Appendices

APPENDIX A

Presidential Proclamation

June 9, 2000

ESTABLISHMENT OF THE CASCADE-SISKIYOU NATIONAL MONUMENT BY THE PRESIDENT OF THE UNITED STATES OF AMERICA A PROCLAMATION

With towering fir forests, sunlit oak groves, wildflower-strewn meadows, and steep canyons, the Cascade-Siskiyou National Monument is an ecological wonder, with biological diversity unmatched in the Cascade Range. This rich enclave of natural resources is a biological crossroads -- the interface of the Cascade, Klamath, and Siskiyou ecoregions, in an area of unique geology, biology, climate, and topography.

The monument is home to a spectacular variety of rare and beautiful species of plants and animals, whose survival in this region depends upon its continued ecological integrity. Plant communities present a rich mosaic of grass and shrublands, Garry and California black oak woodlands, juniper scablands, mixed conifer and white fir forests, and wet meadows. Stream bottoms support broad-leaf deciduous riparian trees and shrubs. Special plant communities include rosaceous chaparral and oak-juniper woodlands. The monument also contains many rare and endemic plants, such as Greene's Mariposa lily, Gentner's fritillary, and Bellinger's meadowfoam.

The monument supports an exceptional range of fauna, including one of the highest diversities of butterfly species in the United States. The Jenny Creek portion of the monument is a significant center of fresh water snail diversity, and is home to three endemic fish species, including a long-isolated stock of redband trout. The monument contains important populations of small mammals, reptile and amphibian species, and ungulates, including important winter habitat for deer. It also contains old growth habitat crucial to the threatened Northern spotted owl and numerous other bird species such as the western bluebird, the western meadowlark, the pileated woodpecker, the flammulated owl, and the pygmy nuthatch.

The monument's geology contributes substantially to its spectacular biological diversity. The majority of the monument is within the Cascade Mountain Range. The western edge of the monument lies within the older Klamath Mountain geologic province. The dynamic plate tectonics of the area, and the mixing of igneous, metamorphic, and sedimentary geological formations, have resulted in diverse lithologies and soils. Along with periods of geological isolation and a range of environmental conditions, the complex geologic history of the area has been instrumental in producing the diverse vegetative and biological richness seen today.

One of the most striking features of the Western Cascades in this area is Pilot Rock, located near the southern boundary of the monument. The rock is a volcanic plug, a remnant of a feeder vent left after a volcano eroded away, leaving an out-standing example of the inside of a volcano. Pilot Rock has sheer, vertical basalt faces up to 400 feet above the talus slope at its base, with classic columnar jointing created by the cooling of its andesite composition.

The Siskiyou Pass in the southwest corner of the monument contains portions of the Oregon/ California Trail, the region's main north/south travel route first established by Native Americans in prehistoric times, and used by Peter Skene Ogden in his 1827 exploration for the Hudson's Bay Company.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 43 1), authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

WHEREAS it appears that it would be in the public interest to reserve such lands as a national monument to be known as the Cascade-Siskiyou National Monument:

NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 43 1), do proclaim that there are hereby set apart and reserved as the Cascade-Siskiyou National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the map entitled "Cascade-Siskiyou National Monument" attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 52,000 acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument.

There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established. Nothing in this reservation shall be construed as a relinquishment or reduction of any water use or rights reserved or appropriated by the United States on or before the date of this proclamation.

The commercial harvest of timber or other vegetative material is prohibited, except when part of an authorized science-based ecological restoration project aimed at meeting protection and old growth enhancement objectives. Any such project must be consistent with the purposes of this proclamation. No portion of the monument shall be considered to be suited for timber production, and no part of the monument shall be used in a calculation or provision of a sustained yield of timber. Removal of trees from within the monument area may take place only if clearly needed for ecological restoration and maintenance or public safety.

For the purpose of protecting the objects identified above, the Secretary of the Interior shall prohibit all motorized and mechanized vehicle use off road and shall close the Schoheim Road, except for emergency or authorized administrative purposes.

Lands and interests in lands within the monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities (including, where applicable, the Act of August 28, 1937, as amended (43 U.S.C. 11 8 la-I 18 lj)), to implement the purposes of this proclamation.

The Secretary of the Interior shall prepare, within 3 years of this date, a management plan for this monument, and shall promulgate such regulations for its management as he deems appropriate. The management plan shall include appropriate transportation planning that addresses the actions, including road closures or travel restrictions, necessary to protect the objects identified in this proclamation.

The Secretary of the Interior shall study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics. Existing authorized permits or leases may continue with appropriate terms and conditions under existing laws and regulations. Should grazing be found incompatible with protecting the objects of biological interest, the Secretary shall retire the grazing allotments pursuant to the processes of applicable law. Should grazing permits or leases be relinquished by existing holders, the Secretary shall not reallocate the forage available under such permits or for livestock grazing purposes unless the Secretary specifically finds, pending the outcome of the study, that such reallocation will advance the purposes of the proclamation.

The establishment of this monument is subject to valid existing rights.

Nothing in this proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of Oregon with respect to fish and wildlife management.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this ninth day of June, in the year of our Lord two thousand, and of the Independence of the United States of America the two hundred and twenty-fourth.

WILLIAM J. CLINTON

APPENDIX B

Antiquities Act of 1906

Act of June 18, 1906, 16 U.S.C. 431-433 (Popularly known as the Antiquities Act of 1906)

The following is the text of the Antiquities Act of 1906, under the authority of which President Clinton established Grand Staircase-Escalante National Monument.

16 U.S.C. § 431 National monuments; reservation of lands; relinquishment of private claims:

The President of the United States is authorized, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and may reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected. When such objects are situated upon a tract covered by a bona fide unperfected claim or held in private ownership, the tract, or so much thereof as may be necessary for the proper care and management of the object, may be relinquished to the Government, and the Secretary of the Interior is authorized to accept the relinquishment of such tracts in behalf of the Government of the United States.

16 U.S.C § 431a Limitation on further extension or establishment of national monuments in Wyoming:

No further extension or establishment of national monuments in Wyoming may be undertaken except by express authorization of Congress.

APPENDIX C

Implementation, Monitoring, and Adaptive Management Framework

INTRODUCTION

This appendix is intended to serve as a framework to guide implementation, monitoring, and adaptive management for the proposed plan. It is anticipated that further refinements of this process will be necessary as the implementation process proceeds.

REFINING LANDSCAPE DECISIONS AND INFORMATION TO SITE-SPECIFIC LEVELS

The proposed plan contains general direction and context for the Cascade-Siskiyou National Monument (CSNM) and makes decisions on specific actions for some issues. Many management actions necessary to achieve landscape objectives (e.g., forest restoration treatments, livestock management) will require further analysis and additional decisions. This additional analysis would:

- Validate, refine, or add to information concerning current and historical resource conditions;
- Address issues not appropriately addressed at the landscape scale;
- Prioritize efforts to maximize the likelihood of meeting management goals and objectives;
- Guide the type, location, and sequence of appropriate management activities; and
- Identify monitoring and research needs.

This section provides an outline of the expected types and levels of analysis and planning that would refine landscape information and decisions in the plan to site-specific actions. This process is designed to ensure that landscape decisions are viewed within the context of site-specific conditions, and that site-specific decisions are made within the context of landscape goals and objectives.

Hierarchy of Analysis

Several steps are envisioned to implement the landscape-level decisions made in this plan. While these steps may occur sequentially, it is likely that they would occur simultaneously since the need for further assessment before project implementation varies in different areas. The proposed monument plan reviews the information at the larger landscape scale and sets the context and priorities for subsequent planning and decisions at the following finer scales.

- *Subwatershed Analysis*: This type of assessment identifies priority areas and actions at the 6th field subwatershed scale that are necessary to achieve overall plan objectives. Such assessments would provide the context for site-scale planning and actions to implement decisions, and focus on interpreting existing information and trends and identifying information gaps. Such analysis would also help refine overall objectives and would characterize the situation and trends in relation to the desired future condition. If necessary, the assessment would set the stage for identifying the management necessary to move towards desired future conditions.

- *Site-specific analysis*: Based on the landscape objectives in the proposed plan and on the subwatershed analysis, finer-scale, site-specific planning and analysis will be completed in order to implement decisions.

Compliance with the National Environmental Policy Act

The Final Environmental Impact Statement (FEIS) for the monument plan provides the compliance with the National Environmental Policy Act (NEPA) for the landscape and site-specific decisions that will be made in the Record of Decision. In most cases, additional site-specific analysis will be needed for implementation actions. The BLM would continue to conduct the appropriate level of environmental analysis as part of the planning and decision making processes described above.

FRAMEWORK FOR MONITORING, EVALUATION, AND ADAPTIVE MANAGEMENT

Adaptive management, as defined here, is a process for continually improving management actions and policies by learning from the outcomes of operational programs and new scientific information. Using adaptive management, plans and activities are treated as "works-in-progress" rather than final solutions to complex problems. The process generally includes four phases: planning, implementation, monitoring, and evaluation (Figure A-1). The planning and implementation phases are discussed above. This section focuses on monitoring and evaluation, which would lead to changes in planning and implementation activities.

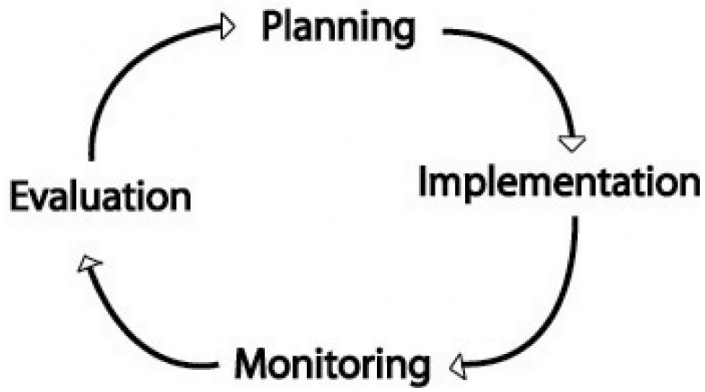

Figure A-1

This section provides a framework for developing a specific monitoring and evaluation program which would measure the conditions and trends in the monument. The information developed through the monitoring process would be used to assess management strategies, alter decisions, change implementation, or maintain current management direction.

Monitoring

An initial step in developing a monitoring program is to define the questions which need to be answered in order to evaluate the attainment of landscape management goals and objectives in the plan. These questions can be used to develop a monitoring strategy on appropriate issues and avoid gathering information that has limited value. Ongoing and proposed monitoring projects are detailed in Appendix J. Additional monitoring projects would be developed as part of the adaptive management process.

Monitoring results will provide managers with the information to determine whether an objective has been met, and whether to continue or modify the management direction. Findings obtained through monitoring, research, and other new information, will provide a basis for changing monument management. The monitoring strategy will be periodically evaluated to ensure that the monitoring questions and standards are still relevant. Adjustment to the monitoring strategy will be made as appropriate. Some monitoring items may be discontinued and others may be added as knowledge and

issues change with implementation. Priorities will be given for monitoring mandated by executive order or legislation.

Determining the specific monitoring approach for any question depends on knowledge of detailed information on existing conditions. For example, trend assessment requires first gathering baseline or status information. The collection of baseline information is currently being conducted in the monument. Landscape scale vegetation assessments, range utilization transects, archaeology inventories, surveys and monitoring for special status species, and visitor use inventories are just a few of the multi-year projects that have occurred or are continuing within the monument. Data from these projects are integral to monitoring trends. Monitoring strategies must also identify other techniques (remote sensing, sample-based studies, modeling) that may be necessary to get a complete picture of structure and pattern of monument resources. Successful implementation of large-scale monitoring may require a combination of approaches.

The monitoring process will collect information in the most cost effective manner possible, and may involve sampling or remote sensing. Monitoring could be cost prohibitive if not designed carefully. Therefore, it will not be necessary or desirable to monitor every management action or direction. Unnecessary detail and unacceptable costs will be avoided by focusing on key monitoring questions and proper sampling methods. The level and intensity of monitoring will vary, depending on the sensitivity of the resource, process or trend and the scope of the proposed management activity.
As mentioned above, the design of the monitoring program would allow flexibility to add data collection needs identified through the assessments and planning processes. Monument assessments and planning, however, should also incorporate monitoring and evaluation information to ensure that the latest information is used in management actions.

Evaluation

Evaluation is the next key component of the adaptive management process. Evaluation is the process in which the plan and monitoring data are reviewed to see if management goals and objectives are being met and if management direction is sound. This portion of the adaptive management strategy examines the monitoring data and uses it to draw conclusions on whether management actions are meeting stated goals and objectives and, if not, why. The conclusions are used to make recommendations on whether to continue current management strategies or to make changes in management practices to meet plan goals and objectives.

Formal plan evaluation will occur at about 5-year intervals and evaluate:

1. Whether management actions are resulting in satisfactory progress toward objectives;
2. Whether actions are consistent with current policy;
3. Whether original assumptions were correctly applied and impacts correctly predicted;
4. Whether mitigation measures are satisfactory;
5. Whether the RMP is consistent with the plans and policies of state and local government, other federal agencies and Indian Tribes;
6. Whether new data are available that would require alteration of the plan; and
7. Whether the RMP is still valid or needs to be amended or revised.

Adaptive Management

The evaluation process discussed above would generate new information for incorporation into management actions. Ongoing assessments and integrated activity planning would also uncover new information that can be used to make changes to projects, strategies, objectives, and monitoring elements. New information may result in any of the following:

- Concluding that management actions are moving the landscape towards the plan objectives.
- Concluding that further research needs to be initiated or actions need to be adjusted to achieve landscape objectives. If new information or research demonstrates better ways to achieve plan objectives, changes in activity planning and project implementation can be made (i.e., plan maintenance). Depending upon the nature of the management changes, NEPA analysis may be required.
- Concluding that landscape objectives should be altered based on new information. If the new information indicates reconsideration of plan objectives, a plan amendment could be considered to re-examine targeted future conditions and the means to reach those conditions.

Role of the Monument Staff

The monument technical staff is responsible for developing monitoring and adaptive management protocols and ensuring that documentation is sufficient to facilitate feedback into the adaptive management process. These specialists, representing the major land management disciplines (e.g. botany, fisheries, hydrology, ecology, wildlife, range, forestry, and recreation) are responsible for ensuring that monitoring results and other new information are compiled, evaluated, and incorporated into future rounds of planning and implementation.

The credibility of an adaptive management process rests in part on the routine application of an outside check on the use of technical and scientific information, including monitoring. Independent reviews and partnerships with outside groups (e.g. Oregon State University; U.S. Fish and Wildlife Service) can provide verification that plans, evaluation and changes in management strategies are consistent with current scientific concepts. In addition, collaboration with the local communities, monument interest groups, and users of the monument ensure credibility and the success of managing the unique elements of the CSNM.

APPENDIX D

Conservation Measures for ESA Species

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Tree Harvest	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
Timber harvest (includes tree salvage)/ large tree thinning /oak woodland restoration	• No harvest of eagle nest, perch, or roost trees. • No eagle habitat removal within ½ mile of nests/roosts. • No suitable/potential perches removed within ½ mile of nests/roosts—public safety is an exception (see Hazard Tree Removal below). • No work or other activities above ambient levels permitted within ¼ mile of active nests/roosts (non line-of-sight), or ½ mile (line-of-site) from January 1- August 31 (nesting season) and November 15 – March 15 (winter roosting). • No blasting within 1 mile of active nest sites from January 1–August 31.	• No work activities that produce noise above ambient levels are permitted within specified distances (see below) of active or unsurveyed nest and activity centers between March 1 and June 30, or until 2 weeks after fledging. Examples of activities and restricted distances: • Blasting (> 2# explosive – 1 mi.) • Blasting (< 2# explosive – 360 ft • Helicopters/Planes – 360 ft. • Chainsaws – 195 ft. • Jackhammers – 180 ft. • Heavy Equipment – 105 ft. • Restrictions can be waived if protocol surveys show non-nesting or failed nesting.	• Pre-decisional surveys required. • 25-foot radius no activity buffer around occurrence boundary. • 100-foot no equipment buffer around occurrence boundary. • No new landings within 300 feet of known sites. • Use of existing landing within 100 feet of known sites not allowed. • Manual treatment through buffers allowed if canopy retention over plants is greater than 40% and during the dormant period (August–February). • Cut material piled outside buffers.
Hazard Tree Removal	See tree harvest restrictions. However, if necessary, restrictions can be waived to provide for public safety. Waiver requires Level 1 Team review.	See tree harvest restrictions. However, if necessary, restrictions can be waived to provide for public safety.	None – site specific conservation measures discretionary.

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Vegetation Management	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
Young stand and understory thinning.	See tree harvest restrictions.	See tree harvest restrictions.	• Pre-decisional surveys if more than 5 years since last survey. • 25-foot buffers. • Manual treatment allowed in buffers if canopy retention greater than 40% and during the dormant period (August – February). • 100-foot no equipment buffer.
Gopher trapping	See tree harvest restrictions.	See tree harvest restrictions.	No trapping within 25-foot buffers.
Mechanical thinning / brushing or heavy equipment.	See tree harvest restrictions.	See tree harvest restrictions.	100-foot no equipment buffer.
Tree Planting	See tree harvest restrictions.	See tree harvest restrictions.	No tree planting within 100 feet of occurrence boundary.
Hand Pruning	See tree harvest restrictions.	See tree harvest restrictions.	Allowed through buffered sites, remove material from buffer.
Fertilizing	See tree harvest restrictions.	See tree harvest restrictions.	No fertilization within 50 feet of buffered occurrences.
Special Forest Products			
SFP Collections	See tree harvest restrictions.	See tree harvest restrictions.	No SFP collection within known sites (25 feet).
Watershed Restoration			
Blasting and low level air-operations	See tree harvest restrictions.	See tree harvest restrictions.	See culvert installation/replacement below.
Culvert installation/ replacement	See tree harvest restrictions.	See tree harvest restrictions.	• Survey suitable, intact habitat and protect occurrence by site specific mitigation. • Surveys of previously disturbed sites within the prism and cut-bank inlet and fill outlet are not required.
In-stream work and equipment	See tree harvest restrictions.	See tree harvest restrictions.	• Survey suitable habitat in equipment access corridors. • Buffer known sites by 100 feet.

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Fuels Management	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
(Includes air operations, slashing, prescribed burning)	• See tree harvest restrictions. • Burning or air operations will not take place within ½ mile of active eagle nests/roosts from January 1-August 31 (nests) and November 15-March 15 (roosts). • When burning within 1 mile of an active nest/roost, ensure that the prescription incorporates smoke management goals.	• See tree harvest restrictions. • Broadcast burning will not take place within ¼ mile of active nests from March 1-June 30 or until two weeks after fledging. • Helicopter operations over suitable NSO habitat will be greater than 360 feet above ground level.	• Minimum 25-foot no-treatment buffer for fuels treatments. • Hand slashing (chain/brush saws) during the dormant period allowed if a minimum of 40% canopy cover retained. If canopy already less than 40%, then no treatment in the buffer is needed. • Remove cut slash from the 25-foot buffer and place 25 feet from the buffer edge. No slash piling or burning within 50 feet of the occurrence. • Broadcast burning through buffers allowed during the dormant period (August-February). • No mechanical treatments within 100 feet of occurrence; 100-foot buffer required.

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Wildland Fire	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
	• Minimize noise disturbance from January 1 - August 31 within 1 mile of active nests. • Minimize repeated aircraft flights over nests when the flights are less than 1,500 feet above ground level. • Do not fly over nest sites with buckets (except to protect the nest). • Minimize use of explosives within 1 air mile of nests. • Place camps and staging areas over a mile from nest sites prior to August 31. • Make available to line officers and incident commanders all information on listed species to minimize impacts and protect sites when possible. • If implementation of conservation measures causes human safety risks, then implementation is discretionary and emergency consultation may be required.	• Minimize noise disturbance from March 1– June 30 within 360 feet of occupied stands. • Minimize repeated aircraft flights less than 360 feet above ground level. • Minimize use of explosives within 1 air mile of nests. • Make available to line officers and incident commanders all information on listed species locations to minimize impacts and protect sites when possible. • If implementation of conservation measures causes human safety risks, then implementation is discretionary and emergency consultation may be required.	• Protect known sites occurrences from high severity fire and ground disturbing activities (line building) if possible. • Make available to line officers and incident commanders all information on listed species locations to minimize impacts and protect sites when possible. • If implementation of conservation measures causes human safety risks, then implementation is discretionary and emergency consultation may be required.

