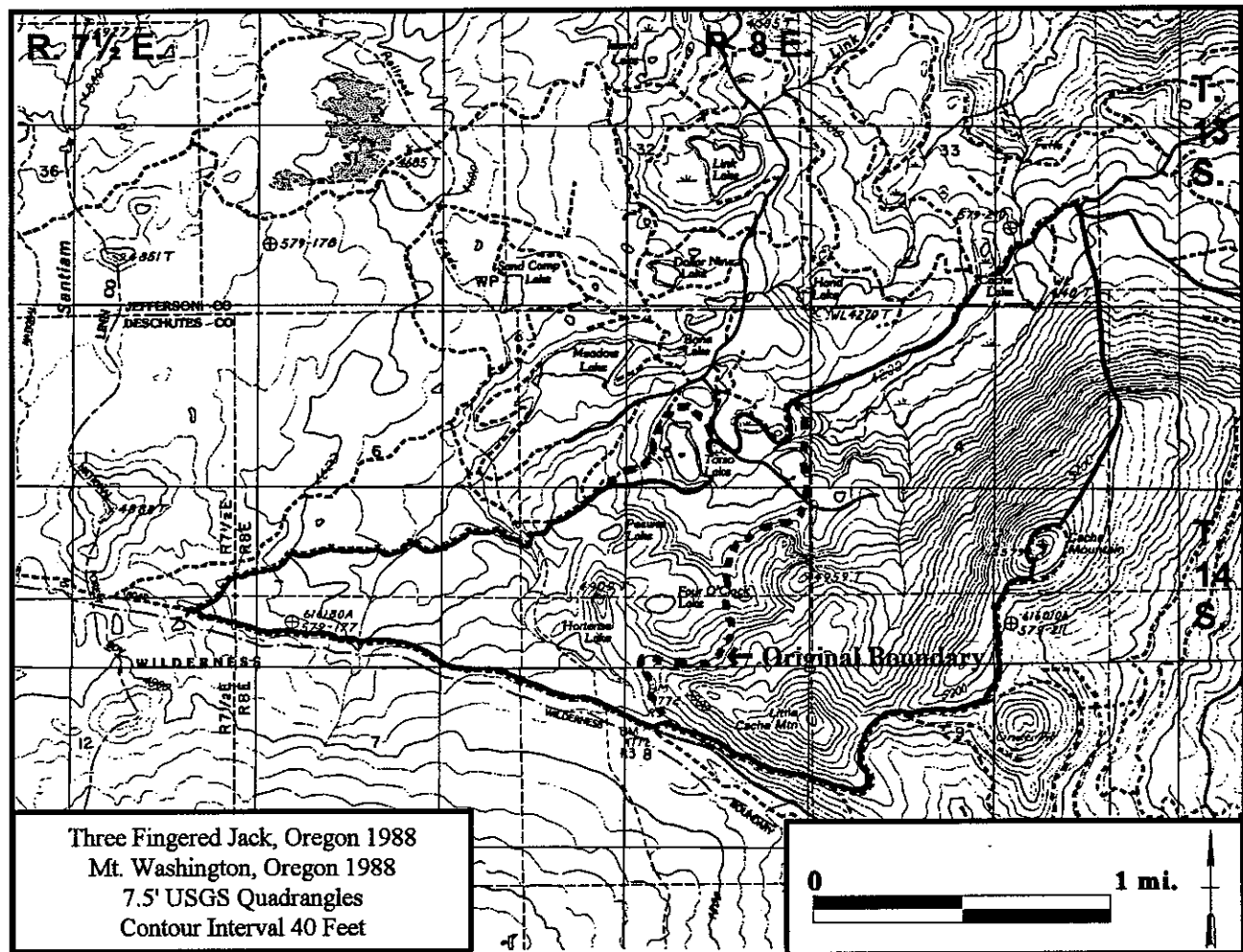


Figure 2: Cache Mountain RNA



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.

