Appendix DD - Oregon Gulch RNA Plan

Management Plan
for
Oregon Gulch Research Natural Area

Ashland Resource Area
Medford District
Bureau of Land Management
United States Department of the Interior

February 15, 2001

Table of Contents

List of Preparers

This document was prepared in large part by Dr. Frank Lang, Professor emeritus, Southern Oregon University. Our thanks to him.

Prepared by:
Dr. Frank Lang- Biology
Dr. Paul Hosten- Ecology
Laurie Lindell- Hydrology
Jeannine Rossa- Fisheries
Jennifer Smith- Fisheries
Fred Tomlins- Recreation
Matt Broyles - Wildlife
Greg Chandler- Fire
Brian Keating- Fire
Ann Ramage- Archeology
Dave Russell- Forestry / Insect and Disease
Mark Mousseaux- Botany
Ted Hass - Editing
James Langhoff - Publishing

I. INTRODUCTION

Research Natural Areas (RNAs) are part of a federal system of land tracts identified and designated to preserve and protect certain natural features for research and educational purposes. The overall goals for establishing RNAs are to provide:

1) baseline areas against which the effects of human activities can be measured;
2) sites for study of natural processes in an undisturbed ecosystem;
3) a gene pool for all types of organisms, especially rare and endangered species.

The interagency Pacific Northwest Research Natural Area Committee, composed of federal, state and private organizations in Oregon and Washington, has identified a set of natural elements, or "cells", representing terrestrial and aquatic habitats, plant communities, and ecosystem processes targeted for protection through the RNA system.

The 1,056 acre (427.4 ha) Oregon Gulch RNA is located in southeastern Jackson County, Oregon between Randcore Pass on the west and the former Box-O Ranch (BLM) at the east and is bound on the north by the ridge from the Pass to Rosebud Mountain and on the south by the ridge that separates Oregon Gulch from Agate Flat. Oregon Gulch enters Jenny Creek on the former Box-O Ranch.

The area was originally nominated by the Nature Conservancy in 1990, analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated a new RNA under the Record of Decision and Resource Management Plan (USDI 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Research Natural Area Management Policy (Appendix R) requires development of a management plan that establishes operational objectives to maintain or enhance the unique values of the designated RNA. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan.

II. POLICY

The documents and policy of authority now guiding decisions for RNAs are in Appendix R of the CSNM Draft Resource Management Plan. Management objectives for RNAs, addressed in the Plan include directives to:

Preserve, protect, or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial or aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured.

RNAs should ideally be undisturbed by human impacts, however, because pristine examples of significant ecosystems may not exist, the least altered sites should be selected. They should be sufficiently large to protect key features from significant impacts judged inappropriate for the area and natural processes should be allowed to dominate. In situations where human activities have interfered with natural processes, deliberate manipulations which simulate natural processes are allowed (USDI 1986b; Appendix R).

Research Natural Area Management Policy (USDI 1986b) requires development of a management plan establishing operational objectives to maintain or enhance the unique values of the RNA for each designated area. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan.

III. BASIS FOR DEDICATION AND SETTING OBJECTIVES

A. RNA History

The Nature Conservancy, under contract with the BLM State Office, nominated Oregon Gulch as an RNA 10 August 1990 (Schaaf 1990). The RNA filled Cell 7, a Rogue Valley mixed conifer forest (Douglas-fir probably dominant) and Cell 27, a Rogue Valley Manzanita-wedgeleaf ceanothus/bunchgrass chaparral as designated in the 1988 Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1988). The Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1998) now indicates that Oregon Gulch RNA fills Cell 18, Douglas-fir/ponderosa pine forest with a poison oak, hairy snowberry, or Piper Oregon grape understory and Cell 37 a white fir moderately dry site forest with baldhip rose, hairy snowberry, and star flower understory. They list Cell 53 (1988 Cell 27) Manzanita-wedgeleaf ceanothus/bunchgrass as unfilled.

The area was analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, was proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated as new RNA under the Record of Decision (ROD) and Resource Management Plan (USDI 1995a). One of the management actions required by the ROD for Special Areas, including RNAs, is development of site-specific management plans. Oregon Gulch RNA has been under interim management requirements since 11 August 1992.

The RNA is now a part of the Cascade-Siskiyou National Monument and is under the management guidelines in the Presidential Proclamation (Appendix A) and the CSNM RMP (see Management Restrictions, below).

B. Basis for Dedication

Oregon Gulch was nominated as an RNA because it represents two RNA cell needs for: a mixed conifer forest dominated by Douglas-fir and ponderosa pine with large scattered sugar pine and incense cedar also prominent in the over-story and a manzanita-wedgeleaf ceanothus/bunchgrass chaparral at the eastern boundary of the Klamath River Ridges of the Klamath Mountains Ecoregion. The area was selected for its natural values and its accessability. It also includes several rare species: Greene's mariposa lily (*Calochortus greenei*), Howell false-caraway (*Perideridia howellii*), and Bellinger meadow-foam (*Limnanthes bellingeriana*).

C. Management Restrictions

The CSNM Resource Management Plan withdraws lands within the Monument from mineral location, entry, and patent and mineral and geothermal leasing; prohibits commercial harvest of timber or other vegetative material except for science-based restoration purposes aimed at meeting the protection and enhancement of old-growth objectives; prohibits unauthorized OHV use of designated roads. The Plan permits continued

livestock grazing at current levels within the Monument until completion of a study of grazing impacts on natural ecosystem dynamics.

IV. NATURAL AREA DESCRIPTION

A. Oregon Gulch Area Description

1. Location

The 1,056 acre Oregon Gulch RNA is located in southeastern Jackson County, Oregon (T.40S.,R.04E., Secs.29, 30 NE1/4NE1/4, 19 S1/2, 20 S1/2SE1/4, 32 N1/2N1/2) along the slopes and bottom of Oregon Gulch in the Jenny Creek Watershed, a part of the Klamath River Basin (map 2) in the eastern portion of the Cascade-Siskiyou National Monument. The RNA begins at Randcore Pass and extends southeast to what was formerly designated as the Box-O Ranch. It is located in the eastern portion of the Cascade-Siskiyou National Monument. The RNA is approximately 18 air miles southeast of Ashland, Oregon.

2. Access

Two public points of entry to Oregon Gulch RNA are:

1) by vehicle from the northwest via Oregon Route 66 to BLM Mill Creek Road 40-3E-12.0 to the Lincoln Creek Road 40-3E-12.1 to Randcore Pass; and
2) by foot from the southeast from the Box-O Ranch via Route 66, the Copco Rd and a short unnamed road to the west at Mile 5.2 (see Plate 1).

The Box-O entry requires fording Jenny Creek. Public vehicle access is possible only via the Mill Creek Road and Randcore Pass. Access is seasonal due to snow depth at Randcore Pass and water depth at Jenny Creek. Roads are surfaced and maintained to Randcore Pass as is the private Copco Road to the Box-O turn-off. The roads down to the former Box-O Ranch and below Randcore Pass and within the RNA are unsurfaced and closed to unauthorized or public vehicle use.

3. Ecoregions

Ecoregions are defined by a number of factors that include physiography (including elevation and local relief), geology (surficial material and bedrock), soil (order, common soil series, temperature and moisture regimes), climate (mean annual precipitation, mean annual frost free days, mean January and July min/max temperature), potential natural vegetation, and land use (recreation, forestry, watershed) and land cover (present vegetation).

Oregon Gulch RNA lies at the east end of the Klamath River Ridges Ecoregion at its confluence with the Southern Cascade Slopes Ecoregion. Because environmental variation, particularly where ecoregions meet, generalized descriptive statements do not always apply. An area such as Oregon Gulch RNA some of the elements of adjacent ecoregions apply. The following synopsis of the ecoregions associated with Oregon Gulch RNA is based on Pater (1997a, 1997b).

78g Klamath River Ridges. (3800-7000 ft) The Klamath River Ridges Ecoregion has a dry continental climate and receives on average, 25 to 35 inches of annual precipitation. Low elevation and south-facing slopes have a more drought resistant vegetation than elsewhere in the Klamath Ecoregion (78) such as juniper, chaparral, and ponderosa pine. Higher and north-facing ridges are covered by Douglas-fir (*Pseudotsuga menziesii*), and white fir (*Abies concolor*). Shasta red fir (*Abies procera var. shastensis*) is found at higher elevations to the west. Ecoregion 78g has less precipitation, more sunny days, and greater number of cold clear nights than the Inland Siskiyou Ecoregion (78e) to the west.

9i Southern Cascade Slope. (3600-6300 ft) The Southern Cascade Slope ecoregion is a transitional zone between the Cascades (4) and the drier Eastern Cascade Slopes and Foothills (9). Forests of ponderosa pine blanket the mountainous landscape; white fir (*Abies concolor*), and Douglas-fir (*Pseudotsuga menziesii*) grow at higher elevations. Shasta red fir (*Abies procera var. shastensis*) is absent from the Oregon Gulch RNA. Much of Ecoregion 9i typically receives more precipitation than other Level IV Eastern Cascade Slopes and Foothills Ecoregions.

4. Climate

No climatic data has been collected at Oregon Gulch RNA. The RNA lies within the influence of the continental climate of the Great Basin and the more moderate, wetter, oceanic influences of to the west. Summers are usually long and dry (most of the precipitation falls between November and March), with occasional wet or dry thunderstorms. Winters are probably drier and colder than areas to the west because of the Great Basin influence. Based on isohyetal maps (map 11) average annual precipitation probably varies from 25 inches at higher elevations to 20 inches at Jenny Creek. Precipitation during the winter months occurs as rain or snow. The transient snow zone lies between 3,000 to 4200 feet elevation (USDI 1995b). The closest National Oceanic and Atmospheric Administration (NOAA) weather station with air temperature is found at Howard Prairie Dam (elevation 4,568 ft.) which is approximately 10 miles north of the RNA. Average monthly maximum, minimum, and mean air temperatures for the Howard Prairie Dam NOAA weather station are shown in Table ADD-1.

Table ADD-1. Ave. Monthly Max, Min, and Mean Air Temperatures at Howard Prairie Dam

	Air Temperature (°F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Max	37.5	42.4	45.9	52.2	61.0	70.2	78.6	78.4	71.6	60.7	43.7	36.5	56.5
Min	18.9	21.1	23.8	27.5	33.1	40.0	43.6	43.2	37.7	32.3	26.7	21.1	30.7
Mean	28.2	31.8	34.8	39.8	47.1	55.1	61.1	60.8	54.7	46.5	35.2	28.8	43.6

Source: NOAA Station (1961-1990) , Oregon Climate Service 2000

5. Topography

The northwest/southeast valley formed by Oregon Gulch lies between between Keene Creek Ridge to the south and the divide between the Oregon Gulch/Rosebud Mountain Ridge and Keene Creek to the north. The valley bottom is at 4,400 feet elevation at Randcore Pass and 3,240 ft. elevation at the eastern boundary. Elevations along the north ridge line are from 4,466 ft. elevation northeast of Randcore Pass to 4,386 ft. at Rosebud Mountain. Elevations along Keene Creek Ridge to the south range from 4,119 ft. elev. to 4,200 ft. elev. The lower elevations are characterized open rocky exposures and bench grasslands interspersed with oak/conifer forests. Special topographic features include steep rocky bluffs below Rosebud Helipond; flat, grassy benches with decreased drainage between forested areas on the slopes south-facing slopes; and exposed, bare scabland hummocks.

6.Geology

Oregon Gulch RNA is made up of Miocene and Oligocene Western Cascade volcanic, pyroclastic, volcanoclastic, and sedimentary rocks (Smith and others, 1982) (Map6). Oregon Gulch is on the south edge of a fairly complex geological island surrounded by vast areas mapped as Western Cascade Oligocene basalt, basaltic andesite, and andesite

(Tb2) on the west and southwest and Pliocene and Upper Miocene basaltic andesite flows (Tba) of the High Cascades Range to the east.

The Western Cascade Oligocene flows are interbedded with volcanic breccias, pyroclastic deposits and other rock types too thin, discontinuous, or poorly exposed to map separately (Smith and others 1985). The Pliocene and Upper Miocene basaltic andesite flow (Tba) commonly is a fine-grained , high-alumina olivine. Except for a few small exposures, Oregon Gulch is separated from the larger, canyon filling flow by Jenny Creek

Four mapped formations are found in Oregon Gulch RNA. With the exception of a slender northeast trending exposure Oligocene intermediate and silicic ash-flow tuff (Ti2, Unit 2) the south half of T.40S.,R.04E.,Sec.29 is Western Cascade Oligocene basalt, basaltic andesite, and andesite (Tb2). To the north, the RNA is mapped as coarse grained Miocene pyroclastic, volcaniclastic, and sedimentary rocks (Tc4). Between the two units is an east-west band of Miocene and Oligocene salicic ash-flow tuff (Ti3, Unit 3). The different rock types in these formations are not mapped because of the scale of the map and the complexity of the formations.

7. Soils

Soil information (map 48) for Oregon Gulch RNA is based on Soil Survey of Jackson County Area, Oregon (USDA 1993). There are twelve mapped general soil units in the RNA. Because of the small scale of the map and the large area covered, mapped units are often presented as complexes of different soil types. Number of acres, percent of RNA, productivity class and site index (if any) of the soil types found in the RNA are summarized in Table ADD-2. About 60 percent of the RNA consist of rock outcrop soil complexes. The balance (40 percent) is soil types capable of supporting mixed conifer stands.

Table ADD-2. Oregon Gulch RNA Soil Units (USDA 1993)

Unit #	Unit Name	Percent Slope	Acres	Percent Acres	Productivity Class *	Site Index **
19E	Bybee-Tatouche complex	12 to 35	6	0.58	PSME*** 8, 8	85, 90
113 E	McMullin-Rock outcrop complex	3 to 35	78	7.48	-	-
113 G	McMullin-Rock outcrop complex	35 to 60	46	4.4 1	-	-
114 E	McNull loam, south slopes	12 to 35	310	29.72	PSME 7	80
115 E	McNull gravelly loam, south slopes	12 to 35	9	0.86	PSME 6	70
116 E	McNull-McMullin gravelly loam, south slopes	12 to 35	48	4.60	PSME 6	70
116 G	McNull-McMullin gravelly loam, south slopes	35 to 60	17	1.63	PSME 6	70
117 G	McNull-McMullin complex, north slopes	35 to 60	13	1.25	PSME 7	80
119F	McNull-Medco complex	1 to 12	9	.86	PSME 7	70, 65
170 C	Skookum very cobbly loam	1 - 20	2	.19	-	-
173 D	Skookum-Rock outcrop-McMullin complex,	1 to 20	40	3.84	-	-
173F	Skookum-Rock outcrop-McMullin complex	20 to 50	465	44.58	-	-

*Site Index. Height and age of selected trees in stands of a given species. A designation of the quality of a forest site based on the height of the dominate stand at an arbitrarily chosen age. Average height at 50 yrs = 75 feet. SI is 75. Age varies with species and soil type: 100 yrs. PSME on Pokegama and Woodcock units, PIPO all units; 50 yrs. PSME on all other units, ABMASH, and ABCO. ** Productivity Class. Yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. ***PSME = *Pseudotsuga menziesii*, Douglas-fir.

8. Hydrology

The Oregon Gulch RNA lies within the 2,000 acre Oregon Gulch drainage area and comprises 52 percent of the drainage area. Oregon Gulch flows from its headwaters in the wetlands at Randcore Pass just outside the established RNA boundary, in a southeasterly direction for approximately 2.7 miles until it joins Jenny Creek on the former Box-O Ranch. Water is contributed to the stream from springs and seeps along its course. There are two unnamed springs marked on the USGS 7.5 Soda Mountain Quad. and one on the Parker Mountain Quad, below Rosebud Mountain (42.03.58W, 122.22.25N). Of the two springs on the Soda Mountain Quad, one (42.04.09N, 122.23.53W) is just outside the RNA boundary to the southwest. The other spring (42.03.57N, 122.22.36W) is just below the Rosebud Helipond. Rosebud Spring just north of the Rosebud Helipond on the south-facing slopes of the Oregon Gulch/Keene Creek ridge is not shown on the USGS maps. Miller (1999) observed three springs in the RNA (one shown on the USGS quad and two others) that maintained flowing water throughout the summer.Oregon Gulch is an intermittent

stream that dries up as early as mid May or not until July, but typically by the second week of June, depending on the distribution and amount of rain in any given year. Parker (1999) and Miller (1999) both reported small pools of water in Oregon Gulch in the summer of 1999. Oregon Gulch passes through several reaches of narrow, steep-walled rocky canyons (Miller 1999). The bedrock substrate allows pools to form and remain filled after reaches upstream and downstream of the canyon sections have dried up. The narrow canyon and dense riparian vegetation protect the pools from evaporation. Oregon Gulch is classified as a Rosgen type A stream (Rosgen 1996) through the RNA. This section of the stream is entrenched and confined.

The lower reach of Oregon Gulch flows through an alluvial fan into Jenny Creek. The channel in this reach is deeply entrenched (Rosgen type G), with evidence of stream straightening and bank riprap. Remnant riparian vegetation is very sparse. Aerial photos from 1939 and the early 1960s show substantially more large riparian vegetation, with little evidence of channel entrenchment. Aerial photos for 1966 show evidence of channel change from the 1964 flood, including new deposits of gravel and reductions in vegetation (USDI 2000a).

There is little data concerning streamflows and water quality for Oregon Gulch. Water temperature data were collected in late June and early July, 1998 (an unusually high water year) at two sites in Oregon Gulch, at the former Box-O Ranch/RNA border (17 days) and downstream near the Jenny Creek confluence (14 days). The number of days at each site reflects the number of days that the temperature recorders operated prior to the stream drying up. At the former Box-O Ranch west boundary site the 7-day average daily temperature was 76.81 F (max 80.11 F - min 58.21 F). At the Jenny Creek site the 7-day average daily temperature was 76.01 F (max 77.91 F - min 52.81 F).

The Jenny Creek Watershed Assessment and Analysis (USDI 1995b) states that poor road location has created major problems for Oregon Gulch, however, no specific concerns are identified. Road restoration work occurred on the Rosebud road (40-3E-19.0, 19.1) in 1999 on BLM lands, stabilizing this portion of the road. The eastern portion of the 40-3EE-19.1 road toward the Rosebud helipond is on private lands and sediment from this road could be a concern for Oregon Gulch and its tributaries.

9. Vegetation

Miller (1999) recognized five major plant communities in her mid-summer vegetation reconnaissance of Oregon Gulch RNA:

- Oregon white oak/Wedgeleaf ceanothus grass or scrubland
- Western Juniper/Oregon white oak scrubland
- Oregon white oak/Ponderosa Pine forest
- Mixed Conifer/California Black Oak forest
- Riparian

Riparian species were found along Oregon Gulch and some of the tributaries. Miller did not describe the manzanita-wedgeleaf ceanothus /bunchgrass chaparral community described in the nomination document (USDI 1989c); the occurrence of this community type was an error in the original RNA nomination. Manzanita communities are not documented to occur in the RNA.

Oregon white oak/Wedgeleaf ceanothus grass or scrubland

The balance between Oregon white oak and wedgeleaf ceanothus cover varies widely in this community in a mosaic that includes relatively flat wet meadows. Miller (1999) found the community covered wide stretches of land following a more or less homogenous slope and aspect. Oregon white oak frequently formed a dense canopy with few other tree species, although occasional ponderosa pine, western juniper, California black oak, and Douglas-fir are scattered in the community. The percent cover of shrubs is usually

greater than the tree coverage. The shrub layer often consists of Oregon white oak sprouted from the base of older trees although wedgeleaf ceanothus usually dominates. Other shrubs, serviceberry (*Amelanchier alnifolia*), mountain mahogany (*Cercocarpus betuloides*), and hazelnut (*Corylus cornuta var. californica*) are common. Grasses include the nearly ubiquitous bulbous bluegrass (*Poa bulbosa)* and medusahead (*Taeniatherum caput-medusae*) and natives such as, Idaho, western and California fescue (*Festuca idahoensis, F. occidentalis, F. californica*, respectively), and California oatgrass (*Danthonia californica*). Forbs vary from relative xeric species associated with the oaks and wedgeleaf ceanothus like balsam-root, B*alsamorhiza deltoidea*; wooly sunflower, *Eriophyllum lanatum*; *Lomatium macrocarpum* to seasonally wet meadow species (heal-all, *Prunella vulgaris;* death camas, *Zigadenus venenosus*).

Western Juniper/Oregon white oak scrubland

This community is found on the driest sites. Western juniper is the dominate tree with a few ponderosa pine and Oregon white oak. Tree coverage is less than 10 percent. Shrub cover varies between 15 to 60 percent with considerable bare rock. Rabbitbrush (*Chrysothamnus nauseous*) is the most significant shrub, although wedgeleaf ceanothus (*Ceanothus nauseous*) may dominate in some areas. The herbaceous layer is sparse, dominated by annual grasses [medusa-head rye, (*Taeniatherum caput-medusa*); nodding brome, (*Bromus tectorum*)] and the perennial alien grass, bulbous bluegrass (*Poa bulbosa*). Forbs include scattered wild buckwheats (*Eriogonum spp*.) and biscuitroots (*Lomatium spp*.).

Oregon white oak/Ponderosa Pine forest

This community consists primarily of Oregon white oak with greater diversity of conifers, particularly ponderosa pine than the tree composition in the Oregon white oak / wedgeleaf ceanothus community. Other common conifers include Douglas-fir, incense cedar, and sugar pine. Shrubs include wedgeleaf ceanothus, tall Oregon-grape (*Berberis aquifolium*), mountain mahogany (*Cercocarpus betuloides*), snowberry (*Symphoricarpos mollis*) and serviceberry (*Amelanchier alnifolia*). Grasses include aliens; bulbous bluegrass (*Poa bulbosa*), medusa-head rye (*Taeniatherum caput-medusae*), and hedgehog dogtail (*Cynosurus echinatus*); and natives; Idaho fescue (*Festuca idahoensis*), California oatgrass (*Danthonia californica*). Forbs include larkspur (*Delphinium menziesii*), strawberry (*Fragaria vesca*), arnica (*Arnica latifolia*), sweet-cicely (*Osmorhiza chilensis*), and yarrow (*Achillea millefolium*).

Mixed Conifer/California Black Oak Forest

Conifers dominate that tree layer in this community. They include Douglas-fir, ponderosa pine, incense cedar, and sugar pine. There is very little white fir. Both oaks are also present. Oregon white oak is present around the margins and in openings. California black oak is found among the conifers but is overtopped by them. The large, old, decadent California black oaks appear to be remnants of a different looking, much more open community. Shrubs include snowberry (*Symphoricarpos albus*), tall Oregon-grape (*Berberis aquifolium*), serviceberry (*Amelanchier alnifolia*), mountain mahogany (*Cercocarpus betuloides*), oceanspray (*Holodiscus discolor*), little woodrose (*Rosa gymnocarpa*), and deerbrush (*Ceanothus intergerrimus*). There are few grasses in the forested areas except for patches of bulbous bluegrass (*Poa bulbosa*), and California fescue (*Festuca californica*). Medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), Idaho fescue (*Festuca idahoensis*), and California oatgrass (*Danthonia californica*) occur in or near openings. Forbs include pathfinder plant (*Adenocaulon bicolor*), strawberry (*Fragaria vesca*), arnica (*Arnica latifolia*), sweet-cicely (*Osmorhiza chilensis*), rattlesnake orchid (*Goodyear oblongifolia*) and Scouler harebell (*Campanula scouleri*).

Riparian

Riparian vegetation is confined to Oregon Gulch, its sometimes steep narrow canyon and tributaries. Riparian herbaceous vegetation is found around some of the seeps and springs. Trees are Oregon ash (*Fraxinus latifolia*), willows (*Salix spp.*), and Douglas hawthorn (*Crataegus douglasii*). Shrubs include chokecherry (*Prunus virginiana*), Douglas

spiraea (*Spiraea douglasii*) and deerbrush (*Ceanothus intergerrimus*) stands on shady banks near the stream. There are a number of herbaceous species: horsetail (*Equisetum arvense*), sedges (Carex spp.), cattail (*Typha latifolia*), and yellow monkeyflower (*Mimulus guttatus*). The rare species Howell's false-caraway (*Perideridia howellii*), and Bellinger meadowfoam (*Limnanthes floccosa ssp. bellingeriana*) occur in the riparian zone. Howell's false caraway is fairly common, however, Bellinger's meadow for is only known for a single site.

10. Alien plants

With the exception of grasses such as bulbous bluegrass (*Poa bulbosa*), medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), and Downy brome (i.e. cheatgrass, *Bromus tectorum*) the RNA is relatively free of invasive noxious weeds. Miller (1999) found yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and dyers woad (*Isatis tinctoria*) in the RNA. She apparently did not find starthistle (*Centaurea solstitialis*). Yellow starthistle is in close proximity to the RNA, mostly along existing roads and in open grassland / scrubland habitats. Medusa-head rye is the most widespread alien plant in the RNA.

11. Special status plants

Three Bureau special status plant species that are endemic to southwest Oregon and adjacent northern California are known in the RNA: Bellinger's meadowfoam (*Limnanthes floccosa ssp. bellingeriana*), Greene's Mariposa lily (*Calochortus greenei*) and Howell's false-caraway (*Perideridia howellii*). No formal surveys for rare plants have occurred within the RNA; habitat exists for other rare plant species like Genter's fritillary (*Fritillaria gentneri*).

Bellinger's meadowfoam is found along a vernal tributary stream at a single location in the RNA. There are other populations of this endemic riparian species in the surrounding monument, to the east in Klamath county, and south into Siskiyou county in northern California. Greene's Mariposa lily grows in open Oregon white oak thickets in deep high clay content soils south of Oregon Gulch creek and into the former Box-O Ranch, at several other sites within the Cascade-Siskiyou National Monument, and immediately south into extreme northern California. These are the only known sites for this endemic species in the world. Howell's false-caraway is most common in and along the upper reaches of Oregon Gulch, and is known from Scotch Creek RNA, as well as several other drainages in southwest Oregon and northern California.