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Recreation	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
New recreation facilities construction and trail construction	Do not construct facilities or trails within ½ mile of active nests or roosts.	See tree harvest restrictions above.	• Surveys of suitable habitat. • Protect occurrences with 100 foot buffers.
Recreation maintenance (including trail maintenance, brushing, signing, post holes)	See tree harvest restrictions above.	See tree harvest restrictions above.	• No surveys required. • Develop site specific conservation measures to protect known sites.
Recreation use	Restrict picnicking, camping, firearm use, and low level aircraft operations within ½ mile of active nests and roosts from January 1- August 31 (nests) and November 15-March 15 (roosts).	None.	None required – if possible, monitor sites and develop site specific conservation measures to protect known sites.
Livestock Grazing			
Existing permitted grazing	None.	None.	Monitor sites and develop site specific conservation measures to protect known sites.
Allotment renewals / new permits & allotments	None.	None.	Pre-decisional surveys and implementation of site specific protection measures (e.g., change timing, intensity, duration, or fence populations).

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Road/Engineering	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
Road construction	See tree harvest restrictions.	See tree harvest restrictions.	• Pre-disturbance surveys of suitable habitat. • 100-foot buffer for existing sites.
Road maintenance	See tree harvest restrictions.	See tree harvest restrictions.	• No pre-disturbance surveys. • Protect known sites on road edge with site specific mitigation.
Decommissioning	See tree harvest restrictions.	See tree harvest restrictions.	• Disturbance within the road prism – no surveys. • Disturbance outside the road prism.
Road Use & Special Use Permits			
ROW & Road use permits	Consult on individual projects if there is a "may affect" determination.	Consult on individual projects if there is a "may affect" determination.	None
Special uses – Facilities construction	Consult on individual projects if there is a "may affect" determination.	See tree harvest restrictions above	• Survey suitable intact habitat. • Protect occurrences by 100 foot no-activity buffer.
Special uses - Maintenance	See tree harvest restrictions.	See tree harvest restrictions.	• No surveys. • Protect known sites by site specific conservation measures.
Research collection permits	Collection permit from USFWS required	Collection permit from USFWS required.	Collection permit from USFWS required.
Quarry/Rock Pits			
New quarries & development of existing quarries	See tree harvest restrictions.	See tree harvest restrictions.	• Survey suitable habitat for quarry development. • Protect sites by a 100-foot buffer.
Quarry reclamation	See tree harvest restrictions.	See tree harvest restrictions.	• Surveys if intact suitable habitat affected; no surveys required within the disturbed quarry.

Table D-1. Conservation Measures for Listed Species

ACTIVITY	LISTED SPECIES		
Cultural Resources	**Bald Eagle**	**Northern Spotted Owl**	**Gentner's Fritillary**
	See tree harvest restrictions.	See tree harvest restrictions.	• Areas proposed for excavation in suitable habitat must be surveyed and occupied sites identified. • No digging of plants allowed.
Noxious Weed Control			
Roadside weeds	See tree harvest restrictions.	None.	• No surveys required within the previously disturbed road prism (cut-slope, bed, & fill slope). • Protect known sites and individual plants from weed treatments.
Non-roadside	See tree harvest restrictions.	See tree harvest restrictions.	• Survey suitable habitat. • 25-foot buffers. • Manual treatments (hand pulling, hot foam, chemical wicking) allowed in buffered occurrences only on individual weeds. • No spot spraying within 25-foot buffer. • Reseed with native species at density appropriate for the location.

APPENDIX E

Wildland Fire Occurrence and Risk Assessment

OVERVIEW

This appendix explains some of the different variables and tools used throughout the planning process to help determine the role that fire has played in shaping the monument's ecosystem, the effects of fire exclusion and other human influences on the ecosystem, and the degree to which fire hazard has been elevated across the landscape and the risk this poses to monument and human resources. These variables are listed below and are discussed in more detail in the remainder of this appendix:

- Wildland fire history
- Fire suppression data
- Fire risk
- Fire hazard rating
- Natural fire regimes
- Degree of departure from natural fire regime (condition class)

Wildfire History

In terms of its history throughout southwest Oregon, fire is recognized as a key natural disturbance process (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). Eventually, early Euro-American settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Thus, fire has played an important role in influencing vegetative successional processes. Observations based on fire scars and vegetative patterns indicate that large fires were a common occurrence in the area and were of varying severity.

Fire Suppression Data

Fire suppression data over the past 37 years show that 143 of the 250 fires that occurred within the greater monument boundary were on public land. One hundred and seven fires started on private land. Most of the fires (81 percent) were less than 0.25 acres; 43 fires were between 0.26 and 10 acres; four fires were between 10.01 and 100 acres; and the largest fire during this time period was 441 acres. Initial attack was done primarily (95 percent) with hand crews and engines. Approximately 50 percent of the fires occurred under high to extreme fire danger ratings (as determined by the Oregon Department of Forestry).

Of all the fires that started between 1967 and 2003, lightning accounted for 136 fires (54 percent). Lightning was the main cause of fires that started on public land (64 percent), while human-caused fires where the main source of fire starts on private land (59 percent).

Fire Risk

The following formula was used to determine the monument's fire occurrence rate per decade per 1,000 acres:

Fire Occurrence Rate/Decade/1,000 Acres = {(X/Y)*10}/Z, where

X = number of starts recorded for the area from the fire start data base,
Y = period of time covered by the data base,
Z = number of acres analyzed (displayed in thousands).

Thus, using the fire history data for the past 37 years, the fire occurrence rate within the greater monument boundary is calculated as follows:

{(250/37)*10}/85.173 = 0.79 fires/decade/1,000 acres

This fire occurrence rate corresponds to the moderate fire risk category below which projects that one fire will occur every 11 to 20 years on each 1,000 acres.

Low Risk: fire occurrence rate = 0 - 0.49 fires/decade/1,000 acres; this projects one fire every 20 or more years/thousand acres.

Moderate Risk: fire occurrence rate = 0.5 - 0.99 fires/decade/1,000 acres; this projects one fire every 11 - 20 years/thousand acres.

High Risk: fire occurrence rate = greater than 0.99 fires/decade/1,000 acres; this projects one fire every 0 - 10 years/thousand acres.

This risk category is consistent with the fire risk for the same time period over the entire Medford District.

Fire Hazard Rating

To determine a "fire hazard rating" vegetation is first assessed by type, arrangement, volume, condition, and location. Next, the analysis looks at how these characteristics combine to determine the threat of ignition, the spread of fire, and difficulty of control. Fire hazard rating is a useful tool in the planning process because it helps in prioritizing watersheds and broad areas within a watershed in need of fuels management treatment. For purposes of this plan, fire hazard rating was determined at a broad-scale level (utilizing satellite data in combination with other factors); planning for site-specific projects would further analyze assumptions made in this plan.

In the fall of 1995, a team of fuel management specialists from the Medford BLM and Rogue River National Forest developed a standard method for assigning a fire hazard rating to local areas. Based on knowledge of fire behavior of southwest Oregon, the following factors were determined to be necessary in order to assign a fire hazard rating to an area:

- fuel model
- presence of ladder fuels
- slope
- aspect
- elevation

The following point system was then developed by the team and assigned to each factor to determine the fire hazard rating for the monument:

Fuel Models (fuel models are defined in Appendix K of the draft plan)

1. Fuel Models 1,2,3,8 …….. 0 points
2. Fuel Models 5,6,9 ……. 5 points
3. Fuel Models 11,10 …… 10 points
4. Fuel Models 4,12,13 ……. 15 points

Presence of Ladder Fuels ….. 10 points

Slope

< 20% slope .....5 points

20% - 45% slope..... 10 points

> 45% slope ..... 25 points

Aspect

315 - 360 & 0 - 68 degrees ……... 5 points

68 - 135 & 293 - 315 degrees ……10 points

135 - 293 degrees ……...15 points

Elevation

> 4,500 feet …….10 points

Hazard ratings are based on the total number of points assigned to each of the factors above (Table E-1):

Table E-1. Hazard Rating Classes

Points	Hazard Rating
0 - 24	Low
25 - 50	Moderate
> 50	High

Field inventory and satellite data were used to establish fuel models and the presence of ladder fuels for conifer stands within the CSNM. Satellite data was used for oak woodlands, shrublands and grasslands to establish fuel models. This information was analyzed in GIS along with information on slope, aspect and elevation to estimate a broad hazard rating for all lands within the greater monument boundary.

A majority of the CSNM is estimated to have moderate or high fire hazard based on the factors described above (Table E-2).

Table E-2. Fire Hazard Ratings for the CSNM

Fire Hazard Rating	Percentage of Acres in Each Category
Low hazard	2%
Moderate hazard	66%
High hazard	32%

Fire hazard ratings are developed at the landscape level. Actual fire hazard incorporating all landscape features, including natural fuel breaks, would be used to assess fire hazard at the site-specific level. Fire hazard, in conjunction with fire risk and values at risk aid in prioritizing where fuels reduction work may be needed.

Fire Regime

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Five broad-scale definitions for “natural”, or historic, fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002); these were subsequently interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural fire regimes are classified based on the

average number of years between fires (fire frequency) combined with the fire severity (amount of replacement) on the dominant overstory vegetation.

Climate and topography combine to create the fire regimes found throughout the CSNM. As mentioned above, fire regime refers to the frequency, severity and extent of fires that would have naturally occurred in an area given the existing vegetation types (Agee 1991). The draft plan originally identified and mapped three fire regimes in the CSNM. Since the draft, the planning team determined that expanding the number of fire regimes would better reflect the diversity of the area. These regimes are used nationally as a foundation for "A Cohesive Strategy for Protecting People and Natural Resources" (Hardy et al. 2001, Schmidt et al. 2002, Hann and Brunnell 2001).

As the scale of application becomes finer, these regimes may be defined with more detail, or any one regime may be further divided. Due to the wide variation of fire affects on vegetation and in some cases the longevity of return interval between fire events in the Pacific Northwest, the nationally developed fire regime categories have been supplemented by the regional ecology group to account for fire effect on ecosystem qualities. Listed below are the fire regimes that are recognized to exist within the Pacific Northwest region. Although they are still a broad evaluation for the monument site, they reflect more closely the effects of past fire activity on the vegetation of this local area at a landscape scale.

A mid-scale assessment of fire regime and condition class based on plant series for southwest Oregon is currently being developed. Specific plant communities within the CSNM and the variation in their fire regimes would need to be assessed on a site-by-site basis and then considered with their relationship to the landscape as a whole. To derive vegetation descriptions of the historic landscapes for use as a reference condition, the planning team is using literature searches of historic accounts of the area, photo documentation, and surveyor accounts. From these historic descriptions, the fire regimes for the landscapes throughout the CSNM will be determined.

When additional analysis is available, the monument's five fire regimes will be mapped. With these delineations in place, it will be possible to qualitatively measure the effects of recent human activities and management on the ecosystems within the CSNM.

Frequent Fire Regime Interval

Fire Regime I: Frequent fire return interval with surface fires of low severity
A low-severity regime is characterized by nearly continual summer drought and frequent (0 - 35 years) widespread fires that burn with low intensity. In general, these are savannah-type vegetation structures maintained by frequent fire. Fire Regime I also includes some frequent mixed-severity fires that created a mosaic of different aged post-fire open forest, early to mid-seral forest structural stages, and shrub or herb-dominated patches. In the monument, this regime is characterized by vegetation types such as open stands of hardwoods and mixed hardwood and pine, which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These stands are located in the Siskiyou Foothills ecoregion (Map 3) and at the lower elevation and more exposed sites of the monument's other ecoregions. These plant communities historically recovered rapidly from fire and can be directly or indirectly dependent on fire for their continued persistence. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age.

In contrast, large areas of grasslands and woodlands of the CSNM appear to deviate from this pattern. Some plant communities of the southwest portion of the CSNM (including the Mariposa Lily Botanical Area) and along Highway 66 show little change in aerial photo comparison (1939 versus current) and repeat photo analysis. Factors other than fire that may play a role in maintaining the static appearance of these grasslands, shrublands, and woodlands include soil characteristics, conversion to annual grass understory, or local extirpation of woody species by historic, season-long grazing practices. Areas

within the monument that deviate from these general site qualities and the historic reference would be addressed at the site-specific level. Other influences to the sites, such as grazing, may have contributed in combination with missed fire cycles to affect their current condition.

Fire Regime II: Frequent fire return interval; high or replacement severity
Typically, these are shrub or grasslands that are maintained by frequent fires. Fires may kill or consume non-sprouting shrubs, but the seed source in the soil is often stimulated by the fire's heat. Fire removes the tops of sprouting shrubs, which typically resprout, becoming dominant within 5 - 15 years. More frequent fire return intervals can result in the local extirpation of both seed and resprout-dependent shrubs. The fires tend to kill most of the tree regeneration, such as juniper, Douglas-fir, and ponderosa pine. This regime would be represented in the CSNM by the thickets of wedgeleaf ceanothus (*ceanothus cuneatus),* whiteleaf manzanita (*arctostaphylos viscida),* and some of the open meadows. Frequent fire return intervals can range up to 50 years. It is important to note that fire return intervals are difficult to determine for shrublands and chaparral.

Infrequent Fire Regime Interval

Fire Regime III: Infrequent fire return interval with mixed fire severity
Generally these sites display a mosaic of different age class vegetation that often ranges from post-fire open forest to early to mid-seral forest structural stages, with occasional shrub or herb dominated patches. This regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). It is further characterized by long summer dry periods; fires are infrequent (35 - 100 years). It is the most difficult fire regime to characterize and is often located in a transitional position between low and high elevation forests or plant communities. Fires burn with different degrees of severity within this regime and patches of varying sizes of mortality to all strata of the vegetation occur. Stand replacement fires, as well as low-intensity fires can occur, depending on burning conditions. The overall effect of fire on the landscape in this regime is a mosaic burn. The frequency with which the historic regimes vary across the Pacific Northwest—and in southwest Oregon, in particular—are of importance in understanding the departure in the current vegetation character from the historic character. The following variations in fire frequency and severity are recognized by the Oregon/Washington regional assessment for this fire regime:

Fire Regime III(a): < 50 years with mixed severity
Typical potential plant communities include mixed conifer, and very dry site westside Douglas-fir. Lower severity fires predominate in many events historically. Some of the monument mixed conifer sites will tend into this classification.

Fire Regime III(b): 50 - 100 years with mixed severity
The amount of severe fire effects across landscapes in these historic events would range between the III(a) and III(c) Regimes. Within the monument the mid-elevation dry site white fir and some of the mixed conifer stands would fall into this classification.

Fire Regime III(c): 100 - 200 years with mixed severity
Higher severity fires in larger patches of mortality dominated many of these historic events. High elevation stands of white fir and mixed conifer within the monument may be included in this classification.

Fire Regime IV: Infrequent fire return interval with replacement fire severity
These sites are usually characterized by large patches (100+ acres) of similar age post-fire shrub or herb-dominated structures, or early to mid-seral forest cycled by infrequent fires. When fire occurs on these sites, a high rate of mortality to the above-ground vegetation is seen over large portions of the landscape. In both Regimes III and IV, the fire return interval can be up to 200 years. The main descriptors that provide the difference between Regimes III and IV are the fire effects on the above-ground vegetation.

The following variations in fire frequency and severity are recognized by the Oregon/Washington regional assessment for this fire regime:

Fire Regime IV(a): 35 - 100 years high severity fires
These are forested stands that would typically be considered long-return fire interval, but are positioned upslope from shorter return interval systems. Often these upslope communities will show effects from more frequent fires and still retain qualities of longer return interval sites.

Fire Regime IV(b): 100+ years high severity, patchy arrangement; typical interval 100 - 150 years
Some high elevation white fir sites within the monument may be represented by this classification. These sites include the upper reaches of Chinquapin, Hobart and Soda mountains.

Fire Regime IV(c): 100 - 200 years high severity
This regime is characterized by the White Fir Vegetation Zone (Franklin and Dyrness 1988). This environment typically has moist, cool conditions with infrequent fires. Accurate fire return intervals have not been calculated because of the long intervals between fires. When fires occur, they are due to unusual conditions, such as drought periods associated with high winds. Fires are of high intensity and normally are stand replacement fires. High elevation white fir stands within the CSNM would be represented by this fire disturbance regime. These include mesic sites present on the upper reaches of Chinquapin, Hobart and Soda mountains.

Long Interval Fire Regime

Fire Regime V: Rare or long fire return interval with replacement fire severity

Sites that rarely burn are described much the same as Fire Regime IV due to the similar effects to above ground vegetation. The key difference is the interval period between episodes is usually much longer (100 - 200+ years). This fire regime does not occur in the monument.

A close approximation of past frequency of fire occurrence, extent, and severity on particular sites is important in understanding the relative difference in vegetation and dead and down debris on these sites today. The change or departure on these sites in the amount of these materials has a direct relationship to the type of fire behavior and post-fire effects these sites will support today when compared to the past. Interruption of disturbance processes by excluding fire is only one management practice that has had an affect on specific areas within the monument. Other elements (e.g., climatic variation) and management practices in combination with fire exclusion are important to consider. In an assessment of site-specific conditions, classifying the site's current condition compared to a reference will give some indication of the change to the type of fire severity or fire behavior characteristics. The ability to predict potential fire behavior characteristics is important for understanding the risk to people and key ecological resources.

Condition Classes

Characteristic vegetation and fuel conditions (as described above) are considered to be those that occurred within the natural, or historical fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural fire regime, such as invasive species (weeds), "high graded" forest composition and structure (e.g., large trees removed by harvesting timber), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Further uncharacteristic conditions created by changes in structure and density contribute to more destructive insect and disease occurrence.

A fire regime condition class (FRCC) is based on a relative measure describing the degree of departure from the natural fire regime (Hann and Bunnell 2001). The condition class scale was developed to exhibit the departure in severity, intensity, and frequency of fires burning in the ecosystem in its current condition

as compared to its historic condition. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and diseased-related mortality, grazing, and drought).

Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural fire regime. The amount of departure is then classified to determine the fire regime condition class.

The means for making an assessment on how much fire exclusion, other human activity and management practices, and evolutionary tendencies, has affected an ecosystem is through classifying the current condition of the site based on a reference. This reference (fire regime) is usually historical, pre-dating when fire exclusion, the introduction of non-native species, and Euro-settlement activity and management, became an influence in these systems. Reference conditions are very useful as indicators of ecosystem function and sustainability, but do not necessarily represent desired future conditions, i.e., they may not reflect sustainable conditions under current climate, land use, or managerial constraints, and they may not be compatible with social expectations.

Using the above delineations of the historic fire regimes, an assessment will be made as to the departure from the current condition of these landscapes compared to the historic reference. The risk of losing key components of the system from fire or other disturbance increases as the condition classes rise on the scale from one to three:

Condition Class 1
For the most part, these ecosystems are currently within historical ranges. Key components of the ecosystem are not at risk of being lost due to wildfire effects.

Condition Class 2
These ecosystems are moderately altered from their historical range at the patch and/or landscape scale by either increased or decreased fire frequency. They are at moderate risk of losing key components of their systems due to fire effects.

Condition Class 3
These lands have been significantly altered from their historic range. Because fire regimes have been altered they are at risk of losing key components of their systems due to fire effects.

Although condition classes in the monument have not been determined, current information indicates that a component of grasslands, oak woodlands, and chaparral show the same vegetation structure depicted by cadastral surveys, historic photos, and archived aerial photos. These plant communities would be considered to be within the range of natural variability and thus in Condition Class 1. Other forest and woodland communities showing change throughout the monument would be in Condition Classes 2 and 3. Much of the high elevation timbered lands of the CSNM are of the longer return intervals; these communities burn with stand replacement characteristics over moderately long periods of time between fire episodes. Examples of these vegetative types within the CSNM area are high elevation white fir, in a Condition Class 1 or 2 based on the fire regime criteria.

APPENDIX F

Prescribed Fire

INTRODUCTION

Prescribed burning is defined as fire applied by qualified personnel in a knowledgeable manner to vegetation (fuels) on a specific land area under selected weather conditions to accomplish predetermined, well-defined resource management objectives. Ash returns vital nutrients to life-supporting soils, which in turn provide for healthy vegetation and habitat for wildlife and birds. Fire reduces the number of small, competing trees, allowing established trees to grow healthier with a greater share of water and nutrients. Most importantly, prescribed fire can help protect public and private lands from the devastation of a wildfire by removing tangled undergrowth, accumulated dead material, and fine fuels.

Prescribed fire is a complex tool. Only a certified fire management official is allowed to burn. Proper site analysis and detailed planning are mandatory before every prescribed burn.

POLICIES AND PLANS

The 1995/2001 Revised Federal Wildland Fire Policy directs federal agencies to achieve a balance between suppression of wildfire to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems. The policy requires that every area with burnable vegetation have an approved Fire Management Plan (FMP).