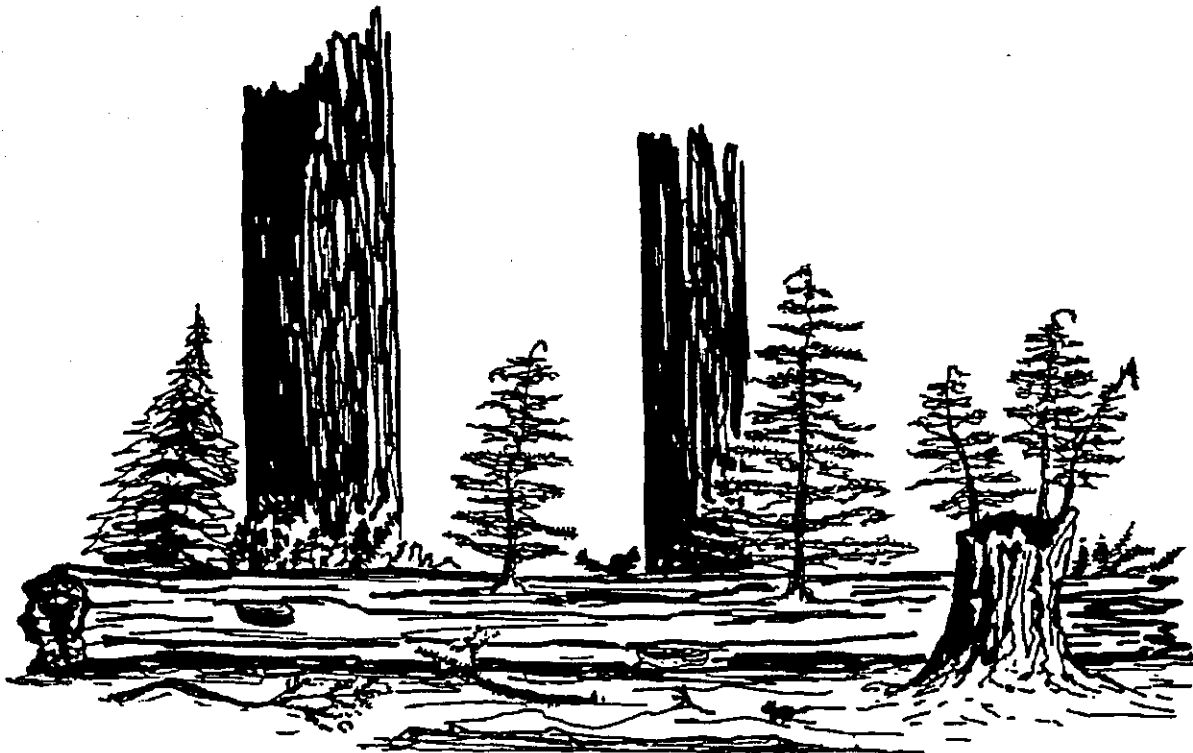
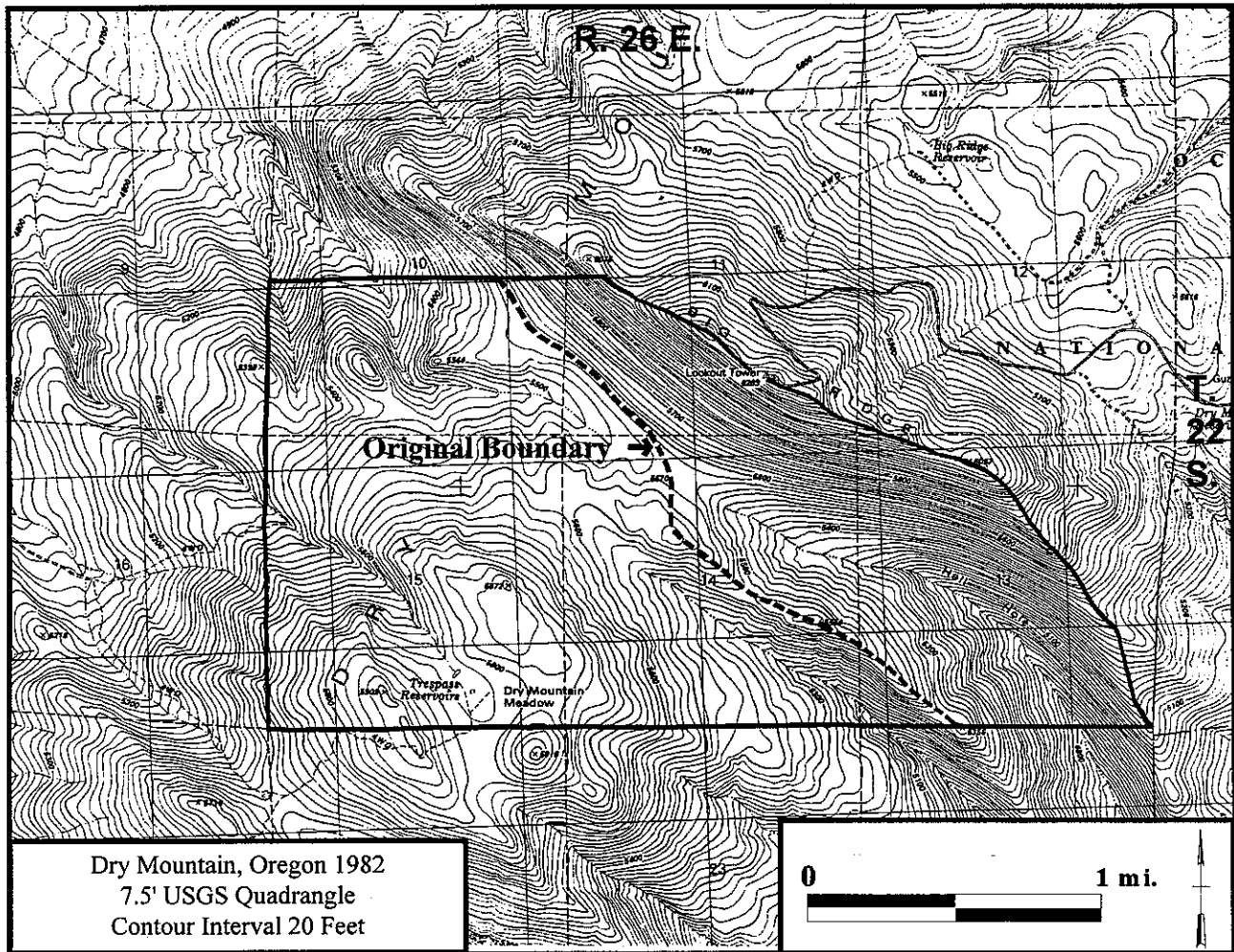


Figure 3: Dry Mountain RNA



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.