According to the Oregon Natural Heritage Program database, Bellinger's meadowfoam and Green's mariposa lily are Federal Species of Concern (i.e. old candidates for federal listing) and have an ONHP status of Category 1 (rare and imperiled in the State). Green's mariposa lily has a Natural Heritage system global rank of G2, which means this species is globally imperiled and vulnerable to extinction. Howell's false-caraway has an ONHP status of Category 4. While this endemic is rare, it has apparently stable populations across its range.

It is Bureau policy to protect, manage, and conserve Special Status Species and their habitats on lands administered by the BLM in such away that any bureau action will not contribute to the need to federally list these species.

12. Forest Health

The mixed conifer forest stands in Oregon Gulch RNA have a large mature sugar pine component that was previously open grown. Douglas-fir, incense cedar and ponderosa pine are found as well. Average age of these mature trees is estimated to exceed 250 years. Much of the stand is composed of younger co-dominant and suppressed Douglas-fir that originated after the last fire event approximately 100 years ago. A few white fir are also found in the understory. The Douglas-fir is currently overstocked and competing directly with the sugar pine and other dominant tree species for water and nutrients. Sugar pine are being attacked by mountain pine beetle (*Dendroctonus ponderosae*) and red turpentine

beetle (*Dendroctonus valens*) due to dense stand conditions and low vigor. Average decadal growth rates for sugar pine in these stands is well below the 1.5 inch diameter growth needed to maintain tree vigor at a level considered necessary to pitch out bark beetles. The stand is currently carrying over 220 square feet of basal area which is well above the 150 feet level preferred for pine. The rate of sugar pine mortality has increased in the area during the last ten years. Most of the mortality occurred in 1995 during a localized mountain pine beetle outbreak.

13. Animals

There are no large-scale vertebrate surveys for Oregon Gulch RNA. However, there are lists for the general area that indicate species that might be expected in the RNA [see for all terrestrial vertebrates Nelson (1997) for Soda Mountain Area and Appendix 10 (USDI 1995b) for the Jenny Creek Watershed; St. John (1984) for herps and reptiles, and Trail (1999) for birds]. Other workers have inventoried the RNA for breeding birds (Alexander 1999), aquatic organisms (Parker 1999) and butterflies (Runquist 1999).

Mollusks

Parker (1999) found the gastropod Stagnicola (*Lymnaeidae*) in the main channel and the Rosebud tributary and in the upstream meadow. Physella (*Physidea*) was present in sunlit stream pools in the lower reaches of Oregon Gulch. The springs in the RNA apparently do not support populations of pebblesnails.

Insects

Runquist (1999) collected 43 species of butterflies (Appendix Q) in the RNA the summer of 1999. The relatively high species count is a direct reflection of the ecological diversity of the RNA and the number and kind of plant communities upon which the butterflies rely for larval host plants and adult nectar sources. The wet meadow just to the south-east of Randcore Pass adds another seven species for a total of 50. Runquist noticed the sudden disappearance of several butterfly species in mid-July that correlated with the appearance of cattle in the wet meadow at the upper end of the RNA below the Randcore Pass road just outside the RNA boundary. He attributed this to trampling of vegetation and cattle consuming flowers that had been used by butterflies.

Parker (1999) sampled aquatic insects in Oregon Gulch. Those found were generally those that can survive warm water, are common in pool environments, or are adapted to survive summer drought. This is unsurprising, given Oregon Gulch's low summer flows and warm water temperatures (see Hydrology section).

Amphibians

Parker (1999) observed Pacific treefrog (Pseudacris regilla) and rough-skinned newts (*Taricha granulosa*) in the headwater meadow and among pools along Oregon Gulch. Rough skinned newts have also been seen in the stock-pond / pump chance near the decommissioned road along the north facing slopes of the RNA toward the former Box-O Ranch. The treefrog tadpoles and metamorphic juveniles were observed in the isolated pools. It was the only breeding population of either species observed in the survey area that did not occur in artificial impoundments.

Fish

BLM electrofishing and visual surveys in Oregon Gulch have found many trout fry in approximately the first mile of stream (USDI 1999c), only the last few hundred meters of which is within the Oregon Gulch RNA. A bedrock falls just within the RNA boundary appears to be a fish barrier. No fish have been observed above it (USDI 1999c; Parker 1999). Jenny Creek suckers (*Catostomus rimiculus*) have never been observed in Oregon Gulch.

The fry in the lower mile of Oregon Gulch, presumably redband trout (*Oncorhynchus mykiss ssp*.), are usually present in May and June. By July, the stream is often dry at the mouth. Some fry probably migrate into mainstem Jenny Creek; others are trapped in pools where chances of predation by raccoons or birds is high. Water temperatures in the lower mile of Oregon Gulch have been measured to be 85 degrees F, extremely high for fish survival (Bjornn and Reiser 1991). These temperatures may decrease fry survival in Oregon Gulch.

Birds

Alexander (1999) conducted a breeding bird survey of the RNA in June 1999. Seventeen monitoring stations were established and sixteen were visited twice. A total of forty-two species were encountered. Thirteen species are conservation focal species for Oregon and / or California.

The area has been surveyed for Great Gray Owls and Spotted Owls. Great Gray owls were not seen during surveys in the RNA. Northern Spotted Owls are known to nest in the RNA. Timbered portions of the RNA have been mapped as roosting and foraging habitat using modified McKelvie Spotted Owl habitat criteria.

Small game species in the general area include Ruffed grouse (*Bondosa umbellus*), Blue Grouse (*Dendragapus obscurus*), Wild Turkey (*Meleagris gallopavo*), Mountain Quail (*Oreortyx pictu*s), and Valley Quail (*Callipepla californicus*).

Mammals

The Black bear (*Ursus americanus*), Cougar (*Felis concolor*) and Black-tailed deer (*Odocoileus hemionus columbianus*) are known to occur within the RNA. Elk also use the RNA seasonally. Small game species in the general area include Western Grey Squirrel (*Sciurus griseus*).

14. Alien Animals

Several alien animals are known or suspected to be present in the RNA. These include birds, pigs, and cattle. Opossum (*Didelphis marsupialis*) have not been observed within the RNA, however they are present in the low elevation valleys in the Rogue and Klamath river basins.

Birds

Turkeys (*Meleagris gallopavo*) have been observed on the former Box-O ranch and in the vicinity of Hobart Bluff. It is likely that they are also found in the RNA because of the oak communities. The native animals affected or displaced by these birds are unknown but likely include mast eaters such as western gray squirrels, black-tail deer, acorn woodpeckers.

Starlings (*Sturnus vulgaris*) are also suspected in the area. These birds compete with native species, especially western blue birds (Sialia mexicana) for cavity nesting sites.

Pigs

The Randcore pot-bellied pig (i.e. *Sus "ventricosus Randcorensis"*) was observed and photographed along the Rosebud Helipond road in the fall of 1997. It is assumed that the female pig was pet that escaped from a hunting camp at Randcore Pass or from a ranch near Lincoln (a pig jaw was collected near the Pinehurst Airport). The establishment of feral pigs could have a major adverse ecological impact on local terrestrial ecosystems. There have been no observations of feral pigs since 1997 in or near the RNA.

Cattle

Livestock grazing currently occurs within the RNA. According to BLM RNA policy (BLM Manual 1623.37C), this activity should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized. Oregon Gulch RNA is also

known as Oregon Gulch Pasture and is a part of the Ashland Resource Area grazing plan. As previously noted, cattle may impact butterfly populations in the wet meadow that supplies water to Oregon Gulch (Runquist 1999). There have been no studies in Oregon Gulch RNA to monitor or establish the effect of grazing on the watershed, the ecosystem, or the sensitive plants.

15. Site history

Native Americans who may have visited the Oregon Gulch area and utilized its resources include the Klamath, the Shasta, and the Takelma. All of these Native American groups came to this area during the warmer months of the year to hunt, gather vegetable foods, trade, and to meet with each other for various social purposes (USDI 1999a p.26).

Jenny Creek lies to the east of the RNA. Jenny Creek, a major perennial stream, contained riverine resources and adjacent environments that were conducive to hunting and gathering. Agate Flat which is located south of the RNA, was a major source of toolstone material (cryptocrystalline silicates or CCS). Good quality material occurs in great quantities and is exposed on the surface where it could be easily gathered and utilized.

There were numerous resources upon which these native peoples depended. Roots and bulbs, such as camas (*Camassia*) and various forms of *Perideridia* (e.g. *ipos, yampa*) provided starchy staples as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, seeds (e.g. tarweed seeds, *Madia spp*.). Other plants and animals were used for fiber, tools clothing, and medicines.

Fire probably was the most significant tool used by native peoples to enhance those resources useful to them. Fire assisted in promoting, maintaining, and harvesting staple crops, such as acorns and tarweed, and maintained open meadows and prairies, which were crucial locations for subsistence resources including game, roots, bulbs, berry patches, and grass seeds. Fire also promoted habitat important to large game. Burning took place during the spring or fall and at specific intervals, and contributed to the development and maintenance of prairies and savannahs, oak and oak/pine woodlands, and upland meadows.

Settlement of southern Oregon by Euro-Americans increased substantially after gold was discovered in Jacksonville in 1852. Newcomers settled throughout the Rogue Valley, utilizing open savannas and grasslands for agriculture and livestock ranching. Conflicts over land between miners and settlers and Native Americans culminated in removal of the remaining Native Americans. The Klamath Indians were confined to the Klamath Reservation east of the Cascades. Some Shasta families however, managed to remain in the Shasta Valley and along the Klamath River, or escaped from the northern reservations to find their way home.

Settlers in the Rogue Valley began seeking summer pastures in these uplands by the 1860s. Livestock grazing was the major use of these uplands for much of the last half of the nineteenth century. Both cattle and sheep ranged through these upland pastures. The latter decades of the nineteenth century witnessed uncontrolled expansion of sheep and cattle grazing, provoking continual "bickerings and wranglings" among rival grazers for the best range. Creation of the Forest Reserves in 1893 and later the Forest Service in 1907 brought some order to the range.

Like the Native Americans before them, these local ranchers and settlers often set fire to large areas to promote the growth of berries, browse for game, and forage for their stock. Sometimes these fires swept through the areas of heavy timber; it seems the fire management of historic settlers was less discriminate than the practices of their Native American predecessors.

George Wright, long time area resident, typed up his recollections in 1954 and mentioned the Oregon Gulch area on several occasions. This anecdotal history contains important information regarding place names, and the early history of the area. This information is in attached at the end of this document and can be found in Appendix C of the CSNM Plan.

16. Human Features

Features in the RNA were built for commodity extraction and enhancement, fire control, transportation, and administrative purposes. These include roads, fire control, and livestock facilities.

Transportation

Road density is about 1.9 miles per square mile. Although road density is not high, poor road location has created major problems for Oregon Gulch (USDI 1995b). There are currently three roads in the RNA: BLM Road 40-3E-19 and 19.1, Lincoln Creek Road 40-3E-12.1. BLM Roads provide access to private land in T.40S.,R.4E., Sections 20 and 30.

BLM Roads 40-3E-19 and 19.1 leave Lincoln Creek Road 40-3E-12.1 just top the south of Randcore Pass. -19.0 leads to private and BLM lands in the Keene Creek drainage. -19.1 leads to the Rosebud Helipond. Both roads are natural, unsurfaced, badly rutted, and become extremely slick when wet.

Lincoln Creek Road 40-3E-12.1 extends beyond Randcore Pass through the southwest corners of the RNA where it enters private land at the SW corner of the NE1/4 of the NE1/4, T.40S.,R.4E., Sec.30. The road continued to Agate Flat until 1996 when a section through BLM land at T.40S.,R.4E., Sec.30, W1/2SE1/4 was decommissioned, effectively ending the road. From Randcore Pass to private land the road is rocked. On private land it is a natural (unsurfaced) road. It also leads to the decommissioned Road 40-4E-30 and offers access to the RNA in T.40S.,R.4E., Sec. 29.

BLM Road 40-4E-30 along the north-facing south slopes of the RNA was effectively decommissioned in 1996 and is blocked by barricades at the east RNA boundary and by a locked gate at the former Box-O ranch boundary to the east. The lower portion of the road was not decommissioned to reduce the possibility of the spread of noxious weeds.

Water Developments

There are four small, operational, livestock watering facilities with water rights in the RNA (Table ADD-3). The BLM also retains water rights on several springs within the RNA.

Table ADD-3. RNA Water Developments with Water Rights

Name	Township	Range	Section	QtrQtr	Size (acre-feet)
Oregon Gulch Reservoir #1	40 S.	4 E.	29	NWSE	0.08
Oregon Gulch Reservoir #2	40 S.	4 E.	29	NESW	0.06
Root Spring Reservoir	40 S.	4 E.	30	NENE	0.01
Twin Pines Spring Reservoir	40 S.	4 E.	19	SESW	0.02

Oregon Gulch Reservoirs #1 and #2 (Range Files #0066, #0065, Ashland Resource Area, Medford BLM). Both earthen detention dams were built in 1958 to check erosion, provide water for livestock, and fire purposes. Reservoir #1 is located above the decommissioned Oregon Gulch Road 40-4E-30 in an unnamed tributary of Oregon Gulch just below a small

seep in T.40S., R.04E., Section 29, NW1/4SE1/4. Reservoir #2 is located below the decommissioned Oregon Gulch Road 40-4E-30 at the site of a small spring on an unnamed intermittent tributary of OregonGulch in T.40S., R.04E., Section 29, SW1/4NE1/4. Reservoir #1 is entitled to store 0.08 acre-foot. The dam at Reservoir #1 failed during an unusually heavy runoff, probably during the 1964 flood year. Reservoir #2 is entitled to store 0.06 acre-foot and was described in 1973 as a good stable water source.

Rosebud Helipond is used as a water source for fire fighting and has a total storage volume of 0.14 acre-feet. It is shown as a feature on the USGS 7.5 minute Soda Mountain Quad. map and is located in T.40 S., R.04 E., Section 29, NE1/4NW1/4. Water is piped from a spring development to the helipond via a livestock watering tank. The helipond supports standing water marsh vegetation with various emergent rushes, sedges, and cattails around its margin and floating duckweed on it surface. There is no defined channel below the helipond.

Fences

Fence 505 passes through the upper part of the RNA in a southwest northeast direction through T.40S.,R.4E., Sec.30, NE1/4, NW1/4 29, S1/2 20 to below the summit of Rosebud Mountain to the SW1/4 of 21. The fence is used to control movement of livestock to the lower portion of the RNA. An historic maintained fence separates the RNA from the former Box-O Ranch along the section line between Sec. 28 and 29.

B. Surrounding Land Use

BLM manages most of the surrounding lands, however there are small parcels of private land adjacent to the RNA. The acquisition of several of the private parcels would have been desirable in order to include all of the Oregon Gulch drainage basin in the RNA. However, most of these lands have experienced fairly intensive management (logging and roads) and are generally no longer suitable to be included in the RNA other than to protect the RNA from potentially damaging activities that can occur on private land (substandard road construction, soil erosion, wildlife habitat destruction, development).

Public land.

Until the establishment of the National Monument, most of the surrounding land was in the BLM Jenny Creek Late-Successional Reserve established by the Northwest Forest Plan. The LSR was to be managed according to Jenny Creek Late-Successional Reserve Management Plan (USDI 1999a). Land to the east, acquired by the BLM in 1995, was the private Box-O ranch which was operated for many years as a private cattle ranch.

Private land.

Private land in T.40S.,R.4E.,Sec.20,30. was formerly owned by Roseburg Lumber Company. The current owner is Larry D. Olson and was recently logged.

V. MANAGEMENT CONSIDERATIONS

A. Botanical/Plant Communities

Policy and Agency Standards

The following directives regard maintaining, protecting or restoring relevant and important botanical values of RNAs:

• RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving the manipulations of environmental or vegetational characteristics or plant harvest must be approved. Because the overriding guidelines for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation, such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained (BLM Manual, 1623.37 (A)(B)).

• Preserve, protect or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial and aquatic cells) in research natural areas. These areas will be available for short or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured (PNW 1991).

RNA Management Goal

• Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).

Current Information

The ecological condition of all plant communities identified as key elements at within the RNA were considered to be of overall high quality when the area was nominated as an RNA in the 1990's (Schaaf 1990). Non-native weedy species, particularly hedgehog dogtail, (*Cynosurus echinatus*), medusa-head (*Taeniatherum caput-medusae*), dyers woad (*Isatis tinctoria*) and yellow star thistle (*Centaurea solstitialis*)(if present) in some of the savanna and woodland areas threaten the integrity of these plant communities. The spread of these and other non-native species into the RNA from surrounding private land is an ongoing threat.

Exclusion of a natural fire regime has resulted in encroachment of shrubs and conifers into the edges of open oak/grass savanna areas, decreasing the extent of this plant community in the RNA. Underbrush and tree density have increased in woodlands and forest areas, increasing fire fuel loads and the risk of high-intensity, stand-replacement fires.

The main plant community management objective within the Oregon Gulch RNA is to maintain or enhance their key attributes. Ideally this would be accomplished by allowing succession to occur as a result of a natural disturbance regime, which could include wildfire, storms, normal mortality, drought, etc. However, because of past human interference, in the form of fire suppression and livestock grazing, pro-active management is necessary to re-establish some of these natural processes.

All plant communities are subject to natural disturbances and corresponding succession over time. It is not the intention of RNA management actions to halt this natural succession and disturbance process at one particular stage. Using prescribed burning as a management tool is an attempt to re-introduce fire as a natural process. Excluding fire during the past 100 years has resulted in a build-up of fire fuel loads and encroachment of trees and shrubs into savannas and meadows. Reintroducing fire in small areas under controlled circumstances would reduce fire fuel loads, as well as improve the ecological condition of plant communities in which fire has historically been a component by restoring native species composition. Allowing naturally-occurring fires to run their course at the RNA is constrained by the proximity of private property surrounding the RNA. Utilizing fire in small areas at different times throughout the RNA is intended to resemble the patchiness of natural disturbances. With this approach, at any one time different areas of

each plant community will be in different successional stages, mirroring normal ecosystem conditions.

Outlined below are goals, objectives, and management actions for each plant community requiring management within the RNA. Other important management considerations affecting plant communities within the RNA are discussed under separate headings (e.g. introduced and noxious weedy species, insects and disease, livestock grazing, timber harvest, etc.). Continuing monitoring of plant communities, discussed in Section VI, is vital to the process of tracking and evaluating responses to natural or prescribed disturbances, determining the effectiveness of management actions or research activities, and making necessary adjustments to insure that management goals continue to be met.

Oregon white oak/Wedgeleaf ceanothus/Grass or Scrubland

Goals and Objectives

- Maintain open meadows by reducing the encroachment of conifers and shrubs
- Decrease non-native and increase native species.
- Re-introduce fire as a natural ecological process, especially in chaparral/grassland component.

Issues

- Competition from non-native weedy species.
- Current fire suppression tactics
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- High densities of shrub mosaic
- Limited access to the site
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using equipment.
- The RNA is utilized in an existing grazing allotment
- Existing populations of Green's mariposa lily in open grassland/scrubland inclusions.

Management actions

- Collect and propagate native grass and forb seeds from savanna areas within the RNA.
- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows/savannas. Design activities to maintain or enhance Green's Mariposa lily or other rare special status species.
- Prescribe burn chaparral component to reduce fuels and regenerate shrubs.
- Re-seed burned areas with native grasses and forbs.
- Conduct post-project vegetation surveys and periodic monitoring, especially in chaparral component.

Western Juniper/Oregon white oak scrubland

Management goals, issues, and actions are similar to Oregon white oak/Wedgeleaf ceanothus grass or scrubland. However, more attention needs to be focused on the rela-

tionship between Oregon white oak and juniper . Since juniper is considered fire sensitive, the extensive use of prescribed fire would reduce its abundance across the landscape over time. A more detailed fire history and better understanding of community changes are required before the application of prescribed fire within this plant association.

Oregon white oak/Ponderosa Pine forest

1. Woodland component

Goals & Objectives

- Maintain open woodland, dominated by Oregon white oak, ponderosa pine and associated native species.
- Reduce Douglas-fir and incense cedar conifer seedlings.
- Reduce fire fuel loads.

Issues

- Fire suppression resulting in conifer recruitment and increased fuel loads and ladders.
- Presence and competition from non-native plant species.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large mechanized equipment.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize prescribed burning or manual thinning to reduce conifer recruitment and fire fuel loads.
- Re-seed between trees after burning with native grasses and forbs.

2. Grasslands and meadow component

Goals

- Maintain open meadows by reducing the encroachment of conifers and shrubs.
- Decrease non-native and increase native species.

Issues

- Competition from non-native weedy species.
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using mechanized equipment.
- Cattle grazing
- Existing sites for the rare Green's Mariposa lily

Management actions

- Collect and propagate native grass and forb seeds from savanna areas within the RNA.

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows/savannas. Design activities to protect or enhance Green's Mariposa lily sites.
- Re-seed burned areas with native grasses and forbs.

Mixed Conifer/California Black Oak forest

Goals

- Maintain ecosystem function in the mixed conifer/California black oak plant community cell.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks, including monitoring for Sudden Oak Death disease.
- Design management activities that restore natural ecosystem and disturbance processes.

Issues

- Once open grown sugar pine stands now contain overly dense component of Douglas-fir.
- Fire suppression has resulted in increased stand densities
- Increased mortality from insect attacks on sugar pine

Management Actions

- Decrease stand densities and improve health of Sugar pine stands by understory thinning of douglas-fir and re-introduction of prescribed fire
- Monitor health of conifer stands

Riparian (also see Hydrology and Aquatic Habitat section)

Goals

- Maintain and restore the function, structure and vegetative composition of the riparian zones, including seeps and springs.

Issues

- Riparian areas subject to grazing and localized areas of periodic high utilization
- Disrupted hydrologic function from past road building and culverts
- Isolated riparian impacts from grazing and water impoundments on springs/seeps
- Lack of riparian survey data

Management Actions

- Perform riparian surveys documenting hydrologic and riparian vegetation condition.
- As part of the Cascade-Siskiyou National Monument grazing study, survey and document the effects of current grazing on the riparian system, including effects to the rare Bellinger's meadowfoam.
- Fence impacted riparian sites if needed.
- Restore riparian areas within the RNA that not properly functioning based on results of Riparian surveys.

B. Introduced Species and Noxious Weeds

Policy and Agency Standards

The introduction of exotic plant and animal species is normally not compatible with the maintenance or enhancement of key RNA features. Certain re-introductions of formerly native species using proper controls may be specified in plans (USDI 1986b).

Take any action necessary to prevent unnecessary or undue degradation of the lands (FLPMA 1976).

The public Rangelands Improvement Act of 1978 directs the BLM to Amanage, maintain, and improve the condition of public rangelands so they become as productive as feasible.

Goals

- Maintain and/or restore native plant communities
- Contain or eradicate exotic and noxious weeds
- Prevent the introduction of new exotic or noxious weed species

Current information

Several areas within the RNA are dominated by introduced (alien) grasses, namely medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*). Occurrences of yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and small populations of dyers woad (*Isatis tinctoria*) are also documented. Yellow starthistle (*Centaurea solstitialis*) populations are in close proximity but are not documented in the RNA. No weed treatments have occurred in the RNA.

Issues

- Exotic plants and noxious weeds threaten the integrity of key features within the RNA
- Disturbance as a result of wildfire, vegetation treatments (burning or thinning), or livestock grazing can create optimum habitat for exotic and noxious weeds
- High cost for weed treatments due to poor access
- Lack of detailed weed surveys within the RNA
- Lack of proven methods for controlling large infestations of exotic grasses like cheatgrass or bulbous bluegrass.
- Lack of large quantities of native grass and forb seed for restoration

Management Actions

- Survey and map existing weed infestations
- Control weeds within and adjacent to the RNA using a integrated weed management approach utilizing mechanical, cultural, biological, and chemical means.
- Collect and propagate native seed sources within the watershed.
- Vegetative treatments to enhance key RNA features must be tailored so as to reduce weed infestations and not increase existing populations
- As part of the grazing study, evaluate wether grazing is increasing noxious or exotic weeds.

C. Endangered and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1973) governs and provides for the conservation of listed and proposed species, and their habitats, on federal lands. The BLM Policy regarding Special Status Species, including federally listed and proposed species, state listed species, and species designated as Sensitive is to protect and conserve federally listed and proposed species, manage their habitat to promote recovery, and (for sensitive and state listed species) to ensure that Bureau actions will not contribute to the need to list sensitive or state listed species as federally listed (BLM Manual 6840).

Goals

- Maintain or enhance Bureau Special Status Species occurrences and habitat within the RNA

1. Wildlife

Current information

Suitable habitat and a spotted owl center of activity exists in the RNA. The nest stand used by a pair of owls falls inside the RNA boundary. No other federally listed wildlife species are known to occur within the RNA.

Issues

- Habitat manipulation activities (burning, vegetation manipulation, etc) proposed to occur in the RNA must be designed to protect, maintain or enhance owl habitat.

Management Action

- Periodic monitoring of nest sites

2. Plants

Current Information

Three species are documented in the RNA, Bellinger's meadowfoam (*Limnanthes floccosa ssp. bellingeriana*), Greene's Mariposa lily (*Calochortus greenei*), and Howell's false-caraway (*Perideridia howellii*). Two of these species, Bellinger's meadowfoam and Howell's false-caraway, are found within the riparian zone of Oregon Gulch creek. Howell's false-caraway is fairly "common" within the RNA and within the surrounding watersheds in the Monument. This species is not in immediate danger of extinction, but it is rare. Bellinger's meadowfoam is quite rare, and is known for a single location in the RNA. It has an Oregon Natural Heritiage ranking of G4/S2, which means it globally secure but it is imperiled within the State because of rarity or because other factors demonstrably make it vulnerable to extinction. Green's mariposa lily is extremely rare, globally and within the state. This species has an ONHP ranking of G2/S2, meaning that range wide it is imperiled because of rarity or because other factors demonstrably make it vulnerable to extinction. The status of these three species occurrences in the RNA is not known; recent monitoring has not occurred. No formal rare plant surveys have occurred within the RNA. Suitable habitat does exist for several other Bureau Special Status plants, including the Federally listed Gentner's fritillary (*Fritillary gentneri*).