All use of prescribed fire is a coordinated interdisciplinary effort supported by resource and fire management. Resource management is responsible for managing vegetation, wildlife and soils. Fire management is responsible for identifying hazardous fuels situations and managing ignitions. The Fire Management Plan described here serves as the document to initiate, analyze, and provide the basis for using prescribed fire to meet resource objectives. Moreover, the FMP is the program strategy document for prescribed fire activities; it captures and quantifies the overall fuels management program needs of the area. The FMP identifies how prescribed fire, along with other fire management strategies, will be used to meet the overall land management goals identified in the RMP and in reality becomes part of the RMP.

An integrated Fire Management Plan (FMP) is currently being written and includes the Medford/Coos BLM Districts, Rogue Siskiyou NF, Oregon Caves National Monument, SW Oregon Department of Forestry, and Coos Fire Protective Association. This cooperative planning effort will be based on resource management objectives from existing and developing Resource and Land Management Plans, local, state, and federal law, and interagency fire policy. In as much, the lands comprised within the Cascade-Siskiyou National Monument will be addressed in this FMP in coordination with the resource and management objectives detailed in the monument's final management plan and record of decision.

IMPLEMENTATION OF PRESCRIBED FIRE

Site Study

The first step in using prescribed fire is to study fire behavior, fire and smoke management, burning laws, plant responses, animal needs, and animal responses. Information of concern to locals is collected through public outreach and through collaboration with local landowners, businesses and ranchers. An interdisciplinary team of specialists in the areas of fuels, vegetation (botany, range), wildlife, soils, hydrology, cultural resources, threatened and endangered species, etc., then compile a document that describes current and future desired resource management options. The end result is an Environmental Assessment (EA). An EA for fuels hazard reduction contains all of the acceptable fire and fuels management options for the area of interest.

Burn Plan

The prescribed fire (burn) plan is a site-specific operational plan that describes the purpose, resource and fire objectives, and operation procedures required to properly plan, safely implement, monitor (observation, measurement), and evaluate fire and resource objectives for this type of treatment. It is a stand-alone document that provides the project manager with all the information needed to implement the project. Fire managers maintain close coordination and communication among interdisciplinary team members and other involved participants.

The prescribe fire plan contains the following information:

Source Documents: Land use plans are the primary planning documents through which prescribed fire projects will be identified. The CSNM management plan identifies the management goals and constraints that project planners and coordinators need for development of a prescribed fire plan.

Preliminary site review: Resource specialists and fire management personnel and/or the fuels management specialist would conduct an on-site review to determine the potential success of a proposed prescribed fire project. Outside groups and individuals are included, as appropriate.

Project objectives: The desired resource objectives will be discussed and confirmed. Specific prescribed fire treatment objectives are written to describe the fire treatments needed to meet the resource objectives. Project constraints are also identified.

Concurrences: Other program input is included and the amount of time and personnel commitment needed to develop and implement the project is identified.

Data collection: Data needs are identified and data are collected (e.g., botanical and archaeological information, and fuel inventories). Monitoring data from previous projects is reviewed and lessons learned are incorporated into the current project.

National Environmental Policy Act (NEPA) compliance: NEPA compliance is required for all prescribed fire projects. The environmental analysis reveals the effects of using or not using prescribed fire in a specific geographic area at a specific time. NEPA compliance usually takes the form of a programmatic environmental assessment (EA) that covers a number of related treatments (mechanical and prescribed fire) in association with the fire management plan.

Clearances and permits: Several types of clearances, permits and other authorization documents may be required. These generally are cultural resource clearances, threatened/endangered species clearances, and air quality permits, and may also include land owner agreements or releases and assistance or cooperative agreements.

Review and approval: The completed Prescribed Fire Plan receives a technical review by a qualified individual. The plan is then submitted for approval by the Agency Administrator.

Determination of Complexity

A complexity rating will be completed for each prescribed fire project. The determination of the prescribed fire complexity will be based upon an assessment of risk (the probability or likelihood of an unexpected event or situation occurring), potential consequences (some measure of the cost or result of an undesirable event or situation occurring), and technical difficulty (the level of skills needed to complete the project and deal with expected events).

Smoke Management Considerations

According to the Clean Air Act (Public Law 95-95), compliance with federal, state and local air quality regulations is mandatory and will require coordination with state and local air quality authorities. Smoke management can also be a significant part of determining the complexity of a prescribed fire project.

The operational guidance for the Oregon Smoke Management Program is managed by the Oregon State Forester. The policy of the State Forester is to:

- Regulate prescribed burning operations on forest land.
- Achieve strict compliance with the smoke management plan.
- Minimize emissions from prescribed burning.

For the purpose of maintaining air quality, the State Forester and the Department of Environmental Quality shall approve an Oregon Smoke Management Plan for the purpose of managing smoke in areas they designate. The authority for the State administration is ORS 477.513(3)(a).

ORS468A.005 through 468A.085 authorizes the DEQ to establish air quality standards including emission standards for the entire state or an area of the state. Under this authority the State Forester coordinates the administration and operation of the plan. The State Forester also issues additional restrictions on prescribed burning in situations where air quality of the entire State or part thereof is, or would likely become, adversely affected by smoke.

In compliance with the Oregon Smoke Management Plan, prescribed burning activities in the Medford District 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.

The amount of smoke that constitutes a nuisance is not often defined but generally includes a property use or behavior that significantly impairs the use of other property due to some health, safety, or economic consideration. The specific concentration or duration of smoke that constitutes a nuisance is subjective and site specific.

In order to avoid creating or continuing nuisance situations, the BLM has implemented smoke management guidelines. The guidelines used for each fire include:

- Identify critical smoke sensitive targets during the planning stage that may be affected by smoke.
- Prescribe weather and burning conditions that would direct smoke away from critical sensitive targets, such as wind direction and speed. Others include burning conditions that maximize the amount of smoke lifted and weather conditions that maximize dispersal (i.e., mixing height, transport wind speed and probability of air mass stagnation).
- On the afternoon prior to burning, obtain a weather forecast and smoke management forecast to make sure the prescribed weather and burning conditions will be met.
- On the morning of the burn, check to see if the weather and smoke management forecasts are favorable. If so, initiate any planned mitigation measures, light the fire and begin monitoring fire/smoke behavior for unanticipated situations. Be prepared to cease ignition and /or begin suppression if unanticipated situations cannot be controlled or mitigated. Also, be prepared to patrol smoke sensitive roadways through the night if the fire is still producing significant smoke at dusk.
- Whenever possible, burn when large fuel (3”+ in diameter) and duff moisture levels are high to minimize emissions. This may be best accomplished by burning under spring-like conditions.

- Whenever possible, pile fuels prior to burning. Piled fuels result in fewer emissions per ton of fuel consumed and have greater seasonal flexibility.
- Whenever possible, burn only fuel concentrations rather than the entire area.
- Whenever possible burn during periods of atmospheric instability for better smoke dispersal.

Consultation With and Notification of Grazing Lessees

The Code of Federal Regulations (CFR) 4110.3 (Changes in permitted use) and CFR 4110.3-2 (decreasing permitted use), provide guidance to land managers when addressing issues that affect range management. This includes prescribed burning on grazing allotments.

The heart and soul of this authority centers on "consultation, cooperation, and coordination with affected permittees or lessees, ... and the interested public". The approach most often used (and most preferable) involves contacting lessees and giving them the chance to comment on the proposed fuels treatment during the NEPA planning process. Options, as well as time frames, are explained during this process, and agreement with the interested public is sought.

In general, during team meetings to draft the burn plan, areas proposed for prescribed burn treatment(s) are overlain with grazing allotments through the use of Geographic Information Systems (GIS). At that point a team member will begin the consultation process by contacting individuals or groups of lessees, depending on the size and scope of the project area. It may be necessary to remove cattle up to one year before a prescribed fire to allow fuels to build up and up to two years after a prescribed fire to allow vegetation to recover. Recovery time varies and may be less with a low-intensity burn, or more, with a severe, stand replacing burn. Specialists, as members of the planning team, consider many different factors when recommending how long the recovery period will need to be for the project area. Each area would be monitored following the prescribed fire to determine recovery rate and necessary rest for the following year.

During the decision-making process, discussions would include possible impacts and disruption to the livelihood of livestock operations. Every effort will be made to incorporate the burn plan into the local grazing use and rotation to minimize possible impacts to operations. Options available to the lessees could include, but are not limited to: identifying alternative areas for stock to go; fencing out the project area to close only a portion of the allotment to grazing; using natural barriers to keep cattle out of the project area; modifying the season of use; allowing for non-use of the allotment; etc.

One year prior to treatment, a letter would be sent to lessees asking for voluntary cooperation in resting allotments or modifying grazing use. Preferably, an agreement is reached with the lessee(s) and a document is drafted to record the details. If an agreement is not reached, a proposed decision could be issued by the Authorized Officer, explaining the need for the burn treatment and asserting the authority necessary to complete planned resource management.

Notification of Neighbors, Media, and the Public

As general practice, press releases are issued at the critical stages of the entire planning process. At the beginning of the process, a scoping letter usually includes a description of the project area and is intended to solicit input from the public about concerns and desired outcomes for the project. An open house or field trips could be held at the beginning of the project with resource specialists or members of the interdisciplinary planning team (ID team) on hand to answer questions from the public. Once the planning process and required surveys are complete, land managers will be able to begin prescribed burning along with other fuels treatments.

Closer to the impending project date, a letter is mailed to local landowners outlining the intended burn

plans, the number of acres to be burned, potential smoke impacts and a general fact sheet or brochure regarding prescribed burning. The letter invites those interested to contact their local fuels specialist so that their concerns can be addressed. A few days prior to a burn, public notices are usually posted at local businesses in the project area.

The Burn

The burn manager will arrange for and communicate with firefighting personnel, obtain burn permits, check to determine that equipment is in working order, develop an adequate fuel load (fairly dry leaves and plant stems), and prepare fireguards.

Obtaining weather information one day prior to the burn date is imperative. Fuel will not burn when wet or will not burn adequately when the humidity is high. Conversely, fire control is compromised when the humidity is below 25%.

Fire behavior and the location of the fire front are monitored during ignition. Fire weather should be monitored not only during the ignition phase, but for the entire length of time during which fire remains in the unit. Throughout the prescribed fire, comparisons are made of the predicted and observed fire behavior.

Safety Considerations

The safety of fire fighters and the public is the number one priority when planning and implementing a prescribed fire project. Every person involved in a prescribed fire project is responsible for identifying and reporting safety issues and concerns. All personnel will be briefed prior to any prescribed fire assignment. The briefing will ensure that all involved parties understand how the project will be implemented and what their assignments are.

Exposure to smoke during prescribed fire operations can be a significant safety concern. Research has shown the smoke exposure on prescribed fires, especially in the holding and ignition positions, often exceeds that of wildfires. The prescribed fire project planners and prescribed fire burn bosses take precautions to reduce exposure to smoke for firefighters, as well as neighbors.

Monitoring

Monitoring is the consistent collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting management objectives. Prescribed fire monitoring can be defined as a systematic process for collecting and recording information to provide a basis for evaluating and adjusting resource and fire treatment objectives, prescriptions, and implementation practices. In prescribed fire monitoring, information is also gathered to document the treatment itself.

Monitoring allows land managers to record pre-burn ecosystem variables and fire characteristics and then to follow fire-induced changes to the ecosystem over several years. Each BLM Field Office develops a minimum monitoring program that will allow fire and resource managers to determine if the fire treatment and resource objectives are being met.

The minimum monitoring requirements established for individual prescribed fire projects include weather during the fire, observed fire behavior and whether fire treatment objectives have been met.

Post-burn monitoring activities include both observations and measurement in order to determine whether fire treatment objectives were met. Post-burn data is collected at the same locations where data were obtained before the fire.

APPENDIX G

Strategy for Controlling the Spread of Noxious Weeds and Other Invasive Grasses in the Cascade-Siskiyou National Monument

WEED ABATEMENT MANAGEMENT STRATEGY

This appendix describes the strategy and objectives for weed management and provides a framework to control the spread of noxious weeds and other invasive grasses in the monument. Although this strategy is specific to the Cascade-Siskiyou National Monument (CSNM), it incorporates decisions and guidance provided in the following documents:

- The Decision Record, signed June 5, 1998, for the *Integrated Weed Management Plan* with the associated FONSI and Medford District Integrated Weed Management Plan.
- Instruction Memo OR 91-302 *Approved Herbicides for Noxious Weed Control* states: "A copy of this memorandum should be made a permanent part of your reference copy of the Record of Decision for the Northwest Area Noxious Weed Control Program..., BLM offices in Oregon and Washington are authorized to use these herbicides for noxious weed control in accordance with BLM Manual H-9011-1."
- The Supplemental Record of Decision, signed May 5, 1987 for the Northwest Area Noxious Weed Control Program and the associated Final Environmental Impact Statement (March 1987).

The primary goal of monument management is to maintain, protect, and restore habitat and ecological processes critical to richness and abundance of the objects of biological interest for which the monument was proclaimed. The proliferation of weeds across the landscape is an obstacle to this goal, and is a management concern throughout the monument, especially in the Diversity Emphasis Area. Current objectives for weed management have been developed and are described below. Additional weed abatement objectives could be developed through research and pilot studies following the adaptive management strategy in Appendix C.

Spatial analysis in GIS indicates that weeds are associated with roads, sites of acute disturbance (past timber harvest, pastures and other tilled areas), and areas of high livestock utilization. Some of the major ecological problems associated with grass/shrub/woodlands involve annual grasses, yellow starthistle, and Canada thistle displacing the native bunchgrasses found in the monument. Limiting disturbance, therefore, is critical to controlling weeds; reduction of soil surface disturbance and increased shading of the soil can help favor the growth of native bunchgrasses over noxious weeds and other invasive grasses.

The literature supports the following formulation of a general management strategy incorporating aspects of vegetation management and weed control:

Maintain healthy herbaceous plant communities as a barrier to weed invasions.

- Limit ground-disturbing activities.
- Collect and maintain sources of native grass and forb seed for emergency restoration.
- Sow with native seed where natural or ground-disturbing management activities take place.

Improve condition of stands that have a mixture of weeds and remnant native herbaceous species.

- Apply manual or spot herbicide treatments.

- Utilize prescribed burning where appropriate.
- Restore native species by seeding and/or planting.
- Utilize different grazing strategies to reduce disturbance.

Eradicate and restore small isolated weed patches to native herbaceous plant domination.

- Apply manual or spot herbicide treatment.
- Protect sensitive resources (e.g., wetlands, riparian, and rare plants). If herbicide treatments occur in riparian areas, use appropriate herbicides labeled for use in these communities.
- Seed areas with native grass and forbs.

Survey and treat primary travel corridors that serve as vectors for weed spread.

- Inventory roads and power line corridors.
- Apply manual or spot herbicide treatments in a systematic manner.
- Work with power companies, the county, and adjacent land owners to reduce periodic disturbance and treat weeds on adjacent non-federal land.
- Re-vegetate treated areas with native grass and forbs.

Isolate and treat large extensive weed areas.

- Minimize soil disturbance and activities that could spread weeds, especially during the wet season.
- Manually or spot spray large patches working from the "outside" in toward the center of the infestation.
- Seed or plant treated locations with native vegetation.

Implement a long-term restoration/management plan for extensive weedy areas (>1 acre)

- Work with local groups and land owners on noxious weed education and management.
- Identify high-priority treatment areas.
- Avoid disturbance in large patches.
- Monitor efficacy of treatment(s).
- Apply adaptive management strategy.

POTENTIAL MANAGEMENT TOOLS

Education and cooperative partnerships with adjacent landowners and local groups

Educating private land owners within the greater monument boundary on weed issues and treatment strategies is paramount to succeeding in controlling and eradicating weeds in the monument. Partnerships and cost-sharing projects, moreover, are an efficient way to treat larger landscape areas. Working with adjacent land owners, including companies under BLM-permitted activities (e.g., power companies), to prevent the spread of weeds across ownership boundaries, and addressing noxious weeds in all land management activities is critical to success for the landscape as a whole. Identification booklets, preventive strategies, and recommended treatment methods could be a valuable tool for educating and developing partnerships with the monument public.

Weed inventories

The use of surveys and inventories contribute to the understanding of the pattern and distribution of weeds within the monument, informing ongoing creation of adaptive strategies to control and eliminate such weeds from the monument. Surveys identify new species and patches becoming established, such that they become a treatment priority before they spread. Focused inventories along identified primary travel corridors and areas of primary concern will help target specific weed populations for containment and eradication.

Weed prevention and treatments

Weed prevention is an important tool to stop the introduction and spread of weeds. Prevention activities can reduce the spread and introduction of weeds. These activities include the use of "weed-free" hay, mulch, and seed for restoration activities; routinely washing the under-carriage of equipment and vehicles; and keeping vehicles and livestock out of heavily infested areas (i.e., reduce disturbance). All available means to effectively and efficiently prevent and treat weeds could be used in the monument, including manual weeding, hot foam treatments, cultural control, biological control, herbicides, prescribed fire, or grazing. Various treatments are discussed below in more detail.

Manual weeding can effectively remove target species over small- to medium-sized areas. Extensive manual weeding can also cause severe damage to micro-topography and microphytic crust through trampling, potentially leading to soil surface instability.

Hot foam treatment is a manual method that utilizes hot steam with foam (formulated from sugar extracts from corn and coconut). This treatment is used along roadways and other accessible areas to treat weeds. The steam and foam is delivered through a hose with a wand. The foam holds the temperature of the steam for several minutes, killing the unwanted vegetation.

The hot foam method is used on individual weed plants, usually in the rosette stage. The hot steam (212 degrees) can kill individual special status plants if treated, but pre-disturbance surveys for special status plants will identify plants to be protected.

Cultural treatments, such as disking or plowing, consist of entire plant removal from a specific site, but do have some negative side effects. For example, these treatments require precise timing to control the desired species; the acute ground disturbance resulting from these treatments can destroy the remnant native vegetation and promote additional weed invasion; and these treatments are difficult to apply in rough or rocky terrain, and will not occur in the monument with perhaps the exception of road-beds during decommissioning. Mowing or clipping removes the above-ground parts of all plants which is harmless to native bunchgrasses. Mowing can result in light to moderate damage to the soil surface, depending on the technique used. Mowing and manual seed head clipping can be effective in reducing a single year seed crop, although it does not kill the plants. However, some weeds, like starthistle or knapweeds, adapt quickly and will flower closer to the ground following mowing. Mowing may require multiple applications and can lead to soil surface instability. Mowing is not likely to be used in the monument except perhaps along road edges.

Bio-control involves the use of insects to control noxious weeds. Insect releases for starthistle in the monument are ongoing. This method is only effective in certain locations. Currently, there are no effective bio-controls available for other weeds like Canada thistle, Dyer's woad, cheatgrass or medusahead. As new bio-controls are developed in the future, these could be incorporated into the monument's weed strategy.

Spot spraying with herbicides can target specific plants in specific areas. Herbicide application is the

most cost-effective weed treatment over large areas and has a low level of soil disturbance. Within the monument, only spot spraying or individual plant wicking or wiping with approved chemicals will be used so as to reduce secondary harm to other life forms. In riparian areas, only chemicals approved for such areas will be used in weed treatment.

Prescribed fire can be used to reduce cheatgrass, medusahead, and starthistle when the timing and intensity of the application is carefully controlled. Prescribed fire also reduces litter build-up and rejuvenates bunchgrasses over large areas. While prescribed fire can result in mortality for some woody plant species and lichens, it can also serve to rejuvenate others.

Livestock grazing prescribed at the right time and intensity may allow removal of specific plants and weeds. When applied correctly, prescribed grazing may reduce litter and rejuvenate bunchgrasses over large areas. Changing the grazing system (e.g., rest-rotation) can serve to allow recovery of the native plant community in heavily utilized areas in combination with other treatment methods. Controlled grazing by goats could also be used to control starthistle. Insufficient livestock control, however, can result in degradation of adjacent biological resources from over-utilization (e.g., in wetlands, springs, and riparian areas). Livestock are also vector for weed spread.

Vegetative restoration

Native seed application is best used several years following weed control treatments, or in areas of acute ground disturbance to prevent weeds from becoming established. Local, adapted native sources of grass and forb species have been established. Planting native shrubs and trees, especially along treated riparian areas will help restore and maintain healthy plant communities that are resistant to weed invasion. Sowing or planting appropriate native plants following under-story burning can re-establish the native plant community and facilitate succession.

Monitoring

Implementation and validation monitoring of treated areas is critical to the adaptive management process. Multiple years are often involved in successful containment and eradication. Successful weed treatments could involve different or multiple treatment methods, depending on the local site conditions, the species of targeted weeds, and infestation levels.

A thorough literature review on control measures for noxious weeds can be found in the CSNM Draft Resource Management plan, Appendix GG, pages 396-411.

PRIORITY TREATMENT AREAS

The following list of focus areas is intended to provide a relative prioritization of areas in which to survey and treat noxious weeds. These focus areas are of major concern and include the primary travel corridors that can function to spread weeds. In general, these are the areas that contain higher densities of weed populations; containment and eventual eradication is the objective. The methods for containment and eradication can vary, depending on site-specific issues, but, in general, working from the outside into the center of the infestations is the model for manual or herbicide treatments.