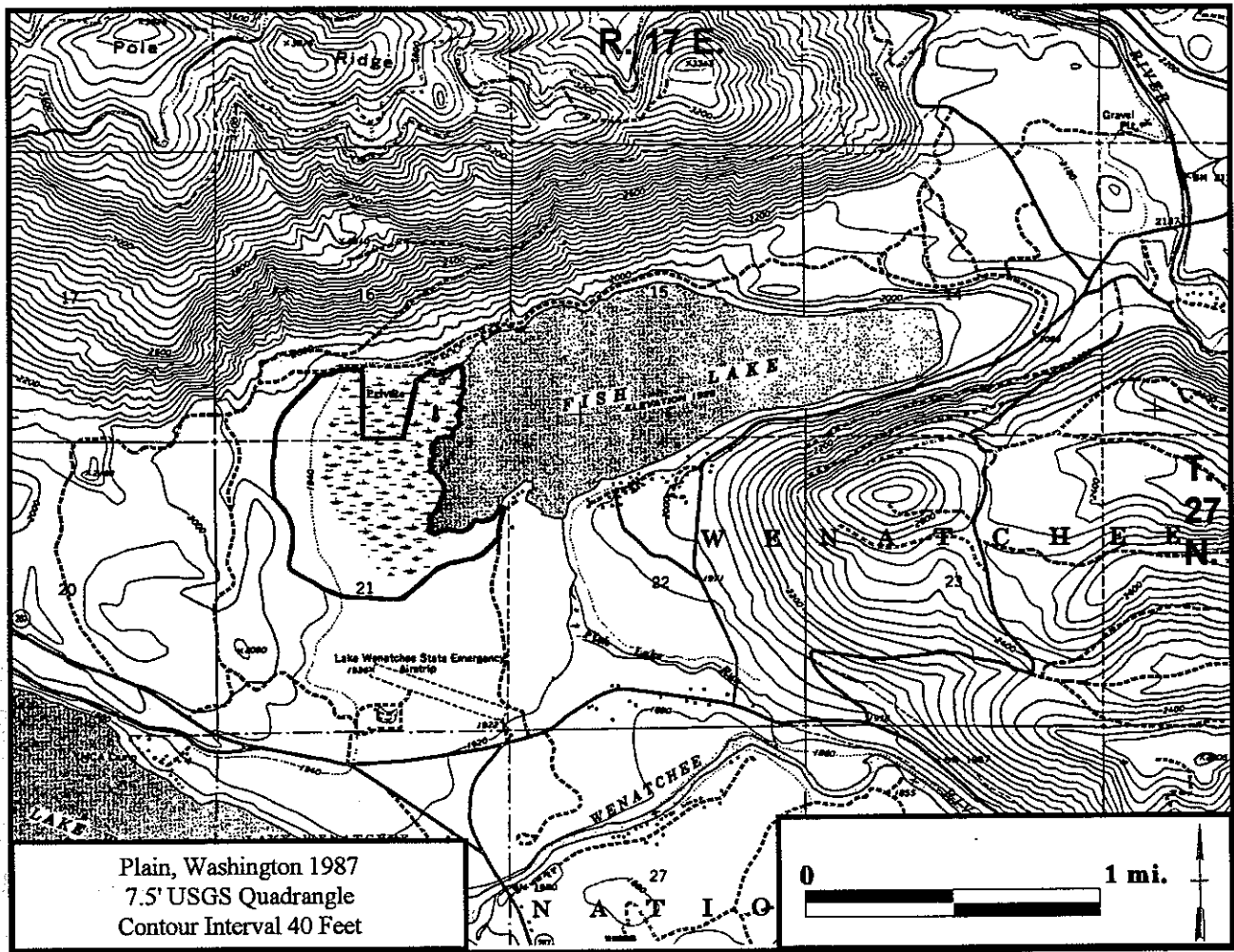
Mineral Resources: There are no reported hardrock mining claims in the RNA. The geology of the area does not lend itself to valuable mineral claims. Salable minerals, such as gravel, are potentially available on the RNA but recovery of these resources would be difficult due to the limited access to the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