Issues

- No formal rare plant surveys within the Monument
- No monitoring of existing populations
- Affects from periodic grazing are not known for existing populations

Management Actions

- Complete rare plant surveys within the RNA
- Establish monitoring plots, as part of the grazing study, for Bellinger's meadowfoam and Green's mariposa lily.
- Protect populations from grazing if needed to maintain viability of these populations.

D. Insects and Pathogens

Policy and Agency Standards

Catastrophic natural events, such as insect infestations should ideally be allowed to take their course. Insect or disease control programs should not be carried out except where infestations threaten adjacent vegetation or will drastically alter natural ecological processes within the tract (USDI 1986b).

Goals and Objectives for Insects and Pathogens

- Maintain historic ecosystem functions in the mixed conifer / California black oak plant community cell.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
- Design management activities that restore natural ecosystem and disturbance processes.

Current Information

The Oregon Gulch mixed conifer / California black oak plant communities are at risk of beetle infestation. Two variants of mixed conifer are found in the RNA. Most of the stands to the north are more mesic, have a dominant sugar pine component and dense Douglas-fir reproduction. The forests to the south are drier with few sugar pine and are more ponderosa pine and incense cedar dominated. The young Douglas-fir component in the south is not as dense.

The stands are overstocked with subdominant Douglas-fir due to fire exclusion for the last 100 years. It appears that parts of the RNA were burned about 60 years ago. A localized mountain pine beetle (*Dendroctonus ponderosae*) outbreak in 1995 caused mortality of approximately 30 percent of dominant old growth sugar pine component as well as a few large ponderosa pine. Red turpentine beetle (*Dendroctonus valens*) is also common in the stand. The summer of 2000, Masters candidate Cori Francis (Oregon State University and Medford District BLM) characterized stand structure while writing a prescription for the forest types in Oregon Gulch. Her data indicates the mixed conifer / California black oak forest type continues to be at risk because of slow growth and overly dense stocking. Pine mortality presently continues at a high, although not epidemic, rate annually. Pine will continue to be replaced by Douglas-fir and occasionally white fir in gaps that result from pine mortality. Further, white pine blister rust (*Cronartium ribicola*) is present in areas near the RNA which reduces the likelihood that young sugar pine will grow to maturity.

Currently, individual sugar and ponderosa pine databases have been developed in an effort to follow growth rates, ages and tree vigor. Annual aerial surveys are used to track insects (beetles).

Needed information

Annual monitoring of all types of disturbance agents is needed. Revisiting permanent plots established in 2000 at 5 year intervals is desirable in order to monitor potential insect and disease problems in the future. The individual large sugar and ponderosa pine database needs to be updated every 3-5 years.

Insects:

- Mountain pine beetle (*Dendroctonus ponderosae*)
- Western pine beetle (*Dendroctonus brevicomis*)
- Red turpentine beetle (*Dendroctonus valens*)

Recent aerial flight survey data and ground checking indicates localized epidemics and increased mortality rates due to overly dense stands (often up to 300 feet of basal area) with individual large dominant old growth pine showing reduced (< than 1/2") decadal radial growth rates. Both of these parameters indicate stands and individual trees are at risk for beetle infestation. Generally, forest stands in the vicinity at the ecoregion level (Klamath River Ridges) are at risk for beetle epidemics. The unique structure of the heritage stand (6-8 dominant sugar pine per acre) with hundreds of small Douglas-fir per acre puts the RNA at an even higher risk for beetle infestation as shown by the 1995 outbreak. All three beetles currently put the forests at risk.

Management Actions

Risk reduction management activities will involve thinning small Doug-fir, piling and burning and then conducting a prescribed underburn. The thinning would not involve cutting trees greater than12" dbh. The stand would be treated at a level that would reduce risk to catastrophic fire and beetle infestation by reducing ladder and fine fuels, reducing competition for water and opening up the stand while maintaining the large tree stand component. Costs to accomplish these activities are well known from other similar projects. Funding can be obtained through forest health monies. Management activities regarding insect risk reduction and fuels reduction need to occur simultaneously in the near future.

Pathogens:

- White pine blister rust (*Cronartium ribicola*)
- Western dwarf mistletoe of ponderosa pine (*Arcuethobium campylopodum*)
- Douglas-fir dwarf mistletoe (*Arcuethobium douglasii*)
- Shoestring root rot (*Armellaria mellea*)
- Black stain (*Verticicladiella wagonerii*)
- Velvet top fungus (*Phaeolus schweinitzii*)

White pine blister rust (*Cronartium ribicola*) is an exotic pathogen introduced to the Pacific Northwest about 80 years ago. It causes mortality by girdling small sugar pine due to stem cankers. Larger trees are generally resistant given their size. At present sugar pine reproduction up to pole sized trees has decreased in the Klamath River Ridges Ecoregion (78g) because of the rust. Forest gaps that historically would have been partly filled by sugar pine are now being filled with Douglas-fir, white fir, incense cedar and ponderosa pine only. The result is a "future forest" with decreasing amounts of sugar pine in the stand. Stand dynamics and resilience will change over time due to its absence. Oregon Gulch RNA has very little evidence of blister rust likely due to some microclimate effect due to moisture. Gooseberries and currents (*Ribes sp.*), that are the alternate host for blister rust, are present in the RNA. Sugar pine is a species that lends unique biodiversity attributes to mixed conifer forests because of its general resistance to drought and fire. The RNA will be monitored for blister rust incidence.

Western dwarf mistletoe in ponderosa pine is common in the RNA, but is not considered a problem because it is present at a natural level. Many of the old growth trees exhibit dwarf mistletoe in the lower crown only indicating that they out grew the infections earlier.

Douglas-fir dwarf mistletoe is present in heavy amounts in some groups of old growth Douglas-fir within the RNA. It has contributed to mortality of mature trees. Douglas-fir mistletoe is a naturally occurring parasitic plant that is beneficial to wildlife in old growth forests. Its presence in the RNA is not considered a problem. Groups of Douglas-fir infected by mistletoe will contribute to diverse canopy structure. Mortality of tree groups will result in gaps being formed and will contribute to coarse woody debris.

Shoestring root rot (*Armellaria mellea*) is present at low levels around ponderosa pine. It is a secondary pathogen that is occasionally attacking stressed trees. It is not a significant problem currently. Stand density reduction and prescribed burning will reduce shoestring root rot levels.

Blackstain (*Verticicladiella wagonerii*) was observed on one isolated Douglas-fir in1999 in the RNA. It is spread by root grafts or beetles. So far very little blackstain has been noted in the Monument. It is unlikely to be a significant problem in the RNA. Its presence should be monitored as it may infect the Douglas-fir in or near existing roads or disturbed areas. Ponderosa pine can also be infected.

Velvet top fungus was noted in association with groups of dwarf mistletoe killed Douglas-fir. It is a commonly found pathogen (saprophyte) found in old growth stands. In this instance it is not considered a problem.

Management Actions

Thinning small trees, primarily Douglas-fir, from below and prescribed burning will increase overall forest stand vigor. As water deficit stress is reduced, susceptibility to diseases will be reduced as well. The pathogens listed above, with the exception of *Cronartium ribicola* are not currently present at a level that will cause significant impacts to RNA forest types. Blister rust is not currently found to be a significant influence in the RNA.

Summary Insect and Disease

Bark beetles pose the most significant threat to the integrity of the Oregon Gulch forests. Overly dense stands are present due to the suppression of fire over the last 100 years. Dense stocking levels of Douglas-fir are causing stress to dominant pine by competing for available moisture. Tree stress increases with increasing water deficits making pine more susceptible to beetle outbreaks. A mountain pine beetle outbreak in 1995 is a precursor to further problems in Oregon Gulch as well as surrounding areas. Natural processes must be reestablished in order to keep the RNA forest community cells viable. Not all insects and pathogens present in the RNA were listed. Only those thought to be significant factors were discussed. No information is available for insect and pathogen issues for oak woodlands or chaparral communities. Obtaining this information will be important in planning to maintain RNA values.

E. Lands & Boundary/Edge Effects

Policy and Agency Standards

- Maintain or increase public land holdings in Zone I by retaining public lands and acquiring non-federal lands with high public resource values.
- Acquire lands and interests in lands needed to manage, protect, develop, maintain, and use resources on public lands... in conformity with land-use plans that apply to the area involved (BLM Manual, 2100.05, 1984).

Goals and Objectives

- Maintain the integrity of the RNA.

Current Information.

The Oregon Gulch RNA covers an area of 1,056 acres of public land. The boundary is defined by the limits of the watershed and property lines between the public and private lands. Approximately 290 acres of private lands are in the drainage, however the key plant communities that the RNA was designated for are no longer intact on the adjacent lands.

Management Actions.

- Periodic inventory to assure no trespass from activities on private lands.

F. Roads and Utilities Rights-of-Way

Policy and Agency Standards

Public uses such as roads, pipelines, communication sites, and powerlines should avoid the designated area and be anticipated in activity plans. Road closures or restrictions maybe considered appropriate in some instances (USDI 1986b). Roads are generally prohibited in RNAs, however, old roads or un-improved tracks often exist. (PNW 1991).

Goals

Ensure that existing roads do not contribute to any loss of integrity of the RNA communities, including the riparian area.

Current Information.

There are no utility rights of way in the RNA. Several old jeep roads exist within the RNA and most have been closed, stabilized and are no longer maintained. One open road (40-4E-19.2) which provides access to the private parcel in Section 30 from Randcore pass serves as the boundary along the NW edge of the RNA. This road is under a reciprocal agreement. A portion of road 40-4E-19.0 is also under a reciprocal agreement and provides access to the private parcel in Section 20. No future ROW permit requests are anticipated through the RNA.

G. Fire Management

Policy and Agency Standards

In 1995, the latest Federal Fire Policy (USDA 1995) was issued directing federal land managers to expand the use of prescribed fire in order to reduce the risk of large wildfires due to unnatural fuel loadings and to restore and maintain healthy ecosystems.

Base the use of prescribed fire on the risk of high intensity wildfire and the associated cost and environmental impacts of using prescribed under-burning to meet protection, restoration, and maintenance of crucial stands that are currently susceptible to large-scale catastrophic wildfire.

Reintroduce under-burning across large areas of the landscape over a period of time to create a mosaic of vegetative conditions and seral stages. This is accomplished by using prescribed fire under specific conditions in combination with the timing of each burn to reach varying fire intensities. Treatments should be site-specific because some species with limited distribution are fire intolerant (USDA 1995).

Where perpetuating a seral stage of plant succession is important, prescribed fires may be specified in the activity plan; but only where they provide a closer approximation of the natural vegetation and governing processes than would otherwise be possible. Application of prescribed burns normally should be performed closely approximating the "natural" season of fire, frequency, intensity, and size of burn. The burn should be followed by a fire effects report documenting vegetative response (USDI 1986b).

Adhere to smoke management and air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning (USDA 1995).

Goals and Objectives

Reintroduce fire into the RNA to re-establish a natural ecological process and to maintain, enhance or restore the structure and composition of the key plant communities. Specific objectives include:

- Increasing the extent of oak/pine savannas by removing encroaching hardwood and conifer seedlings and shrubs.
- Reduce non-native and increase native grass and forb species.
- Invigorate chaparral stands by removing decadent shrubs and creating openings for native grasses and forbs.
- Maintain and improve existing grasslands and meadows by using prescribed fire to invigorate native grasses, provide a good bed for reseeding, and reduce encroaching shrubs and conifers.
- Control wildfire in mixed conifer stands to protect losses to surrounding land owners.
- Reduce fuel loadings created from thinning activities.

Current Information

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen, 1995). Early settlers to the Rogue and Klamath Valleys used fire to improve grazing and farming and to expose rock and soil for mining. It is not known if fire was used in this manner historically in the RNA. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying severities.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions. Fire frequency also decreased as the use of fire by native peoples decreased due to their disappearance from the landscape by disease or translocation to reservations.

Based on calculations using fire return intervals, five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism, thereby, naturally regulating the density of the forests by killing unsuited and small trees. Consequently, much old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at

lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow growing trees rather than faster growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination, without fire, these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production and/or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their relatively short-lived seed-bank.

Climate and topography combine to create the type of fire regime found in the Oregon Gulch RNA. Fire regime is a broad term and is described as the frequency, severity and extent of fires occurring in an area (Agee 1990). Vegetation types are helpful in delineating different fire regimes. The Oregon Gulch RNA is classified as a low-Severity (68%) and moderate-Severity (32%) fire regimes based on the vegetation types found within the RNA. The low-severity regime is characterized by vegetation types such as grasslands, shrub-lands, hardwoods, mixed hardwoods, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities are adapted to recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. A low-severity regime is characterized by nearly continual summer drought, fires are frequent (1-25 years), burn with low intensity and are widespread. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. The intermixture of pine-oak within the RNA suggests the fire return interval of about 10 years (Agee 2000). The moderate-severity regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). A moderate-severity regime is characterized by long summer dry periods, fires are frequent (25-100 years), burn with different degrees of intensity and burn in a mosaic pattern across the landscape. Some stand replacement fires as well as low-intensity fires may occur depending on burning conditions.

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the responsibility of fire protection of all lands within the Oregon Gulch RNA to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Between the years 1967 and 1999, there have been three fires within the Oregon Gulch RNA. All three fires were started by lightning and occurred in the years 1989, 1996 and 1999. Suppression action was taken by ODF resulting in two fires contained at 0.1 acre in size while one fire was contained at 1 acre in size.

Currently, some fire suppression techniques are not allowed within the Oregon Gulch RNA in order to minimize disturbance to the area. All vehicles are restricted to existing roads and the use of tractors are not allowed within the RNA.

Prescribed fire can be used to meet resource management objectives which include but are not limited to wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat and silvicultural treatments. When utilizing prescribed fire it should be based on the fire history of the area and past vegetation patterns known for the area. The application of prescribed fire should closely approximate the frequency, intensity, size, and the "natural" season of fire when possible.

Many factors influence fire behavior and the effects fire will have on a resource. Some are beyond our ability to control such as the location of where a fire starts, weather and topography. Fuels management programs focus on the factors which we have influence over such as fuels and vegetation. Prescribed fire is one tool that can be utilized to regulate fuels and vegetation. A primary objective of any fuels management activity in the RNA is to alter existing fuels in order to protect or minimize damage to existing late-successional habitat from wildfires which may occur.

All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. In compliance with the Oregon Smoke Management Plan, any prescribed burning activities within the RNA require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the State Forester on a daily basis concerning smoke management and air quality conditions.

Prescribed burns would be conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained.

Issues

- Limited access to and within the RNA.
- Restrictions against using large equipment in fire treatment or suppression activities.
- Constraints to season of prescribed burning due to air quality and fire season restrictions.
- Seasonal constraints due to growth period for rare plant species (Green's mariposa lily)
- Limited funding for repetitive treatments and restoration projects.
- Limited availability of native grass, forb, and shrub seed or seedlings for re-planting.

Management Actions

- Develop a fire management plan and memorandum of understanding for the entire RNA, coordinated between BLM and ODF, including a plan for prescribed burning.
- Use fire to enhance known sites of special status plant populations where applicable.
- Establish pre-burn plots in targeted plant communities to gather baseline data of vegetation species composition, density, etc. to determine the effects of fire on affected plant communities.

- Through prescribed burning, reintroduce fire as a natural process, based on past fire regimes.
- Conduct post-project monitoring of plant communities to determine the effectiveness of management activities in achieving RNA goals. Adapt management activities as necessary.

H. Aquatic Ecosystems: Hydrology and Habitat

Policy/Agency Standards

Two major planning efforts have set the objectives for aquatic ecosystems. Objectives for water resources include compliance with State water quality requirements to restore and maintain water quality necessary to protect designated beneficial uses for the Klamath River Basin. In addition, the overall goal of the Monument Aquatic Conservation Strategy (MACS), is to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands (Appendix BB). Included in the MACS are specific goals:

- Maintain and restore the physical integrity of the aquatic system.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration, and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.
- Maintain and restore a properly functioning watershed condition within the Oregon Gulch RNA.
- Maintain and restore the ecological health of aquatic ecosystems within the Oregon Gulch RNA.

Objectives

- Reduce or eliminate sediment input into streams and wetlands as disturbed areas regenerate.
- Reduce or eliminate surface disturbing activities such as roads/jeep trails.
- Restore and maintain native riparian vegetation along streams and springs/seeps.
- Achieve properly functioning riparian areas.
- Restore and maintain natural water flow (ground water and overland) into streams and spring/seeps.

Current Information

Hydrologic features in the Oregon Gulch RNA include intermittent streams (Oregon Gulch and unnamed tributaries), four known springs, and four constructed ponds. Current hydrologic condition of the RNA is unknown. A stream survey is necessary to determine if there are any watershed concerns affecting water quantity, water quality or aquatic habitat. The Jenny Creek Watershed Assessment and Analysis (USDI 1995b) states that poor road location has created major problems for Oregon Gulch, however, no specific concerns are identified.

Although timber harvest or OHV use is not allowed in the RNA, potential adverse impacts to the streams, springs and seeps could occur on BLM-administered lands as a result of erosion from existing or new roads, current grazing, or a severe wildfire. Approximately 532 acres of the Oregon Gulch drainage area are private lands that lie above the RNA. Management actions such as road building, timber harvest, burning, pesticide treatments, and livestock grazing on these private lands could negatively affect streamflows and water quality in the RNA. Sediment increases would be the most likely adverse impact associated with these types of activities.

Management Actions

- Conduct stream/riparian survey to determine waterbody category, current channel and riparian conditions, aquatic fauna habitat condition, and locations of unmapped waterbodies.
- Assess need for water/riparian monitoring based on stream/riparian survey results.
- Undertake restoration projects as needed to comply with the objectives of the Monument Aquatic Conservation Strategy and to prevent further damage to hydrologic and ecological values.

I. Mining and Geothermal Resources

Mining and geothermal rights have been withdrawn within the Cascade-Siskiyou National Monument and are not an issue. There are no goals, objectives or actions necessary for this resource.

J. Cultural Resources

Policy and Agency Standards

- Protect cultural resource values including information and significant sites for public and/or scientific use by present and future generations. Sites with significant values will be protected from management actions and from vandalism to the extent possible.
- Develop project plans to preserve, protect and enhance archeological, historical and traditional use sites, and materials under the district's jurisdiction. This would include protection from wildfires (USDA 1995).

Goals

- Protect cultural resources at Oregon Gulch RNA from theft and human disturbance.

Current Information

Several cultural resource surveys have been conducted within the Oregon Gulch RNA. A number of both historic and pre-historic sites have been recorded both within and adjacent to the RNA.

Issues

- The isolated location of the RNA makes enforcement of restrictions and protection of archeological sites difficult.

Management Actions

- Protect sites as needed from management activities and vandalism.

K. Livestock Grazing

Policy and Agency Standards

- "Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and land-form and maintain or improve water quality, water quantity and the timing and duration of flow..."
  "Habitats are, or are making significant progress toward being restored or maintained for federal threatened and endangered species, federal proposed, category 1 and 2 federal candidates (Federal Species of Concern), and other special status species" (Fundamentals of Rangeland Health, 43 CFR 4180)
- "Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate, and landform (Standard 5, Standards for Rangeland Health, USDI 1997)."
- "Livestock grazing should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized (USDI 1987. BLM Manual, RNAs, 1623.37)."

Goals and Objectives

- Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).
- Maintain or improve the designated values of the RNA, especially native plant community composition and structure, soils, riparian areas, stream health and function, and nutrient cycling.

Current Information

Grazing in the area encompassed by the Oregon Gulch RNA dates back to the 1850s when large herds of cattle, horses and sheep utilized the area. Control of these ranges did not occur until the passage of the Taylor Grazing Act in 1934. The long term goal of this law was the improvement of range conditions and the stabilization of the western livestock industry. Prior to the enactment of the Taylor Grazing Act unregulated grazing occurred. During this period rangeland resources and ecological conditions suffered significant harm from overgrazing.

The Oregon Gulch RNA is currently part of the Oregon Gulch Pasture of the Soda Mountain Allotment #10110. The pasture is utilized on alternative years under a rest-rotation grazing plan that includes the rest of Soda Mountain Allotment. Cattle numbers on the Soda Mountain Allotment have been reduced by 34% since the 1970s. Cattle utilize the RNA approximately between June 1 into early July on alternating years. The current Animal Unit Months (AUMs) is 1174. Utilization data within the Soda Mountain allotment shows overall utilization of the pasture to be 6 percent with portions of the pasture unused. Several range monitoring plots occur within the RNA. Past monitoring has shown slight utilization (21-40%) and moderate (41-60%) utilization in portions of the RNA.

The Oregon Gulch RNA contains significant areas of native grassland communities, especially in the Oregon white oak/Wedgeleaf ceanothus/grass or scrubland, and the Western Juniper/Oregon white oak scrubland communities . Grasslands are also a component under the Oregon white oak/Ponderosa pine communities and along the narrow Riparian zone. In the RNA, large native herbivores (deer and Elk) play an important evolutionary and ecological role. Different grazing animals vary in their foraging preferences, season, duration, and intensity of use, which can have significantly different effects

on plant communities, particularly when considering introduced versus non-introduced species. Grazing modifies vegetation height, frequency, and density; influences vegetation composition and succession; and, alters water retention and drainage characteristics. To plants, critical factors are the severity, frequency, duration, and seasonality of defoliation. These factors can be controlled through proper grazing management.

Livestock grazing could have a significant impact in Oregon Gulch RNA if not managed in a manner appropriate for the particular plant communities. Uncontrolled grazing by domestic livestock is not compatible with the maintenance of key RNA features, however, controlled grazing could offer an ecological management tool to maintain or improve the some of the biological features (e.g. grassland component) for which the RNA was established.

Exotic and noxious weed populations do occur in the RNA. With the exception of Medusa head rye (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*), most weeds currently have overall low densities [Dyers woad (*Isatis tinctoria*), bull thistle (*Cirsium vulgare*), yellow alyssum (*Alyssum alyssoides*), and hedgehog dogtail (*Cynosurus echinatus*)]. Soil and vegetation disturbance from over grazing utilization can increase exotic plant densities, and affect the plant communities for which the RNA was established.

Issues

- Existing noxious weed populations that can increase as a result of soil disturbance from grazing over- utilization or congregating livestock.
- Terms and conditions in the existing grazing permit will likely need to be modified to protect or maintain key elements in the RNA
- Only a few utilization plots exist in the RNA. Other areas (e.g. riparian) have not had formal surveys documenting utilization or impacts. Several photo-points were recently established in the riparian area.

Management Actions

- Collect data in grassland / shrubland / riparian communities within the RNA as part of the three year grazing study within the Monument. This information will determine if grazing is maintaining or enhancing key communities. Make recommendations on how to utilize grazing, if appropriate, as tool to maintain these communities.
- In the interim, continue existing grazing in the RNA.
- After the recommendations from the grazing study are a made, it may be necessary to require current permit holders to change grazing patterns in the RNA so as to maintain or improve condition of key plant communities, or remove the RNA from the allotment plan.
- Install additional monitoring plots in utilized areas within the RNA to ensure that grazing promotes maintenance or enhancement of key plant communities.

L. Timber Management

Policy and Agency Standards

Regulated timber harvest within the RNA and salvage removal of downed trees are not compatible with the RNA values. For RNAs adjacent to timber harvest units, buffer zones should be considered in order to meet plan objectives (USDI 1986b).

Timber harvesting should be managed within RNAs to promote the maintenance of the key characteristics for which the area is recognized.

Current Information

Few trees have been removed in the past. A road runs east and west through the RNA. An occasional tree was removed during road construction. Timber harvesting in the RNA is not consistent with overall goals for the mixed conifer/black oak cell or for the ponderosa pine/white oak cell. An overstory removal occurred in private ownership in Section 30 during summer of 2000 to the west directly adjacent to the mixed conifer cell. Potentially, windthrow could occur during winter storms on the west boundary of the RNA. Private lands in Section 20 also abuts the RNA to the north, few of the conifer communities are found here. No BLM sales are planned in the area. Nor are any other forest stands adjacent to the RNA.

Timber harvesting in RNAs is not consistent with overall RNA management goals. However, non-merchantable Douglas-fir, less than 12" in diameter and less than 90 years old, will be removed and burned to reduce stand density and insect risk. These trees have become established in the absence of fire. Occasionally, individual trees larger than this will be girdled and/or felled when competing directly with individual mature sugar pine.

Goals and Objectives

- Maintain viable ecosystem functions and protect RNA community cells from catastrophic disturbance events.

Management Actions Needed

- In conjunction with fuels treatments/understory burning, treat conifer stands to promote health of key communities.
- No commercial timber harvesting will occur in the RNA unless it is part of an ecological protection or enhancement project. All trees felled or girdled for forest health reasons will be left on site. Small diameter Douglas-fir will be cut and burned in order to reduce fuel hazard and beetle outbreak risk.

M. Public Use/Recreation

Policy and Agency Standards

Recreation, camping, wood cutting, trapping, plant gathering, and OHV use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Incidental hunting and fishing use is typically permitted, but not hunter camps (see Wildlife sub-section below). Educational use - class field studies are encouraged but repetitive consumptive class activities are allowed only with BLM approval. Development of peripheral nature trails and interpretive signs may be appropriate in some cases, but with consideration for protection of the values without attracting undue attention. Public use roads, pipelines, communication sites, or powerlines should avoid the RNA. Road closures or way closures or restrictions may be considered appropriate in some instances (see Rights of Way section). (USDI 1986b)

Current Information

Recreational use in the Oregon Gulch RNA is mostly by hunters or local residents. The RNA was accessible by road until 1998 when the road was blocked to eliminate vehicle use of the area. The closed road now serves as a hiking trail. The entire RNA is closed to all off-road travel by motorized and mechanized vehicles.