Given the annual fluctuations in operational funds to treat weeds, not all areas will be treated annually. New areas may be added over time as new populations are discovered; as monitoring shows successful treatment, areas will be dropped. The focus areas outlined below are a starting point for controlling noxious weeds in the monument and are not intended to be an exhaustive list. Numerous small populations occur that are also important to treat before they spread. Knapweeds, for example, are new to the monument. Because they are forming new starts, they are a high priority for eradication while

populations are small.

Infestations in areas utilized by livestock are also high on the list of treatment priorities so as to prevent further weed spread and to improve the range condition. Some of these infested areas targeted for weed treatment are around seeps, springs, and stock ponds. In some areas, pasture rotation or even rest for several years from grazing could be beneficial for recovery while they are treated.

The focus areas are listed by local name, township, range, and section and/or BLM road segments. Weed infestations in adjacent areas on private lands may also be of concern, but are not listed. When possible, partnerships with adjacent land owners will be formed to treat weeds within the sub-watershed across ownerships.

Focus areas (not in priority order):

- Soda Mountain area (T40S, R3E, sections 21, 27, 28)
- Box O ranch area (T40S, R4E, sections 21, 22, 27, 28)
- Parsnip Lakes (T40S, 3E, section 10)
- Agate Flat, T41S, R4E, sections 6 and 7
- Hobart Lake (T40S, 3e, section 16)
- Eastern Schoheim road (Camp Creek) T41S, R3E, Sections 11, 12 including road 41-2E-10.1
- Scotch Creek RNA (T41S, R3E, section 8,9)
- Jenny Creek (below the Box O to the California Border)
- Mariposa Lily Botanical Area (T41S, R 2E, Sections 8, 9)
- Buck Rock (T40S, 2E, section 11) and roads 39-2E-34 and 40-2E-1
- Chinquapin area (T39S, R3E, sections 23, 26, 35)

As important as actual infested acres are, linear features that serve as vectors for spread also require attention. The major roadways coming into the monument and the large PacifiCorp power line corridor that bisect the monument are areas that receive some level of periodic disturbance from vehicles, maintenance, and animals. Weeds are spreading along these areas, mostly by seed on vehicles, equipment, and animals, including livestock. Wind and water also serve as vectors. The periodic disturbance in these areas provides available habitat for weed species to become established and then spread to adjacent areas outside the corridors. In some areas, grazing is confined to accessible areas along the roads. These linear features need to be continually surveyed and monitored, and as infestations are detected, treatment will prevent further weed spread.

Primary travel routes

- PacifiCorp power line and associated access road: (T40S, R3E, section 16, 17, 21, 27, 35;
- T41S, R3E, sections 1, 12; T41S, R4E, sections 6, 7, 8);
- Tyler Creek Road (BLM road 40-3E-5);
- Upper Jenny Creek and Roads 39-4E-6, -7.5, -8);
- Keene Creek/Lincoln creek/Rancore Pass roads (40-3E-12-12.1);
- Soda Mountain Road (39-3E-32.3);
- Lower Keene creek road (40-3E-12.2, 40-3E-7).

MITIGATING MEASURES

RODEO® (glyphosate) would be used as the primary herbicide in efforts to control noxious weeds listed by Oregon Department of Agriculture in the monument. Manual and biological treatments may also occur in conjunction with the control efforts. Treatment operations would generally occur between March 15th and October 31st.

The following mitigating measures apply to noxious weed treatments in the monument:

- **Human buffer** – None of the products may be applied within 500 feet of any residence or other place of human occupation unless the occupant or resident gives their consent in writing.
- **Cropland buffer** – Commercial products will not be applied within 100 feet of any cropland.
- **25-foot water buffer** – Commercial products applied by ground vehicles equipped with boom sprayers will not be applied within 25 feet of any water, flowing/moist (i.e., not dry) streams, springs, and wetlands (saturated ground).
- **10-foot water buffer –** Spot treatments with vehicle-mounted handguns or with backpack sprayers will not be applied to within 10 feet of water. To add an extra measure of security, a ten-foot buffer "no spray" buffer will be respected along all flowing/moist (i.e., not dry) streams, springs, and wetlands. This will eliminate the potential for any drift entering waters (Hatterman-Valenti et al. 1995). Ground application within 10 feet of any flowing/moist waters will only be done by hand-wicking, wiping, or painting.
- **Spraying Prohibitions** – Spraying operations will be prohibited when wind velocity exceeds **5 mph; when temperatures exceed 80 degrees; when air turbulence would affect spray pattern; or in the event of any other kind of adverse weather conditions that could cause the glyphosate to impact non-target plants**. These requirements would eliminate the potential for spray drift entering the stream channels.
- **Dry season application –** The herbicide treatment would occur only during months with little rain. These months will almost always be June - September; however, during some years, May can be hot and dry and weeds will ripen and begin to set seed early. Moreover, every few years, April can be almost rainless with weeks of temperatures in the high 70s. In such situations, glyphosate may be applied during April or May.
- **Weather Monitoring** – During application, weather conditions will be monitored periodically by trained personnel at spray sites. Weather will be monitored frequently during the first days of a prolonged project, especially projects within Riparian Reserves. Additional weather monitoring will occur whenever a weather change may affect safe placement of the herbicide on the target area. The intent is to ensure that weather conditions are within the parameters of this document and/or other regulatory restrictions.
- **Communication** – Prior to beginning treatment each year, the District Weed Specialist and/or Resource Area staff will provide the Resource Area Fisheries Biologists with the following information:
  - Locations to be treated
  - Riparian Reserves and approximate acres to be treated
  - Application method
  - Herbicide to be used
  - Approximate date of treatment
- **"No rain" rule –** Glyphosate would never be applied when weather reports predict precipitation within 24 hours of application, before or after. This ensures that glyphosate would not be washed off by precipitation into small rivulets, or enter ground water. From a practical perspective, glyphosate would not be as effective if sprayed when rain could wash it off.

- **Mixing and Loading Restrictions** – Herbicides will be mixed and loaded into tanks at least 100 feet from any stream channel or surface water or at a location where an accidental spill would not flow into or contaminate a stream or body of water.
- **Tank Washing and Disposal** – Spray tanks will not be washed or rinsed within 100 feet of any waters. All chemical containers will be disposed of at sites approved by the Oregon State Department of Environmental Quality.
- **Application Concentrations** – RODEO® and ACCORD® will be applied at or below concentrations allowable on the labels.
- **Quality Control** – Regular testing on field calibration and calculation will take place to prevent gross application errors. A licensed/certified herbicide applicator will oversee all spray projects. Dye or a similar method will be used to ensure that chemical application occurs only in target areas. (See "Monitoring" below.)
- **Spill Safety** – The BLM contract inspector will review the BLM spill response procedures outlined in the BLM manual 9011-1 with each applicator before commencing herbicide application operations. All hand-operated application equipment must be leak- and spill-proof.
- **Parsimony Rule** – Only the minimum area necessary for the control of noxious weeds will be treated.
- **Monitoring –** Spray cards, dye, or other type of indicator to monitor chemical drift will be used at the water's edge on a small sample (no less than five sites) of riparian treatment areas. These indicators will provide visual verification that the application methods are minimizing risk to listed fish species.

APPENDIX H

Old-Growth Emphasis Area (OGEA) Treatment Design based on Ecoregion Characteristics and Individual Stand Structures

Appendix H provides additional criteria for the design and implementation of projects in the Old-Growth Emphasis Area (OGEA). Previous field inventory work identified differences in the structure, density, and species composition of Habitat Types 1 & 2. Differences were also noted for each habitat type throughout the monument's four ecoregions. Subsequent management activities will be developed with the intention of mimicking, as well as possible, historic forest conditions at both the landscape or ecoregion level and specific site or stand level. This appendix includes the following information:

- a general overview of OGEA forests in relationship to monument ecoregions;
- an overview of what is typically found in each of the McKelvie Habitat Types (1, 2, 3 and 5) by ecoregion;
- how to use Habitat Type 1 & 2 stands as reference conditions;
- descriptions of proposed treatments by habitat type with more detail than Chapter 2; and
- standards and guidelines regarding snag retention and coarse woody debris (CWD) levels.

OVERVIEW OF ECOREGION CHARACTERISTICS

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).

Four ecoregions (Map 3) have been identified in the monument. The following synopsis of these ecoregions is based on Pater (1997a and 1997b).

Southern Cascades (4g)

The Southern Cascades Ecoregion (2,600-5,800 feet) is characterized by gently sloping mountains, broad valleys, a long summer drought, and high vegetation diversity. White fir (*Abies concolor*) is common. At low elevations, Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) are prevalent. Compared to the other ecoregions in the CSNM, the Southern Cascades Ecoregion contains the most white fir plant communities as the potential natural vegetation (Atzet et al. 1996), and the highest percentage of late-successional and old-growth northern spotted owl nesting, roosting, and foraging habitat in the OGEA.

Southern Cascade Slope (9i)

The Southern Cascade Slope Ecoregion (3,600-6,300 feet) is a transitional zone between the Cascades (4) and the drier Eastern Cascade Slopes and Foothills (9). The Southern Cascade Slope Ecoregion within the CSNM tends to be predominantly gently sloping to flat ponderosa pine-dominated landscapes. White fir and Douglas-fir grow at higher elevations. Much of the Southern Cascade Slope ecoregion typically receives more precipitation than the Eastern Cascade Slopes and Siskiyou Foothills ecoregions. Meadows and grasslands are often found associated with forest stands.

Siskiyou Foothills (78b)

The Siskiyou Foothills Ecoregion (1,500-4,000 feet) is affected by a mediterranean climate, similar to that of the Rogue Valley. The driest area occurs east of Medford and is dominated by oak woodlands, ponderosa pine, and Douglas-fir. This ecoregion is the western-most and lowest in elevation in the CSNM. Few white fir are present. Pacific madrone, generally absent from the other ecoregions of the CSNM, is a common hardwood component of the forest in this ecoregion.

Klamath River Ridges (78g)

The Klamath River Ridges Ecoregion (3,800-7,000 feet) has a dry continental climate. Low elevation and south-facing slopes have more drought-resistant vegetation than elsewhere in the Klamath Ecoregion (78), such as juniper, chaparral and ponderosa pine. Mid-elevation forests are composed of sugar and ponderosa pine, as well as incense cedar and Douglas-fir. Higher and north-facing ridges are covered by Douglas-fir and white fir. A significant portion of the Klamath River Ridges in the CSNM does not have the potential capacity to become suitable habitat for northern spotted owls and therefore is not part of the OGEA because it is comprised of low elevation, south facing slopes. Most of this ecoregion is in the Diversity Emphasis Area.

Historic canopy closures vary by ecoregion (Table H-1).

Table H-1. Historic Crown Closure for Ecoregions in the OGEA (OWEB 2004)

Ecoregion	Historic Crown Closure (%)	Subwatersheds All or Partially Included in Ecoregion
Southern Cascades (4g)	40 - 45	Upper Emigrant Creek, Upper Jenny Creek, Middle Jenny Creek, Keene Creek
Southern Cascade Slope (9i)	< 30	Upper Jenny Creek, Johnson Creek, Middle Jenny Creek, Lower Jenny Creek, Fall Creek
Siskiyou Foothills (78b)	> 50	Upper Emigrant Creek
Klamath River Ridges (78g)	> 30	Upper Emigrant Creek, Keene Creek, Lower Jenny Creek, Camp Creek, Scotch Creek, East Fork Cottonwood Creek, Middle Cottonwood Creek

POTENTIAL TREATMENT DESIGNS IN THE OGEA

Potential Treatments for Habitat Type 1

No management activities are planned in Habitat Type 1. With respect to stand density and the species mix of large trees, Habitat Type 1 provides the closest current representation of the OGEA's historic condition prior to fire exclusion. However, the in-growth of shade-tolerant species currently found in the understory along with midsized trees generally less than 100 years old is not representative of historic conditions.

A 1998 inventory measured forest tree structure/size and density within Habitat Types 1 and 2 in the area

that is now the CSNM (Tables H-2 through H-4). The variability of tree sizes is represented by three to five age classes. Tree stands generally consist of small, densely packed shade-tolerant conifers and an overstory of uneven-aged conifers with individual trees exceeding 35 inches dbh. Tables H-2, H-3, and H-4 provide a modeling guide to be used during the project planning process within the major plant communities and ecoregions which may vary by aspect and elevation. The species mix and size classes noted in these tables are particularly important when conducting management activities designed to promote the development of late-successional and old-growth conditions in Habitat Types 3 and 5.

The more xeric mixed conifer community (Table H-2) is typical of the mid-elevation Klamath River Ridges and the Siskiyou Foothills Ecoregions.

Table H-2. Dry Douglas-Fir/Pine Community (xeric) – Habitat Types 1 & 2

Species	Trees per Acre by Species and Size Class (DBH in Inches)									
	00-06	07-10	11-14	15-18	19-22	23-26	27-30	31-34	35+	Total
Ponderosa Pine	16.0	39.5	7.7	17.5	10.6	1.1	1.3	1.4	0.0	**95.1**
Douglas-Fir	78.0	54.9	24.6	11.5	8.4	2.4	0.5	0.4	1.1	**181.8**
Incense Cedar	25.0	0.0	0.0	1.5	1.7	1.1	0.4			**29.7**
Sugar Pine	0.0	0.0	0.0	4.1	1.6	1.4	0.9		0.8	**8.8**
White Fir	25.0	0.0	1.0							**26.0**
Summary	**144.0**	**94.4**	**33.3**	**34.6**	**22.3**	**6.0**	**3.1**	**1.8**	**1.9**	**341.4**
>10” dbh			33.3	34.6	22.3	6.0	3.1	1.8	1.9	**103.0**
>19” dbh					22.3	6.0	3.1	1.8	1.9	**35.1**
>30” dbh								1.8	1.9	**3.7**

The drier mixed conifer community is representative of the higher elevation Klamath River Ridges and Southern Cascade Slope Ecoregions (Table H-3).

Table H-3. Mixed Conifer Plant Community (mesic) – Habitat Types 1 & 2

Species	Trees per Acre by Species and Size Class (DBH in Inches)									
	00-06	07-10	11-14	15-18	19-22	23-26	27-30	31-34	35+	Total
Ponderosa Pine	25.0	0.0	0.0	2.9	3.6	0.6	1.3	0.3	2.3	**36.0**
Douglas-Fir	166.0	47.6	41.6	25.2	11.6	2.5	0.9	0.4	0.9	**296.7**
Incense Cedar	8.0	4.5	0.0	2.7	4.1	0.6	0.5	0.0	0.8	**21.2**
Sugar Pine	4.0	0.0	4.4	1.6	0.0	0.0	0.0	0.0	0.0	**10.0**
White Fir	29.0	0.0	8.7	0.0	0.8	0.0	0.0	0.0	0.0	**38.5**
California Black Oak	45.0	0.0	8.4	3.7	0.0	0.0	0.0	0.0	0.0	**57.1**
Summary	**277.0**	**52.1**	**63.1**	**36.1**	**20.1**	**3.7**	**2.7**	**0.7**	**4.0**	**459.5**
>10” dbh			63.1	36.1	20.1	3.7	2.7	0.7	4.0	**130.4**
>19” dbh					20.1	3.7	2.7	0.7	4.0	**31.2**
>30” dbh								0.7	4.0	**4.7**

The white fir plant community is primarily located in the Southern Cascades and higher Klamath River Ridges Ecoregions (Table H-4).

Table H-4. White Fir Plant Community – Habitat Type 1 & 2										
	Trees per Acre by Species and Size Class (DBH in Inches)									
Species	**00-06**	**07-10**	**11-14**	**15-18**	**19-22**	**23-26**	**27-30**	**31-34**	**35+**	**Total**
Ponderosa Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.3	**0.7**
Douglas-Fir	33.0	0.0	7.7	2.9	0.8	0.6	0.0	0.3	2.5	**47.8**
Incense Cedar	0.0	8.1	4.1	0.0	0.0	0.0	1.4	1.1	0.3	**15.0**
Sugar Pine	0.0	0.0	0.0	1.7	0.0	0.7	0.4	0.7	1.6	**5.1**
White Fir	132.0	32.7	21.0	17.5	9.2	7.3	3.6	2.0	4.4	**229.7**
Summary	**165.0**	**40.8**	**32.8**	**22.1**	**10.0**	**8.6**	**5.8**	**4.1**	**9.1**	**298.3**
>10" dbh			32.8	22.1	10.0	8.6	5.8	4.1	9.1	**92.5**
>19" dbh					10.0	8.6	5.8	4.1	9.1	**37.6**
>30" dbh								4.1	9.1	**13.2**

Potential Treatments for Habitat Type 2 (Dispersal Habitat)

As a result of fire exclusion or harvest, the composition of overstory species in Habitat Type 2 stands has been shifting from Douglas-fir, sugar pine, ponderosa pine, and incense cedar, toward white fir. A dense understory of small white fir trees has filled the gaps created by harvesting, disease, windfall, and other disturbance factors, shifting stands toward less stability and fire resistance.

Pilot projects could take place in Habitat Type 2 stands outside of the Oregon Gulch Research Natural Area (OGRNA). These pilot projects could include thinning from below, prescribed burning, and creating openings around large pine trees.

The following management actions are designed to protect and enhance the late-successional characteristics of Habitat Type 2 stands:

- Design treatments within and adjacent to Habitat Type 2 in order to increase patch size (the amount of contiguous late-successional habitat) and protect un-entered stands and existing owl cores.
- Leave some untreated patches in stands selected for treatment.
- Thin from below to improve canopy structure and mimic pre-fire exclusion species composition.
- Use prescribed burning (usually done in association with thinning) to move vertical and horizontal fuel profiles to pre-fire exclusion levels.
- Promote snags and CWD levels where deficient.
- Vary tree spacing in thinning projects. No canopy layer should be totally removed when thinning from below.
- Green trees designated for removal from the stand may be left standing (girdled) or felled on site and left where existing CWD levels are low.
- Reduce fire hazard by removing ladder fuels (generally white fir understory) adjacent to large trees.
- Use thinning to encourage large trees of ecologically preferred species, size, and vigor.
- Create openings (generally less than 1/4 acre) around and adjacent to pines to provide for regeneration opportunities and to improve the health of these large pines. Larger white fir may be removed in stands where they compete with mature sugar pine and ponderosa pine. These treatments would emphasize retaining and enhancing the existing pine components and promote opportunities for pine regeneration while retaining adequate canopy cover throughout the stands treated.
- Plant blister-rust resistant sugar pine seedlings when planting is necessary.
- Openings around individual or groups of large pines would not take place within northern spotted owl activity centers.

Habitat Type 2 - Descriptions by Ecoregions

Habitat Type 2 – Southern Cascades Ecoregion (4g)

Most stands have been entered for harvest or are younger in age and have smaller trees than Habitat Type 1 stands. Pure white fir stands that have been opened up by thinning are affected by wind throw and pockets of *Phellinus sp.* root rot. Additionally, these stands have become infected with *Annosus sp.* root rot through stumps from previous thinning projects. Over time, all of these factors have contributed to decreased canopy cover.

Multi-species stands which include sugar pine, incense cedar, and white fir are more resilient and show some recovery from harvest disturbance with release of species resistant to root rot after harvest. Multi-species composition stands tend to have more developed canopy levels. Stands are approaching 60 percent canopy cover. Canopy gaps are often filled with species resistant to root rot. Snags and CWD are sometimes deficient in numbers.

Habitat Type 2 – South Cascade Slope Ecoregion (9i)

Ponderosa pine-dominated stands occur on the east side of the Cascades. The sites are generally flat and dry. A Douglas-fir and white fir understory has developed in the absence of fire. Overall, the stands tend to be more open than forest stands in the other ecoregions. Tree diameter is less than in Habitat Type 1. Most of these stands have been entered for harvest and canopy closure has been reduced. The canopy may or may not be single-layered. Snags and CWD are generally deficient due to past management practices.

Habitat Type 2 – Siskiyou Foothills Ecoregion (78b)

Most mixed conifer stands have been entered for harvest. Late-successional and old-growth characteristics are present in varying amounts. Douglas-fir generally fills gaps where large trees have been removed. Dwarf mistletoe on Douglas-fir is common and sometimes heavy due to past logging practices. Canopy closure has been reduced. Although the canopy is generally not single-layered, forest structural diversity is less than in un-entered stands. The mean stand diameter is less than in Habitat Type 1. The vigor of ponderosa pine and black oak trees has decreased due to competition from Douglas-fir and incense cedar. Snags and CWD are sometimes deficient due to past management practices.