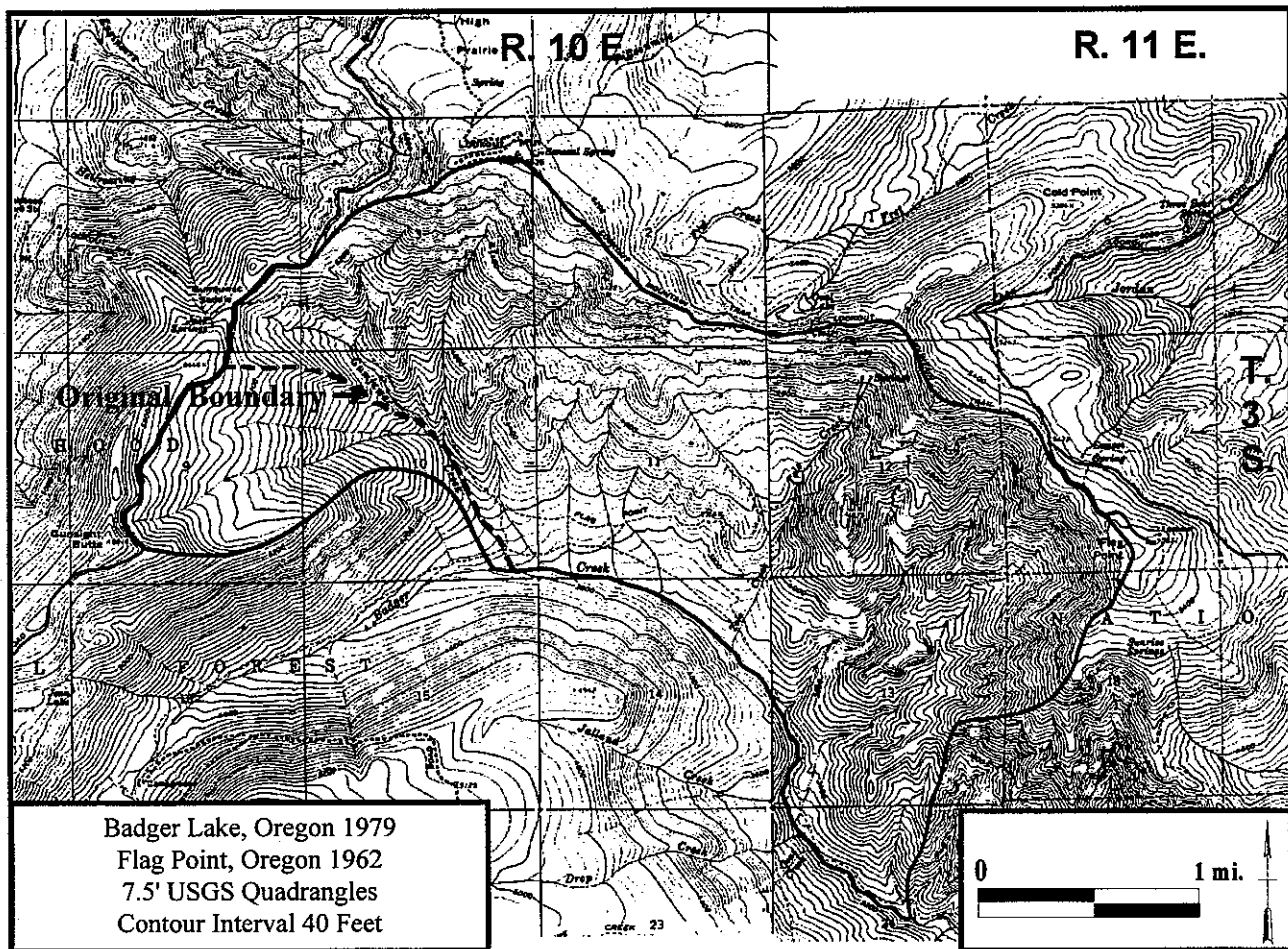
Grazing: There is no grazing allotment or potential for grazing associated with this RNA.

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.

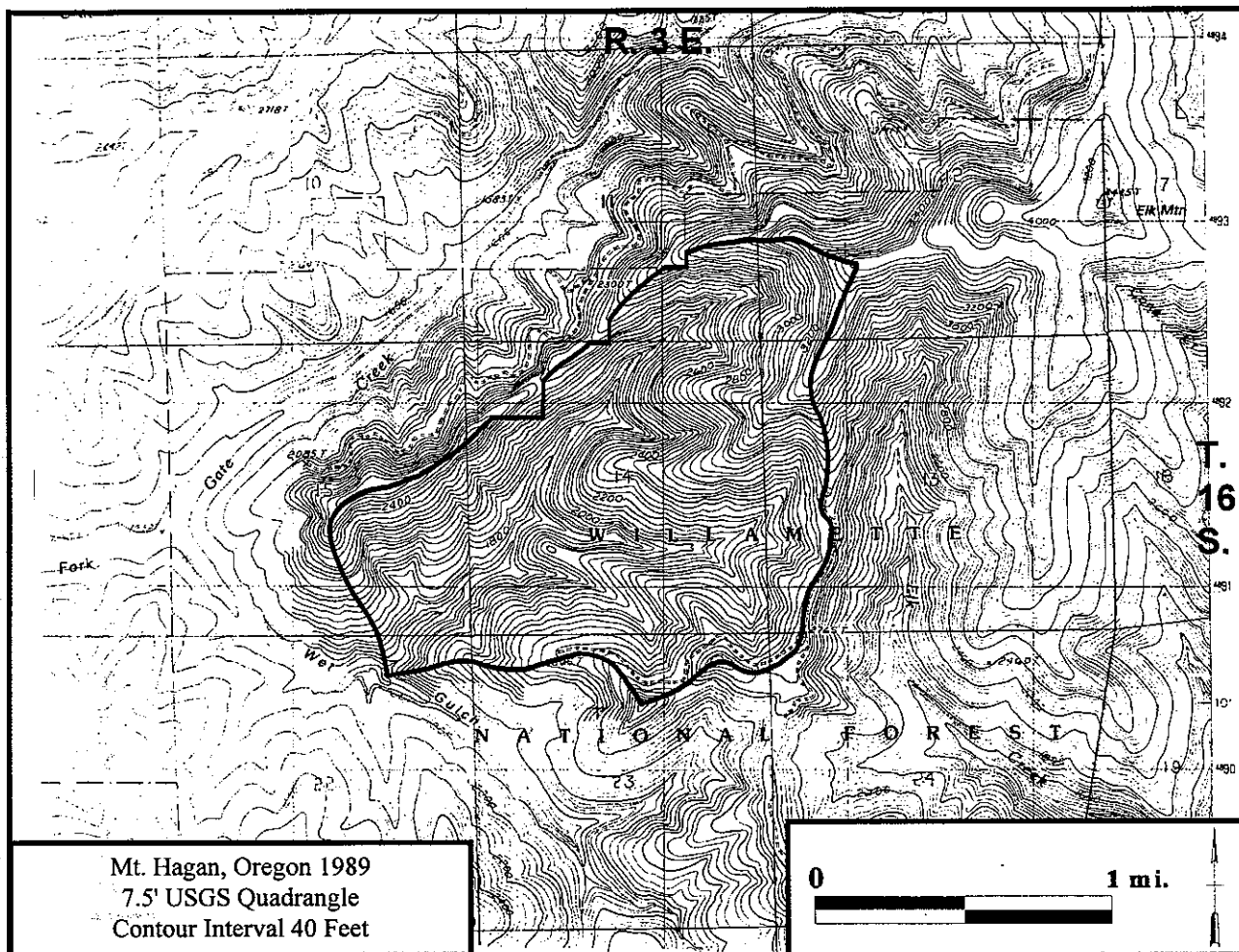
Mineral Resources: This area is considered to have low to very low potential for economic deposits of all minerals except construction rock. The RNA has already been withdrawn from future locatable mineral entry in conjunction with designation of the wilderness.