Potential problems arising from public use of the RNA include the threat of human-caused stand-replacement fire; damage to grasses, forbs and soils by compaction from hikers; and the introduction of undesirable non-native species. Current recreational use is very light and low-impact. Periodic monitoring should be conducted to evaluate the impacts of recreational use on the protected plant communities and to determine if signs are necessary to protect against adverse effects.

1. Camping

Policy and Agency Standards
(See Public Use/Recreation)

Goals
Protect designated values of the RNA.

Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information
No established camping facilities exist in Oregon Gulch RNA although dispersed hunter camps were present when the road was open. Camping occurs during hunting season at Randcore Pass which is close to the RNA boundary. In general, camping is not compatible with protection of the key elements of the RNA. However, unless camper use becomes evident, no actions are needed at the present time. If it does become a problem, and camping signs could be posted around the RNA.

Issues
- Isolated location of the RNA and difficulty in enforcing restrictions.
- Historical use of the area.

Management Actions
- Conduct periodic monitoring to determine if camping has occurred that has had a negative impact on the protected elements.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

2. Hiking

Policy and Agency Standards
(See Public Use/Recreation)

Goals
- Protect designated values of the RNA.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information
The closed access road through the RNA is now an existing hiking trail. The RNA receives the greatest amount of foot traffic during the fall hunting season and, to a lesser extent, during spring turkey hunting season.

Features at the RNA that might appeal to hikers are wild flowers, wild game, and diverse plant communities, however, the RNA is not well-known or easily accessible to the general public. For these reasons, developing hiking trails or promoting the area as a recreational hiking destination would not be practical or recommended. Casual hiking itself does not pose a threat to the resources of the RNA. However, if done by a large number of people, native grasses and wild flowers could be trampled and destroyed and soils compacted, jeopardizing the integrity of the protected elements of the RNA.

Issues

- Isolated location of the RNA making enforcement of restrictions difficult.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to evaluate the extent and effects of hiker use.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

3. Equestrian

Policy and Agency Standards

There are no specific BLM guidelines or policies restricting equestrian activities within RNAs. However, any activities should be avoided that threaten protection of the key elements for which the RNA has been designated (USDI 1987).

Goals

- Protect soils, vegetation, roads, streams and other resources from damage caused by equestrian use in the RNA.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information

Oregon Gulch RNA currently receives occasional equestrian use, probably by neighbors and the grazing allotment lessee involved with cattle ranching activities. Equestrian activities in this management plan refers to horses, llamas, mules, and other pack animals. Recreational animals could threaten the values of the RNA by trampling vegetation and soil, particularly in meadows with thin, fragile soils, or by carrying in seeds of exotic weedy species on their hooves, hair, or in their feces. During wet conditions horses can push root crops, used by Indian tribes as food, too far into the soil to dig and use. The use of horses and other pack or riding stock is generally not seen as compatible with the key elements of the RNA. Horse use by the grazing allotment lessee should be evaluated as part of the three year grazing study.

Issues

- Isolation of area and difficulty in enforcing closures or restrictions.
- Historical use in the area.

Management Actions

- Periodically monitor the RNA to ensure that horse or other stock use is not occurring.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact with equestrian groups).
- Post signs at entrances to the RNA, stating the goals of the RNA and closure to equestrian use.

4. Off-Highway Vehicles

Policy and Agency Standards

Management directions for all RNA's specifies closure to off-highway vehicle (OHV) use. Off-highway vehicles include, but are not limited to, motorcycles, all-terrain vehicles, and mountain bikes.

Goals

- Prevent intrusions into the RNA by motorized and mechanized vehicles.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information

Oregon Gulch received some OHV use in the past, but recent road closures and blocking has eliminated most if not all motorized vehicle use within the RNA. OHV use is prohibited in RNAs because of the damage they cause to plant communities, individual plants and streams via erosion.

Issues

- Isolated location makes enforcing restrictions or road closures difficult.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to assess off-highway vehicle violations.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

5. Hunting, Fishing and Trapping

Policy and Agency Standards

(See also Public Use / Recreation)

Incidental hunting and fishing are typically permitted, although not encouraged, in RNAs, Trapping is viewed as an activity not consistent with RNAs (USDI 1986b). Management of fish and wildlife populations is controlled by ODFW with regulations for hunting, fishing and trapping set on a yearly basis. Regulations regarding seasons, bag limits, stream stocking, licenses and techniques are dictated by the Department through the Fish and Wildlife Commission and are applicable on all lands within the state, including private property. Specific areas may be closed to activities in order to protect human life or natural resources.

Goals

- Protect designated values of the RNA, including plant, soil and wildlife resources with minimal disturbance and interference from people.

Current Information

Wildlife is abundant in Oregon Gulch RNA. Most of the RNA is very good deer hunting country and receives a fair amount of pressure, especially on the western edge where there is vehicle access right up to the edge of the RNA near Randcore pass. Big game in the general area of the RNA consists of Black bear (*Ursus americanus*), Cougar (*Felis concolor*) and Black-tailed deer (*Odocoileus hemionus columbianus*). Elk (*Cervus canadensis*) also use the RNA seasonally. Small game species in the general area include Ruffed grouse (*Bonasa umbellus*), Blue Grouse (*Dendragapus obscurus*), Wild Turkey (*Meleagris gallopavo*), Mountain Quail (*Oreortyx pictus*), Valley Quail (*Callipepla californicus*), Western Grey squirrel (*Sciurus griseus*). It is unknown what, if any, trapping activity is occurring in this area. There is no indication that any trapping currently occurs. Fur bearing species in the area include Bobcat (*Felix rufus*), Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), and Grey fox (*Urocyon cinereoargenteus*), and possibly Pine Marten (*Martes americanus*). Redband trout (*Oncorhynchus mykiss ssp.*) appear to spawn in the lower mile of Oregon Gulch, because trout fry have been found throughout this stretch of stream. Fish use of Oregon Gulch appears to be limited by a natural barrier just inside the RNA boundary (see Fish Section).

Issues

- Dispersed camping and OHV use are often associated with hunting and could negatively impact RNA resources if these activities occur illegally.
- The isolation of the area makes enforcing restrictions difficult.
- Historical use of the area.
- Prohibition of hunting and trapping in the RNA would require a change to the Oregon State Game Regulations and would be difficult to enforce due to unclear boundaries (on the ground).
- Minimal impact to wildlife populations in the area. No impact to the values for which the RNA was designated.

Management Actions

- Restrict hunting and trapping to foot traffic only, no vehicles or stock use.
- Prevent intrusions into the RNA by motorized and mechanized vehicles.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

N. Special Forest Products

Policy and Agency Standards

Commercial or personal harvest of Special Forest Products (SFPs) like boughs, burls, fungi, medicinal plants, etc..., within RNAs are not compatible with the over all goals to "Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987)."

Current Information

No use permits are currently issued for this area. Historical personal use within this area is not well documented. No information is available to determine the abundance of SFPs within the RNA. Future research within the RNA may require the collection of certain animal and plant specimens.

Issues

- The isolation of the area makes enforcing SFP collection restrictions difficult.

Management Action

- Prohibit any commercial or person use collection of Special Forest Products within the RNA. Permits for collection of specimens for research will be allowed on a case by case basis.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

O. Interpretation and Research

Policy and Agency Standards

The purpose for RNAs is for research, observation, and study. Studies involving manipulations of environmental or vegetation characteristics or plant harvest must have prior approval of the BLM.

Goals

- Protect the designated values for which the RNA was nominated to provide baseline information against which the effects of human activities in other areas may be compared.
- Provide a site for study of natural processes in as undisturbed (by human activities) an ecosystem as possible.

Current Information

Oregon Gulch RNA is only accessible on foot which protects it from overuse by the public, but also makes it impractical as an interpretive or educational site. One of the main objectives for RNAs is to provide educational and research areas for ecological and environmental studies. The following specific research topics have been suggested for Oregon Gulch:

- Evaluating the effects and the role of domestic livestock grazing on key elements in the RNA (plant communities, butterflies, and rare plant species) as part of the three year grazing study.
- The role of fire in plant and animal community development, composition and production.

Other potential areas for research include the effectiveness of prescribed fire and seeding of native species in reducing non-native plant species, and studies of the effects of prescribed fire or vegetative manipulation on plant community composition, insects, wildlife, or special status plant populations.

When researchers plan to use an area, they have certain obligations to**:**

(1) notify the appropriate BLM field office, submit a research plan, and obtain permission where needed;
(2) abide by regulations and management prescriptions applicable to the natural area; and,
(3) inform the agency of the research progress, published results, and disposition of collected materials.(USDI 1986b).

Issues

- Lack of funding for treatments in RNAs
- Impacts from surrounding land use activities.

Management Actions

- Evaluate all proposed research projects and approve only those that will not adversely affect the RNAs resources or short-term and long-term viability of species.
- Maintain a list of projects and research in the RNA, including findings and conclusions.
- Incorporate pertinent new findings from research projects into management actions.
- Maintain copies of all surveys, inventories, monitoring and activities conducted within the RNA.

VI. MONITORING

A. Definition and Role of Monitoring

Monitoring is defined as a process of repeated recording or sampling of similar information for comparison to a reference. The role of monitoring in Research Natural Areas is to collect information in order to evaluate if objectives and anticipated or assumed results of a management plan and management actions are being realized or if implementation is

proceeding as planned. Because monitoring may be so costly as to be prohibitive, priority should be given to monitoring mandated by legislation and to focusing on management actions aimed at maintaining, protecting and restoring key elements and minimizing disturbance in the RNA (USDI 1995). All monitoring activities must include the following steps:

- Establish monitoring objectives.
- Collect baseline information.
- Repeat consistent standardized monitoring procedures over time.
- Interpret monitoring results relative to the baseline information and monitoring and implementation objectives.
- Modify management objective actions and monitoring procedures as necessary based on reliable monitoring data to continue to achieve goals of the RNA.

The monitoring plan should be tailored to the unique characteristics of the RNA. Two types of monitoring activities are outlined below. Ecological status monitoring is designed to track the ecological condition of the natural elements protected within the RNA. Defensibility monitoring should detect impacts from outside factors on the protected elements in the RNA. These monitoring activities are general in nature and should not be used in lieu of more complex research strategies. Detailed monitoring protocols should also be developed in conjunction with specific management projects to measure their effectiveness in achieving RNA objectives. For each element, monitoring objectives, unit and frequency of measurement, responsible personnel, and location for data storage are stated.

B. Ecological Status Monitoring

Ecological status monitoring involves tracking species and plant communities relative to the stated objectives of the RNA. Ecological status monitoring at Oregon Gulch RNA should assess the current status of RNA elements and track trends or changes over time to determine if any RNA values are at risk. Monitoring results provide the basis for evaluating the effectiveness of management actions and determining if changes are required. Where possible, monitoring within the RNA should be tiered to the monitoring for the Cascade-Siskiyou National Monument.

Element: PLANT ASSOCIATIONS
Monitoring Objectives: Track successional changes in the key RNA plant associations or communities to determine if native species are protected, if ecological processes are properly functioning, and if RNA management actions are achieving desired outcomes. Information collected during monitoring provides the basis for making adjustments to management actions.

Frequency of Measurement: After initial baseline, every 5 years.
Responsible Personnel: Botanists, Ecologists, Foresters
Data Storage: Oregon Gulch RNA File

Element: SPECIAL STATUS PLANTS
Monitoring Objectives: Perform formal surveys of the RNA for Bureau Special Status Plants. Monitor populations of special status plants in order to maintain or enhance populations and associated habitats. Utilize the RNA to collect base-line biological data for sensitive species. Evaluate effects from grazing on Green's mariposa lily.

Unit of Measure: Revisit known sites and record population demographics on site reports. As part of the grazing study include monitoring of Greens mariposa lily.
Frequency of Measurement: Revisit known sites of special status plants every 5 years.
Responsible Personnel: Botanists
Data Storage: Oregon Gulch RNA File, Medford Rare Plant Database

Element: SPECIAL STATUS WILDLIFE
Monitoring Objectives: Perform surveys for Special status wildlife species and monitor species within the RNA in order to maintain or enhance populations.

Unit of Measure: Determined by established protocols for specific species.
Frequency of Measurement: According to established protocols.
Responsible Personnel: Field Office Lead Wildlife Biologist
Data Storage: Oregon Gulch RNA File, Wildlife database

Element: FIRE
Monitoring Objectives: Determine the need to restored key plant communities using prescribed fire. Perform fuel surveys in key plant communities following established protocols. Monitor following prescribed burning results.

Unit of Measure: Determined by established wildland burning protocols .
Frequency of Measurement: According to established protocols.
Responsible Personnel: Prescribed fire specialists
Data Storage: Oregon Gulch RNA File, Fire database

Element: NON-NATIVE SPECIES
Monitoring Objectives: Assess the need for management actions to reduce or minimize the impact, introduction and/or spread of non-native weedy species. Identify problem areas. Collect baseline data. Non-native species of concern include all currently identified noxious and exotic weeds known within the Monument and in the adjacent watersheds.

Unit of Measure: Presence/absence and abundance of non-native weedy species by random surveys. Target highly susceptible points of invasion (along borders and roads).
Frequency of Measurement: Every 5 years; casual observations during other site visits.
Responsible Personnel: Botanists, Range Specialists, Ecologists.
Data Storage: Oregon Gulch RNA File, Medford District Noxious Weed Database

Element: INSECTS, DISEASES OR PESTS
Monitoring Objectives: Monitor harmful insects, diseases or pests that could cause long-term negative changes in plant communities, especially the Mixed conifer/California black oak community. Determine if treatments are needed to reduce the negative effects of these insects, diseases or pests.

Unit of Measure: Periodic evaluation of the RNA to discover presence/absence and extent of harmful insects, diseases or pests. Initial evaluations may be accomplished by walking through the RNA, or through photo interpretation.
Frequency of Measurement: Every 5 years or as needed based on casual observations during other site visits.
Responsible Personnel: Foresters, Ecologists.
Data Storage: Oregon Gulch RNA File, Southwest Oregon Insect and Disease Center if appropriate.

Element: HYDROLOGY
Monitoring Objectives: Evaluate hydrological conditions (channel stability, erosion, sedimentation, slumping potential, etc.) and riparian vegetation of all streams to determine the functioning condition and need for habitat improvement or restoration activities. Monitor the influence of grazing on riparian vegetation and channel stability as part of the three year grazing study.

Unit of Measure: Established riparian stream survey protocols.
Frequency of Measurement: Establish baseline, then every 10 years
Responsible Personnel: Hydrologist / Riparian Coordinator
Data Storage: Oregon Gulch RNA File, Riparian Database

Element: NATURAL DISTURBANCE
Monitoring Objectives: Document type, extent, intensity, and frequency of natural disturbances in the RNA and resulting changes in ecosystem structure or composition.

Unit of Measurement: Intuitively controlled surveys after disturbance, photos of affected plant communities or areas.
Frequency of Measurement: After significant disturbance, wildfires, landslides, insect and disease outbreaks
Responsible Personnel: Botanist, Ecologist and Foresters
Data Storage: Oregon Gulch RNA File

C. Defensibility Monitoring

Defensibility monitoring involves on-the-ground assessment of factors which affect the manager's ability to protect the Research Natural Area and its elements. Considered are current and anticipated land uses within and adjacent to the RNA and their potential negative effects on the protected elements or their governing ecological processes. Defensibility monitoring also involves checking for evidence of prohibited use, encroachment or degradation within the RNA.

Element: CULTURAL RESOURCES
Monitoring Objectives: Detect vandalism or disturbance to known archeological or historical sites at the RNA.

Unit of Measure: Visual assessment to detect evidence of disturbance.
Frequency of Measurement: Every 5 years or as needed based on observations during periodic site visits.
Responsible Personnel: Cultural Resource Manager / Archaeologist
Data Storage: Oregon Gulch RNA File, District Archaeology files

Element: PUBLIC USE OF RNA (camping, hiking, equestrian, trapping, OHV, special forest products, interpretation and research, trespass livestock grazing, timber harvesting)
Element Objectives: Determine if the level of public use jeopardizes protection of RNA values or key elements.

Unit of Measure: Observations made during other surveys or during periodic site visits. Indications of problem areas include evidence of vehicular use (on or off existing roads in the RNA), refuse, signs of campfires or campsites, trampled meadows, significant erosion or rutting on or off roads. If problems are noted during casual visits to the site, conduct more extensive surveys to determine if actions should be taken to prevent damage to the protected elements.
Frequency Measurement: Every 5 years
Responsible Personnel: RNA Coordinator
Data Storage: Oregon Gulch RNA file

Element: ROADS
Element Objectives: Determine condition of roads, track erosion and gullying of road surfaces.

Unit of Measurement: Subjective evaluation by knowledgeable personnel. Establishment of photo-points of marginal spots to compare condition over time.
Frequency of Measurement: Every 5 years during periodic site-evaluation visits to the RNA.
Responsible Personnel: RNA Coordinator, Road Engineers
Data Storage: Oregon Gulch RNA file

Element: FENCES AND GATES
Monitoring Objectives: Determine if existing fences and gates adequately protect the RNAs elements. If not, determine if repairs, additional fencing or gates are needed.

Unit of Measurement: Walk fence lines to discover broken fences.
Frequency of Measurement: Every 5 years or as needed if trespass grazing or excessive OHV use is observed during other visits to the site.
Responsible Personnel: Rangeland Specialists, Road Engineers
Data Storage: Oregon Gulch RNA file

Element: GRAZING
Element Objectives: Determine if permitted grazing is maintaining or enhancing key plant community elements within the RNA, including Special Status Plants. Meet the intent of the overall goals for the RNA. Adjust grazing permit accordingly.

Unit of Measurement: Establishment of monitoring plots following standardized protocols in livestock utilized plant communities (grasslands / riparian) within the RNA. Where possible monitor grazing in conjunction with plant community and Special Status plant monitoring plots. Establish photo-points in areas of concern to compare condition over time.
Frequency of Measurement: Monitor for three years as part of the monument grazing study. Monitor utilization transects every year that livestock use the RNA.
Responsible Personnel: Ecologists, Range Specialists, Botanists
Data Storage: Oregon Gulch RNA file

VII. Historical Attachment for Oregon Gulch RNA

Recollections of George Wright

March 3, 1954, **THE WITCHERLY RANCH,** 666
It was probably around 1923 when Louis Miller located his homestead at Apple Jack along Jenny Creek. Later he bought George A. Grieve's homestead on the north, and located a grazing homestead joining on the west.

Miller sold his holdings in a bout 1943 and its changed hands several times since. "Bert" Dodendoaph bought it from Miller, but about three months, sold it to Jesse B. Kidwell, who had it for a few years, in which time he sold the timber and it was logged off, and then sold to Jack Stoddard, and after a year or two, Stoddard sold to a man by the name of Witcherly, and in another year or two sold to George W. McCullum, however, it still seems to go by the name of the Witcherly Ranch.

March 4, 1954, **OREGON GULCH,** 669

I don't know how Oregon Gulch got its name. It runs into Jenny Creek on the ranch now owned by George McCullum, but is still called the Witcherly Ranch and heads west from Jenny Creek about two miles, on the east end of Skookum [Keene Creek Ridge] Ridge.

There are several place names in the Oregon Gulch area, Bark Spring about one half mile on the hill north of Oregon Gulch, and near Rose Bud, Shady Spring is on the south side, and so is Smith's Camp. Root Spring and Valentine Spring is in the south head part, while Rancour's Homestead and Shake Spring is in the north head part, and in the divide that slopes toward Kein [Keene] Creek. The Shake Road which is usually called the Oregon Gulch Road these days goes through the head of Oregon Gulch, by Root Spring and Rancour's Homestead.

March 7, 1954, **SHADY SPRING,** 670

South of Oregon Gulch about a quarter of a mile or less, is a spring located in a timbered place, and sort of a pretty place.

It was about 1921 when Roy Hartwell, his father and myself camped there for a few days and made some shakes. During the many years that I was ranger rider for the Pilot Rock Grazing District I salted cattle there.

From the obsidian chips scattered around there shows the place was the camping place for the Indians before the white man came.

The spring didn't have any name till about twenty-five years ago, when Con G. Mulloy and myself were discussing the range and place names, and Mulloy suggested that the spring should have a name, and that Shady Spring would be a good name, because of the shady place where the spring is located, and I agreed.

March 7, 1954, **SMITH'S CAMP,** 671

Near the upper south part of Oregon Gulch, a man by the name of Smith located a timber claim, or homestead, probably in 1908 or before. He built a log cabin and lived there some, and made a lot of posts, and sold them to D. Marshall Horn, of Hornbrook, California. Horn hauled the posts to his ranch with teams or wagons, with four or more horses to the wagon, as was customary with long teams in the early days, they had bells on their hames [manes] which was there to serve about the same purpose as the horns did on the early automobiles, on narrow and crooked roads.

The cabin burned many years ago, and the spot as grown up with trees and brush till it don't look like anyone has ever lived there, and the name Smith's Camp has been almost forgotten.

March 8, 1954, **ROOT SPRING,** 672

In the head of Oregon Gulch by the side of the Shake Road is a spring that's been known as Root Spring, as far back as I can remember. The spring was well named, for there is a tanglement of roots around the edge of the spring. About twenty-five years ago the cattlemen of this area sort of boxed the spring in to make it a better place for the cattle to drink water, and three years ago, some other cattlemen re-boxed the spring with new logs in the same manner. About 1916 Thos. J Hearn and I camped there and made a few shakes near Shake Spring about a half mile northward, also about the same place and made shakes. Root Spring is a well known name place among the Cattlemen of this area.

March 7, 1954, **BARK SPRING,** 673

It was a long time ago when a little group of riders of the range dismounted from there (sic) horses at a spring a little west of Rose Bud not far from Oregon Gulch. One of the riders, Robert Bruce Grieve cleaned the leaves and mud out of the nice cold spring and from a piece of bark from a tree he placed there for the water to run out in, hence the name, Bark Spring, which is still a popular name among cattlemen of the area. As far back as I can remember [sic] there has been a little log cabin there, probably some ones timber claim taken before my time.

March 8, 1954, **VALENTINE SPRING,** 674

Many new calendars have been hung on the wall, probably about seventy of them, since a little group of buckaroos rode up to a little spring in the head of Oregon Gulch. Included in this group was Valentine Griffith, my uncle, Wm. A. Wright, and my father, Thos. J. Wright. It was a dry and hot summer day, and they wanted a drink of water. Griffith cleaned the leaves and mud from the spring, and they soon had a drink of water.

Griffith passed on a dozen or so years ago at the age of eighty-six years. Even in such a short space of time, and as well known as he was in this region, as a buckaroo of the days of old, the name Griffith is being forgotten as time goes by, but his given name, Valentine, still lives among the buckaroos of today, as Valentine's Spring, but few, in any, know how the spring got its name.

March 8, 1954, **CEDAR SPRING,** 675

On the east end of Skookum Ridge, on the south slope, a nice spring comes out of the earth in a cluster of cedar trees, hence the name Cedar Spring, a name well known among the cattlemen.

March 9, 1954, **RANCOUR'S HOMESTEAD,** 676

During the mid-1920's, Ireane Wehhli, a young lady of Ashland, Oregon, located a homestead in the head of Oregon Gulch at Shake Spring and built a little log cabin there. After a year of two she gave it up. In about 1931, George Rancour established his homestead there in the same place, and built a nice, three-room house from logs, He and Mrs. Rancour lived there for about three years during the summer months. After he got his homestead patent he sold the timber, and the place was then logged off. At this time they built a road from Kein Creek which connected with the Shake Road to haul logs out on. A year or two later, Wade H. Wallis aquired the homestead. After a few years Wallis traded it to the United States government, for some land joining his ranch along Jenny Creek.

That was a beautiful place before it was logged off. It is, however, growing up again, so it don't look as bad as it did.

There used to be some fine timber on the place, and in earlier years there were lots of shakes made from the sugar pine trees. Shake Springs is located there, which was usually the camping place of the people while they were making shakes. The shakes were hauled by team and wagons over the Shake Road to their ranches and homesteads.

March 10, 1954, **SHAKE SPRING,** 677

Up till the mid 1930's the end of the road going north to Oregon Gulch, known as the Shake Road, ended at Shake Spring. In the mid-1930's a logging road was built from Kein Creek, to Shake Spring, or Rancour's Homestead, and connected on the Shake Road.

Shake Spring was the camping place for ranchers and homesteaders in the early days, while they were making shakes to cover their buildings with. Shake Springs was located in the timber and was a pretty spot to camp. In about 1916, I camped there with Thos. J. Hearn and made some shakes, and a little later, Walter Herzog and I camped there and make shakes. At this time Herzog went hunting, and killed a deer, and of course, killed it to eat. He made one of his favorite mulligan stews, in it was several different kinds of vegetables, and the parts of the deer, liver, lungs, kidney, heart and brains went in too. That was his

way of making stew, cooked in an old iron kettle over a camp fire, it was a pretty good stew. Herzog was a good game shot with his old 38-55 Ballard single shot rifle.

Also during the early 1920's Roy Hartwell, his father, and I camped there and made shakes.

I believe it was in 1888 when Mr. and Mrs. Thos. J. Hearn were camping at Shake Springs to make shakes. With their little baby daughter in her cradle at camp, they left for an hour or two a few hundred yards away to make shakes, and while returning on a cattle trail they saw the tracks of a cougar made minutes before, heading for camp. They hurried to camp and found the baby unharmed, although the cougar tracks were within a few feet of the cradle holding their baby daughter.

May 15, 1954, **ROSE BUD,** 684

Rose Bud is a large knoll, or sort of a butte, west of what used to be the Wallis Ranch. There is quiet a lot of bluffy places on the south and east sides.