Habitat Type 2 – Klamath River Ridges (78g)

Most mixed conifer stands have been entered for harvest. Late-successional and old-growth characteristics are present in varying amounts. Gaps exist where large trees have been removed. White fir commonly fills gaps to the exclusion of pine. Although large trees are still present in these stands, the mean stand diameter and stand age is less than in Habitat Type 1. Many residual trees present are over 80 years old and often exceed 250 years of age. Canopy closure has been reduced. The canopy may or may not be single-layer, but vertical forest structure is reduced and is more open and discontinuous than in un-entered stands. White fir trees grow around residual old-growth conifers. Sugar and ponderosa pine vigor is decreased due to competition with in-grown white fir. Snags and CWD are often deficient.

Potential Treatments for Habitat Type 3 (Young stands)

Following the strategy described in Chapter 2, management actions could potentially take place in all Habitat Type 3 stands. Most of these young stands were artificially established as pine plantations in historic clearcuts. Because of altered natural disturbance regimes (including fire exclusion, the proliferation of pathogens and insects, accelerated fragmentation, and shifts in species composition), many of these stands are on developmental paths that may not provide adequate late-successional and old-growth structure and characteristics. The overall management objective for these young stands is to mimic more closely historic forest development in order to provide structure and habitat for late-successional and old-growth associated species.

Treatments that would be used to promote late-successional and old-growth habitat include the following:

- Density management in young plantations and natural stands would promote the growth and development of desired tree species. Thinning and release efforts could be used to select individual trees specifically for large crowns and limbs, disease resistance (sugar pine rust resistance), selective tree species composition, and other mortality or habitat attributes consistent with OGEA objectives.
- Thinning would favor historic species composition at the stand level. Options will be limited due to the near-monoculture ponderosa pine component present in many of these stands.
- Treatments would include substantially varied spacing in order to provide for the development of late-successional characteristics as quickly as possible. Some areas of heavy canopy closure and structural complexity would be maintained and the growth of a variety of species appropriate to the site and the late-successional and old-growth objectives would be encouraged.
- Prescribed fire is not always an option in Habitat Type 3; trees may be small and susceptible to fire damage. Some limited underburning or pile burning in older pine plantations may be possible after thinning.

Habitat Type 3 - Descriptions by Ecoregion

Habitat Type 3 – Southern Cascades Ecoregion (4g)

Young pine plantations with generally low stocking levels are found at higher elevations in white fir forests. Stocking levels are generally medium or low and not always candidates for thinning. CWD and snags are always deficient due to previous post-harvest burning.

Habitat Type 3 – Southern Cascades Slope Ecoregion (9i)

Very little Habitat Type 3 exists in this ecoregion. Most of the Habitat Type 3 present is young pine plantations.

Habitat Type 3 – Siskiyou Foothills Ecoregion (78b)

This habitat type is represented primarily by mixed conifer species. White fir is generally lacking. Black oak and madrone are common. A few pine plantations are present as well.

Habitat Type 3 – Klamath River Ridges Ecoregion (78g)

This habitat type is represented by mixed conifer advanced reproduction and pine plantations originating from clearcuts in the Lincoln Creek and Rosebud area. Trees are generally less than 25 years old. Tree density is currently too high to allow for the development of late-successional habitat or old growth. Understory vegetation consists of grasses, manzanita, and ceanothus.

Potential Treatments for Habitat Type 5 (Dispersal Habitat)

Habitat Type 5 stands are more varied than Habitat Type 3 as they have often retained some vertical structure, CWD, and variable species composition after logging. Habitat Type 5 stands are commonly the result of partially harvested stands where large old-growth trees were removed. Some Habitat Type 5 stands are characterized by 80 to 120-year-old, overly dense, even-aged trees that resulted from a stand replacement fire. Because of altered natural disturbance regimes – including fire exclusion, the proliferation of pathogens and insects, and shifts in species composition – many of these stands are on developmental paths that may not provide adequate late-successional and old-growth characteristics in the future. The overall objective of stand management would be to mimic more closely historic forest development in order to provide structure and habitat for late-successional and old-growth associated species, and would include the following:

- Thinning from below in order to remove some portion of small suppressed and intermediate-size trees could occur. Trees targeted for removal would generally be the in-growth of small Douglas-fir and white fir that developed during the last 100 years of fire exclusion.
- Thinning would substantially vary the spacing of residual trees in order to (1) provide for the development of late-successional characteristics as quickly as possible; (2) maintain some areas of heavy canopy closure; and (3) enhance structural complexity. Treatments would encourage the growth and development species appropriate to the site in order to promote late-successional and old-growth characteristics.

Habitat Type 5 - Descriptions by Ecoregion

Habitat Type 5 – Southern Cascades Ecoregion (4g)

Forest stands have often been thinned as shelterwoods. Some stands may be open-grown, intertwined with meadows, or exhibit naturally low stocking levels. Stands are open with little canopy development and have few seedlings due to exposure on cold, harsh sites even though canopy cover is greater than 40 percent. Root rot is a problem, particularly in stands dominated by white fir. Windfall is common and stands decrease in stocking levels, canopy closure, and complexity over time, especially in stands dominated by white fir trees. Snags and CWD are deficient due to past management practices.

Habitat Type 5 – Southern Cascades Slope Ecoregion (9i)

Many of these stands were heavily thinned and some were selectively cut to remove larger trees. A few are younger stands or have low tree densities due to disturbance or poor soils, or are intermixed with natural meadows. Stands are open and canopy cover is generally limited with minimal layering. Snags and CWD are often deficient.

Habitat Type 5 – Siskiyou Foothills Ecoregion (78b)

Many of these stands were heavily and selectively thinned. These stands are now composed of heavy brush and hardwoods, as well as residual conifers. Some stands are younger in age than other Type 5 stands and have low tree densities due to disturbance or poor soils. Residual Douglas-fir with dwarf mistletoe were often left in the stand during previous harvests. Canopy cover is generally less than 40 percent with minimal layering. CWD and snags are usually limited.

Habitat Type 5 – Klamath River Ridges Ecoregion (78g)

Many of these stands were more heavily thinned than thinned stands elsewhere in the CSNM and are often a result of shelterwood cuts, overstory removal, or multiple entries. Some are younger stands or have lower tree densities due to disturbance, poor soils, or low-site forest lands. Canopy cover is limited, little layering exists, and understory stocking levels are often poor. Snags and CWD are almost always deficient.

- Thinning would also focus on reducing the density of trees growing in gaps created during previous harvests of old-growth trees.
- Canopy closure is a key component of spotted owl dispersal habitat. Treatments would be designed to retain a canopy sufficient to provide for spotted owl dispersal habitat.
- Pile burning could be used to remove slash resulting from thinning activities conducted in canopy openings. The removal of ladder fuels and pile burning would be conducted in order to protect smaller trees prior to any prescribed underburn.

Snags and Coarse Woody Debris (CWD)

In 1998 sixteen Northern Spotted Owl (NSO) activity centers in the monument were sampled for snags and CWD. The activity centers are distributed quite evenly among the monument's ecoregions. Based on the assumption that the NSO activity centers represent the most functional late successional and old-growth habitat in the monument, the data derived from this study will provide the basis for snag and CWD management for projects in the Old-Growth Emphasis Area. In addition, "Guidelines for Snag and Down Wood Prescriptions in Southwest Oregon" (White 2000) and DecAID (Mellen et al. 2003) would be used in the management of snags and CWD.

APPENDIX I

Standards for Rangeland Health and Guidelines for Livestock Grazing Management

STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT FOR PUBLIC LANDS ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT IN THE STATES OF OREGON AND WASHINGTON

AUGUST 12, 1997

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Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington

INTRODUCTION

These Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington were developed in consultation with Resource Advisory Councils and Provincial Advisory Committees, tribes and others. These standards and guidelines meet the requirements and intent of 43 Code of Federal Regulations, Subpart 4180 (Rangeland Health) and are to be used as presented, in their entirety. These standards and guidelines are intended to provide a clear statement of agency policy and direction for those who use public lands for livestock grazing, and for those who are responsible for their management and accountable for their condition. Nothing in this document should be interpreted as an abrogation of Federal trust responsibilities in protection of treaty rights of Indian tribes or any other statutory responsibilities including, but not limited to, the Taylor Grazing Act, the Clean Water Act, and the Endangered Species Act.

FUNDAMENTALS OF RANGELAND HEALTH

The objectives of the rangeland health regulations referred to above are: “to promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; . . . and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands.”

To help meet these objectives, the regulations on rangeland health identify fundamental principles providing direction to the States, districts, and on-the-ground public land managers and users in the management and use of rangeland ecosystems.

A hierarchy, or order, of ecological function and process exists within each ecosystem. The rangeland ecosystem consists of four primary, interactive components: a physical component, a biological component, a social component, and an economic component. This perspective implies that the physical function of an ecosystem supports the biological health, diversity and productivity of that system. In turn, the interaction of the physical and biological components of the ecosystem provides the basic needs of society and supports economic use and potential.

The Fundamentals of Rangeland Health stated in 43 CFR 4180 are:

1. 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 landform and maintain or improve water quality, water quantity and the timing and duration of flow.
2. Ecological processes, including the hydrologic cycle, nutrient cycle and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
3. Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established Bureau of Land Management objectives such as meeting wildlife needs.
4. 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 candidate and other special status species.

The fundamentals of rangeland health combine the basic precepts of physical function and biological health with elements of law relating to water quality, and plant and animal populations and communities. They provide direction in the development and implementation of the standards for rangeland health.

STANDARDS FOR RANGELAND HEALTH

The standards for rangeland health (standards), based on the above fundamentals, are expressions of the physical and biological condition or degree of function necessary to sustain healthy rangeland ecosystems. Although the focus of these standards is on domestic livestock grazing on Bureau of Land Management lands, on-the-ground decisions must consider the effects and impacts of all uses.

Standards that address the physical components of rangeland ecosystems focus on the roles and interactions of geology and landform, soil, climate and water as they govern watershed function and soil stability. The biological components addressed in the standards focus on the roles and interactions of plants, animals and microbes (producers, consumers and decomposers), and their habitats in the ecosystem. The biological component of rangeland ecosystems is supported by physical function of the system, and it is recognized that biological activity also influences and supports many of the ecosystem's physical functions.

Guidance contained in 43 CFR 4180 of the regulations directs management toward the maintenance or restoration of the physical function and biological health of rangeland ecosystems. Focusing on the basic ecological health and function of rangelands is expected to provide for the maintenance, enhancement, or creation of future social and economic options.

The standards are based upon the ecological potential and capability of each site. In assessing a site's condition or degree of function, it must be understood that the evaluation compares each site to its own potential or capability. Potential and capability are defined as follows:

Potential – The highest level of condition or degree of function a site can attain given no political, social or economic constraints.

Capability – The highest level of condition or degree of function a site can attain given certain political, social or economic constraints. For example, these constraints might include riparian areas permanently occupied by a highway or railroad bed that prevent the stream's full access to its original flood plain. If such constraints are removed, the site may be able to move toward its potential.

In designing and implementing management strategies to meet the standards of rangeland health, the potential of the site must be identified, and any constraints recognized, in order that plan goals and objectives are realistic and physically and economically achievable.

STANDARDS AND GUIDELINES IN RELATION TO THE PLANNING PROCESS

The standards apply to the goals of land use plans, activity plans, and project plans (Allotment Management Plans, Annual Operating Plans, Habitat Management Plans, etc.). They establish the physical and biological conditions or degree of function toward which management of publicly-owned rangeland is to be directed. In the development of a plan, direction provided by the standards and the social and economic needs expressed by local communities and individuals are brought together in formulating the goal(s) of that plan.

When the standards and the social and economic goals of the planning participants are woven together in the plan goal(s), the quantifiable, time specific objective(s) of the plan are then developed. Objectives describe and quantify the desired future conditions to be achieved within a specified timeframe. Each plan objective should address the physical, biological, social and economic elements identified in the plan goal.

Standards apply to all ecological sites and land forms on public rangelands throughout Oregon and Washington. The standards require site-specific information for full on-ground usability. For each standard, a set of indicators is identified for use in tailoring the standards to site-specific situations. These indicators are used for rangeland ecosystem assessments and monitoring and for developing terms and conditions for permits and leases that achieve the plan goal.

Guidelines for livestock grazing management offer guidance in achieving the plan goal and objectives. The guidelines outline practices, methods, techniques and considerations used to ensure that progress is achieved in a way, and at a rate, that meets the plan goal and objectives.

INDICATORS OF RANGELAND HEALTH

The condition or degree of function of a site in relation to the standards and its trend toward or away from any standard is determined through the use of reliable and scientifically sound indicators. The consistent application of such indicators can provide an objective view of the condition and trend of a site when used by trained observers.

For example, the amount and distribution of ground cover can be used to indicate that infiltration at the soil surface can take place as described in the standard relating to upland watershed function. In applying this indicator, the specific levels of plant cover necessary to support infiltration in a particular soil should be identified using currently available information from reference areas, if they exist; from technical sources like soil survey reports, Ecological Site Inventories, and Ecological Site Descriptions, or from other existing reference materials. Reference areas are lands that best represent the potential of a specific ecological site in both physical function and biological health. In many instances potential reference areas are identified in Ecological Site Descriptions and are referred to as “type locations.” In the absence of suitable reference areas, the selection of indicators to be used in measuring or judging condition or function should be made by an interdisciplinary team of experienced professionals and other trained individuals.

Not all indicators identified for each standard are expected to be employed in every situation. Criteria for selecting appropriate indicators and methods of measurement and observation include, but are not limited to: 1. the relationship between the attribute(s) being measured or observed and the desired outcome; 2. the relationship between the activity (e.g., livestock grazing) and the attribute(s) being measured or observed; and 3. funds and workforce available to conduct the measurements or observations.

ASSESSMENTS AND MONITORING

The standards are the basis for assessing and monitoring rangeland condition and trend. Carrying out well-designed assessment and monitoring is critical to restoring or maintaining healthy rangelands and determining trends and conditions.

Assessments are a cursory form of evaluation based on the standards that can be used at different landscape scales. Assessments, conducted by qualified interdisciplinary teams (which may include but are not limited to physical, biological and social specialists, and interagency personnel) with participation from lessees and other interested parties, are appropriate at the watershed and sub-watershed levels, at the allotment and pasture levels and on individual ecological sites or groups of sites. Assessments identify the condition or degree of function within the rangeland ecosystem and indicate resource problems and issues that should be monitored or studied in more detail. The results of assessments are a valuable tool for managers in assigning priorities within an administrative area and the subsequent allocation of personnel, money and time in resource monitoring and treatment. The results of assessments may also be used in making management decisions where an obvious problem exists.

Monitoring, which is the well documented and orderly collection, analysis and interpretation of resource data, serves as the basis for determining trends in the condition or degree of function of rangeland resources and for making management decisions. Monitoring should be designed and carried out to identify trends in resource conditions, to point out resource problems, to help indicate the cause of such problems, to point out solutions, and/or to contribute to adaptive management decisions. In cases where monitoring data do not exist, professional judgement, supported by interdisciplinary team recommendation, may be relied upon by the authorized officer in order to take necessary action. Review and evaluation of new information must be an ongoing activity.

To be effective, monitoring must be consistent over time, throughout administrative areas, and in the methods of measurement and observation of selected indicators. Those doing the monitoring must have the knowledge and skill required by the level or intensity of the monitoring being done, as well as the experience to properly interpret the results. Technical support for training must be made available.

MEASURABILITY

It is recognized that not every area will immediately meet the standards and that it will sometimes be a long-term process to restore some rangelands to properly functioning condition. It is intended that in cases where standards are not being met, measurable progress should be made toward achieving those standards, and significant progress should be made toward fulfilling the fundamentals of rangeland health. Measurability is defined on a case-specific basis based upon the stated planning objectives (i.e., quantifiable, time specific), taking into account economic and social goals along with the biological and ecological capability of the area. To the extent that a rate of recovery conforms with the planning objectives, the area is allowed the time to meet the standard under the selected management regime.

IMPLEMENTATION

The material contained in this document will be incorporated into existing Land Use Plans and used in the development of new Land Use Plans. According to 43 CFR 4130.3-1, permits and leases shall incorporate terms and conditions that ensure conformance with 43 CFR 4180. Terms and conditions of existing permits and leases will be modified to reflect standards and guidelines at the earliest possible date with priority for modification being at the discretion of the authorized officer. Terms and conditions of new permits and leases will reflect standards and guidelines in their development.

Indicators identified in this document will serve as a focus of interpretation of existing monitoring data and will provide the basis of design for monitoring and assessment techniques, and in the development of monitoring and assessment plans.

The authorized officer shall take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining, through assessment or monitoring by experienced professionals and interdisciplinary teams, that a standard is not being achieved and that livestock are a significant contributing factor to the failure to achieve the standards and conform with the guidelines.

STANDARDS FOR RANGELAND HEALTH

Standard 1 Watershed Function – Uplands

Upland soils exhibit infiltration and permeability rates, moisture storage and stability that are appropriate to soil, climate and landform.

Rationale and Intent

This standard focuses on the basic physical functions of upland soils that support plant growth, the maintenance or development of plant populations and communities, and promote dependable flows of quality water from the watershed.

To achieve and sustain rangeland health, watersheds must function properly. Watersheds consist of three principle components: the uplands, riparian/wetland areas and the aquatic zone. This standard addresses the upland component of the watershed. When functioning properly, within its potential, a watershed captures, stores and safely releases the moisture associated with normal precipitation events (equal to or less than the 25 year, 5 hour event) that falls within its boundaries. Uplands make up the largest part of the watershed and are where most of the moisture received during precipitation events is captured and stored.

While all watersheds consist of similar components and processes, each is unique in its individual makeup. Each watershed displays its own pattern of landform and soil, its unique climate and weather patterns, and its own history of use and current condition. In directing management toward achieving this standard, it is essential to treat each unit of the landscape (soil, ecological site, and watershed) according to its own capability and how it fits with both smaller and larger units of the landscape.

A set of potential indicators has been identified for which site-specific criteria will be used to determine if this standard is being met. The appropriate indicators to be used in determining attainment of the standard should be drawn from the following list.

Potential Indicators

Protection of the soil surface from raindrop impact; detention of overland flow; maintenance of infiltration and permeability, and protection of the soil surface from erosion, consistent with the potential/capability of the site, as evidenced by the:

- amount and distribution of plant cover (including forest canopy cover);
- amount and distribution of plant litter;
- accumulation/incorporation of organic matter;
- amount and distribution of bare ground;
- amount and distribution of rock, stone, and gravel;
- plant composition and community structure;
- thickness and continuity of A horizon;
- character of micro-relief;
- presence and integrity of biotic crusts;
- root occupancy of the soil profile;
- biological activity (plant, animal, and insect); and
- absence of accelerated erosion and overland flow.

Soil and plant conditions promote moisture storage as evidenced by:

- amount and distribution of plant cover (including forest canopy cover);
- amount and distribution of plant litter;
- plant composition and community structure; and
- accumulation/incorporation of organic matter.

Standard 2 Watershed Function - Riparian/Wetland Areas

Riparian-wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.

Rationale and Intent

Riparian-wetland areas are grouped into two major categories: 1. lentic, or standing water systems such as lakes, ponds, seeps, bogs, and meadows; and 2. lotic, or moving water systems such as rivers, streams, and springs. Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Riparian areas commonly occupy the transition zone between the uplands and surface water bodies (the aquatic zone) or permanently saturated wetlands.

Properly functioning condition of riparian and wetland areas describes the degree of physical function of these components of the watershed. Their functionality is important to water quality in the capture and retention of sediment and debris, the detention and detoxification of pollutants, and in moderating seasonal extremes of water temperature. Properly functioning riparian areas and wetlands enhance the timing and duration of streamflow through dissipation of flood energy, improved bank storage, and ground water recharge. Properly functioning condition should not be confused with the Desired Plant Community (DPC) or the Desired Future Condition (DFC) since, in most cases, it is the precursor to these levels of resource condition and is required for their attainment.

A set of indicators has been identified for which site-specific criteria will be used to determine if this standard is being met. The criteria are based upon the potential (or upon the capability where potential cannot be achieved) of individual sites or land forms.

Potential Indicators

Hydrologic, vegetative, and erosional/depositional processes interact in supporting physical function, consistent with the potential or capability of the site, as evidenced by:

- frequency of floodplain/wetland inundation;
- plant composition, age class distribution, and community structure;
- root mass;
- point bars revegetating;
- streambank/shoreline stability;
- riparian area width;
- sediment deposition;
- active/stable beaver dams;
- coarse/large woody debris;
- upland watershed conditions;
- frequency/duration of soil saturation; and
- water table fluctuation.

Stream channel characteristics are appropriate for landscape position as evidenced by:

- channel width/depth ratio;
- channel sinuosity;
- gradient;
- rocks and coarse and/or large woody debris;
- overhanging banks;
- pool/riffle ratio;
- pool size and frequency; and
- stream embeddedness.