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



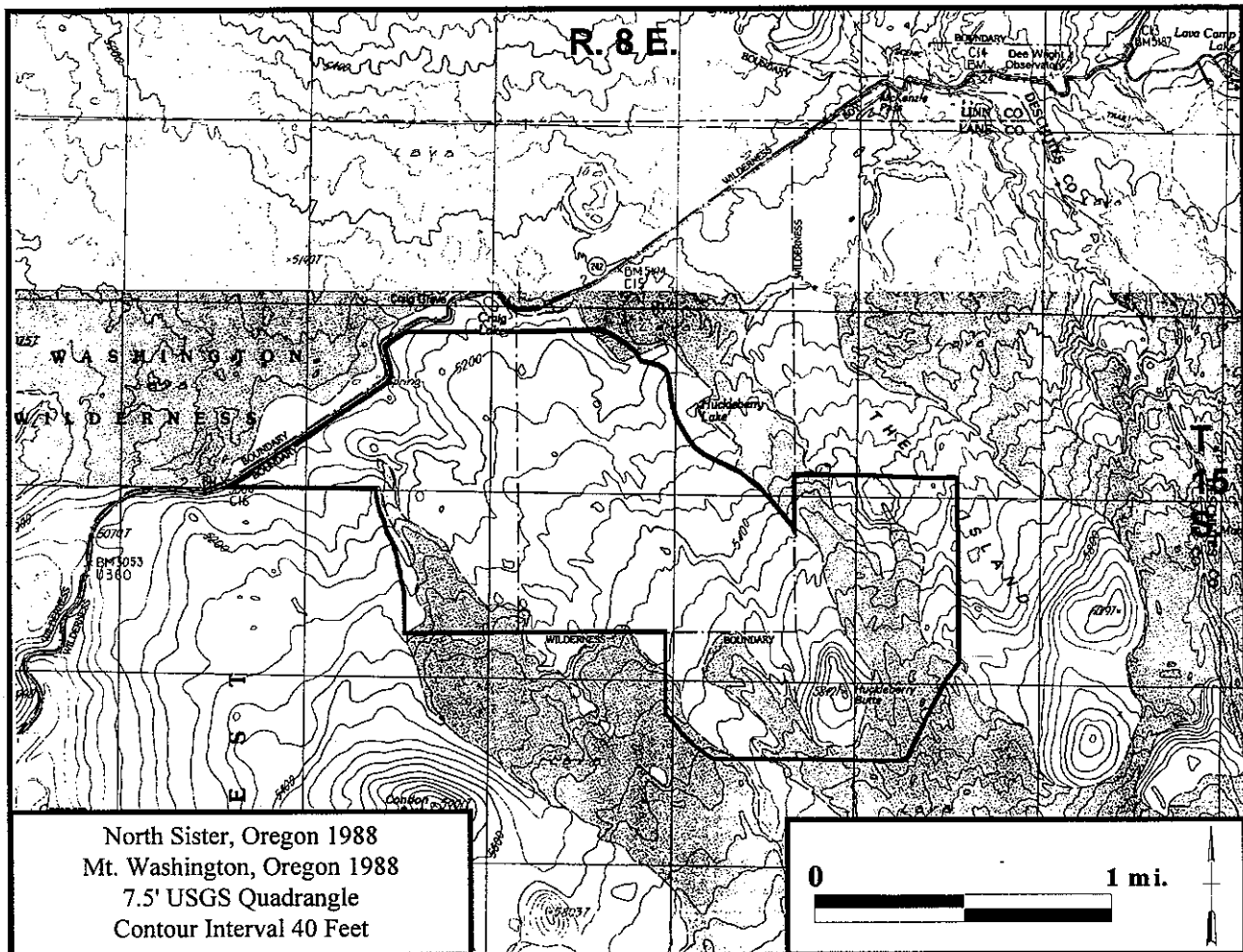
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