A number of years ago John H. Miller reported finding a rattlesnake den there in the rocks while he was hunting deer. No wonder, for it is an ideal place for rattlesnake dens.

I don't know how the place got its name. Its been called Rose Bud as far back as I can remember, however, in late years, some people call it Rose Bush.

Table ADD-4 siaplays the plant community distribution in Oregon Gulch RNA.

ADD-4. Plant Communities within the Oregon Gulch RNA

Plant Community	Acres
Western Juniper/Oregon white oak	115
Oregon white oak/Wedgeleaf Ceanothus	316
Oregon white oak/Ponderosa pine	95
Mixed conifer/California black oak	530

Appendix EE - Scotch Creek RNA Plan

Management Plan
for
Scotch Creek Research Natural Area

Ashland Resource Area
Medford District
Bureau of Land Management
United States Department of the Interior

February 16, 2001

Table of Contents

INTRODUCTION

Research Natural Areas are part of a federal system of land tracts identified and designated to preserve and protect certain natural features for research and educational purposes. The overall goals for establishing RNAs are to provide 1) baseline areas against which the effects of human activities can be measured; 2) sites for study of natural processes in an undisturbed ecosystem; and 3) a gene pool for all types of organisms, especially rare and endangered species. The interagency Pacific Northwest Research Natural Area Committee, composed of federal, state and private organizations in Oregon and Washington, have identified a set of natural elements, or "cells", representing terrestrial and aquatic habitats, plant communities, and ecosystem processes targeted for protection through the RNA system.

The 1,800 acre Scotch creek RNA is located in extreme southern Oregon in Jackson County along the border with California in Scotch Creek.

The area was originally nominated by the Nature Conservancy in 1991, analyzed and evaluated by the Medford District RMP process in 1992 by the Ashland Resource Area, BLM, proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated a new RNA under the Record of Decision and Resource Management Plan (USDI 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Research Natural Area Management Policy (USDI 1986b) requires development of a management plan that establishes operational objectives to maintain or enhance the unique values of the designated RNA. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this management plan.

I. POLICY

This management plan references the guidelines established by the Pacific Northwest Interagency Natural Area Committee (PNW 1991), the Medford District Bureau of Land Management (BLM) Management Plan and Record of Decision (USDI BLM 1995a) and BLM Manual Supplement, 1623 Supplemental; Program Guidance for Land Resources (USDI 1987).

Management objectives for RNAs and ACECs, addressed in both plans under the category Special Areas, include directives to:

> Preserve, protect, or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial or aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured.

RNAs should ideally be undisturbed by human impacts, however, because pristine examples of significant ecosystems may not exist, the least altered sites should be selected. They should be sufficiently large to protect key features from significant impacts judged inappropriate for the area and natural processes should be allowed to dominate. In situations where human activities have interfered with natural processes, deliberate manipulations which simulate natural processes are allowed (USDI 1986b).(also see Appendix R)

Research Natural Area Management Policy (USDI 1986b) requires development of a management plan establishing operational objectives to maintain or enhance the unique values of the RNA for each designated area. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan

II. BASIS FOR DEDICATION AND SETTING OBJECTIVES

A. RNA History

The Nature Conservancy, under contract with the BLM State Office, nominated lower Scotch Creek as an RNA in February 1991 because it filled Cell 53, a typical eastern Siskiyou chaparral community, as designated in the 1988 Oregon Natural Heritage Plan (ONHAC 1998). This area was originally nominated as the Slide Creek Ridge RNA and the name was changed when designated. The Oregon Natural Heritage Advisory Council (1998) now refers to Cell 56, Birch-leaf mountain mahogany-ceanothus-rosaceous mixed chaparral. The NHA Council considers that the cell is adequately represented by the Scotch Creek RNA.

The area was analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, was proposed as a new RNA in the Medford District Proposed Resource Management Plan / Environmental Impact Statement (USDI 1994b) and designated as new RNA under the Record of Decision and Resource Management Plan (USDI BLM 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Scotch Creek RNA has been under interim management requirements since January 5, 1989.

The RNA is now a part of the Cascade-Siskiyou National Monument and is under the management guidelines in the Proclamation (Clinton 2000 and CSNM RMP) (see Management Restrictions, below).

B. Basis for Dedication

The lower half of Scotch Creek drainage to the California border was nominated as an RNA because it satisfied cells for two Eastern Siskiyou chaparral types: a Rosaceous type dominated by *Quercus garryana* (not mentioned in the original nomination) , *Prunus subcordata, P. virginiana, P. emarginata*, and *Cercocarpus betuloides* and a different chaparral community dominated by *Ceanothus cuneatus*, *Arctostaphylos species* and *Cerocarpus betuloides*. Access was also a consideration in the selection of this particular area.

C. Management Restrictions

The Presidential Proclamation (Clinton 2000) withdraws lands within the Monument from mineral location, entry, and patent and mineral and geothermal leasing; prohibits commercial harvest of timber or other vegetative material; prohibits unauthorized OHV use; but permits continued grazing until completion of a study of grazing impacts on natural ecosystem dynamics.

D. Setting Objectives

The Scotch Creek RNA was established for scientific research and as a baseline study area for chaparral vegetation represented in the area.

III. NATURAL AREA DESCRIPTION

A. Scotch Creek Area Description

1. Location

The RNA is a 1,800 acre (728.5 ha) parcel located in southeastern Jackson County (T.41S.,R.3E., Secs.5 SW1/4;06S1/2;07NE1/4;08;09SW1/4) along Scotch Creek, a tributary of the Klamath River that flows into Iron Gate Reservoir through the Horseshoe Ranch Wildlife Area (California Department of Fish and Game and Redding Resource Area, BLM). Scotch Creek flows to the southeast from the ridge that separates the Klamath and Rogue River below Porcupine Mountain to the north. The area is bounded on the north by the closed Schoheim Road BLM Road 41-2E-10.1, on the west by Slide Creek Ridge, on the east by Lone Pine Ridge, and the Oregon-California border on the South. The Schoheim Road forms a common boundary between the Scotch Creek RNA and the Soda Mountain Wilderness Study Area to the northeast. The small parcel of privately owned land is isolated at the southeast corner of the RNA (T.41S.,R.3E., Sec.16) was recently given to the U.S. Department of the Interior by the Soda Mountain Wilderness Council. This will be incorporated into the Scotch Creek RNA.

2. Access

In the past the Schoheim Road 41-2E-10.1 has provided relatively easy vehicle access to Scotch Creek RNA. However, the National Monument Proclamation closed the Schoheim Road to all mechanized travel except for authorized administrative access for emergency or management purposes. Authorized OHV use is allowed, weather and road conditions permitting. Public access to the RNA by foot or horseback is not restricted.

Scotch Creek RNA is most easily accessed from U.S. 99 via BLM Pilot Rock Road 40-2E-33 to the headwaters of Scotch Creek via Porcupine Gap, then south on the closed Scotch Creek connector road (foot travel only) along Scotch Creek to the north RNA boundary at the Schoheim Road or from the south through the California Department of Fish and Game's Horseshoe Ranch Wildlife Area via the Copco-Irongate Road in Siskiyou County, California. The road north from Irongate Reservoir has a locked gate (California Department of Fish and Game, Shasta Valley Wildlife Area Headquarters, Montague CA) at the south end of the canyon. The road is passable as far as the stone spring house, except when for periods of high water when the ford below the spring house is impassable. The SCRNA southern boundary at the Oregon-California border is reached by a two mile walk on an old road along Scotch Creek. Except for the Horseshoe Ranch Wildlife Area access other routes to the RNA are unavailable much of the year because of snow. Other authorized administrative access or public access (on foot or horseback) is available from the east via the closed BLM Schoheim Road 41-2E-10.1 from the east via Skookum Creek (from Oregon Route 66 to BLM Soda Mountain Road 39-3E-32.2 to 39-3E-28.0 to 39-3E-27.2 to Schoheim Road, Randcore Pass (from Oregon Route 66 to BLM Mill Creek Road 40-3E-12.0 to 12.1 to 19.2 to Schoheim Road or the Jenny Creek Crossing from the Copco Road (private) and BLM Road 40-4E-3.1 to the Schoheim Road. From the west the RNA can be reached from U.S. 99 via the BLM Pilot Rock Road 40-2E-33 to 41-2EB3.0 to the Schoheim Road. The upper northeast part of the RNA can also be reached from Baldy Creek Rd. 40-3E-5 and 40-3E-30, down Lone Pine Ridge Rd to the Schoheim Rd.

3. Ecoregion

The Scotch Creek RNA is located in the Klamath River Ridges Ecoregion (78 of Klamath Mountains (78) Level III Ecoregion (Pater and others 1997a and 1997b). Ecoregions are defined by a number of factors that include: physiography (including elevation and local relief), geology (surficial material and bedrock), soil (order, common soil series, temperature and moisture regimes), climate (mean annual precipitation, mean annual frost free days, mean January and July min/max temperature), potential natural vegetation, land use (recreation, forestry, watershed), and land cover (vegetation present). The following synopsis of the Klamath River Ridges Ecoregion is based on Pater (1997a and 1997b).

78g Klamath River Ridges. (3,800-7,000 feet) The Klamath River Ridges Ecoregion has a dry continental climate and receives on average 25 to 35 inches of annual precipitation. Low elevation and south-facing slopes have a more drought resistant vegetation than elsewhere in the Klamath Ecoregion (78), such as juniper, chaparral, and ponderosa pine. Higher and north-facing ridges are covered by Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and Shasta red fir (*Abies procera var. shastensis*). Ecoregion 78g has less precipitation, more sunny days, and greater number of cold, clear nights than the Inland Siskiyou Ecoregion (78e) to the west. Shasta red fir is not present in the RNA.

4. Climate

Scotch Creek RNA lies within the influence of the continental climate of the Great Basin and the more moderate wetter oceanic influences to the west. Local climate is further influenced by mountain topography and elevation and tends to be more like that of the Shasta Valley to the south than the Rogue Valley to the north. Winter storms generally come from the ocean. Periodic floods of some magnitude occur when warm wet storms melt existing snow pack. Summers are usually long and dry, with occasional thunderstorms with lightning and with or without precipitation. These summer events are usually more frequent than in the Rogue Valley due to the influence moisture laden air drawn up from the southwest along the eastside of the Sierra Nevada and Cascade Mountains.

Map 11 shows average annual precipitation varying from a low of 24 inches at the southeast corner of the RNA to a high of 34 inches at the northwest boundary. Average annual precipitation at Copco Dam (elevation 2,700 ft.) on the Klamath River to the southeast in California is 19.8 inches (WorldClimate 2000). There is also a National Oceanic and Atmospheric Administration (NOAA) weather station at Howard Prairie Dam (elevation 4,568 ft.) located approximately 13 miles northeast of the RNA in the Jenny Creek Watershed. Average annual precipitation is 32.8 inches at the Howard Prairie Dam station (NOAA 1996). Precipitation during the winter months occurs as rain or snow.

The Howard Prairie Dam NOAA station is the closest weather station with air temperatures (Table AEE-1).

Table AEE-1. Average Air Temperatures at Howard Prairie Dam

NOAA Station (1961-1990)

	Air Temperature (°F)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Max	37.5	42.4	45.9	52.2	61.0	70.2	78.6	78.4	71.6	60.7	43.7	36.5	56.5
Min	18.9	21.1	23.8	27.5	33.1	40.0	43.6	43.2	37.7	32.3	26.7	21.1	30.7
Mean	28.2	31.8	34.8	39.8	47.1	55.1	61.1	60.8	54.7	46.5	35.2	28.8	43.6

Source: Oregon Climate Service 2000

5. Topography

Scotch Creek is in a northwest/south east trending steep sided valley that extends from Pilot Rock and Porcupine Mountain on the Rogue/Klamath Divide to the Klamath River where it empties in Iron Gate Reservoir. The watershed is bounded on the west by Slide Creek/Hutton Creek Ridge and the east by Lone Pine Ridge. There is one major tributary that joins the main stem of Scotch Creek at the end of a narrow ridge just above the waterfall in the SE 1/4 NE 1/4 of Section 7. The 30 foot waterfall on the main stem of Scotch Creek is a special topographic feature that prevents the upstream migration of fish. Slide Creek, a major tributary that enters Scotch Creek in the Horseshoe Ranch Wildlife Area in California, is not included in the RNA. The elevation of Scotch Creek in the RNA varies from 3,960 feet where Scotch Creek crosses the Schoheim Road to 3,080 feet at the lower boundary of the RNA at the California border. Highest elevations in the drainage are 5,908 feet at Pilot Rock, 5,200 feet at Porcupine Mountain, 5,403 feet on upper Lone Pine Ridge. Lone Pine Ridge is 3,640 feet at the California border, Slide Ridge, 4,000 feet.

The Scotch Creek RNA comprises about 25 percent of the Scotch Creek subwatershed (see Hydrology section). The RNA is bounded on the north and east by the Schoheim Road, on the south by the Oregon/California border, and on the west by the small ridge between Scotch and Slide Creeks. In the center of the RNA, Scotch Creek splits into two forks, the east and west. Approximately 1/2 mile downstream from the forks is a 30' bedrock waterfall, which prevents upstream migration of fish (Parker 1999). The elevation of Scotch Creek within the RNA varies from 3,960 feet where the east fork of Scotch Creek crosses the Schoheim Road, to 3,080 feet at the Oregon/California border. West-facing slopes are characterized by open grasslands with oaks in the draws; densely vegetated east-facing slopes are dominated by small oaks and brush.

6. Geology

Scotch Creek RNA is mapped as Western Cascade Oligocene basalt, basaltic andesite, and andesite (Tb2) (Smith and others 1985). These flows are interbedded with volcanic breccias and pyroclastic deposits and other rock types too thin, discontinuous, or poorly exposed to map separately. Different rock types in these formations are not mapped because of the scale of the map and the complexity of the formations. Pilot Rock, at the head of the Scotch Creek watershed, and Cathedral Cliffs just to the east of Lone Pine Ridge on Camp Creek are mapped as mafic intrusive rocks (Tm) and are outside the present RNA boundaries (Smith and others 1985).

7. Soils

Soil information for Scotch Creek RNA is based on the Soil Survey of Jackson County Area, Oregon (USDA 1993). There are six mapped general soil units in the RNA (map 50). Because of the small scale of the map and the large area covered, mapped units are often presented as complexes of different soil types. Number of acres, percent of RNA, productivity class and site index (if any) of the soil types found in the RNA are summarized in Table AEE-2. About 79 percent of the RNA consist of clay or rock outcrop soil complexes. The balance (21%) are soil types capable of supporting mixed conifer stands.

Table AEE-2. Scotch Creek RNA Soil Units

Soil #	Unit Name	Percent Slope	Acres	Percent Acres	Productivity Class *	Site Index **
14G	Bogus very gravelly loam, north slopes	35 to 65	323.2	18.1	***PSME 70 PIPO 90	6 6
81G	Heppsie clay, north slopes	35 to 70	151.9	8.5	-	-
82G	Heppsie-McMullin complex	35 to 70	403.5	22.5	-	-
113G	McMullin-Rock outcrop complex	35 to 60	865.6	48.4	-	-
114G	McNull gravelly loam, north slopes	35 to 60	15.2	0.8	PSME 80	7
116E	McNull-McMullin gravelly loam	12 to 35	15.2	0.5	PSME 70	6

(USDA,1993)*Site Index. Height and age of selected trees in stands of a given species. A designation of the quality of a forest site based on the height of the dominate stand at an arbitrarily chosen age. Average height at 50 yrs = 75 feet. SI is 75. Age varies with species and soil type: 100 yrs. PSME on Pokegama and Woodcock units, PIPO all units; 50 yrs. PSME on all other units, ABMASH, and ABCO. ** Productivity Class. Yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. ***PSME = *Pseudotsuga menziesii*, Douglas-fir; PIPO = *Pinus ponderosa*, ponderosa pine; ABCO = *Abies concolor*, white fir.

8. Hydrology

Scotch Creek Subwatershed is 11,503 acres (18 sq. mi.); 62.5 percent of the ownership is BLM, 30.3 percent State of California, and 7.2 percent private. There are 109.5 total stream miles with a stream density of 6.1 miles per square mile. Scotch Creek Subwatershed contains 4.7 miles of fish-bearing streams and based on aerial photo estimates, 5.5 miles of perennial non-fish bearing streams, 60 miles of intermittent streams for a total of 70.2 miles of stream with riparian reserves (USDI-BLM 2000a). Scotch Creek enters the Klamath River system as a fifth order stream at Iron Gate Reservoir. There are no mapped springs on the USGS 7.5 Quad maps for the RNA. There are no water developments within the RNA, however there is a 0.033 acre-foot reservoir used for livestock watering on an unnamed tributary to Scotch Creek above the RNA.

Stream gradient of Scotch Creek is low to moderate from Iron Gate Reservoir to the Oregon border, but steepens beyond that point. The channel meanders through a narrow valley near the confluence with Slide Creek, then it is confined in a narrow V-shaped valley with steep hillslopes to its headwaters (USDI-BLM 2000a). Substrate material in Scotch Creek is cobble and boulders over bedrock with some gravel and fines. Riffles and cascades dominate the average stream profile. Three stream channel morphology types were

identified for the Scotch Creek Subwatershed using the Rosgen classification system (Rosgen 1996): Aa+ (74 miles), A (10 miles), and B (25 miles). The main stem of Scotch Creek, and the lower reaches of Slide Creek and the main unnamed tributary above the waterfall are classified as B type channels. B stream types are moderately entrenched, having a moderate gradient, riffle dominated channel with infrequently spaced pools. These channel types have a very stable plan and profile with stable banks. The A channel types are steep, entrenched, cascading, step/pool streams. They are high energy streams located in the headwaters of Scotch Creek. The Aa+ channel types are very steep (greater than 10 percent slope) and deeply entrenched.

There is little data available on water quality or quantity in Scotch Creek, except for a few water quality measurements taken on July 29, 1975 by a BLM fish survey crew and what Parker obtained during his aquatic surveys on June 30 and July 1, 1999 (Parker 1999). Throughout the RNA, Scotch Creek was quite cool: 50-52°F above the falls, and 56°F below (USDI 1999c). At one spring in the upper watershed, water temperatures were a healthy 48-49°F (Parker 1999). At the time of the survey, Scotch Creek was intermittent above the junction of the two forks with a permanent flow below.

The 1975 measurements, taken 50 yards upstream from the mouth of Scotch Creek, were air temperature 68°F, water temperature 66°F, dissolved oxygen 8.5 ppm, pH 9.0, CO_2 60 ppm, free acidity 0 for both high and low range, and total hardness 205.2 ppm. Parker (1999) found that water temperatures varied from 9-9.5°C (48.2-49.1°F) at cold water inputs to 14.5-16.5°C (58.1-61.7°F) at the reservoir and in open meadows near the upper reaches of the stream. Temperatures ranged from 10.0-11.5°C (50-52.7°F) throughout the rest of the stream. Parker also noted that at the time of his survey, Scotch Creek was intermittent above the junction of Scotch Creek and the major tributary and perennial below.

Water quality in the RNA has probably been affected by road building and past logging in the upper portion of the Scotch Creek Subwatershed. The decommissioned Porcupine Gap/Schoheim Road connector is within the riparian zone adjacent to the upper reach of Scotch Creek. The natural surfaced Schoheim Road with its culvert crossings on the main stem of Scotch Creek and many tributaries had a detrimental affect on the sediment regime in the Scotch Creek system. In the fall of 1998, the BLM improved drainage structures and seasonally blocked the section of the Schoheim Road within the Scotch Creek Subwatershed. This road work reduced the amount of sediment moving into the Scotch Creek system.

9. Vegetation

Scotch Creek RNA was established on the basis of a large area of chaparral dominated by members of the Rosaceae (*Prunus species, Amelanchier, Cercocarpus, Holodiscus*) primarily located on the east-facing slopes of Slide Ridge. The grassy, west-facing slopes of Lone Pine Ridge contained stands of perennial native grass which were dominate grassland species in former times. Little was known of the nature of the plant communities and their plant species.

Brock and Callagan (1999a) conducted a general inventory of plant community types in April-August 1999 that greatly increased our knowledge of Scotch Creek RNA plant communities. A list of plant species is provided in Appendix E. They point out several interesting floristic features of the RNA. Poison oak occurs at a single location, in a steep rock outcrop formation in the far northeast corner of the RNA. Poison oak is common at similar elevations both north and south of the RNA. Madrone is also absent, although it is common in the Rogue River watershed to the north. The grasslands contain native perennial grasses with low cover. Small areas of nearly pure Idaho fescue and bluebunch wheatgrass were found. Other grasslands best described as "mixed annual-perennial dominance" have 10-15 percent cover of native species, and a high percentage of cover by

introduced grasses species, and weeds. They also describe an important broadleaf maple-black oak forest riparian community associated with the perennial Scotch Creek stream system.

In their study they distinguished 11 different community types of varying degrees of cohesiveness of five different types: Riparian, Oregon white oak woodland, Grassland, Chaparral, and Conifer. Map 32 shows the distribution of the community types in the RNA. The following description is taken with some modification from Brock and Callagan (1999a).

Riparian Types

Two riparian communities are present: one dominated by trees; another by shrubs.

California Black Oak-Bigleaf Maple Riparian Woodland

This distinctive riparian woodland type occupies a wide zone in the alluvial bottoms of Scotch Creek and a more narrow zone in the lower reaches of several of the smaller side streams. On Scotch Creek these woodlands extend upslope on cool aspects for 100-200 feet above the creek bottoms. The alluvial soils sometimes form wide low terraces. Elevations range from 3,000 feet to 4,400 feet. This riparian zone forms a major wildlife corridor through the RNA.

Bigleaf maple (average 38% cover), black oak (18%) and Oregon white oak (16%) dominates the tree layer with occasional Douglas-fir, ponderosa pine and rarely black cottonwood or white alder. The shrub layer is usually dense with mock orange, tall Oregon grape, tall snowberry and serviceberry. The herb/grass layer varies, typically dominated by *Claytonia spp., Galium aparine, Tonella tenella, Vicia americana* and, in drier spots, *Bromus sterilis*. Two special Status species are associated with this type, *Ribes inerme ssp. klamathense* and *Isopyrum stipitatum.*

Riparian Shrub Community

On the middle and upper portions of the many tributaries which dissect the west slopes of Lone Pine Ridge (and the entire reaches of the southern-most tributaries that traverse the rocky "Lower Slope Complex") is a distinctive shrub-dominated community which typically occupies a very narrow band (50 ft. wide) with dry grasslands or rock outcrop beyond its margins. These riparian zones typically also have open exposed stretches between shrub patches. Most of these streams are perennial. A very high level of butterfly activity was observed at these sites (Brock and Callagan, 1999a)

Oregon white oak and western juniper are usually present with low percent cover. Mock orange (average 40% cover) dominates the shrub layer with willow, tall Oregon grape, and chokecherry common. *Rosa californica* is occasional. The herb layer is dominated by *Mimulus guttatus* and *Trifolium variegatum* (in the aquatic zone) with *Bromus sterilis* and *Poa bulbosa* (on the drier margins). Howell false-caraway (*Perideridia howellii*) is common.

Oregon white oak / Woodland Type

Brock and Callagan (1999a) describe a single oak woodland type.

Oregon white oak /Tall Oregon Grape Woodland

While Oregon white oak (also known as white oak) is a common co-dominant species in virtually all of the forest and chaparral plant communities in the RNA, it forms nearly pure stands in much of the area; these areas are mapped as Oregon white oak woodland. This type is found in several situations; it forms the outer margin of the riparian woodlands, extending upslope when soil depth allows; it extends up sidestream canyons in wide bands, it forms patches in open grassland communities (apparent clonal patches), and it is a component of the large chaparral-complexes which cover the upper slopes of Lone Pine Ridge and the east slopes of Slide Ridge. It occurs on Bogus (very gravelly loam) and Heppsie (clay) soils.

Oregon white oak cover is nearly always very dense (average 85%). Western juniper is often present at low cover. California black oak is present in draws or moist areas. The shrub layer is dominated by tall Oregon grape and tall snowberry with covers of each averaging 10-12 percent. Klamath plum and chokecherry are often present. The herb layer is variable depending on the density of the shrub layer; where shrubs are dense, the herb layer is sparse. The herb layer cover varies from under 10 percent to over 50 percent. Typical species include *Claytonia, Nemophila parviflora, Viola sheltonii, Bromus sterilis, Yabea microcarpa, Lithophragma parviflora* and *Marah oregana*. Isopyrum stipitatum, a rare species, is fairly frequent. This Oregon white oak woodland is not adequately described in current plant association guides for southwest Oregon.

In much of this community the oaks are dense and stunted, averaging 15-20 feet in height. Stems in many of these stands are 60-70 years old with diameters of only 4-6 inches. Occasional large trees are encountered but small diameter trees are the rule. Apparently, these stands developed under a frequent fire regime. It is possible that many of the patches are clonal and of very great (undeterminable) age. Many of the more stunted trees have a resemblance to *Quercus garryana var. breweri* but the length of the leaves consistently indicates that these are *var. garryana*.

Rock Outcrops

Rock outcrops are sparsely vegetated with the most frequent species being Juniperus occidentalis, Prunus subcordata, *Bromus tectorum* (cheatgrass), *Pseudoroegneria spicata, Alyssum alyssioides, Penstemon deustus* and *Lomatium californicum*. At higher elevations, *Sedum obtusatum* is common. A large population of Woodsia oregana also occurs at the higher elevations. A large sprawling member of the *Hydrophyllaceae, Phacelia ramosissima var. eremophila*, an interesting eastern Oregon species that is uncommon here, was found in protected (shady) areas of rock outcrops. The distinctive Scotch Creek RNA rock outcrop plant community is frequently associated with grassland complexes and with outcrops in tree and shrub dominated communities.

Grassland Types

Brock and Callagan (1999a) recognize grassland complexes based on elevation and their association with rock outcrops or Oregon white oak Woodlands.