Standard 3 Ecological Processes

Healthy, productive and diverse plant and animal populations and communities appropriate to soil, climate and landform are supported by ecological processes of nutrient cycling, energy flow and the hydrologic cycle.

Rationale and Intent

This standard addresses the ecological processes of energy flow and nutrient cycling as influenced by existing and desired plant and animal communities without establishing the kinds, amounts or proportions of plant and animal community compositions. While emphasis may be on native species, an ecological site may be capable of supporting a number of different native and introduced plant and animal populations and communities while meeting this standard. This standard also addresses the hydrologic cycle which is essential for plant growth and appropriate levels of energy flow and nutrient cycling. Standards 1 and 2 address the watershed aspects of the hydrologic cycle.

With few exceptions, all life on earth is supported by the energy supplied by the sun and captured by plants in the process of photosynthesis. This energy enters the food chain when plants are consumed by insects and herbivores and passes upward through the food chain to the carnivores. Eventually, the energy reaches the decomposers and is released as the thermal output of decomposition or through oxidation.

The ability of plants to capture sunlight energy, to grow and develop, to play a role in soil development and watershed function, to provide habitat for wildlife and to support economic uses depends on the availability of nutrients and moisture. Nutrients necessary for plant growth are made available to plants through the decomposition and metabolization of organic matter by insects, bacteria and fungi, the weathering of rocks and extraction from the atmosphere. Nutrients are transported through the soil by plant uptake, leaching and by rodent, insect and microbial activity. They follow cyclical patterns as they are used and reused by living organisms.

The ability of rangelands to supply resources and satisfy social and economic needs depends on the buildup and cycling of nutrients over time. Interrupting or slowing nutrient cycling can lead to site degradation, as these lands become increasingly deficient in the nutrients plants require.
Some plant communities, because of past use, frequent fire or other histories of extreme or continued disturbance, are incapable of meeting this standard. For example, shallow-rooted winter-annual grasses that completely dominate some sites do not fully occupy the potential rooting depth of some soils, thereby reducing nutrient cycling well below optimum levels. In addition, these plants have a relatively short growth period and thus capture less sunlight than more diverse plant communities. Plant communities like those cited in this example are considered to have crossed the threshold of recovery and often require great expense to be recovered. The cost of recovery must be weighed against the site's potential ecological/economic value in establishing treatment priorities.

The role of fire in natural ecosystems should be considered, whether it acts as a primary driver or only as one of many factors. It may play a significant role in both nutrient cycling and energy flows.

A set of indicators has been identified for which site-specific criteria will be used to determine if this standard is being met.

Potential Indicators

Photosynthesis is effectively occurring throughout the potential growing season, consistent with the potential/capability of the site, as evidenced by plant composition and community structure.

Nutrient cycling is occurring effectively, consistent with the potential/capability of the site, as evidenced by:

- plant composition and community structure;
- accumulation, distribution, incorporation of plant litter and organic matter into the soil;
- animal community structure and composition;
- root occupancy in the soil profile; and
- biological activity including plant growth, herbivory, and rodent, insect and microbial activity.

Standard 4 Water Quality

Surface water and groundwater quality, influenced by agency actions, complies with State water quality standards.

Rationale and Intent

The quality of the water yielded by a watershed is determined by the physical and chemical properties of the geology and soils unique to the watershed, the prevailing climate and weather patterns, current resource conditions, the uses to which the land is put and the quality of the management of those uses. Standards 1, 2 and 3 contribute to attaining this standard.

States are legally required to establish water quality standards and Federal land management agencies are to comply with those standards. In mixed ownership watersheds, agencies, like any other land owners, have limited influence on the quality of the water yielded by the watershed. The actions taken by the agency will contribute to meeting State water quality standards during the period that water crosses agency administered holdings.

Potential Indicators

Water quality meets applicable water quality standards as evidenced by:

- water temperature;
- dissolved oxygen;
- fecal coliform;
- turbidity;
- pH;
- populations of aquatic organisms; and
- effects on beneficial uses (i.e., effects of management activities on beneficial uses as defined under the Clean Water Act and State implementing regulations).

Standard 5 Native, T&E, and Locally Important Species

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.

Rationale and Intent

Federal agencies are mandated to protect threatened and endangered species and will take appropriate action to avoid the listing of any species. This standard focuses on retaining and restoring native plant and animal (including fish) species, populations and communities (including threatened, endangered and other special status species and species of local importance). In meeting the standard, native plant communities and animal habitats would be spatially distributed across the landscape with a density and frequency of species suitable to ensure reproductive capability and sustainability. Plant populations and communities would exhibit a range of age classes necessary to sustain recruitment and mortality fluctuations.

Potential Indicators

- essential habitat elements for species, populations and communities are present and available, consistent with the potential/capability of the landscape, as evidenced by:
- plant community composition, age class distribution, productivity;
- animal community composition, productivity;
- habitat elements;
- spatial distribution of habitat;
- habitat connectivity; and
- population stability/resilience.

GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

Guidelines for livestock grazing management offer guidance in achieving plan goals, meeting standards for rangeland health and fulfilling the fundamentals of rangeland health. Guidelines are applied in accordance with the capabilities of the resource in consultation, cooperation, and coordination with lessees and the interested public. Guidelines enable managers to adjust grazing management on public lands to meet current and anticipated climatic and biological conditions.

General Guidelines

1. Involve diverse interests in rangeland assessment, planning and monitoring.
2. Assessment and monitoring are essential to the management of rangelands, especially in areas where resource problems exist or issues arise. Monitoring should proceed using a qualitative method of assessment to identify critical, site-specific problems or issues using interdisciplinary teams of specialists, managers, and knowledgeable land users.

Once identified, critical, site-specific problems or issues should be targeted for more intensive, quantitative monitoring or investigation. Priority for monitoring and treatment should be given to those areas that are ecologically at-risk where benefits can be maximized given existing budgets and other resources.

Livestock Grazing Management

1. The season, timing, frequency, duration and intensity of livestock grazing use should be based on the physical and biological characteristics of the site and the management unit in order to:
   a. provide adequate cover (live plants, plant litter and residue) to promote infiltration, conserve soil moisture and to maintain soil stability in upland areas;
   b. provide adequate cover and plant community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas.
   c. promote soil surface conditions that support infiltration;
   d. avoid sub-surface soil compaction that retards the movement of water in the soil profile;
   e. help prevent the increase and spread of noxious weeds;
   f. maintain or restore diverse plant populations and communities that fully occupy the potential rooting volume of the soil;
   g. maintain or restore plant communities to promote photosynthesis throughout the potential growing season;
   h. promote soil and site conditions that provide the opportunity for the establishment of desirable plants;
   i. protect or restore water quality; and
   j. provide for the life cycle requirements, and maintain or restore the habitat elements of native (including T&E, special status, and locally important species) and desired plants and animals.
2. Grazing management plans should be tailored to site-specific conditions and plan objectives. Livestock grazing should be coordinated with the timing of precipitation, plant growth and plant form. Soil moisture, plant growth stage and the timing of peak stream flows are key factors in determining when to graze. Response to different grazing strategies varies with differing ecological sites.
3. Grazing management systems should consider nutritional and herd health requirements of the livestock.
4. Integrate grazing management systems into the year-round management strategy and resources of the permittee(s) or lessee(s). Consider the use of collaborative approaches (e.g., Coordinated Resource Management, Working Groups) in this integration.
5. Consider competition for forage and browse among livestock, big game animals, and wild horses in designing and implementing a grazing plan.
6. Provide periodic rest from grazing for rangeland vegetation during critical growth periods to promote plant vigor, reproduction and productivity.
7. Range improvement practices should be prioritized to promote rehabilitation and resolve grazing concerns on transitory grazing land.
8. Consider the potential for conflict between grazing use on public land and adjoining land uses in the design and implementation of a grazing management plan.

Facilitating the Management of Livestock Grazing

1. The use of practices to facilitate the implementation of grazing systems should consider the kind and class of animals managed, indigenous wildlife, wild horses, the terrain and the availability of water. Practices such as fencing, herding, water development, and the placement of salt and supplements (where authorized) are used where appropriate to:
   a. promote livestock distribution;

b. encourage a uniform level of proper grazing use throughout the grazing unit;

c. avoid unwanted or damaging concentrations of livestock on streambanks, in riparian areas and other sensitive areas such as highly erodible soils, unique wildlife habitats and plant communities; and

d. protect water quality.

2. Roads and trails used to facilitate livestock grazing are constructed and maintained in a manner that minimizes the effects on landscape hydrology; concentration of overland flow, erosion and sediment transport are prevented; and subsurface flows are retained.

Accelerating Rangeland Recovery

1. Upland treatments that alter the vegetative composition of a site, like prescribed burning, juniper management and seedings or plantings must be based on the potential of the site and should:
   a. retain or promote infiltration, permeability, and soil moisture storage;
   b. contribute to nutrient cycling and energy flow;
   c. protect water quality;
   d. help prevent the increase and spread of noxious weeds;
   e. contribute to the diversity of plant communities, and plant community composition and structure;
   f. support the conservation of T&E, other special status species and species of local importance; and
   g. be followed up with grazing management and other treatments that extend the life of the treatment and address the cause of the original treatment need.
2. Seedings and plantings of non-native vegetation should only be used in those cases where native species are not available in sufficient quantities; where native species are incapable of maintaining or achieving the standards; or where non-native species are essential to the functional integrity of the site.
3. Structural and vegetative treatments and animal introductions in riparian and wetland areas must be compatible with the capability of the site, including the system's hydrologic regime, and contribute to the maintenance or restoration of properly functioning condition.

Glossary

Appropriate action–implementing actions pursuant to subparts 4110, 4120, 4130 and 4160 of the regulations that will result in significant progress toward fulfillment of the standards and significant progress toward conformance with the guidelines (see significant progress below).

Assessment–a form of evaluation based on the standards of rangeland health, conducted by an interdisciplinary team at the appropriate landscape scale (pasture, allotment, sub-watershed, watershed, etc.) to determine conditions relative to standards.

Compaction layer–a layer within the soil profile in which the soil particles have been rearranged to decrease void space, thereby increasing soil bulk density and often reducing permeability.

Crust, Abioti–(physical crust) a surface layer on soils, ranging in thickness from a few millimeters to a few centimeters, that is much more compact, hard and brittle, when dry, than the material immediately beneath it.

Crust, Bioti–(microbiotic or cryptogamic crust) a layer of living organisms (mosses, lichens, liverworts, algae, fungi, bacteria, and/or cyanobacteria) occurring on, or near the soil surface.

Degree of function–a level of physical function relative to properly functioning condition commonly expressed as: properly functioning, functioning-at-risk, or non-functional.

Diversity–the aggregate of species assemblages (communities), individual species, and the genetic variation within species and the processes by which these components interact within and among themselves. The elements of diversity are: 1. community diversity (habitat, ecosystem), 2. species diversity; and 3. genetic diversity within a species; all three of which change over time.

Energy flow–the processes in which solar energy is converted to chemical energy through photosynthesis and passed through the food chain until it is eventually dispersed through respiration and decomposition.

Groundwater–water in the ground that is in the zone of saturation; water in the ground that exists at, or below the water table.

Guideline–practices, methods, techniques and considerations used to ensure that progress is made in a way and at a rate that achieves the standard(s).

Gully–a channel resulting from erosion and caused by the concentrated but intermittent flow of water usually during and immediately following heavy rains.

Hydrologic cycle–the process in which water enters the atmosphere through evaporation, transpiration, or sublimation from the oceans, other surface water bodies, or from the land and vegetation, and through condensation and precipitation returns to the earth's surface. The precipitation then occurring as overland flow, stream flow, or percolating underground flow to the oceans or other surface water bodies or to other sites of evapo-transpiration and recirculation to the atmosphere.

Indicators–parameters of ecosystem function that are observed, assessed, measured, or monitored to directly or indirectly determine attainment of a standard(s).

Infiltration–the downward entry of water into the soil.

Infiltration rate–the rate at which water enters the soil.

Nutrient cycling–the movement of essential elements and inorganic compounds between the reservoir pool (soil, for example) and the cycling pool (organisms) in the rapid exchange (i.e., moving back and forth) between organisms and their immediate environment.

Organic matter–plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

Permeability–the ease with which gases, liquids or plant roots penetrate or pass through a bulk mass of soil or a layer of soil.

Properly functioning condition–

Riparian-wetland: adequate vegetation, landform, or large (coarse) woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid in flood plain development; improve flood-water retention and ground water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse channel and ponding characteristics to provide the habitat and water depth, duration and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The result of interaction among geology, soil, water, and vegetation.

Uplands: soil and plant conditions support the physical processes of infiltration and moisture storage and promote soil stability (as appropriate to site potential); includes the production of plant cover and the accumulation of plant residue that protect the soil surface from raindrop impact, moderate soil temperature in minimizing frozen soil conditions (frequency, depth, and duration), and the loss of soil moisture to evaporation; root growth and development in the support of permeability and soil aeration. The result of interaction among geology, climate, landform, soil, and organisms.

Proper grazing use–grazing that, through the control of timing, frequency, intensity and duration of use, meets the physiological needs of the desirable vegetation, provides for the establishment of desirable plants and is in accord with the physical function and stability of soil and landform (properly functioning condition).

Reference area–sites that, because of their condition and degree of function, represent the ecological potential or capability of similar sites in an area or region (ecological province); serve as a benchmark in determining the ecological potential of sites with similar soil, climatic, and landscape characteristics.

Rill–a small, intermittent water course with steep sides; usually only a few inches deep.

Riparian area–a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and stream, glacial potholes, and shores of lakes and reservoirs with stable water levels area typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil. Includes, but is not limited to, jurisdictional wetlands.

Significant progress–when used in reference to achieving a standard: (actions), the necessary land treatments, practices and/or changes to management have been applied or are in effect; (rate), a rate of progress that is consistent with the anticipated recovery rate described in plan objectives, with due recognition of the effects of climatic extremes (drought, flooding, etc.), fire, and other unforeseen naturally occurring events or disturbances. Monitoring reference areas that are ungrazed and properly grazed may provide evidence of appropriate recovery rates. (See Proper Grazing Use)

Soil density–(bulk density)--the mass of dry soil per unit bulk volume.

Soil moisture–water contained in the soil; commonly used to describe water in the soil above the water table.

Special status species–species proposed for listing, officially listed (T/E), or candidates for listing as threatened or endangered by the Secretary of the Interior under the provisions of the Endangered Species Act; those listed or proposed for listing by the State in a category implying potential endangerment or extinction; those designated by each Bureau of Land Management State Director as sensitive.

Species of local importance–species of significant importance to Native American populations (e.g., medicinal and food plants).

Standard–an expression of the physical and biological condition or degree of function necessary to sustain healthy rangeland ecosystems.

Uplands–lands that exist above the riparian/wetland area, or active flood plains of rivers and streams; those lands not influenced by the water table or by free or unbound water; commonly represented by toe slopes, alluvial fans, and side slopes, shoulders and ridges of mountains and hills.

Watershed–an area of land that contributes to the surface flow of water past a given point. The watershed dimensions are determined by the point past, or through which, runoff flows.

Watershed function–the principal functions of a watershed include the capture of moisture contributed by precipitation; the storage of moisture within the soil profile, and the release of moisture through subsurface flow, deep percolation to groundwater, evaporation from the soil, and transpiration by live vegetation.

Wetland–areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

APPENDIX J

Monitoring Strategy and Projects

INTRODUCTION

The presidential proclamation for the Cascade-Siskiyou National Monument (CSNM) calls for protecting the objects considered special to the monument. These include Greene's mariposa lily, Gentner's fritillary, Bellingers meadowfoam, populations of long-isolated fish species, special plant communities (rosaceous chaparral and Oregon white oak-juniper woodlands), mixed conifer, winter deer habitat, old-growth conifer habitat crucial for spotted owl, as well as the diversity of butterfly and snail species associated with the assemblage of plant communities dispersed across the landscape.

The call to consider ecosystem dynamics (change over time) and ecosystem integrity (whether all the components of the ecosystem are present and functioning) requires the Bureau of Land Management (BLM) to consider biological objects and ecosystem variables relative to the range of processes occurring within the CSNM landscape. The monitoring of key species and variables indicative of ecosystem functioning is critical to understanding the health of the ecosystems within the monument. While most monitoring projects identified in this appendix contribute to an understanding of ecological integrity and ecosystem functioning, there are other important processes that need to be monitored; these include forest succession, weed invasion, hydrology, and monitoring of individual species considered indicative of habitat conditions required by a broader suite of species.

Of particular concern within the monument is the impact of livestock on the biological elements considered characteristic of the CSNM and mentioned within the presidential proclamation. The ongoing livestock impact study will address these concerns.

There are four primary categories of monitoring needed to assess the array of resources and potential impacts of management actions throughout the CSNM. Monitoring within each category is necessary to provide a comprehensive ecological perspective at the landscape scale. Each of the four monitoring efforts is described below:

Baseline Data

Forest systems in the monument will be monitored to determine trends related to disturbance agents such as insects, disease, and fire. Landscape-level plant community surveys will be conducted on the ground and supported by satellite imagery in order to determine long-term trends. Baseline data gathering methodologies will be initiated as soon as possible.

Historical Plant Community Change

Several monitoring projects and surveys are planned to provide a better understanding of historical and more recent impacts of livestock, human, and natural disturbance on ecosystem dynamics across the CSNM landscape. Monitoring and surveying will be conducted to examine present landscape-level conditions, past plant community changes, the distribution of special plant community/wildlife habitat, and noxious weed invasion. Aerial and satellite imagery may provide additional baseline data with which to conduct future, more detailed examinations of the above dynamics.

Landscape-level surveys of plant community, wildlife habitat, weed abundance, surface hydrology, riparian condition, and livestock utilization will provide the context for more intense monitoring at specific sites on the landscape. Full use is being made of existing data to provide seamless maps of plant communities across the CSNM landscape.

Fence-line contrasts and existing livestock exclosures coupled with ground-nesting bird surveys will allow limited assessment of past plant community change and wildlife nesting habitat associated with livestock impact. A re-examination of vegetation plots associated with old soil and vegetation surveys will allow further assessment of long-term change for the range of plant communities within the monument. Aerial photos taken in 1939 will provide visual evidence of change at specific locations within the CSNM.

Ecosystem Dynamics

Several projects will provide insight to ecosystem dynamics as defined by the proclamation. Inference about ecosystem dynamics will be obtained through studies of insect and arthropod populations, changes in plant community composition, weed invasion, coarse woody debris, tree vigor and disease, and insects within spotted owl cores and adjacent areas, within the context of past disturbance and ecological process (timber harvest, grazing, wildland fire, weed invasion, etc.).

Monitoring of Management Activities

The monument supports a variety of forest and non-forest plant communities with changing compositional and structural characteristics. Any activities initiated within the monument that change or affect plant communities require monitoring and research that support or validate management objectives. Issues related to this are grass/shrubs/woodland plant community health, forest health, and livestock grazing. Plant community trends need to be measured with the best technology available in a manner that will identify environmental processes over time, creating a long-term archive in the process.

Future management activities (prescribed fire, weed eradication, small tree thinning, etc.) will be monitored using permanently marked monitoring sites following standard protocols established for the CSNM. Where feasible, care will be taken to establish monitoring protocols that are compatible with existing data.

INDIVIDUAL MONITORING PROJECTS CONTRIBUTING TO UNDERSTANDING THE CSNM LANDSCAPE: TERRESTRIAL

Habitat Type 1 & 2 vs. 5, Effectiveness Monitoring

Introduction

The purpose of this project is to establish long-term, permanent plots using forest stand data and Firemon data. Habitat Types 1, 2, and 5 compare trends with management at the project level. The existing or pretreatment information will be the baseline data for monitoring treatments and trends in CSNM. Various pre- and post-treatment stand density, growth and fuels data, etc., will help to determine effectiveness in meeting goals and objectives during management activities.

Objectives

Objective 1: Monitor stand structural characteristics, stocking levels, canopy, fuels, CWD and snags over time.

Objective 2: Determine effectiveness in meeting protection and maintenance goals after treatments.

Objective 3: Use information to further assist decision making and planning future activities.

Methods and Materials

Establish plots in the habitat types during designed projects in order to monitor post-treatment effects such as fire and thinning activities. Use BLM stand exam to collect data and maintain database. Use Firemon data for post-fire effects.

Analytical Process

Compare pre- and post-treatment data and any other information available using existing forest, fuels or botany data systems available.

Root Rot Incidence and Insect Activity in CSNM

Introduction

Root rots and insects, especially bark beetles, are common agents of disturbance in CSNM. This will be a project aimed at developing baseline data in determining the location of and the extent to which root rots and beetles are affecting forest stands in the monument.