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



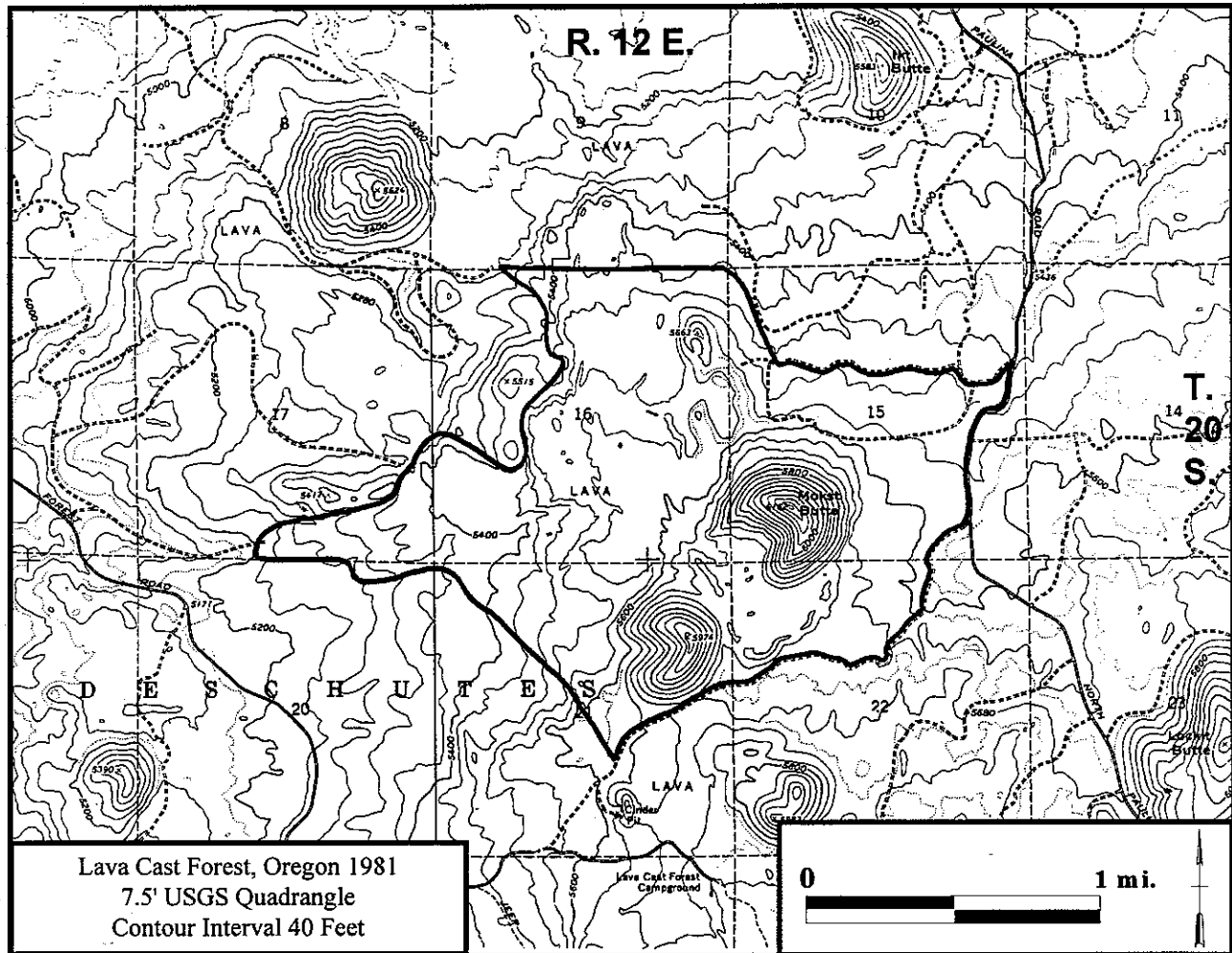
Mineral Resources: There are no known mineral resources in or adjacent to the RNA.