Low Elevation Grassland-Rock Outcrop Complex

Lower elevations have a well defined zone which is significantly more shallow and rocky than higher elevations. The zone's upper limit is at approximately 3,350 ft. elevation, the same elevation as the major waterfall on Scotch Creek and the series of rock outcrops west of Scotch Creek. This may represent a geological break between old and "new" volcanic flows. Soils are all classified as McMullin-Rock Outcrop Complex (the proportion of rock outcrop is quite high). The elevation ranges from 3,000-3,350 feet. This grassland here

forms a mosaic with rock outcrop communities, Oregon white oak woodland and wedgeleaf ceanothus-Klamath Plum chaparral in approximately the following proportion:

20% - Rock Outcrop
60% - Dry grassland
15% - Oregon white oak Woodland
5% - Oregon white oak/ Klamath Plum-Wedgeleaf Ceanothus Chaparral

The grassland component in this area is dominated by annuals with a regular low cover of bluebunch wheatgrass. It differs significantly from the mid to upper slope grasslands in several respects including:

- dominance by the exotic grasses *Bromus tectorum* and *B. japonicus*
- *Bromus hordeaceus* much less abundant.
- high frequency of *Prunus subcordata*
- high frequency of *Lomatium californicum*
- higher frequency and cover of *Lupinus albifrons*
- very low frequency and cover of Medusahead (*Taeniatherum caput-medusae*)
- low frequency of star thistle (*Centaurea solstitalis*)
- relatively higher frequency and cover of *Agoseris heterophylla*, *Lomatium macrocarpum* and *Trifolium ciliolatum*.

The area is on a southeast aspect with significant due south and due west aspects represented. On the east slopes of Slide Ridge are several small rock outcrop openings which should be classified as this type though several of these support dense stands of Idaho fescue which is sparse east of the creek where heavy grazing has been continuous for 150 years. Significant surface erosion has occurred due to grazing but no rills or gullies are obvious. The surface layer is very gravelly with 30-50 percent exposed gravels and soil.

Middle and Higher Elevation Grassland-Oregon white oak Woodland Complex
Soils are significantly deeper, slopes tend to be more moderate with occasional "bench" topography above approximately 3,350 feet elevation. The grasslands here tend to have denser cover than the lower grasslands. Most of the area is still dominated by exotic annual grasses and forbs. Idaho fescue or bluebunch wheatgrass dominates the occasional patch of grass. However, patches of star thistle which is rapidly moving-in from the south and east are more frequent.

All soils are McMullin-Rock Outcrop Complex although the proportion of rock outcrop is much lower than in the Lower Grassland Complex. Elevation ranges from 3,350 to 4,200 feet. The plant community is on a southwest aspect with significant due south and due west aspect represented. Significant surface erosion has occurred due to grazing but no rills or gullies are obvious. The surface layer is gravelly with 20-30 percent exposed gravels and soil. The type is a mosaic of grassland with Oregon white oak woodland and a small amount of wedgeleaf ceanothus- Klamath plum chaparral.

5% - Rock Outcrop
65% - Dry grassland
18% - Oregon white oak Woodland
2% - Oregon white oak/ Klamath Plum-Wedgeleaf Ceanothus Chaparral

Astragalus californicus, a species previously considered "possibly extinct in Oregon", was found in this grassland community. It is often associated with fairly dense patches of bluebunch wheatgrass. This is the only known Oregon location for this species.

This community is at serious risk of further invasion by star thistle. Many incipient populations are present in the northwest half of the area. The southeast half is already

infested by large star thistle populations. The soils have the right combination of adequate depth and periodic exposure (through erosive mechanisms) to allow for the continued spread of starthistle. This should be considered the biggest threat to the integrity of the community.

Chaparral Types

Brock and Callagan (1999a) discovered that the eastern Siskiyou rosaceous chaparral for which the RNA was established consists of three relatively distinct plant communities.

Oregon white oak/Klamath Plum-Wedgeleaf Ceanothus

This community is a minor component of the RNA, occurring on the lower and middle slopes of the west aspects of Lone Pine Ridge and extending south across the Oregon/California border. It is a typical dry-site chaparral but appears to be fairly localized in occurrence. It differs significantly from similar communities in the Applegate Valley because poison oak is absent here. This community may extend up the Klamath River Canyon to the east.

Oregon white oak is always present, usually in shrub form, at a cover which can vary widely depending on soil depth. Wedgeleaf ceanothus and Klamath plum are both usually present with covers averaging 23 percent and 57 percent, respectively. Klamath plum is clearly the more abundant species on most sites. Birchleaf mountain mahogany is common at the higher elevations with covers of up to 5 percent. Annual grasses (*Bromus japonicus*, *B. tectorum and B. mollis*) dominate the grass/forb layer with frequent *Lomatium californicum, Claytonia perfoliata* and *Dichelostemma capitata*.

The soils supporting this type are classified as McMullin-Rock Outcrop complex. Elevation ranges from 3,000 to 4,000 feet. The aspect is south to southwest. Slope position is lower to mid-slope. This community typically has very gravelly surface soils.

Oregon white oak/Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)

The upper slopes of the west face of Lone Pine Ridge are covered with a dense chaparral consisting of a mix of Oregon white oak, birchleaf mountain mahogany, with a regular presence (but low cover) of Klamath plum. Some areas are dominated by Oregon white oak with reduced levels of mountain mahogany; other areas are dominated by mountain mahogany with Oregon white oak cover reduced; much of the area is a more or less equal mix of these two. Where mountain mahogany is the dominant (and Oregon white oak cover low), canopy gaps are frequent and the herb layer is significantly more dense as well as more diverse with several dry-site (grassland) species occurring in the canopy gaps. Most of the area is very dense and extremely difficult to walk through.

Throughout the area, the dominant herb-layer species are Claytonia (both *perfoliata* and *parviflora*), *Galium aparine*, and *Nemophila parviflora*. These species are the same as are found to be dominant in the Oregon white oak Woodland type and in the chaparral on Slide Ridge. However, three other species were found in high frequency in this complex; *Hydrophyllum occidentale* (average 2% cover), *Osmorhia chilensis* (1%) and *Clarkia rhomboidea* (average 2% cover). These elements are significantly different than the Slide Ridge chaparral complex.

The complex consists of roughly the following proportions:

40%"Mixed Type" with Oregon white oak averaging 60 percent cover and mountain mahogany averaging 50 percent cover with 3 percent chokecherry and 3 percent Klamath plum and with 4 percent tall snowberry. This type closely resembles some of the drier, mountain. mahogany dominant chaparral) found on Slide Ridge.
30% "Dry Type" with Mountain mahogany averaging 65 percent and Oregon white oak

averaging 5 percent. Klamath plum is usually present a 1 to 2 percent cover. Chokecherry and snowberry are usually absent. This type has frequent small open spots with dry-site species such as *Collomia granidflora, Bromus sterilis, Lomatium californicum* and *Eriophyllum lanatum*.
10% Oregon white oak Woodland: see separate description for the type; it occurs here fairly randomly often in the form of a large (apparent) clone in the middle of one of the other types.
10% Grassy openings; with typical mid-slope annual-grassland species; star thistle was not seen in this part of the RNA.
10% Rock outcrops

There does not seem to be any apparent aspect affinities in this complex except that the "Dry" Type (mountain mahogany dominant) seems to prefer the more southerly aspects. For the most part, the types are apparently randomly mixed.

The soils supporting this type are mapped as Heppsie-McMullin complex. The elevations ranges between 4,200 and 5,100 feet. The aspects is mainly southwest with some due west and some due south.

Oregon white oak/ Mountain Mahogany-Snowberry Chaparral Complex (Slide Ridge)
On the entire east slope of Slide Ridge (west of Scotch Creek) is a complex similarly dominated Oregon white oak and mountain mahogany but is more moist than the Lone Pine Ridge complex. There is considerable variation in species composition across the slope and some patterns are discernable. However, there are no clear delineations, and all of the "types" more or less intergrade. The vegetation is fairly uniformly short-statured (10-20 feet in height) and moderately dense. It can be traversed on foot with reasonable ease, though fairly slowly. The tree/shrub layer cover is consistently high, averaging 90 percent. Oregon white oak is always present with an average cover of 54 percent. Mountain mahogany is usually present with an average cover of 30 percent. Snowberry is usually present with an average cover of 18 percent. Serviceberry, tall Oregon grape, Klamath plum and chokecherry all have high frequency and average 2-9 percent cover. Mock orange (*Philadelphus*) and Indian plum (*Oemleria*) occasionally occur. Claytonia (*perfoliata* and *parviflora*) and Galium aparine dominate the herb layer with Smilacina racemosa usually present. Other high frequency species include *Nemophila parviflora, Viola sheltonii* and *Clarkia rhomboidea*. This complex differs from the Lone Pine Ridge chaparral complex in the consistent high cover of snowberry (average 18%), the consistent presence of S*milacina racemosa* and *Viola sheltonii* and the significantly lower cover of *Hydrophyllum, Clarkia rhomboidea* and *Osmorhiza* chilensis. It also lacks the dry grassland species which are fairly frequent in the Lone Pine Ridge chaparral.

While it is difficult to distinguish distinct types in this complex, there are some patterns which can be described. The complex is roughly composed of the following mix of community types:

40% - Oregon white oak-Mt. Mahogany; Oregon white oak Dominant: This type averages 60-70 - percent Oregon white oak and 20 percent mountain mahogany with 20 percent snowberry; it is fairly moist and occurs on northeast, east, southeast aspects.
20% - Oregon white oak-Mt. Mahogany- Mt. Mahogany dominant: This type averages 30-35 percent Oregon white oak and 60 percent Mountain mahogany with snowberry much less abundant; it is fairly dry and usually occurs on southeast aspects. This type is closely related to the "mixed" type of the Lone Pine Ridge upper complex.
10% - Oregon white oak Woodland: see the separate description for this type. It occurs here on east and southeast aspects, typically on lower slope position..
5% - Riparian: in each of the small draws which dissect the area there is a narrow band dominated by dense Philadelphus, with Holodiscus and occasional bigleaf maple.
5% - Rocky grassy openings: typically on southeast aspects, often with a strong native Idaho fescue component.

20% - Sites with Douglas-fir-Oregon white oak or Douglas-fir/Serviceberry-Oregon Grape conifer potential are mostly currently dominated by Oregon white oak (40-50% cover), mountain mahogany (20-25% cover) and snowberry (32% cover) like the previous two types, but also have consistent serviceberry cover (20%). Also distinctive in this more moist type is the regular presence of chokecherry, baldhip rose, silktassle, *Oemleria, Lonicera ciliosa* and occasional thimbleberry. The herb layer also has some distinctive species such as *Trientalis latifolia* and *Moehringia macrophylla* which are both usually present with a 2 percent cover. Douglas-fir, black oak and ponderosa pine are present in some of the areas. The potential for some of this area is for a open canopied Douglas-fir or ponderosa pine overstory with Oregon white oak or black oak in the understory and continued fairly dense shrub layers. Some areas are trending toward the Douglas-fir/Serviceberry-Oregon Grape (PSME/AMAL-BEPI) type. Other areas seem to be more trending toward keeping Oregon white oak as a co-dominant. It is probable that most of this area has not seen much more than scattered conifers for a long time due to repeated fires, but given enough time without disturbance, the conifer component would develop. This does not mean that the area "should" be pushed toward conifer dominance, it just means that the ecology of the area is more difficult to interpret than was formerly thought. These conifer-potential sites are on north and northeast aspects, often clearly delineated by ridge lines.

The soils in this area are mapped as Bogus very gravelly loam with large inclusions of Heppsie-McMullin complex. Aspect includes north through southeast with northeast dominant. The elevation ranges from 3,000 feet to 4,100 feet.

Conifer Types

Two distinct conifer communities are present in the RNA.

Douglas-fir/Serviceberry-Tall Oregon Grape

This plant association occasionally occurs in the Applegate Valley (though in limited areas). Brock and Callagan (1999a) use this name for this particular Scotch Creek RNA plant community. They have not seen it in the Southern Cascades except in this area. The community is characterized by a lack of white fir, a consistent cover of serviceberry and tall Oregon grape and a lack of poison oak (the latter is not unique here, of course, but in the Applegate Valley its absence would be quite distinctive for the Douglas-fir series). Even though Scotch Creek RNA has totally different soils, this community appears to be nearly identical to the stands found in the Applegate Valley, west of the planning area.

The community occurs on north and northeast slopes mostly at the north end of the RNA. Soils are mapped as Bogus and McNull gravelly loams.

Some of the conifer stands on Slide Ridge, currently dominated by ponderosa pine, are probably best combined with this community. High black oak cover, low Oregon white oak cover and a regular, fairly dense cover of serviceberry and Oregon grape are good characteristics to use identify the community.

White Fir/Dwarf Oregon Grape

This type occupies a small portion of the RNA, at the north end near the east fork of Scotch Creek and at the summit of Lone Pine Ridge on a northeast aspect. The soils are McNull gravelly loam and Farva cobbly loam. Conditions are cool and moist and soils are sufficiently deep to support dense conifer growth. This area represents the lower edge of a typical forest type in the area to the north outside of the RNA. White fir is dominant with an average of 60 percent cover; Douglas-fir is co-dominant (30%). The shrub layer has dwarf Oregon grape (24% cover). The herb layer has *Smilacina stellata* (3%) and *Trientalis latifolia* (2%) as dominants.

10. Exotic Plants and Noxious Weeds

Scotch Creek RNA has a number of exotic plants (annual grasses) and yellow starthistle, a listed noxious weed. Because of disturbed soil from grazing practices, and the adjacent Schoheim Road, the RNA is at risk to invasion by other weeds, most immediately Dyer's woad.

Starthistle

Brock and Callagan (1999a) consider the active invasion of starthistle in the mid to high elevation grassland communities to be the main management concern in the RNA. They have discovered that approximately 200 acres in the southeast portion of the RNA is currently seriously infested with star thistle. About 10 percent of that area is heavily infested while 30 percent has light to moderate cover. Patch size varies from 200 sq. ft. to up to 2 acres. Another 200-300 acres of similar habitat is vulnerable to invasion in the near future. Incipient populations are also present along the Schoheim Road. South of the state line fence in California the situation is much worse with most of the grasslands already occupied by star thistle. This area will continue to act as a seed source. Annual-dominated grasslands offer a fertile place for establishment due to the periodic availability of bare soil. One strategy for management may be to establish a higher level of native grass cover to limit the bare soil available for star thistle.

Dyer's Woad

This noxious weed was recently collected along Lone Pine Ridge Road above the Schoheim Road less than 1,500 feet up hill from Scotch Creek RNA. This noxious weed has the potential to colonize dry hill sides very rapidly.

Medusahead

Brock and Callagan (1999a) found that low elevation grassland were somewhat resistant to invasion by Medusahead that they attributed to shallow soils. They suggest that these might be good areas to seed with bluebunch wheatgrass and Idaho fescue.

Other exotic weeds and annual grasses include such species as Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), chess (*Bromus secalinus*), bulbous bluegrass (*Poa bulbosa*), Klamath weed, (*Hypericum perforatum*), and hedgehog dog-tail (*Cynosurus echinatus*)

11. Special Status Plants

In addition to their plant community study, Brock and Callagan (1999b) surveyed for special status plants. They found nine species listed by ONHP (Table AEE-3). The listing of Saw-tooth sedge (*Carex serratodens*) is tentative, awaiting confirmation. Other occurrences of this species have been found in the Applegate River drainage.

Brock and Callagan (1999b) searched the Scotch Creek RNA for three other plants with special status in Oregon, Ashland thistle (*Circium ciliolatum*), Gentner fritillary (*Fritillaria gentneri*), and Siskiyou four-o'clock (*Mirabilis greenei*), but could not find them. Other plants of interest found in the RNA include Tracy pea (*Lathyrus lanzwertii* var. *tracyi*), Parish nightshade (*Solanum parishii*), and Klamath Basin milkvetch (*Astragalus californicus*). The milkvetch is the most significant, since this is the only known Oregon location. Mountain lady's-slipper (*Cypripedium montanum*) is also Northwest Forest Plan Survey and Manage species.

12. Forest Health

The Scotch Creek RNA has few conifer communities. A few riparian areas have white fir stands, Douglas-fir and Ponderosa pine occur on northerly slopes, and in scattered pockets on the ridgelines. The few older stands present have a high density shade tolerant conifers in the understory, likely a result of fire suppression activities. Insects and disease have been documented but are not at epidemic levels.

Table AEE-3. Scotch Creek RNA Special Status Plants				
Scientific Name	**Common Name**	**TNC Rank**	**BLM / Federal Status**	**ONHP List**
Astragalus californicus	California milk-vetch	G4?/S1	A	2
Carex serratodens	Saw-tooth sedge	G4?/S2	A	2
Cypripedium montanum	Mountain Lady's-slipper	G4G5/S4	T	4
Isopyrum stipitatum	Dwarf isopyrum	G4?/SU	A	3
Lathyrus lanszwertii var. tracyi	Tracy peavine	G?/T3/S1	T	3
Microseris laciniata ssp. detlingii	Deling microseris	G4T2/S2	S	1
Ribes inerme ssp. klamathense	Klamath gooseberry	G5T3?/SU	T	3
Perideridia howellii	Howell false-caraway	G4/S3	T	4
Solanum parishii	Parish nightshade	G4/S?	T	3

13. Animals

There have been no large-scale vertebrate surveys done Scotch Creek RNA. However, there are lists for the general area that indicate species that might be expected in the RNA (see for all terrestrial vertebrates Nelson (1997) for Soda Mountain Area and Trail (1999) for birds. Other workers have inventoried the RNA for breeding birds (Alexander 1999), aquatic organisms (Parker 1999) and butterflies (Runquist 1999).

Mollusks

Parker (1999) discovered pebblesnails (*Hydrobidea, Fuminicola*) in the main channel of Scotch Creek and in the main tributary at T.40S.,R.2E.,Sec.1,NE1/4. The snails were at discreet locations in the stream associated with cold water inputs detailed in the Hydrology discussion above. The sites were also associated with flow rates that would prevent the settling of fine sediments on the surfaces of coarse sediments, and where enough sunlight penetrated the canopy to stimulate diatom growth. Parker suggests that the pebblesnails might be localized or endemic species since they have no way to move between streams.

Aquatic Insects

Cursory visual surveys of aquatic insects in the Scotch Creek RNA found that the aquatic insect community seemed similar to those in nearby Dutch Oven and Camp Creeks (Parker 1999). If so, it is possible that the insect community in Scotch Creek reflects glacial isolation. Intensive sampling in Dutch Oven Creek (in October, 1993) discovered many species that are more typical of moist, coastal, higher-elevation streams in the western Cascades (Aquatic Biology Associates 1993). Due to the isolation of Dutch Oven and Scotch Creek, there is a high probability that some of the aquatic insects are endemic to these streams. Further sampling may provide answers in the next few years.

Terrestrial Insects
Runquist (1999) collected 60 species of butterflies (Appendix Q) in the Scotch Creek watershed the summer of 1999. Because of access problems only the northern section of the RNA was sampled. Fifty butterflies were collected in the RNA. An additional 10 species were collected along the decommissioned Scotch connector road from Porcupine Gap to Schoheim road at the north end of the RNA. The remarkable butterfly diversity is a reflection of the geographic location of where ecoregions meet, the diversity of host plants, and the variety of ecological niches.

Amphibians
Parker (1999) surveyed Scotch Creek for stream-dwelling amphibians in early July, 1999. He found none within the RNA. This seemed unusual, since all aquatic habitat requirements were present for Pacific giant salamanders (*Dicamptodon tenebrosus*) and tailed frogs (*Ascaphus truei*). Dicamptodon is found in upper Jenny, Keene, and Cottonwood Creeks (Parker 1999). However, these two species appear to be very sensitive to aspect in southern Oregon. It is likely that the combination of dry terrestrial environment predominately hot, dry, south-facing slopes and the low summer water flow makes it difficult for adults to migrate into the watershed from adjacent populations, and for aquatic juveniles to persist during droughts (Parker 1999).

Fish
The falls on Scotch Creek appear to be a fish barrier. Surveys in July, 1999 found no fish above the falls (Parker 1999; USDI 1999c). Therefore, within the RNA, fish reside in only about the first 1 km (0.6 mile) of Scotch Creek.

Fish in Scotch Creek appear to be redband trout (*Oncorhynchus mykiss* ssp.) (Parker 1999). Genetic studies will have to be completed in order to determine whether this population of trout is the closely-related but more common rainbow trout (Oncorhynchus mykiss), or is, indeed, redband trout.

Birds
Alexander (1999) conducted a breeding bird survey of the RNA in June 1999. Twenty monitoring stations were established. Sixteen were visited twice. A total of 47 species were encountered. Sixteen species are conservation focal species for Oregon and/or California.

Spotted Owls are known to nest in the immediate vicinity of the RNA. Timbered portions of the RNA have been mapped as roosting and foraging habitat using modified McKelvie Spotted Owl habitat criteria.

14. Alien Animals
There are no alien animals known in the area with the exception of cattle. Opossum and starlings are documented from the lowlands in the Rogue and Shasta Valley, but haven't been documented in the RNA.

Cattle. This area is part of the Camp Creek Pasture of the Soda Mountain allotment.

15. Site History
There have been no cultural resource surveys of the Scotch Creek RNA and no archeological or historical sites have been recorded. Native Americans who may have visited the Scotch Creek and utilized its resources include the Klamath and the Shasta.

There were numerous resources upon which these native peoples depended. Roots and bulbs, such as camas (*Camassia*) and various forms of Perideridia (*e.g. ipos, yampa*) provided starchy stapes as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, seeds (e.g. tarweed seeds, *Madia* spp.). Other plants and animals were used for fiber, tools clothing, and medicines.

Native peoples employed a number of techniques to enhance those resources useful to them. Fire was probably the most significant tool. Fire assisted in promoting and maintaining staple crops, such as acorns and tarweed, and maintained open meadows and prairies, which were crucial locations for subsistence resources including game, roots, bulbs, berry patches, and grass seeds. Fire also promoted habitat important to large game. Burning took place during the spring or fall and at specific intervals, and contributed to the development and maintenance of prairies and savannahs, oak and oak/pine woodlands, and upland meadows (Pullen 1996).

Settlement of southern Oregon by Euro-Americans increased substantially after gold was discovered in Jacksonville in 1852. Newcomers settled throughout the Rogue Valley, utilizing open savannas and grasslands for agriculture and livestock ranching. Conflicts over land between miners and settlers and native Americans culminated in removal of the remaining Native Americans. The Klamath Indians were confined to the Klamath Reservation east of the Cascades. Some Shasta families however, managed to remain in the Shasta Valley and along the Klamath River, or escaped from the northern reservations to find their way home.

Historical land use of the Scotch Creek area by Euro-Americans has been predominantly grazing in the open meadows and pine/oak savannas. Reports indicate the area was heavily grazed by cattle for more than 100 years.

16. Human Features

There are no human-made features in the RNA with the exception of the Schoheim Road and the short unnamed spur road south of the Schoheim between the two branches of Scotch Creek. An old road remnant is present in the bottom of Scotch creek.

B. Surrounding Land Use

The RNA is surrounded by Monument lands on the north, west and east. The Soda Mountain Wilderness Study Area is adjacent to the northeast and is managed to maintain its wilderness values (USDI 1995d). The Horseshoe Ranch Wildlife Area (Redding BLM and California Department of Fish and Game) along the southern boundary is managed by the California Department of Fish and Game primarily as deer winter range.

IV. MANAGEMENT CONSIDERATIONS

Botanical/Plant Communities

Agency Standards

The following standards, policies, and directives regard maintaining, protecting or restoring relevant and important botanical values of RNAs:

- The overall goal of RNAs is to preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1986b).

- RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving the manipulations of environmental or vegetational characteristics or plant harvest must be approved. Because the

overriding guidelines for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation, such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained (BLM Manual, 1623.37 (A)(B)).

• Preserve, protect or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial and aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured. (USDI 1995a)

• Manage Oregon white oak woodlands to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. Utilize prescribed fire to maintain habitat conditions within the Oregon white oak woodland community (USDI 1995a).

Current Information

The ecological condition of all plant communities identified as key elements of the RNA were considered to be of overall high quality when the area was nominated as an RNA 1991 (Schaaf, 1991). Brock and Callagan (1999a) found that with the exception of some weed issues, the plant communities in the RNA are in good condition. Non-native weedy species, particularly yellow star thistle (*Centaurea solstitialis*), hedgehog dogtail, (*Cynosurus echinatus*), medusa-head (*Taeniatherum caput-medusae*), and Bull thistle (*Cirsium vulgare*) occur in some of the savanna and woodland areas and threaten the integrity of these plant communities. The spread of these and other non-native species into the RNA from surrounding lands, especially from the south in California and along the Schoheim road is an ongoing threat.

Exclusion of a natural fire regime has resulted in encroachment of shrubs and conifers into the edges of open oak/grass savanna areas, decreasing the extent of this plant community in the RNA. Underbrush and tree density have increased in woodlands and forest areas, increasing fire fuel loads and the risk of high-intensity, stand-replacement fires.

The main objective in managing plant communities within the RNA is to maintain or enhance their key attributes. Ideally this would be accomplished by allowing succession to occur as a result of a natural disturbance regime, which could include wildfire, storms, normal mortality, drought, etc. However, because of past human interference, in the form of fire suppression and livestock grazing, proactive management is necessary to re-establish natural processes.

Over time all plant communities are subject to natural disturbances and corresponding succession. It is not the intention of RNA management actions to halt this natural succession and disturbance process at one particular stage. Using prescribed burning as a management tool is an attempt to re-introduce fire as a natural process. Excluding fire during the past 100 years has resulted in a build-up of fire fuel loads and encroachment of trees and shrubs into savannas and meadows. Re-introducing fire in small areas under controlled circumstances would reduce fire fuel loads, as well as improve the ecological condition of plant communities in which fire has historically been a component by restoring native species composition. Allowing naturally-occurring fires to run their course in the RNA (and outside) is somewhat constrained by the proximity of private property to the northwest of the RNA north of Pilot Rock. Utilizing fire in small areas at different times throughout the RNA is intended to resemble the patchiness of natural disturbances. With this approach, at any one time different areas of each plant community will be in different successional stages, mirroring normal ecosystem conditions.