Objectives

Objective 1: The insect and root rot baseline data would be linked to annual aerial flights to assist in tracking trends and aiding in decision-making in the monument.

Methods and Materials

Annual flights will continue to map out insect occurrence in CSNM. Locations will be field checked. Root rot occurrence and severity has been and will continue to be added to the database as inventory work is accomplished.

Analytical Process

Develop maps, determine severity, link to effectiveness monitoring involving established plots and input into the decision-making process for prioritizing treatments in forest stands. Specifically, protection of late-successional and old-growth habitat types is desired.

INDIVIDUAL MONITORING PROJECTS CONTRIBUTING TO UNDERSTANDING THE CSNM LANDSCAPE: AQUATIC (PHYSICAL AND BIOLOGICAL)

Landscape Hydrologic/Riparian Surveys

Introduction

Management, protection, and monitoring of aquatic/riparian resources can only be accomplished if the location of those resources is known. Detection of change in many of those resources, especially due to the site-specific nature of many aquatic/riparian features, can be accomplished only through the collection of existing-condition data, and then monitoring change over time.

Objectives

Objective 1: Provide general hydrologic/riparian spatial information, morphologic description, flow regime, and ecological condition, as context for other studies, input to transportation planning, and protection of aquatic/riparian objects identified. Will serve as baseline for long-term monitoring.

Objective 2: Provide data to assist in assessment of all Aquatic Conservation Strategy (ACS) objectives.

Methods and Materials

Location, flow duration, channel classification/morphology data for streams, wetlands, and other hydrologic features; instream large wood; impact descriptions and restoration opportunities, especially related to livestock, transportation, and vegetation throughout the monument. Assess functioning condition. Conduct surveys using the Ashland Resource Area Stream Survey Protocol. On BLM lands within the monument, initial data collection in the Keene Creek and a portion of the middle Jenny Creek subwatersheds was completed in 1999; portions in the upper Emigrant Creek subwatershed were

completed in 2000. Portions in Fall, Camp, Scotch, upper Cottonwood, lower Cottonwood, upper Jenny, lower Jenny, and the remainder of middle Jenny Creek subwatersheds are proposed for initial data collection. Surveys would be repeated at 10-25 year intervals.

Baseline Stream Temperature Monitoring

Introduction

Changes in vegetative cover, channel dimensions, and bank/floodplain water storage are known to influence stream temperatures. Changes in riparian management, upland management to increasingly protect riparian resources, and cooperative restoration activities targeted at meeting ACS objectives and state water quality standards should lead to detectable changes in summer stream temperature at locations throughout and adjacent to the CSNM as stream and riparian function improves.

Objectives

Objective 1: Monitor for long-term changes in stream temperatures, as context for judging success of riparian/aquatic management, restoration, and protection.

Objective 2: Provide data to assist in assessment of ACS objectives 2, 4, and 9, for assessment of compliance with state water quality standards, and to assist in development of State of Oregon/EPA-required Water Quality Management Plans for this area.

Methods and Materials

Collect seasonal 30-minute interval stream temperature data using USGS and Oregon DEQ-established methodologies. Collect data at 13 existing and 10 proposed sites in addition to the 9 project-specific sites listed above.

Gaging Station and Staff Gages: Flow and Water Quality Assessment

Introduction

Calculation and assessment of peak, high, and low flows is extremely difficult without actual field measurement and reference over time. Flow data is also required for the meaningful analysis of water quality parameters. Because of rapid fluctuation in stream levels, continuous records are required at a key location to interpret data collected in non-continuous sampling from other locations.

Objectives

Objective 1: Provide flow and water quality information at key locations as context for other types of aquatic condition assessment.

Objective 2: Provide data to assist in the assessment of ACS objectives 1, 2, 4, 5, 6, 7, and 8, and to monitor compliance with state water quality standards.

Methods and Materials

Perform monthly grab sample collection of turbidity, air temperature, H2O temperature, pH, flow, fecal coliform, and dissolved oxygen at 11 existing and five proposed locations. Do a continuous record (15-minute interval) of stream stage, water and air temperature at one location. Standard methods will be undertaken using USGS, Oregon DEQ and EPA approved protocols.

Stream Channel Cross Sections Throughout the CSNM

Introduction

Calculation and assessment of peak, high, and low flows is extremely difficult without actual field measurement and reference over time. Flow data is also required for the meaningful analysis of water quality parameters. Cross-sections provide a reference point from which to document changes in channel morphology, conduct flow measurements, and estimate flood flows. Documentation of changes in channel morphology provides an indication of stability and functioning of the upstream surface hydrologic system.

Objectives

Objective 1: Provide site-specific trend of width/depth ratios, entrenchment, and other indicators of channel form, and provide reference points for assessment of large flood flows.

Objective 2: Provide data to assist in the assessment of ACS objectives 1, 2, 3, 5, 6, 7, and 8.

Methods and Materials

Perform cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity. Measurement methodologies will include standard cadastral survey techniques and those outlined in Rosgen (1996). Twelve existing and five proposed monumented sites measured at ~5-year intervals and after major flood events.

Lower Jenny Creek Rain Gage

Introduction

Assessment of hydrologic response and water quality parameters, as well as many other aspects of ecosystem function, can only be analyzed accurately in the context of recent precipitation. Although year-to-year trends in precipitation tend to be uniform over an area of this size, there is substantial variability in precipitation between locations based on terrain, elevation, etc. Precipitation data from a number of sites at varying elevations and locations in and around the monument is needed for interpretation of related data including hydrologic, vegetation conditions, etc.

Objectives

Objective 1: Provide rainfall data as context for flow assessment and other types of monitoring.

Objective 2: Provide data to assist in assessment of ACS objectives 4, 5, 6, and 7.

Methods and Materials

Collect rainfall data at 15-minute intervals at one site in lower Jenny Creek using tipping bucket rain gauge. Collect daily precipitation at Howard Prairie Dam (NOAA), Parker Mountain (RAWS), and Buckhorn Springs (RAWS). Collect daily snowfall and snow-on-the-ground at Howard Prairie Dam (NOAA).

Jenny Creek Riparian Restoration Aerial Photo Monitoring

Introduction

Past practices in vegetation management and utilization, stream channelization, and flood control have dramatically changed riparian condition and morphologic character of portions of Jenny Creek. Changes in management, riparian vegetation restoration activities, and removal of flood control structures should allow the stream channel of Jenny Creek to recover from a straightened and constrained state to an increasingly sinuous, non-entrenched condition as described by Rosgen (1996) and others. The extent and size of woody riparian vegetation should likewise increase. Aerial photo monitoring of this change over time is a relatively inexpensive technique that can dramatically demonstrate the magnitude of change occurring.

Objectives

Objective 1: Aerial photo monitoring of change in riparian and morphologic condition in a portion of Jenny Creek undergoing restoration activities.

Objective 2: Provide data to assist in assessment of ACS objectives 1, 2, 3, 5, 7, 8, and 9.

Methods and Materials

Capture digitally-orthocorrected GIS layer photo mosaics of Jenny Creek and tributaries in 40S 4E sections 22, 27, and 28 using photos from 1939, 1953, 1962, 1966, 1975, 1980, 1985, 1991, 1996, ~2001, and ~5 year intervals after that.

Jenny Creek Riparian Restoration Stream Temperature Monitoring

Introduction

Changes in riparian vegetative cover, channel dimensions, and bank/floodplain water storage are known to influence stream temperature. Restoration activities and management strategies targeted at meeting ACS objectives should lead to detectable changes in summer stream temperature over the next few decades on this portion of Jenny Creek as the stream channel and adjacent riparian/floodplain areas regain functionality.

Objectives

Objective 1: Document long-term change in water temperatures resulting from passive and active restoration activities attempting to reverse past management impacts.

Objective 2: Provide data to assist in assessment of ACS objectives 2, 4, and 9.

Methods and Materials

Collect seasonal 30-minute interval stream temperature data according to USGS and Oregon DEQ-established methodologies. Collect data at nine monumented sites along 2.5 miles of Jenny Creek, repeated annually. Two sites monitored since 1991, seven additional sites monitored since 1997.

Jenny Creek Riparian Restoration Channel Morphology Monitoring

Introduction

Recovery of riparian vegetation and removal of flood control structures should allow the stream channel to recover from a straightened and constrained state to an increasingly sinuous, non- entrenched condition as described by Rosgen (1996), Leopold (1992) and others.

Objectives

Objective 1: Document long-term change in stream dimension, pattern, and profile resulting from passive and active restoration activities attempting to reverse past management impacts.

Objective 2: Provide context for other aquatic monitoring activities.

Objective 3: Provide data to assist in assessment of ACS objectives 1, 2, 3, 5, 7, and 8.

Methods and Materials

Perform cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity. Utilize measurements methodologies including standard cadastral survey techniques and those outlined in Rosgen (1996). Collect data collection at eight cross-sections along 2.5 miles of Jenny Creek, measured at ~ 5-year intervals or after major flood events.

Aquatic Macroinvertebrate Monitoring

Introduction

When monitored over the long term, composition of macroinvertebrate communities can serve as a sensitive indicator of condition and change in aquatic habitat/water quality conditions.

Objectives

Objective 1: Long-term monitoring of aquatic macroinvertebrate community change as indicator of habitat/water quality.

Objective 2: Provide data to assist in assessment of ACS objectives 4, 6, and 9, and compliance with state water quality standards.

Methods and Materials

Monitor taxa abundance, taxa richness, other metrics measured at 12 existing and ten proposed sites using methods which meet or exceed state or EPA protocols for the sampling of benthic macroinvertebrates. Revisit sites at 5-6 year intervals.

Patterns of Fish Habitat Use throughout Jenny Creek/Response to Watershed Change Over Time

Introduction

Habitat relationships of western suckers are poorly understood. Most studies on sucker habitat relationships have been conducted at the microhabitat scale, e.g., the way in which suckers use habitat within a pool (Moyle and Nichols 1973; Alley 1977; Baltz and Moyle 1984; Moyle and Baltz 1985; Decker 1989): This is important information, but without understanding habitat use at more than one spatial scale, serious misinterpretations could lead to inaccurate conclusions about Jenny Creek sucker habitat needs (Dunham and Vineyard 1997). In addition, little is known about the habitat use of suckers at different ages (e.g., young-of-the-year, juvenile, adult). Examining the habitat requirements of different age classes is important in identifying potentially limiting or sensitive physical habitat requirements (Imhof et al. 1996). Finally, the paucity of studies describing habitat relationships of western suckers at different spatial scales is exacerbated by the almost complete lack of studies examining habitat use for longer than one year. This monitoring study continues the work begun by Rossa (1999). It repeats her study of two consecutive sampling seasons to see if the habitat use patterns of the suckers remain the same. In addition, habitat use information of native trout and speckeled dace will also be quantified and compared with Rossa's unpublished data from 1992 and 1993. All of this habitat information will help us understand how the fishes in Jenny Creek are responding to watershed changes, including changes in water management over Howard Prairie and Keene Creek Reservoir dams.

Objectives

Objective 1: To quantify Jenny Creek sucker, Jenny Creek redband trout, and Jenny Creek speckeled dace habitat use within study reaches and throughout the watershed for all age classes.

Objective 2: To further understand how the patterns of habitat use vary between years, and to explore why.

Methods and Materials

Study locations are distributed throughout the entire watershed, to sample a wide variety of reach types. Five monitoring sites are located within the CSNM. A habitat-type based stream survey is used to quantify habitat. Randomly selected habitat units are snorkeled to collect fish numbers and estimated fish lengths.

Analytical Process

Related to Objective 1: Chi-square goodness-of-fit tests. See Rossa (1999) for details.

Related to Objective 2: Multiple stepwise regression and/or discriminant functions analysis. See Rossa (1999) for details.

Keene Creek and Jenny Creek Channel Restoration Monitoring

Introduction

In 1991 and 1992, two large, complicated channel restoration project were constructed as part of the Jenny Creek Work Day (now part of Public Lands Day). Two projects cabled logs to bankside trees to protect eroding banks, allow the return of riparian vegetation, and reduce fine sediment input into stream. The third project embedded logs across an eroding meadow channel to trap sediment and stop downcutting.

Objectives

Objective 1: To evaluate whether original project objectives (bank stability and fish habitat improvement) were met.

Objective 2: To determine how (or if) fish habitat responded to channel changes as a consequence of these projects.

Methods and Materials

Both sites have established photo points documenting bank conditions before and immediately after project completion. Subsequent photos will be taken at these photo points to show changes to the structures over time, and to assess whether they are protecting the stream banks. To assess whether they are providing better fish habitat, two different habitat mapping methods will be used. At the Keene Creek site, a fish habitat-type stream survey (Rossa 1999) will be repeated to document (among other things) changes in pool size and depth, pool-to-riffle ratio, and substrate distribution. At the Jenny Creek site, a channel mapping method will be used, including channnel cross sections and Wolman pebble counts.

Jenny Creek Sucker Spawning

Introduction

Two scientific studies have been completed on Jenny Creek suckers *(Catostomus rimiculus*): Hohler (1981) and Rossa (1999). While both researchers observed fish in spawning colors, neither pinpointed the exact spawning areas of suckers. Apparently, all closely related sucker species migrate upstream to spawn in the spring (Moyle 1976, Bond and Coombs 1985). Therefore, it is assumed that Jenny Creek suckers also migrate upstream to spawn in tributaries. Until now, it has been assumed that the suckers spawn in Corrall, Beaver and Johnson Creeks (Hohler 1981).

In addition, Rossa (1999) found some indication that certain reaches of Jenny Creek serve as important "nursery areas" for young-of-the-year suckers. Researchers in the Klamath Basin are also finding that larval (baby) suckers prefer certain habitats (John Crandall, The Nature Conservancy, personal communication). A better effort needs to be made to determine the location of the primary nursery areas for suckers. Sucker survival in these nursery areas could be important to population stability.

This information needs to be collected so that the spawning areas can be protected or restored. In the future, sucker spawning should be tracked in different water years to determine if sucker spawning areas are influenced by water flows (e.g., . low water years or high water years) (Barton 1980, White et al. 1990).

Objectives

Objective 1: Quantify Jenny Creek sucker spawning migration timing, and spawning area location.

Objective 2: Quantify Jenny Creek sucker larval dispersment timing, and identify important sucker nursery areas.

Methods and Materials

Larval/Young-of-the-year sampling: Instream drift nets will capture drifting larval suckers. Other related suckers drift downstream at night after hatching (White et al. 1990), and it is likely that Jenny Creek suckers do, too. Dip nets, specially-designed minnow traps and larval fish light traps may also be used to catch newly-hatched fish. All of this sampling gear is small and inconspicuous. Sites will be scattered throughout the Jenny Creek basin and may vary from week to week.

Adult sampling: If possible, adults will be tagged (e.g., with tiny pit tags) in order to track their movements throughout the basin. Pit tags are read with hand-held tag readers (like a grocery store bar code reader), or with small, flat instream panels. Any instream reading stations would be small and inconspicuous.

CSNM Visitor Use Monitoring

Introduction

The goal of this plan is to gather visitor use data, or in the absence of accurate data, make estimates of visitation to the monument. Accurate data can be obtained from the Hyatt Lake Recreation Complex, the only developed recreation facility within the monument. Data will also be gathered from the Pacific Crest Trail and the Pilot Rock areas using traffic or trail counters, but these types of counters require some corrections for number of occupants or animals which might be counted. In areas where no public vehicle access is allowed, estimates will be made based on the best available data.

Businesses within the monument boundary should have some estimates of visitors associated with the monument. These businesses will be asked for use estimates as well. The Oregon Department of Forestry lookout tower on Soda Mountain receives many visitors and these visitor totals will also be useful.

Secondary goals are to attain a count of general area visitors who express interest in the monument and to determine the effectiveness of road closures through monitoring.

Objectives

Objective 1: Continue to collect accurate visitor use data at the Hyatt Lake Recreation Complex. This data is already required for the Recreation Management Information System yearly submission so the mechanism is already in place to gather this data.

Objective 2: Install trail counters along the Pacific Crest Trail. Most of the PCT use within the monument comes from day use on stretches of the trail. Popular segments of the PCT within the monument include Soda Mountain to the Greensprings summit, and Pilot Rock to Soda Mountain. The segment near the Hyatt Lake Recreation Complex also receives a lot of use with hikers going from Hyatt Lake to Howard Prairie Reservoir, or from Hyatt Lake to Little Hyatt Reservoir. Trail counters installed along these segments should provide acceptable use figures. The exact locations will to be determined from field studies, but the objective is to count people who hike these four segments.

Objective 3: A number of people go to the Pilot Rock area to hike to or climb Pilot Rock. A trail counter placed on the path to the base of the rock will provide visitor use data.

Objective 4: The Oregon Department of Forestry lookout tower on Soda Mountain receives many sightseers yearly, and the lookout maintains a log for visitor registration. The lookout will be contacted yearly and asked to supply this visitor data to BLM.

Objective 5: There are a number of roads within the monument, which receive large amounts of vehicle use. Some of the roads will remain open to vehicle traffic, some will be open seasonally, and some will be permanently closed. To determine vehicle usage and to monitor visitation trends, traffic counters will be installed on selected roads. Possible locations include the

Pilot Rock road, the Baldy Creek road, the Pilot Rock jeep road, the Yew Springs road, the Mill Creek road, the Soda Mountain road, the East Chinquapin road, the Emigrant Creek road, the Beaver Creek, and the Parsnip Lakes road.

Objective 6: The area within the monument north of Keene Ridge receives a large portion of its use during big game hunting season. To gather use data, hunter patrols should be conducted during the first two weekends at the beginning of big game rifle season. Major access roads to the monument should be staffed from the afternoon of the Friday before rifle season begins and both weekend days thereafter; then again on the following weekend, at the same times.

Objective 7: Pending the availability of funds, the Soda Mountain WSA will be monitored at least once per month during the time it is accessible to the public. Since all the boundary roads except portions of the Pilot Rock jeep road have been closed, the WSA will be monitored from the air. This monthly over-flight would be an opportunity to gather visitor use data for the monument area south of Keene Ridge.

Objective 8: Interview selected state and federal agencies, and local visitor centers to determine the level of expressed interest in the monument.

Objective 9: Install traffic counters on selected "closed roads to determine the effectiveness of the closures.

The data from all the objectives will then be totaled for a yearly report.

Implementation

Overflights of the WSA will need to be started once the area is accessible to the public, probably April, and continue through November. The WSA will not need to have an overflight every month because the northwest portion of the WSA can be monitored from the Pilot Rock jeep road, but this only allows viewing about a third of the WSA so the remainder must be monitored from the air.

Peregrine Falcon Site Inventory and Monitoring

Introduction

In 1999 the United States Fish and Wildlife Service removed the American peregrine falcon from the Federal List of Endangered and Threatened Wildlife. The BLM is required to monitor known sites for at least five years after the delisting in order to ensure that the species does not suffer undetected declines. There is one known peregrine falcon site in the CSNM. This site is located in an area of high (and probably increasing) human recreational activity. There are also two other cliff sites in the CSNM that may be suitable for peregrines based on their physical attributes. One of these sites is currently occupied by prairie falcons, which strongly suggests that it is suitable for peregrines. Peregrines have been known to displace or replace prairie falcons. The other potential site is not known to be occupied by falcons of either species. The peregrine population appears to be expanding and there is a need to identify any new peregrine sites that may become occupied by that species.

Meeting the following objectives would provide important information on the occupancy and production of peregrine falcon sites in the CSNM. This information would be important for planning activities in the CSNM, as well as for assessing the CSNM's contribution to peregrine falcon populations at a regional scale.

Objectives

Objective 1: Obtain reproductive status and productivity data on every peregrine site in the monument every year.

Objective 1: Detect new peregrine nest sites in their first year of occupancy in order to provide appropriate protection for the site and to plan for future monitoring needs.

Methods and Materials

1. Annually monitor the one known peregrine site for occupancy, reproduction, and productivity using standardized peregrine falcon monitoring protocol techniques. This effort would be extended to any additional peregrine nest sites that are found in the CSNM.
2. Annually check the two potential peregrine sites in the CSNM for occupancy by peregrines. Techniques would be standard peregrine falcon inventory techniques.

Spotted Owl Site Inventory and Monitoring

Introduction

Prior to CSNM designation, most of the northern part of the monument was part of the Jenny Creek Late Successional Reserve (LSR).

In the time period from just before the spotted owl was listed as threatened, to several years after listing, several attempts were made to develop regional conservation plans for the owl and other late-successional associated species prior to the development of the Northwest Forest Plan. Common to all of these plans was a system of reserves along the Cascades. Although different plans had different reserve boundaries, they all showed a reserve in the general area that is now the CSNM. The monument designation essentially made moot the LSR designation in this area. However, the area that is now the CSNM still has a role to play in the conservation of the spotted owl. There are 21 known spotted owl sites in the monument, 17 of which are in what was once LSR. However, not all of the sites in the monument contribute to recruitment into the region's spotted owl population on a regular basis. The BLM has never observed more than 17 pairs of spotted owls in the monument in any one year. In that year (1993) there were no young observed at any sites in the monument. Four of the 21 sites have no documented production of young in any year.