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



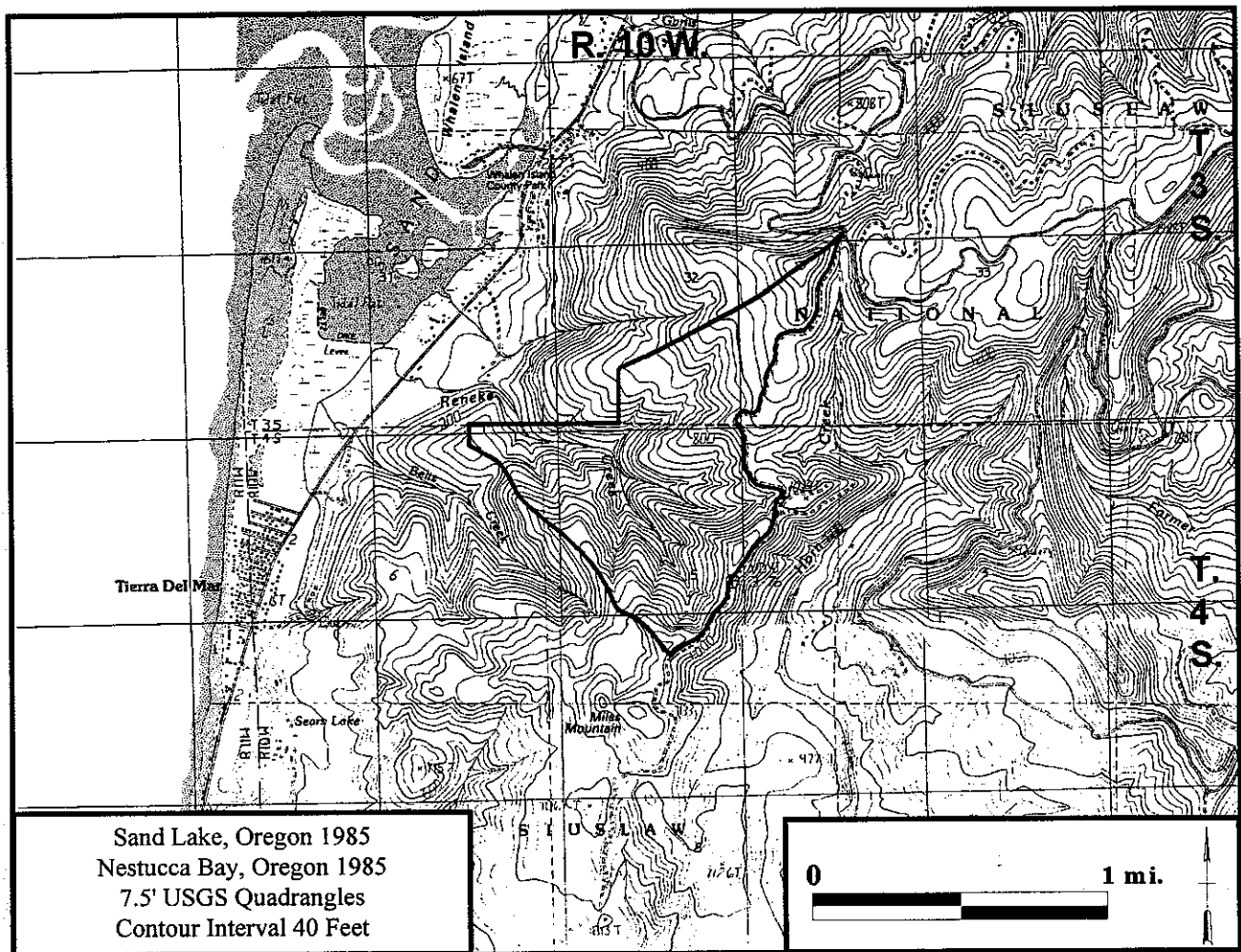
Mineral Resources: The State of Oregon has a mineral reservation covering 480 acres in section 16 of the RNA. The area is also withdrawn from mineral entry under the Newberry Crater National Volcanic Monument enabling legislation.

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



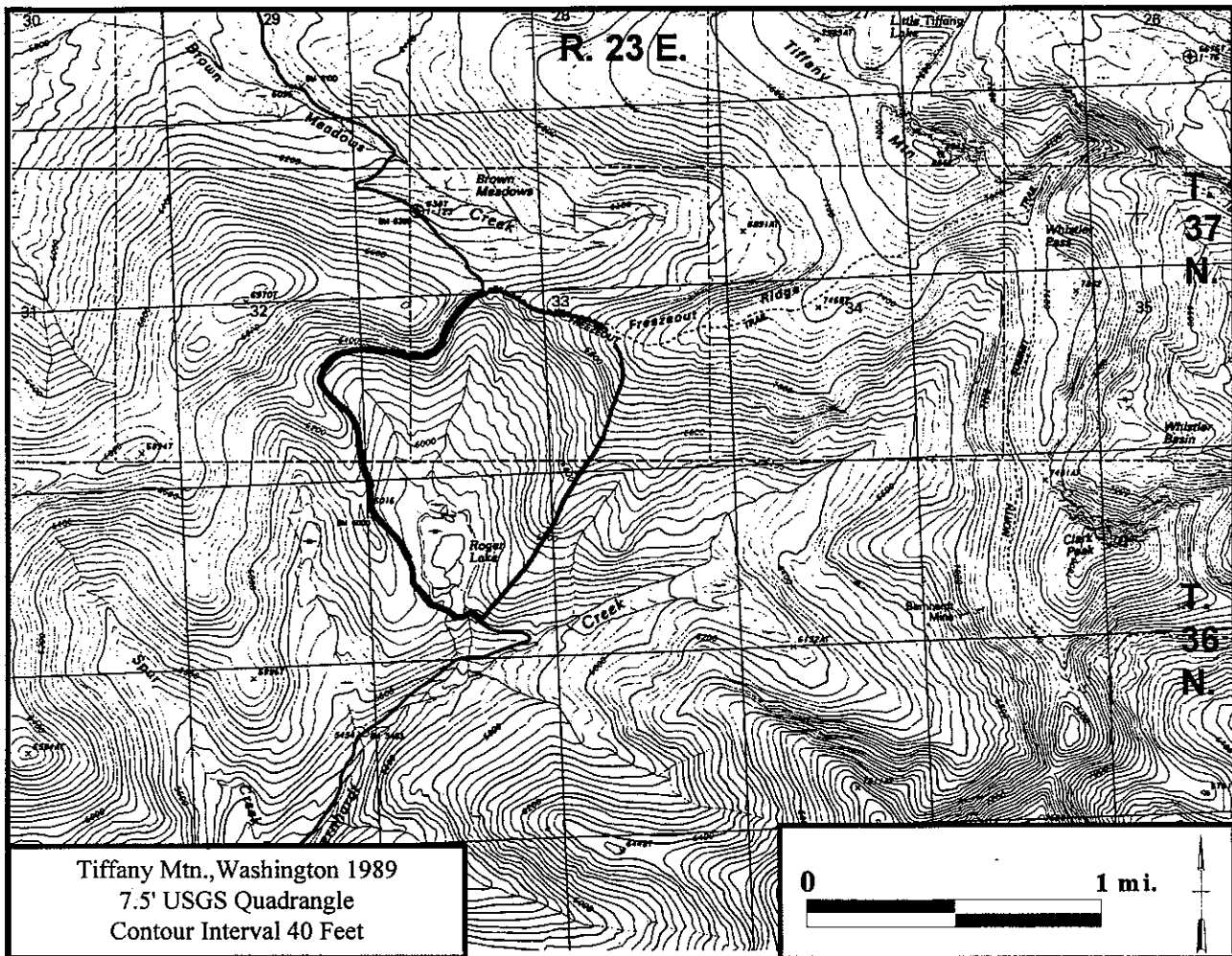
Mineral Resources: There are no known mineral resources in the RNA.