Outlined below are goals, issues relating to those goals, and management actions for each plant community requiring management within the RNA. Additional important aspects affecting the management of plant communities within the RNA are discussed under separate headings (e.g. introduced and noxious weedy species, insects and disease, livestock grazing, timber harvest, etc.). Monitoring of plant communities, discussed in Section VI, is also a vital process of tracking and evaluating responses to natural or prescribed disturbances, determining the effectiveness of management actions or research activities, and making necessary adjustments to insure that management goals continue to be met.

Riparian (California Black Oak-Bigleaf Maple Riparian Woodland & Riparian Shrub Community)

Goals

- Maintain the function, structure and vegetative composition of the riparian zones, including seeps and springs.

Current Information

These two plant communities are currently in good condition. Open galleries of Black oak show limited juniper establishment. This may become a problem in the future necessitating prescribed fire or manual treatment. Livestock impact is no longer a threat to this plant community, as little utilization occurs.

Issues

- Riparian areas are currently little utilized by livestock grazing although localized areas historically received periodic high utilization
- Lack of riparian survey data.

Management Actions

- Perform riparian surveys documenting hydrologic and riparian vegetation condition.
- Restore riparian areas within the RNA that is not properly functioning based on results of riparian surveys.
- Remove livestock grazing from riparian communities if necessary.

Oregon white oak woodland (Oregon white oak /Tall Oregon Grape Woodland)

Goals

- Maintain open woodland, dominated by Oregon white oak, ponderosa pine and associated native species.
- Reduce Douglas-fir and incense cedar conifer seedlings.
- Reduce fire fuel loads.

Issues

- Fire suppression resulting in conifer recruitment and increased fuel loads and ladders.
- Competition from non-native plant species, especially annual grasses and scattered patches of yellow star-thistle.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, topography, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large equipment.
- Oak phytopthora is present in oak woodlands in California. This disease is affecting vast areas of oak woodlands in central and northern California.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize prescribed burning or manual thinning to reduce conifer recruitment and fire fuel loads.
- Eliminate patches of yellow starthistle using all available tools.
- Re-seed between trees after burning with native grasses and forbs.

Rock Outcrops

Goals

Maintain these sparsely vegetated but important niche communities.

Current Information

Plant communities associated with Rock outcrops are likely stable. These fine feature communities are important as they provide a unique niche for certain plant species, including lichens and mosses. Certain weedy species (i.e. annual grasses such as cheatgrass) can occur in these communities.

Issues

None.

Management Actions

Survey these sites with future Botanical inventories.

Grasslands (Low Elevation Grassland-Rock Outcrop Complex & Middle and Higher Elevation Grassland-Oregon white oak Woodland Complex)

Oak Woodland component

Goals

- Maintain open canopied oak woodlands, and understory grasslands, dominated by native perennial grasses and forbs.
- Reduce noxious weeds and invasive annual grasses.
- Reduce fire fuel loads.

Issues

- Competition from non-native plant species
- Conifer encroachment as a result of fire suppression.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using heavy equipment.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize all management tools available reduce conifer invasion, thin dense stands of Oregon white oak, and favor the abundance of native herbaceous understory species over invasive annual grasses.
- Contain and eradicate patches of yellow starthistle using all available means
- Re-seed after weed treatment/burning with native grasses and forbs.

Grassy meadow component

Goals

- Maintain open meadows/grassland by reducing the encroachment of conifers and shrubs.
- Decrease non-native and increase native species.
- Protect and maintain the rare Astragalus californicus population. It is the only population in Oregon.

Issues

- Competition from non-native weedy species. Yellow starthistle is especially dominant in the mid-high elevation grassland; expansion of this species is likely. Annual grasses (Japanese brome and cheatgrass) are a dominant species in the low elevation grasslands.
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large equipment.
- Presence of a rare plant that can complicate restoration activities

Management actions

- Collect and propagate native grass and forb seeds from savanna areas of the RNA.
- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Tailor management activities to maintain the Astragalus californica population in mid-high elevation grasslands, and to decrease the yellow starthistle populations
- Eradicate large patches of yellow starthistle using all available means
- Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows/savannas.
- Re-seed burned areas with native grasses and forbs.

Rosaceous Chaparral (Oregon white oak/Klamath Plum-Wedgeleaf Ceanothus Oregon white oak/Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)

Goals

Maintain healthy chaparral communities

Current Information

These plant communities are commonly described as rosaceous chaparral. Long-term plant community dynamics are not yet fully understood. The mollic epipedon described by the SCS manual suggests past domination by grass. The abundance of this plant community could be attributed to fire suppression. The presence of oak within the rosceous chapparal, and fire dependent species, such as buckbrush, imply the importance of fire within these plant communities. The rare plant Tracy peavine (Lathyrus lanzwertii var. tracyi) occurs in very small populations in Oregon white oak/mountain mahogany chaparral in the RNA. This rare endemic is only known for a few sites in Oregon. The role of fire for this species is also not well understood; it could benefit from periodic disturbance events.

Issues

- Lack of ecological information and understanding of the relationship of fire within these communities.
- Dense fuel loads

Management Action
More study of these plant communities, and key species within them is needed before any implicit management action is formulated.

Conifer Communities (Douglas-fir / Serviceberry - Tall Oregon Grape & White fir dwarf Oregon Grape)

Goals
- Maintain ecosystem function in the limited Douglas-fir and White fir communities.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
- Design management activities that restore natural ecosystem and disturbance processes.

Issues
- Limited access to the site
- High cost and uncertain funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, restrictions on using large equipment.
- Restrictions on commercial harvest.

Management Action
- Periodic surveys and monitoring of conditions in conifer communities
- Reduce fuel loads and risk of catastrophic event by manual understory thinning, and understory burning

Introduced and Noxious Weed Species

Policy and Agency Standards
The introduction of exotic plant and animal species is not compatible with the maintenance or enhancement of key RNA features. Certain re-introductions of formerly native species using proper controls may be specified in plans (Appendix R).

Take any action necessary to prevent unnecessary or undue degradation of the lands (FLPMA, 1976).
The public Rangelands Improvement Act of 1978 directs the BLM to "manage, maintain, and improve the condition of public rangelands so they become as productive as feasible..." (RIA, 1978, Section 2(b)(2)). The priority on managing this area is for productive plant community not rangeland productivity.

Goals:
- Maintain and / or restore plant communities.
- Contain or eradicate exotic and noxious weeds.
- Prevent the introduction of new exotic or noxious weed species.

Current information
Several areas within the RNA (see Botanical section) are dominated by introduced (alien) grasses, namely medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), bulbous bluegrass (*Poa bulbosa*), Japanese brome (*Bromus japonicus*) and cheat grass (*Bromus tectorum*). Small occurrences of yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and dyers woad (*Isatis tinctoria*) are also documented. There are large yellow starthistle (*Centaurea solstitialis*) populations in the mid-high elevation grasslands and along the Schoeheim road (Brock and Callagan 1999a). No weed treatments have occurred in the RNA.

Issues

- Exotic plants and noxious weeds threaten the integrity of key features within the RNA. These occurrences were mapped in 1999.
- Disturbance as a result of wildfire, vegetation treatments (burning or thinning), or livestock grazing can create optimum habitat for exotic and noxious weeds.
- High cost for weed treatments due to poor access.
- Lack of proven methods for controlling large infestations of exotic grasses like cheatgrass or bulbous bluegrass.
- Lack of large quantities of native grass and forb seed for restoration.

Management Actions

- Control weeds within and adjacent to the RNA using a integrated weed management approach utilizing all appropriate means (mechanical, cultural, biological, and chemical).
- Collect and propagate native seed sources for use within the RNA.
- Vegetative treatments to enhance key RNA features must be tailored so as to reduce weed infestations and not increase existing populations.
- Evaluate wether grazing can be used as a tool to promote maintenance of the key features of the RNA in the grazing study, especially reducing non-native species. If it is not, remove SCRNA from the Soda Mountain allotment.

Threatened, Endangered, Sensitive, and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1973) governs and provides for the conservation of listed and proposed species, and their habitats, on federal lands. The BLM Policy regarding Special Status Species, including federally listed and proposed species, state listed species, and species designated as Sensitive is to protect and conserve federally listed and proposed species, manage their habitat to promote recovery, and (for sensitive and state listed species) to ensure that Bureau actions will not contribute to the need to list sensitive or state listed species as federally listed (BLM Manual 6840).

Goals

- Maintain or enhance Bureau Special Status Species occurrences and habitat within the RNA.

Current Information

Nine Bureau Special Status Species are documented in the RNA, California milk-vetch, (*Astragalus californicus*), saw-tooth sedge (*Carex serratodens*), mountain lady's-slipper, (*Cypripedium montanum*), dwarf isopyrum (*Isopyrum stipitatum*), Tracy peavine (*Lathyrus lanszwertii var. tracyi*), Detling's microseris (*Microseris laciniata ssp. detlingii*), Klamath gooseberry (*Ribes inerme ssp. klamathense*), Howell false-caraway (*Perideridia howellii*), and Parish nightshade (*Solanum parishii*).

Two of these species, Klamath gooseberry and Howell false caraway were found in the riparian zone of Scotch Creek. Howell false-caraway is fairly "common" within the RNA and within the surrounding watersheds in the Monument.

Three species were found in grassland habitats, saw-toothed sedge, Detling microseris, and the California milk-vetch. All three occur in areas with fairly high levels of exotic species or noxious weeds. This is the only known site for the occurrence of the California milk-vetch in Oregon, and Brock and Callagan (1999b) documented a competitive relationship between this species and yellow star thistle. The ability of this species to persist in the RNA is a concern unless the grasslands are restored. A small population of Detling microseris was also found in one location. The identification of saw-toothed sedge has not been confirmed to date.

Three species are documented for the chaparral communities, dwarf isopyrum, Tracy peavine, and Parish nightshade. The dwarf isopyrum is documented for several locations in the RNA, and has been found in several locales within the Monument. Several patches of Tracy peavine are present in the Oregon white oak chaparral, but all are very small in size. Only two plants of Parish nightshade were seen in the chaparral at the outer rocky edge of the riparian zone, south of the falls.

Only one occurrence of mountain lady's slipper was found in a conifer community. The occurrence was fairly large for this orchid (45 plants) and was in a Ponderosa pine and black oak stand on a northerly slope. Suitable habitat exists for several other Bureau Special Status plants, including the Federally listed Gentners fritillary (Fritillary gentneri), however no populations were found.

Issues
- No monitoring of existing populations.
- Affects from the limited grazing are not known.
- Exotic and noxious weeds are likely threatening rare plants in the grasslands.

Management Actions
- Periodic monitoring of existing occurrences.
- Establish formal monitoring plots in the grasslands to evaluate the affects of noxious weed invasion and treatment (especially for Astragalus californicus).
- Tailor management actions (noxious weed treatment, fire) to protect or enhance rare plant populations.

Wildlife Species

Current Information
There is a Northern Spotted Owl center of activity in the immediate vicinity of the RNA. Part of the nest stand used by this pair of owls falls inside the RNA boundary.

Management Action
Any habitat manipulation activities (burning, vegetation manipulation, etc) proposed to occur in the RNA should take the habitat and security requirements of this owl site into account. Such projects should be planned with the same or more stringent constraints as would be placed on such activities outside the Monument / RNA.
Insects and Pathogens

Agency Standards
Catastrophic natural events, such as insect infestations. Should ideally be allowed to take their course. Insect or disease control programs should not be carried out except where infestations threaten adjacent vegetation or will drastically alter natural ecological processes within the tract (Appendix R).

Goals
- Maintain historic ecosystem functions in the forested plant communities.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
- Design management activities that restore natural ecosystem and disturbance processes.

Current Information
The Scotch Creek RNA has few areas occupied by conifer communities. Most occur on north and northeast slopes in the northern portion of the RNA. A dense understory of young conifers is found in much of the area, which is likely a result of fire suppression

activities. As a result increased, but not epidemic level mortality due to beetle outbreak has been noted. Some true fir engraver incidence is present in the white fir/dwarf Oregon grape association which occurs in the Northern portion of the RNA along the creek. Individual ponderosa pine are being attacked by bark beetle in conifer and non conifer plant communities.

Insects:

- Mountain pine beetle (*Dendroctonus ponderosa*)
- Western pine beetle (*Dendroctonus brevicomis*)
- Red turpentine beetle (*Dendroctonus valens*)

Individual pines are being infested at a higher than normal level by these species of beetles. Generally, this is not a serious problem within the RNA. Within the Klamath River Ridges ecoregion plant communities that support pine are often too dense thereby creating a higher risk for beetle outbreak. Both the short term and long term outlook is that mature ponderosa pine will be subject to increased beetle risk. Prescribed burning and thinning small trees around pine could reduce this risk. Given the inaccessibility of the area, efforts should be made to protect the most highly valued areas by proactive thinning/burning projects.

- Fir engraver (*Scolytus ventralis)*

Beetle and root rot often occur in association with white fir forests. Dense stands of white fir and associated pockets of laminated root (*Phellinus weirii*) often show increased levels of fir engraver. Root rot and fir engraver are the common disturbance agents in high elevation white fir in contrast to fire events in lower elevation mixed conifer. Very light noncommercial thinning and low level prescribed burns should be done on a trial basis at the SCRNA stand in an effort to reduce engraver incidence. The laminated root rot is not found at a sufficient level for concern. Further baseline data collection may identify other areas where it is present.

Management Actions
Thinning small trees and brush and prescribed burning will increase overall forest stand vigor while reducing risks to beetle infestation and stand replacement fires. These activities should follow collection of baseline data and development of specific objectives at a forest stand level or plant association level.

Pathogens:

Annosus root rot (*Heterobasidion annosum*)

Previously harvested areas at the northern extreme of the RNA, mainly those near roads may have detectable but as yet undetermined amount of annosus root rot present. This incidental occurrence is considered serious. White fir trees removed for hazard control or other reasons should be treated with Sporax to prevent annosus spread. While it is unlikely that very many trees of sufficient size would be cut for any reason, all effort should be made to prevent this root rot from entering new areas.

- True fir dwarf mistletoe (*Arceuthobium abietinum*)
- Doug-fir dwarf mistletoe (*Arceuthobium douglasii*)
- Western dwarf mistletoe on ponderosa pine (*Arceuthobium campylopodum*)
- Juniper mistletoe (*Phorodendron densum*)
- Incense cedar mistletoe (*Phorodendron libocedri*)
- Oak mistletoe (*Phorodendron villosum*)

Dwarf mistletoe is present on white fir, Doug-fir and ponderosa pine in the RNA. Three mistletoe species have been identified occurring on Incense cedar, Oregon white oak and juniper. While these parasitic plants sometimes cause mortality, they are present at endemic levels and are not considered to be a problem.

Management Activities
Thinning small trees and brush, and prescribed burning will increase forest stand vigor thereby reducing susceptibility to pathogens that cause forest diseases. These activities should be preceded by collection of baseline data and development of specific objectives at a forest stand or plant association level.

Needed Information
More baseline data is needed for the conifer plant communities in the RNA. This will serve to inventory and document insects and pathogens. Five year inventories are needed to assess overall stand conditions.

Summary
This is not a comprehensive list of all insects and pathogens in the RNA. For instance, little specific information is known on insects and pathogens occurring in the Oregon white oak woodlands, other deciduous trees or shrubs. The species thought to present the most likely problems to conifers or effecting the RNA were included. Any management activity proposed in the RNA needs to evaluated further before enacted. The insects and pathogens listed here typify those found at the Klamath River Ridges ecoregional level. Generally, forest stand densities and fuel loading are at a level where beetle outbreak risks and fire behavior threaten forest plant associations at a greater than historic natural level.

Boundary/Edge Effects

Policy and Agency Standards
- Maintain or increase public land holdings by retaining public lands and acquiring non-federal lands with high public resource values.
- Acquire lands and interests in lands needed to manage, protect, develop, maintain, and use resources on public lands ... in conformity with land-use plans that apply to the area involved (BLM Manual, 2100.05, 1984).

Goals and Objectives
- Maintain the integrity of the RNA.

Current Information.
The Scotch Creek RNA covers an area of 1,800 acres of public land. The boundary is defined by the limits of the watershed and property lines along the California border. Immediate property to the west, north and east is all BLM public lands.

Management Actions.
- Periodic inventory to assure no trespass from activities on non-federal lands along the California border

Roads and Utilities Rights-of-Way

Policy and Agency Standards
...public uses such as roads, pipelines, communication sites, and power lines should avoid the designated area and be anticipated in activity plans. Road closures or restrictions maybe considered appropriate in some instances (USDI, 1986). Roads are generally prohibited in RNAs however old roads or un-improved tracks often exist. (PNW Interagency Natural Area Committee, 1991).

Goals
Ensure that existing roads do not contribute to any loss of integrity of the RNA communities, including the riparian area.

Current Information.
There are no utility rights of way in the RNA. The Schoheim road (BLM 41-2E-10.1) serves as the boundary along the northern and eastern edge. This road has been closed. No future ROW permit requests are anticipated through the RNA. An old abandoned road exists along Scotch Creek on the California side on private land.

Goals and Objectives.
Maintain the roadless character of the RNA.
Insure that the Schoheim road does not cause any resource damage to features in the RNA

Management Actions
Monitor the existing Schoheim road

Fire Management

Agency Standards
In 1995, the latest Federal Fire Policy (USDA and USDI 1995) was issued directing federal land managers to expand the use of prescribed fire in order to reduce the risk of large wildfires due to unnatural fuel loadings and to restore and maintain healthy ecosystems.

Base the use of prescribed fire on the risk of high intensity wildfire and the associated cost and environmental impacts of using prescribed underburning to meet protection, restoration, and maintenance of crucial stands that are currently susceptible to large-scale catastrophic wildfire.

Reintroduce underburning across large areas of the landscape over a period of time to create a mosaic of vegetative conditions and seral stages. This is accomplished by using prescribed fire under specific conditions in combination with the timing of each burn to reach varying fire intensities. Treatments should be site-specific because some species with limited distribution are fire intolerant (USDI 1995).

Where perpetuating a seral stage of plant succession is important, prescribed fires may be specified in the activity plan; but only where they provide a closer approximation of the natural vegetation and governing processes than would otherwise be possible. Application of prescribed burns normally should be performed closely approximating the "natural" season of fire, frequency, intensity, and size of burn. The burn should be followed by a fire effects report documenting vegetative response (USDI 1986).

Adhere to smoke management and air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning (USDI 1995).

Goals
- Reintroduce fire into the RNA to re-establish a natural ecological process and to maintain, enhance or restore the structure and composition of the protected plant communities. Specific objectives include:

a) Increasing the extent of oak/pine savannas by removing encroaching hardwood and conifer seedlings and shrubs.
b) Reduce non-native and increase native grass and forb species.

c) Invigorate chaparral stands by removing any decadent shrubs and creating openings for native grasses and forbs.
d) Maintain and improve existing grasslands and meadows by using prescribed fire to invigorate native grasses, provide a good bed for reseeding, reduce encroaching shrubs and conifers.
e) Control wildfire in mixed conifer stands to protect losses to surrounding land owners.
f) Reduce fuel loadings created from thinning activities.

Current Information
Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen, 1995). Early settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying severities.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions.

Based on calculations using fire return intervals, five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism, thereby, naturally regulating the density of the forests by killing unsuited and small trees. Consequently, much old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow growing trees rather than faster growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination - without fire, these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production and / or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their short-lived seed-bank.

Climate and topography combine to create the type of fire regime found in the Scotch Creek RNA. Fire regime is a broad term and is described as the frequency, severity and extent of fires occurring in an area (Agee, 1990). Vegetation types are helpful in delineating different fire regimes. The Scotch Creek RNA is classified as a low-severity (80%) and moderate-severity (20%) fire regimes based on the vegetation types found within the RNA. The low-severity regime is characterized by vegetation types such as grasslands, shrublands, hardwoods, mixed hardwoods, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities are adapted to recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. A low-severity regime is characterized by nearly continual summer drought, fires are frequent (1-25 years), burn with low intensity and are widespread. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. The intermixture of pine-oak within the RNA suggests the fire return interval of about 10 years (Agee 2000). The moderate-severity regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). A moderate-severity regime is characterized by long summer dry periods, fires are frequent (25-100 years), burn with different degrees of intensity and burn in a mosaic pattern across the landscape. Some stand replacement fires as well as low-intensity fires may occur depending on burning conditions.

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the responsibility of fire protection of all lands within the Scotch Creek RNA to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Between the years 1967 and 1999, there have been two fires within the Scotch Creek RNA. Both fires were started by lightning and occurred in the years 1984 and 1992. Suppression action was taken by ODF resulting in both fires being contained at 0.1 acre in size.

Currently, some fire suppression techniques are not allowed within the Scotch Creek RNA in order to minimize disturbance to the area. All vehicles are restricted to existing roads, the use of tractors are not allowed within the RNA, Scotch Creek is not be utilized as a water source and the use of retardant is prohibited near the creek.

Prescribed fire can be used to meet resource management objectives which include but are not limited to wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat and silvicultural treatments. When utilizing prescribed fire it

should be based on the fire history of the area and past vegetation patterns known for the area. The application of prescribed fire should closely approximate the frequency, intensity, size, and the "natural" season of fire when possible.

Many factors influence fire behavior and the effects fire will have on a resource. Some are beyond our ability to control such as the location of where a fire starts, weather and topography. Fuels management programs focus on the factors which we have influence over such as fuels and vegetation. Prescribed fire is one tool that can be utilized to regulate fuels and vegetation. A primary objective of any fuels management activity in the RNA is to alter existing fuels in order to protect or minimize damage to existing late-successional habitat from wildfires which may occur.

All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. In compliance with the Oregon Smoke Management Plan, any prescribed burning activities within the RNA require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the State Forester on a daily basis concerning smoke management and air quality conditions.

Prescribed burns would be conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained.

Issues

- Limited access to and within the RNA.
- Restrictions against using large equipment in fire treatment or suppression activities.
- Constraints to season of prescribed burning due to air quality and fire season restrictions.
- Limited funding for repetitive treatments and restoration projects.
- Limited availability of native grass and forb seed or starts for re-planting.
- Concerns that fire can create conditions optimal for the expansion of annual grasses and noxious weeds like yellow starthistle.

Management Actions

- Develop a fire management plan and memorandum of understanding for the entire RNA, coordinated between BLM and ODF, including a plan for prescribed burning.
- Maintain or enhance known sites of special status plant populations
- Establish pre-burn plots in targeted plant communities to gather baseline data of vegetation species composition, density, etc. to determine the effects of fire on affected plant communities.
- Through prescribed burning, reintroduce fire as a natural process, based on past fire regimes.
- Conduct post-project monitoring of plant communities to determine the effectiveness of management activities in achieving RNA goals. Adapt management activities as necessary.

Hydrology

Policy/Agency Standards

Objectives for water resources include compliance with State water quality requirements to restore and maintain water quality necessary to protect designated beneficial uses for the Klamath River Basin. The overall goal of the Aquatic Conservation Strategy, is to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Included are specific objectives to:

- Maintain and restore the physical integrity of the aquatic system.

- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration, and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

Goals and Objectives

- Restore and maintain a properly functioning watershed condition and the ecological health of aquatic ecosystems within the Scotch Creek RNA.
  - Reduce or eliminate surface disturbing activities such as roads/jeep trails.
  - Restore and maintain native riparian vegetation along streams and springs/seeps.
  - Achieve properly functioning riparian areas.

Current and Needed Information

Hydrologic features in the Scotch Creek RNA include intermittent and perennial streams. Current hydrologic condition of the RNA is unknown. A stream/riparian survey is necessary to determine watershed concerns affecting water quantity or quality.

Except for 129.4 acres of timber land owned by Boise Cascade Corporation east of Porcupine Mountain in the south half of section 36, the remainder of the Scotch Creek Subwatershed above and including the RNA is managed by the BLM. Management of the approximately 0.7 intermittent stream miles on the private timber land follows the Oregon State Forest Practice Administrative Rules, which do not require protection of vegetation along small, intermittent stream channels. Management actions within or above the RNA having the greatest potential to adversely affect Scotch Creek and its tributaries include existing or newly constructed roads, timber harvest, or grazing. Sediment and stream temperature increases would be the most likely adverse impacts to water quality associated with these types of activities. A severe wildfire could also result in sediment increases to the stream system.

Management Actions

- Conduct stream/riparian survey to determine waterbody category, current channel and riparian conditions, and locations of unmapped waterbodies.
- Assess need for water/riparian monitoring based on stream/riparian survey results.
- Undertake restoration projects as needed to comply with the objectives of the Aquatic Conservation Strategy and to prevent further damage to hydrologic values.

Mining and Geothermal Resources

Mining and geothermal rights have been withdrawn within the Cascade-Siskiyou National Monument and are not an issue. There are no goals, objectives, issues, or actions necessary for this resource.

Cultural Resources

Agency Standards

Protect cultural resource values including information and significant sites for public and/or scientific use by present and future generations. Sites with significant values will

be protected from management actions and from vandalism to the extent possible. Develop project plans to preserve, protect and enhance archeological, historical and traditional use sites, and materials under the district's jurisdiction. This would include protection from wildfires (USDI 1995).

Goals

- Protect cultural resources at Scotch Creek RNA from theft and human disturbance.

Current Information

No cultural resources have been recorded within the Scotch Creek RNA.

Issues

- The isolated location of the RNA makes enforcement of restrictions and protection of archeological sites difficult.

Management Actions

- Conduct surveys for archeological values within the RNA
- Protect sites as needed from management activities and vandalism.