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.

Topographic map of Lakeside, Oregon 1985, showing the coastline, Umpqua River, and surrounding areas. The map includes contour lines, place names, and a scale bar.

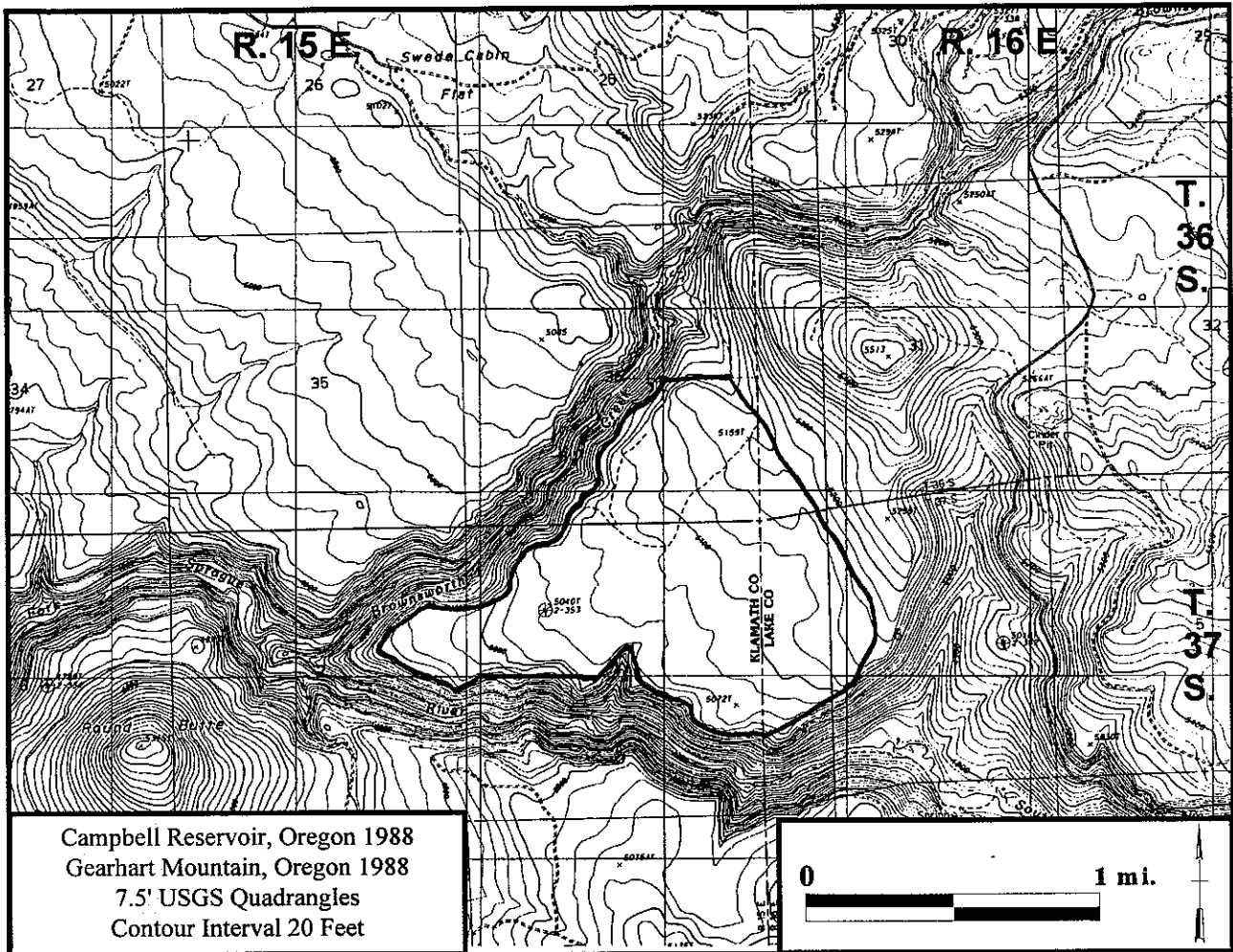
Key features and labels on the map:

- Coastline:** OCEAN, LIFELINE REFUGE, ERNESS, ATION = AREA.
- Water Bodies:** Umpqua River (R. 13 W.), Sand Dunes, Schooner 1926, Boat Ramp, Picnic Area, WLB Lake, Tugman State Park.
- Landmarks:** Umpqua Lighthouse, State Park, Douglas Co, Coos Co, Sand Dunes, Schooner 1926, Boat Ramp, Picnic Area, WLB Lake, Tugman State Park.
- Scale:** 0 to 1 mi.
- Grid:** T. 22 S., T. 23 S., R. 13 W.

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

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.