Livestock Grazing

Agency Standards

"Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and land-form and maintain or improve water quality, water quantity and the timing and duration of flow..." "Habitats are, or are making significant progress toward being restored or maintained for federal threatened and endangered species, federal proposed, category 1 and 2 federal candidates (Federal pecies of Concern), and other special status species" (Fundamentals of Rangeland Health, 43 CFR 4180)

"Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate, and landform (Standard 5, Standards for Rangeland Health, USDI, 1997a)."

"Livestock grazing should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized (USDI, 1987. BLM Manual, RNAs, 1623.37)."

Goals

- Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).
- Maintain or improve the designated values of the RNA, especially native plant community composition and structure, soils, riparian areas, stream health and function, and nutrient cycling
- Prevent spread of noxious and invasive weed species and control/eradicate existing populations

Current Information

Grazing in the area encompassed by the Scotch Creek RNA dates back to the 1850's when large herds of cattle, horses and sheep utilized the area. Control of these ranges did not occur until the passage of the Taylor Grazing Act in 1934. The long term goal of this law were the improvement of range conditions and the stabilization of the western livestock

industry. Prior to the enactment of the Taylor Grazing Act unregulated grazing occurred. During this period rangeland resources and ecological conditions are reported to have suffered significant harm from overgrazing.

The Scotch Creek RNA is currently part of the Camp Creek Pasture of the Soda Mountain Allotment #10110. Cattle numbers on the Soda Mountain Allotment have been reduced by 34% since the 1970's. The current animal unit months on the entire Soda Mountain Allotment are currently 1791, with about 366 cattle on the allotment. Utilization in the area of the pasture encompassing Scotch Creek RNA is extremely light with only the very northern part of Scotch Creek RNA receiving any utilization. Much of the RNA is unaccessible to livestock because of dense rosaceous chaparral. No formal utilization plots are currently occur in the RNA.

The Scotch Creek RNA contains significant areas of native grassland communities. In the RNA, large native herbivores (deer and Elk) play an important evolutionary and ecological role. Even more important was the role played by now extinct large late Pleistocene herbivores. How these herbivores behaved should play an important role in how domestic livestock are used to obtain ecological objectives. Different grazing animals vary in their foraging preferences, season, duration, and intensity of use, which can have significantly different effects on plant communities, particularly when considering introduced versus non-introduced species. Grazing modifies vegetation height, frequency, and density; influences vegetation composition and succession; and, alters water retention and drainage characteristics. To plants, critical factors are the severity, frequency, duration, and seasonality of defoliation. These factors can be controlled through proper grazing management.

Livestock grazing is likely a significant impact in the RNA if not managed in a manner appropriate for the particular plant community. Uncontrolled grazing by domestic livestock is not compatible with the maintenance of key RNA features, however, controlled grazing could offer an ecological management tool to maintain or improve some of the biological features (e.g. grassland component, noxious weeds) for which the RNA was established. Because of the topography and existing vegetation densities (rosaceous chaparral), much of the RNA is not currently utilized by grazing cattle.

Exotic and noxious weed populations do occur in the RNA, especially Medusa head rye (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*), and (*Centaurea solstitialis*) yellow star-thistle. Other weeds currently have overall low densities dyers woad (Isatis tinctoria), bull thistle (*Cirsium vulgare*), yellow Alyssum (*Alyssum alyssoides*) and hedgehog dogtail (*Cynosurus echinatus*). Disturbance created by historic overgrazing grazing may have lead to weed introduction and expansion in the RNA, especially in the grasslands. Soil and vegetation disturbance from over grazing utilization can increase exotic plant densities, and affect the plant communities for which the RNA was established. However, because of limited utilization within the RNA, current livestock grazing practices do not appear to be increasing noxious weeds within the Scotch Creek RNA. Livestock grazing could be utilized as a tool under an integrated weeds management plan to control noxious weeds within the RNA.

Issues

- Populations of dyers woad (Isatis tinctoria), Medusa-head rye (*Taeniatherum caput-medusae*), and yellow starthistle (*Centaurea solstitialis*) currently exist within the RNA. Soil disturbance from grazing in these areas could increase weed densities.
- Grazing permits are currently held for the area encompassed by the RNA. The terms and conditions in the existing permit will likely need to be modified to protect or maintain key elements in the RNA
- Current vegetation densities preclude grazing from much of the RNA. Future management actions (thinning/fire) intended to improve the condition of the vegetation, could result in more area being accessible to grazing cattle.

• No formal utilization plots exist in the RNA. No riparian surveys (see Hydrology section) have been done documenting the condition of the riparian vegetation.

Management Actions

• Collect data in grassland/scrubland/riparian communities within the RNA as part of the three year grazing study within the monument. Baseline information has been collected.
• Until the completion of the grazing study, continue to allow the RNA to remain in the allotment management plan
• Make recommendations on how to use grazing, if appropriate, as tool to maintain or improve these communities
• If needed, modify current grazing permits to change grazing patterns in the RNA so as to maintain or improve condition of key plant communities, or remove the RNA from the allotment plan.

Timber Management

Agency Standards

Regulated timber harvest within the RNA and salvage removal of downed trees are not normally compatible with RNA values. For RNA's adjacent to timber harvest units, buffer zones should be considered in order to meet plan objectives. (USDI 1986)

Goals

Maintain viable ecosystem functions and protect RNA community cells from catastrophic disturbance events.

Current Information

Few trees have been removed in the past. The Schoheim road that runs along the current northern boundary of the RNA resulted in removal of some trees. No private land is found next to the RNA since BLM acquired 160 acres of private land in section 2. No commercial logging adjacent to the RNA will occur.

Timber harvesting in RNA's is not consistent with overall RNA management goals. However, non merchantable sized trees less than 12" in diameter will be cut to reduce stand density and insect risk. Most of these will be Douglas-fir that is less than 90 years old that has established itself in the absence of fire. Occasionally, individual trees larger than this will be girdled and/or felled when competing directly with individual mature pine.

Management Actions Needed

No timber harvesting will occur in the RNA. Harvesting of small trees will only occur to support thinning/prescribed burning activities designed to maintain or protect forested communities from catastrophic events and to restore historic ecosystem processes. Trees that are felled or girdled for forest health reasons will be left on site. Small Diameter Douglas-fir will be cut and burned in order to reduce fuel hazard and beetle outbreak risk.

Public Use/Recreation

Agency Standards

Recreation, camping, horse use, wood cutting, trapping, plant gathering, and OHV use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Hunting and fishing is typically permitted (but not hunter camps). Educational use - class field studies are encouraged but repetitive consumptive class activities are allowed only with BLM approval. Development of peripheral nature

trails and interpretive signs may be appropriate in some cases, but with consideration for protection of the values without attracting undue attention. Public use roads, pipelines, communication sites, or powerlines should avoid the RNA. Road closures or way closures or restrictions may be considered appropriate in some instances.(USDI 1986). Equestrian use is not specifically prohibited in the RNA policies, however use is generally felt to not be compatible with the overall goal of RNAss to "Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases" (USDI 1986b).

Goals

- Protect the designated values of the RNA. Prevent equestrian, motorized and mechanized vehicles, and high impact recreation.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information

Recreational use in the Scotch Creek RNA is almost non-existent. There are no existing roads or trails within the RNA. The Schoheim Road is the northern boundary of the RNA and it is now closed to all vehicle use and will be decommissioned. The entire RNA is closed to all off-road travel by motorized and mechanized vehicles. Hiking from Porcupine Gap down Scotch Creek could become a major recreational hike, since hikers would have access to vehicles on public land without trespassing.

Potential problems arising from public use of the RNA include the threat of human-caused stand-replacement fire; damage to grasses, forbs and soils by compaction from hikers and horses; and the introduction of undesirable non-native species. Current recreational use is very light and low-impact. Periodic monitoring should be conducted to evaluate the impacts of recreational use on the protected plant communities and to determine if signs are necessary to protect against adverse effects.

1. Camping

Current Information

No established camping facilities exist in Scotch Creek RNA. Camping is not compatible with protection of the key elements of the RNA. However, unless camper use becomes evident, no actions are needed at the present time. If it does become a problem, "no camping" signs could be posted around the RNA.

Issues

- Isolated location of the RNA and difficulty in enforcing restrictions.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to determine if camping has occurred that has had a negative impact on the protected elements.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

2. Hiking

Current Information

There is an existing spur road between east and west forks of Scotch Creek but no designated trails within Scotch Creek RNA. Features at the RNA that might appeal to hikers are wild flowers, wild game, and diverse plant communities, however, the RNA is not well-known or easily accessible to the general public. For these reasons, developing hiking trails or promoting the area as a recreational hiking destination would not be practical or recommended. Casual hiking itself does not pose a threat to the resources of

the RNA. However, if done by a large number of people, native grasses and wild flowers could be trampled and destroyed and soils compacted, jeopardizing the integrity of the protected elements of the RNA.

Issues

- Isolated location of the RNA making enforcement of restrictions difficult.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to evaluate the extent and effects of hiker use.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

3. Equestrian

Current Information

Scotch Creek RNA currently receives little, if any, equestrian use. What use occurs is likely occasional use by riders under the grazing permit. Equestrian activities in this management plan refers to horses, llamas, mules, and other pack animals. Recreational animals could threaten the values of the RNA by trampling vegetation and soil, particularly in meadows with thin, fragile soils; or by carrying in seeds of exotic weedy species on their hooves, hair or in their feces. During wet conditions horses can push root crops, used by Indian tribes as food, too far into the soil to dig and use. For these reasons, horse and other pack or riding stock use is not considered compatible with the values in the RNA.

Issues

- Isolation of area and difficulty in enforcing closures or restrictions.
- Historical use of the area.

Management Actions

- Periodically monitor the RNA to ensure that recreational horse or other stock use is not occurring
- Horse use under the Grazing permit should be evaluated as part of the three year grazing study
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact with equestrian groups)
- Post signs at entrances to the RNA, stating the goals of the RNA and closure to equestrian use.

4. Hunting, Fishing and Trapping

Agency Standards

Hunting and fishing are typically permitted, although not encouraged, in RNAs, whereas trapping is not permitted (USDI 1986b).

Management of fish and wildlife populations is controlled by ODFW with regulations for hunting, fishing and trapping set on a yearly basis. Regulations regarding seasons, bag limits, stream stocking, licenses and techniques are dictated by the Department through the Fish and Wildlife Commission and are applicable on all lands within the state, including private property. Specific areas may be closed to activities in order to protect human life or natural resources.

Current Information

Wildlife is abundant in and around Scotch Creek RNA. The area contains big game like deer, black bear, and cougar. Elk may occasionally pass through the RNA. Small game

include grouse, quail, grey squirrel and wild turkey. Since there are no roads or trails, actual hunting within the RNA is extremely low. Most of Scotch creek contains no trout due to falls that acts as a natural barrier preventing up stream migration. However, fishes are present in the creek for the last 1/2 mile before Scotch creek enters California. Scotch creek doesn't support fish big enough or in big enough numbers to be of interest to anglers. Recreational fishing is nearly non-existent. It is unknown what, if any, trapping activity is occurring in this area. Fur bearing species area include Bobcat, Coyote, Raccoon, Grey fox, and possibly Pine Marten. Due to the limited access, steep terrain, thick vegetation, relative scarcity of water and distance from town, this is probably not an area where extensive trapping has occurred recently. Since vehicular access to this area is no longer available, it is anticipated that any recent trapping activity in the area will no longer occur. There is no indication that any trapping currently occurs. Since there is only one spur road between east and west forks of Scotch Creek and no trails within the RNA, hiking is only allowed on existing roads/trails; horse use is generally prohibited; hunting, fishing and trapping in Scotch Creek RNA is not likely an issue.

Issues

- Dispersed camping and OHV or Horse use are often associated with hunting and could negatively impact RNA resources if these activities occur illegally.
- The isolation of the area makes enforcing restrictions difficult.
- Historical use of the area.
- Prohibition of hunting and trapping in the RNA would require a change to the Oregon State Game Regulations and would be difficult to enforce.
- Minimal impact to wildlife populations in the area. No impact is anticipated on the values for which the RNA was designated.

Management Actions

- Monitor use to determine if any impacts from Hunting are occurring.

5. Off-Highway Vehicles

Agency Standards

Management directions for all RNAs specifies closure to off-highway vehicle (OHV) use. Off-highway vehicles include, but are not limited to, motorcycles, all-terrain vehicles, and mountain bikes.

Current Information

Because of the dense vegetation, lack of roads, remote location, and limited access, there has been no noticeable OHV activity within this RNA. In the past OHV use occurred on high open grassy slopes below the Schoheim along the lower end of Lone Pine Ridge to the California Border.

Issues

- Isolated location makes enforcing restrictions or area closures difficult.
- Historical use of the area.

Management Actions

Conduct periodic monitoring to assess off-highway vehicle violations.
Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

Special Forest Products

Policy and Agency Standards

Commercial or personal harvest of Special Forest Products (SFPs) like boughs, burls, fungi, medicinal plants, etc..., within RNAs are not compatible with the over all goals to "Preserve natural features in as nearly an undisturbed state as possible for scientific and

educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases" (USDI 1987).

Current Information
No use permits are currently issued for this area. Historical personal use within this area is not well documented. Little information is available to determine the abundance of SFPs within the RNA, although numerous plants used in the medicinal herb industry are present. The lack of access to the RNA would limit the removal of any significant quantities of SFPs. Future research within the RNA may require the collection of certain animal and plant specimens.

Issues
- The isolation of the area makes enforcing SFPs collection restrictions difficult.

Management Action
- Prohibit any commercial or person use collection of Special Forest Products within the RNA. Permits for collection of specimens for research will be allowed on a case by case basis.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Interpretation and Research

Policy and Agency Standards
The purpose for RNAs is for research, observation, and study. Studies involving manipulations of environmental or vegetation characteristics or plant harvest must have prior approval of the BLM.

Goals
- Protect the designated values for which the RNA was nominated to provide baseline information against which the effects of human activities in other areas may be compared.
- Provide a site for study of natural processes in as undisturbed (by human activities) an ecosystem as possible.

Current Information
Scotch Creek RNA is only accessible on foot or horseback which protects it from overuse by the public, but also makes it impractical as an interpretive or educational site. The RNA is accessible all year via the Horseshoe Ranch Wildlife Area (California). It can be used by investigators and classes willing to walk the several miles to the RNA. One of the main objectives for RNAs is to provide educational and research areas for ecological and environmental studies. The following specific research topics have been suggested for Scotch Creek:

- Evaluating the effects and the role of domestic livestock grazing on key elements in the RNA (plant communities and rare species) as part of the three year grazing study.
- The role of fire in plant community development, composition and production

Other potential areas for research include the effectiveness of prescribed fire and seeding of native species in reducing non-native plant species, and studies of the effects of prescribed fire or vegetative manipulation on plant community composition or special status plant populations. BLM encourages any nondestructive research that leads to a further understand of RNA ecosystems and is not limited to restoration or the study of politically signification plants and animals.

When researchers plan to use an area, they have certain obligations to:

(1) notify the appropriate BLM field office, submit a research plan, and obtain permission;
(2) abide by regulations and management prescriptions applicable to the natural area; and,
(3) inform the agency of the research progress, published results, and disposition of collected materials (Appendix R)

Issues
• Lack of funding for treatments in RNAs
• Impacts from surrounding land use activities.

Management Actions
• Evaluate all proposed research projects and approve only those that will not adversely affect the RNA's resources or short-term and long-term viability of species.
• Maintain a list of projects and research in the RNA, including findings and conclusions.
• Incorporate pertinent new findings from research projects into management actions.
• Maintain copies of all surveys, inventories, monitoring and activities conducted within the RNA.

V. MONITORING

A. Definition and Role of Monitoring

Monitoring is defined as a process of repeated recording or sampling of similar information for comparison to a reference. The role of monitoring in Research Natural Areas is to collect information in order to evaluate if objectives and anticipated or assumed results of a management plan and management actions are being realized or if implementation is proceeding as planned. Because monitoring may be so costly as to be prohibitive, priority should be given to monitoring mandated by legislation and to focusing on management actions aimed at maintaining, protecting and restoring key elements and minimizing disturbance in the RNA (Appendix R). All monitoring activities must include the following steps:

1. Establish monitoring objectives.
2. Collect baseline information.
3. Repeat consistent standardized monitoring procedures over time.
4. Interpret monitoring results relative to the baseline information and monitoring and implementation objectives.
5. Modify management objective actions and monitoring procedures as necessary based on reliable monitoring data to continue to achieve goals of the RNA.

The monitoring plan should be tailored to the unique characteristics of the RNA. Two types of monitoring activities are outlined below. Ecological status monitoring is designed to track the ecological condition of the natural elements protected within the RNA. Defensibility monitoring should detect impacts from outside factors on the protected elements in the RNA. These monitoring activities are general in nature and should not be used in lieu of more complex research strategies. Detailed monitoring protocols should also be developed in conjunction with specific management projects to measure their effectiveness in achieving RNA objectives. For each element, monitoring objectives, unit and frequency of measurement, responsible personnel, and location for data storage are stated.

B. Ecological Status Monitoring

Ecological status monitoring involves tracking species and plant communities relative to the stated objectives of the RNA. Ecological status monitoring at Round Top RNA should assess the current status of RNA elements and track trends or changes over time to determine if any RNA values are at risk. Monitoring results provide the basis for evaluating the effectiveness of management actions and determining if changes are required. Where possible, monitoring within the RNA should be tiered to the monitoring for the Cascade-Siskiyou National Monument.

Element: PLANT ASSOCIATIONS
Monitoring Objectives: Track successional changes in the key RNA plant associations or communities to determine if native species are protected, if ecological processes are properly functioning, and if RNA management actions are achieving desired outcomes. Information collected during monitoring provides the basis for making adjustments to management actions.
Frequency of Measurement: Every 5 years and after any management action
Responsible Personnel: Botanists, Ecologists, Foresters
Data Storage: Scotch Creek RNA File

Element: SPECIAL STATUS PLANTS
Monitoring Objectives: Monitor populations of special status plants that were documented in surveys done in 1999, in order to maintain or enhance populations and associated habitats. Utilize the RNA to collect base-line biological data for rare plant species. Evaluate effects from any vegetation treatments (burning/thinning) and grazing.
Unit of Measure: Revisit known sites and record population demographics on site reports. Include monitoring of for the rare *Astragalus californica*.
Frequency of Measurement: Revisit known sites of special status plants every 5 years.
Responsible Personnel: Botanist
Data Storage: Scotch Creek RNA File, Medford Rare Plant Database

Element: SPECIAL STATUS WILDLIFE
Monitoring Objectives: Perform surveys for special status wildlife species and monitor species within the RNA in order to maintain or enhance populations.
Unit of Measure: Determined by established protocols for specific species.
Frequency of Measurement: According to established protocols.
Responsible Personnel: Wildlife Biologist
Data Storage: Scotch Creek RNA File, Wildlife database

Element: FIRE
Monitoring Objectives: Determine the need to restored key plant communities using prescribed fire. Perform fuel surveys in key plant communities following established protocols. Monitor following prescribed burning results and the plant community response, in conjunction with Plant association monitoring .
Unit of Measure: Determined by established wildland burning and vegetation protocols.
Frequency of Measurement: According to established protocols
Responsible Personnel: Fire specialists, ecologist, botanist
Data Storage: Scotch Creek RNA File, Fire database

Element: NON-NATIVE SPECIES
Monitoring Objectives: Assess the need for management actions to reduce or minimize the impact, introduction and/or spread of non-native weedy species. Monitor identified treatment and problem areas. Non-native species of concern include all currently identified noxious and exotic weeds known within the Monument and in the adjacent watersheds.
Unit of Measure: Presence/absence, abundance and spread. Treatment results of non-

native weedy species by fixed plots. Target highly susceptible points of invasion (along borders and roads), susceptible habitats, and areas that receive vegetation treatments.
Frequency of Measurement: Monitor treatment plots for 2 years following the treatment. Demographic monitoring every 3 years (presence/spread); casual observations during other site visits.
Responsible Personnel: Botanists, Range Specialists, Ecologists.
Data Storage: Scotch Creek RNA File, Medford District Noxious Weed Database

Element: INSECTS, DISEASES OR PESTS
Monitoring Objectives: Monitor harmful insects, diseases or pests that could cause long-term negative changes in plant communities, especially the Mixed conifer/California black oak community. Monitoring for the presence of the oak phytophthora. Determine if treatments are needed to reduce the negative effects of insects and diseases.
Unit of Measure: Periodic evaluation of the RNA to discover presence/absence and extent of harmful insects, diseases or pests. Initial evaluations may be accomplished by walking through the RNA, or through photo interpretation.
Frequency of Measurement: Every 5 years or as needed based on casual observations during other site visits.
Responsible Personnel: Foresters, Ecologists, Entomologists, Pathologists, Botanists.
Data Storage: Scotch Creek RNA File, Southwest Oregon Insect and Disease Center.

Element: HYDROLOGY
Monitoring Objectives: Evaluate hydrological conditions (channel stability, erosion, sedimentation, slumping potential, etc.) and riparian vegetation of all streams to determine the functioning condition and need for habitat improvement or restoration activities.
Unit of Measure: Established riparian stream survey protocols.
Frequency of Measurement: Establish a baseline, then every 10 years
Responsible Personnel: Hydrologist / Riparian Coordinator
Data Storage: Scotch Creek RNA File, Riparian Database

Element: NATURAL DISTURBANCE
Monitoring Objectives: Document type, extent, intensity, and frequency of natural disturbances in the RNA and resulting changes in ecosystem structure or composition.
Unit of Measurement: Intuitively controlled surveys after disturbance, photos of affected plant communities or areas.
Frequency of Measurement: After significant disturbance, wildfires, landslides, insect and disease outbreaks
Responsible Personnel: Botanist, Ecologist and Foresters
Data Storage: Scotch Creek RNA File

C. Defensibility Monitoring

Defensibility monitoring involves on-the-ground assessment of factors which affect the manager's ability to protect the Scotch Creek Research Natural Area and its elements. Considered are current and anticipated land uses within and adjacent to the RNA and their potential negative effects on the protected elements or their governing ecological processes. Defensibility monitoring also involves checking for evidence of prohibited use, encroachment or degradation within the RNA.

Element: CULTURAL RESOURCES
Monitoring Objectives: After initial baseline surveys, detect vandalism or disturbance to known archeological or historical sites at the RNA.
Unit of Measure: Visual assessment to detect evidence of disturbance.
Frequency of Measurement: Every 5 years or as needed based on observations during periodic site visits.
Responsible Personnel: Cultural Resource Manager/ Archaeologist
Data Storage: Scotch Creek RNA File, District Archeology files

Element: PUBLIC USE OF RNA (camping, hiking, equestrian, trapping, OHV, special forest products, interpretation and research, trespass livestock grazing, timber harvesting)
Element Objectives: Determine if the level of public use jeopardizes protection of RNA values or key elements.
Unit of Measure: Observations made during other surveys or during periodic site visits. Indications of problem areas include evidence of vehicular use (on or off existing roads in the RNA), refuse, signs of campfires or campsites, trampled meadows, over grazing, significant erosion or rutting on or off roads. If problems are noted during casual visits to the site, conduct more extensive surveys to determine if actions should be taken to prevent damage to the protected elements.
Frequency Measurement: Casual visits yearly
Responsible Personnel: RNA Coordinator
Data Storage: Scotch Creek RNA file

Element: ROADS
Element Objectives: Determine condition of Schoheim road, track erosion and gullying of road surfaces, or other problems associated with the closed road.
Unit of Measurement: Subjective evaluation by knowledgeable personnel. Establishment of photo-points of marginal spots to compare condition over time.
Frequency of Measurement: Every 5 years during periodic site-evaluation visits to the RNA.
Responsible Personnel: RNA Coordinator, Road Engineers
Data Storage: Scotch Creek RNA file

Element: FENCES AND GATES
Monitoring Objectives: Determine if existing fences and gates adequately protect the RNAs elements. If not, determine if repairs, additional fencing or gates are needed.
Unit of Measurement: Walk fence lines to discover broken fences.
Frequency of Measurement: Every 5 years, or as needed if trespass grazing from California or any OHV use is observed during other visits to the site.
Responsible Personnel: Rangeland Specialists, Road Engineers
Data Storage: Scotch Creek RNA file

Element: GRAZING
Element Objectives: Determine if permitted grazing is maintaining or enhancing key plant community elements within the RNA, including Special Status Plants. Meet the intent of the overall goals for the RNA. Adjust grazing permit accordingly.
Unit of Measurement: Establishment of monitoring plots following standardized protocols in livestock utilized plant communities (grasslands / riparian) within the RNA. Where possible monitor grazing in conjunction with plant community and Special Status plant monitoring plots. Establish photo-points in areas of concern to compare condition over time.
Frequency of Measurement: Monitor for a minimum of three years as part of the Monument grazing study. Monitor utilization transects every year that livestock use the RNA.
Responsible Personnel: Ecologists, Range Specialists, Botanists
Data Storage: Scotch Creek RNA file

AEE-4. Plant Communities in the Scotch Creek RNA

Plant Communities	Acres
Roads	6
Lower slopes grassland/rock outcropping	119
Middle slope grassland/Oregon white oak woodlands	592
Oregon white oak/Klamath Plum/Wedgeleaf Ceanothus	45
Oregon white oak/Hollyleaved Barberry	212
Riparian Bigleaf maple/Oregon white oak	130
Oregon white oak/Birchleaf Mountain Mahogany	275
Rock Outcropping	21
White fir/Hollyleaved Barberry	18
Douglas-fir/Serviceberry/Hollyleaved Barberry	22
Oregon white oak/Birchleaf Mountain Mahogany	276
Douglas-fir/Oregon white oak	84

VI. RECOMMENDATIONS FOR FUTURE RESEARCH

None at this time.

VII. REFERENCES

Clinton WJ. 2000. Establishment of the Cascade-Siskiyou National Monument. Washington (DC): Office of the President of the United States. June 9, 2000. 3 p.

Schaaf DL 1991. RNA Nomination Letter from The Nature Conservancy to Medford BLM. Oregon Field Office. Portland, Oregon.