Since the late 1980s, almost all of the adult spotted owls in the Ashland Resource Area have been captured and individually marked with a plastic leg band of a site-specific color and/or pattern. These birds are also marked with numbered USFWS aluminum leg bands. Most of the juvenile owls produced have also been captured and marked with a standard color "juvenile band" and a USFWS band. Many birds were banded prior to 1990, although there was no effort to catch and band every spotted owl at every site. Since 1990, the policy of banding adults and juveniles was in effect until approximately 1995 across the Resource Area and has largely been applied to the monument to date. This has allowed BLM to track movements of individual adult and juvenile owls.

Due to the de-emphasis of monitoring programs for this species since 1995, the BLM currently has no way of reliably tracking the size and demographic trends of the spotted owl population in the monument, or assessing the effects of land management treatments on that population. Without this information there is no way of assessing the contribution that the monument is making to the recovery of the northern spotted owl on a regional scale. Meeting the following objectives would provide important demographic information on the spotted owl population in the monument as well as information on movements of individual owls within, into, and out of the monument.

Objectives

1. Obtain reproductive status and productivity data on every site in the monument every year.
2. Capture and band all adult and juvenile spotted owls.

Methods and Materials

1. Every five years perform a survey of the suitable spotted owl habitat in the monument using established survey techniques as described in the Interagency Spotted Owl Inventory and Monitoring Protocol. This will provide an opportunity to find additional spotted owl sites in the CSNM if and when they become established.
2. Annually monitor the occupancy, reproductive status and productivity of all the known spotted owl sites in the monument, as well as any additional sites turned up by survey efforts described above. Methodology would be that described in the Interagency Spotted Owl Inventory and Monitoring Protocol, as well as standard BLM spotted owl banding procedures.

APPENDIX K

Memorandum of Understanding between the Bureau of Land Management and Friends of the Cascade-Siskiyou National Monument

MEMORANDUM OF UNDERSTANDING

Bureau of Land Management, Medford District
and
Friends of the Cascade-Siskiyou National Monument

This Memorandum of Understanding (MOU) is made and entered into by and between the U.S. Department of the Interior, Medford District, Bureau of Land Management (BLM) and the Friends of the Cascade-Siskiyou National Monument (CSNM). Collectively, the parties to this MOU will be referred to as the Cooperators.

PURPOSE
The purpose of this MOU is to establish a general framework for cooperation between the Medford District BLM and the Friends of the CSNM regarding the management of the CSNM Information Center located at 11470 Highway 66.

BACKGROUND
Designated on June 9, 2000, the Cascade-Siskiyou National Monument consists of 52,947 acres of BLM-administered public lands. There are approximately 32,000 acres of private land interspersed with Monument lands, creating a checkerboard pattern of public and private lands. As a result of this checkerboard, there is not a natural "portal" to the Monument along a specific route, making it difficult to "welcome" visitors to the Monument. Although a majority of first-time visitors to the Cascade-Siskiyou National Monument will enter the Monument along Highway 66, access to public land is not readily apparent. Since June 2001, Friends of the CSNM has been operating an un-staffed Information Center in a small building next to the Greeen Springs Inn on Highway 66. The Information Center helps orient visitors with Monument boundaries and recreational opportunities. The Information Center also provides visitors with educational materials on the area's remarkable ecology and biodiversity.

OBJECTIVES
The BLM and Friend's of the CSNM will collaborate to create and maintain displays, exhibits, and other media designed to orient and inform the CSNM visitor.

The Information Center will provide the following types of information:

- Maps
- Brochures
- Planning documents
- Educational displays on the area's natural and cultural history
- Information regarding the National Landscape Conservation Service and its goals and objectives.
- Hiking/recreational opportunities
- Awareness of private property issues
- Prohibited activities/Road Closures
- Regional information
- Video and other multimedia presentations

The information center will not be used for promotion of special interests or advocacy for specific management alternatives during the planning process.

COOPERATORS SHALL

Bureau of Land Management

1 Continue to provide space for the Information Center within the local community.
2 Develop and install a sign alerting visitors to the Information Center.
3 Designate a BLM staff person as Information Center liaison.
4 BLM liaison to serve on Friend's Information Center committee.
5 Collaborate with Friends to help create and maintain educational and informative exhibits.
6 Provide the media necessary for visitor orientation (maps, brochure, posters, photographs).
7 Provide toilet facilities if deemed necessary.

Friends of the Cascade-Siskiyou National Monument

1 Oversee day-to-day operation of Information Center.
2 Collaborate with BLM to help create and maintain educational and informative exhibits.
3 When possible, organize volunteer staffing of the Information Center.
4 Maintain a visitor's sign-in log to track use.
5 Establish Information Center hours and ensure facility is open to the public during this time.
6 Identify information gaps or needs in the Information Center.
7 Designate Friend's member as a BLM contact person.

IT IS MUTUALLY AGREED AND UNDERSTOOD BY THE PARTIES THAT:
Specific work projects or activities that involve the transfer of funds, services, or property among the cooperators to this MOU will require the execution of separate agreements or contracts, contingent upon the availability of funds as appropriated by Congress, the State Legislature, or as obtained from other funding sources. Each subsequent agreement or arrangement involving the transfer of funds, services, or property will be in accordance with applicable statutes and regulations.

This MOU in no way restricts the cooperators from participating in other legal activities, nor from participating in similar activities or arrangements with other public or private parties.

Nothing in this MOU shall obligate the cooperators to expend appropriations, provide material, services, or labor, or to enter into any contract or other obligation.

This agreement may be revised as necessary by the issuance of a written amendment, signed and dated by all cooperators.

Any party may terminate this agreement by providing a 60-day written notice. Unless terminated under the terms of this paragraph, this MOU will remain in full force and effect until March 15, 2006 and may be renewed by agreement of all parties.

Entered into this 15th day of March, 2004.

SIGNERS:

_____

Cascade-Siskiyou National Monument Manager, Bureau of Land Management

_____

Chairperson, Friends of the Cascade-Siskiyou National Monument

APPENDIX L

Scotch Creek Research Natural Area

Management Plan
for
Scotch Creek Research Natural Area

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

Table of Contents

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; 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, 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 1,800 acre Scotch Creek RNA (SCRNA) 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 1994), and designated a new RNA under the Record of Decision 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. Research Natural Area Management Policy (USDI 1986) 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.

POLICY

This management plan follows 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 1995a) and BLM Manual Supplement, 1623 Supplemental; Program Guidance for Land Resources (USDI 1987).

Management objectives for RNAs and Areas of Critical Environmental Concern (ACECs), addressed in both plans under the category Special Areas, include the following directives:

- 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.
- Ideally, RNAs should 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 1986).
- Research Natural Area Management Policy (USDI 1986) 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.

BASIS FOR DEDICATION AND SETTING OBJECTIVES

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 as a Birch-leaf mountain mahogany-ceanothus-rosaceous mixed chaparral community. 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 1994), and designated as new RNA under the Record of Decision 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. 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.

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.

Management Restrictions

The presidential proclamation (Appendix A) 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 for grazing until completion of a study of grazing impacts on natural ecosystem dynamics.

Setting Objectives

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

NATURAL AREA DESCRIPTION

Scotch Creek Area Description

Location

The RNA is a 1,800 acre (728.5 ha) parcel located in southeastern Jackson County (T.41S.,R.3E., Secs.5 SW¼;06S½;07NE¼;08;09SW¼) 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.

Access

In the past, the Schoheim Road 41-2E-10.1 has provided relatively easy vehicle access to Scotch Creek RNA. However, the monument proclamation closed the Schoheim Road to all mechanized travel except for authorized administrative access for emergency or management purposes. Authorized off-highway vehicle (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 Iron Gate 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 during 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 41-2E-3.0 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.

Ecoregions

The Scotch Creek RNA is located in the Klamath River Ridges Ecoregion (78g of Klamath Mountains, Level III Ecoregion (Pater and others 1997a and 1997b)(Map 3). 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 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). Ecoregion 78g has less precipitation, more sunny days, and a greater number of cold, clear nights than the Inland Siskiyou Ecoregion (78e) to the west.

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.

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. 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 L-1).

Table L-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

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 ft. 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 ft. where Scotch Creek crosses the Schoheim Road to 3,080 ft. at the lower boundary of the RNA at the California border. Highest elevations in the drainage are 5,908 ft. at Pilot Rock, 5,200 ft. at Porcupine Mountain, 5,403 ft. on upper Lone Pine Ridge. Lone Pine Ridge is 3,640 ft. at the California border, Slide Ridge, 4,000 ft.

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 □ mile downstream from the forks is a 30 ft. bedrock waterfall, which prevents upstream migration of fish (Parker 1999). 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.

Geology

Scotch Creek RNA is mapped as Western Cascade Oligocene basalt, basaltic andesite, and andesite (Tb2) (Smith, et al. 1982). 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 Subwatershed, 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 et al. 1982).

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. 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 L-2. About 79 percent of the RNA consists of clay or rock outcrop soil complexes. The balance (21%) are soil types capable of supporting mixed conifer stands.

Table L-2. Scotch Creek RNA Soil Units

Soil #	Unit Name	Percent Slope	Acres	Percent Acres	Productivity Class[2]	Site Index[1]
14G	Bogus very gravelly loam, north slopes	35 to 65	323.2	18.1	PSME[3] 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)

[1]Site Index (SI). 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 dominant 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.

[2] 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.

[3]PSME = *Pseudotsuga menziesii*, Douglas-fir; PIPO = *Pinus ponderosa*, ponderosa pine; ABCO = *Abies concolor*, white fir.

Hydrology

Scotch Creek Subwatershed comprises 11,503 acres (18 sq. mi.); 62.5 percent of the ownership is BLM, 30.3 percent is the State of California, and 7.2 percent is privately owned. 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 and 60 miles of intermittent streams, for a total of 70.2 miles of stream with riparian reserves (USDI 2000). 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.

The 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, where it is then confined in a narrow V-shaped valley with steep hill slopes to its headwaters (USDI 2000). 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, 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 those that Parker obtained during his aquatic surveys on June 30 and July 1, 1999 (Parker 1999). These data indicate that, throughout the RNA, Scotch Creek was quite cool: 50-52□F above the falls, and 56□F below (USDI 1999). 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.

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 dominant 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 of the CSNM draft plan. 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, 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 for 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).

*Ripa*rian 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 ft. above the creek bottoms. The alluvial soils sometimes form wide low terraces. Elevations range from 3,000 - 4,400 ft. 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 that 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. In addition, these riparian zones typically 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’s 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 ft. 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 bear 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 ft. The grassland here forms a mosaic with rock outcrop communities, Oregon white oak woodland, and wedgeleaf ceanothus-Klamath Plum chaparral in approximately the following proportions:

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 starthistle (*Centaurea solstitalis*)
- relatively higher frequency and cover of A*goseris 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 and slopes tend to be more moderate with occasional "bench" topography above approximately 3,350 ft. 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 starthistle, 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 ft. 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. A mosaic of grassland is formed here, with Oregon white oak woodland and a small amount of wedgeleaf ceanothus- Klamath plum chaparral in approximately the following proportions:

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 starthistle. Many incipient populations are present in the northwest half of the area. The southeast half is already infested by large starthistle 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 that 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 ft. 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 denser 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, 3 percent Klamath plum, and 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; starthistle 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 range between 4,200 and 5,100 ft. The aspect 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 by Oregon white oak and mountain mahogany but it 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 ft. 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 occur with high frequency and average 2-9 percent cover. Mock orange (*Philadelphus)* and Indian plum *(Oemleria)* occur occasionally. *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 *Smilacina racemosa* and *Viola sheltonii*, and the significantly lower cover of *Hydrophyllum*, *Clarkia rhomboidea* and *Osmorhiza chilensis*. It also lacks the dry grassland species that are fairly frequent in the Lone Pine Ridge chaparral.

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

40% – Oregon white oak-mountain 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-mountain mahogany; mountain 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 that 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*, both of which are 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 an 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. There seems to be a trend in other areas 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; however, given enough time without disturbance, the conifer component would develop. This

does not mean that the area "should" be pushed toward conifer dominance; rather, 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 with 30% cover. The shrub layer has dwarf Oregon grape (24% cover); the herb layer has *Smilacina stellata* (3%) and *Trientalis latifolia* (2%) as dominants.

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 historical activities that introduced weeds—including grazing—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 starthistle. 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 two 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 starthistle. 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 starthistle.

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. Dyer's woad has the potential to colonize dry hill sides very rapidly.

Medusahead

Brock and Callagan (1999a) found that low-elevation grasslands were somewhat resistant to invasion by medusahead, which 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*).

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 the Oregon Natural Heritage Program (ONHP) (Table L-3). Other occurrences of this species have been found in the Applegate River drainage. Since the draft plan, *Perideridia howellii* has been dropped from the ONHP species list and is no longer tracked. It is left on

Table L-3. Scotch Creek RNA Special Status Plants

Scientific Name	Common Name	TNC Rank	BLM/Federal Status	ONHP List
Astragalus californicus	California milk-vetch	G3/S1	A	2
Carex serratodens	Saw-tooth sedge	G5/S2	A	2
Cypripedium montanum	Mountain Lady's-slipper	G4G5/S4	T	4
Isopyrum stipitatum	Dwarf isopyrum	G4?/S3	A	3
Lathyrus lanszwertii var. *tracyi*	Tracy peavine	G4/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	Off	Off
Solanum parishii	Parish nightshade	G4/S2	A2	2

the following table for reference only:
Brock and Callagan (1999b) searched the Scotch Creek RNA for three other plants with special status in Oregon: Ashland thistle (Circium ciliolatum), Gentner's 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) was also Northwest Forest Plan Survey and Manage species.

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 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.

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 Nelson (1997); Trail (1999); (Alexander 1999); (Parker 1999); and (Runquist 1999).

Mollusks

Parker (1999) discovered pebblesnails (*Hydrobidea, Fuminicola*) in the main channel of Scotch Creek and in the main tributary at T40S, R2E, Sec.1,NE□. 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 of 1993) revealed 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 in the Scotch Creek watershed during 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 a 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 of 1999 found no fish above the falls (Parker 1999; USDI 1999). Therefore, within the RNA, fish reside in only about the first one 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 whether it is, indeed, redband trout.

Birds

Alexander (1999) conducted a breeding bird survey of the RNA in June of 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.

Exotic 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.

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 staples as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, and 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: it 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 that the area was heavily grazed by cattle for more than 100 years.

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.

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 1995). 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.

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 1986).*
- *RNAs are established primarily with scientific and educational activities intended as the principal form o 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 in 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 starthistle (*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 are 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 starthistle.
- 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.
- Sudden Oak Disease (SOD) 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 because they provide a unique niche for certain plant species, including lichens and mosses. Certain weedy species (e.g., 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 to 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- to 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- to 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 Soil Conservation Service (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 fire and insect outbreaks by thinning from below and prescribed 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.

Take any action necessary to prevent unnecessary or undue degradation of the lands Federal Land Policy and Management Act (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- to high-elevation grasslands and along the Schoeheim Road (Brock and Callagan 1999a). Hand pulling weeds was started in 2003 and takes place annually.

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 an 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 (1) reduce weed infestations; and (2) not increase existing populations.
- Evaluate whether 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 the Scotch Creek RNA from the Soda Mountain allotment.

Threatened, Endangered, Sensitive, and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1988, as amended) 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 BLM Special Status Species occurrences and habitats within the RNA.

Plant Species

Current Information

Nine BLM 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's false-caraway (*Perideridia howellii*), and Parish nightshade (*Solanum parishii*).

Two of these species, Klamath gooseberry and Howell's 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's 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's 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 BLM Special Status plants, including the Federally listed Gentner's 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 (e.g., noxious weed treatment and 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

Ideally, catastrophic natural events, such as insect infestations, should 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 of the CSNM draft plan).

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, and is likely a result of fire exclusion 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. In both the short- and long-term outlook, 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 in the Scotch Creek RNA stand in an effort to reduce engraver incidence. Currently, 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 amounts 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 about insects and pathogens occurring in the Oregon white oak woodlands, other deciduous trees, or shrubs. In this plan, the species thought to present the most likely problems to conifers or affecting the RNA were included. Any management activity proposed in the RNA needs to evaluated further before its implementation. 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.

Lands and 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. Private land only borders a small area in Scotch Creek. 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 may be considered appropriate in some instances." (USDI, 1986) Roads are generally prohibited in RNA's; however, old roads or unimproved 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. Schoheim Road (BLM 41-2E-10.1) serves as the boundary along the northern and eastern edge, and this road has been closed. No future ROW grant 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 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/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.
- 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.
- Adhere to smoke management and air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning."

Goals

Re-introduce 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 the following:

- Increase 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 any 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, 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, 1996). 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 that 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 percent) and Moderate-Severity (20 percent) 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 and Huff 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 BLM 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 ODF. 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 and the use of tractors are not allowed within the RNA. Moreover, 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 those factors which can be influenced by humans, 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 that 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

Medford ROD/RMP (USDI 1995, as amended by Aquatic Conservation Strategy [ACS SEIS]) 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 ACS, 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 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

- 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 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 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 percent since the 1970s. The current Animal Unit Months (AUMs) on the entire Soda Mountain Allotment are currently 1,794, 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 inaccessible to livestock because of dense rosaceous chaparral. No formal utilization plots 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 could have 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 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 Dyer's 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 leases 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; install monitoring plots in utilized areas within Scotch Creek. 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 a tool to maintain or improve these communities.
- If needed, modify current grazing leases 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 RNAs adjacent to timber harvest units, buffer zones should be considered in order to meet plan objectives." (USDI 1986)

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, which 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 RNAs 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 are less than 90-years old, and which 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 off-highway vehicle (OHV) use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Hunting and fishing activities are typically permitted, but camping associated with these uses is prohibited in RNAs (see Wildlife sub-section below). Educational use such as class field studies is 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 power lines 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 RNAs 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 1986).

Goals

- Protect the designated values of the RNA. Prevent 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.

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).

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 of 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).

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 lease. Equestrian activities in this management plan refer to horses, llamas, mules, and other pack animals. Heavy use by 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 and hair, or in their feces. During wet conditions horses can push root crops (used by Native American 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. Incidental use by riders moving cattle is allowed under the grazing leases.

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 causing damage.
- 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.

Hunting, Fishing and Trapping

Agency Standards

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

Management of fish and wildlife populations is controlled by the Oregon Department of Fish and Wildlife (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 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). 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 act as a natural barrier preventing up stream migration. However, fish are present in the creek for the last two miles 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 in the area include Bobcat (Felix rufus), Coyote (Canis latrans), Raccoon (Procyon lotor), and Grey fox (Urocyon cinereoargenteus), and possibly Pine Marten (Martes americanus). 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, 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.

Off-Highway Vehicles

Agency Standards

Management directions for all RNAs specify 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 Schoheim Road 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) within RNAs, such as boughs, burls, fungi, medicinal plants, etc., are not compatible with the overall 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 ongoing 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.

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- 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.

MONITORING

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 (RNA) 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. 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. Monitoring is also dependent on annual fluctuations of funding.

Ecological Status Monitoring

Ecological status monitoring involves tracking species and plant communities relative to the stated objectives of the RNA. Ecological status monitoring at Scotch Creek 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

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 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

RECOMMENDATIONS FOR FUTURE RESEARCH

None at this time.

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APPENDIX M

Oregon Gulch Research Natural Area

Management Plan
for
Oregon Gulch Research Natural Area

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

Table of Contents

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; 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, 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 1994), and designated a new RNA under the Record of Decision 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. Research Natural Area Management Policy 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.

POLICY

The documents and policy of authority now guiding decisions for RNAs are in Appendix R of the Cascade-Siskiyou National Monument (CSNM) Draft Resource Management Plan. Management objectives for RNAs addressed in the plan include the following directives:

- 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.
- Ideally, RNAs should 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. The guiding principal of RNAs is to allow natural, ecological, and physical processes to predominate, while preventing human-induced encroachments and activities that directly or indirectly modify ecological processes in the area. Active management should be undertaken where natural processes have been interrupted (PNW 1991).

BASIS FOR DEDICATION AND SETTING OBJECTIVES

RNA History

The Nature Conservancy, under contract with the BLM State Office, nominated Oregon Gulch as an RNA on August 10, 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 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. The plan lists 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 1994), and was designated as a 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 August 11, 1992, as the RNA is now a part of the Cascade-Siskiyou National Monument.

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 accessibility. It also includes several rare species: Greene's mariposa lily (*Calochortus greenei*), Howell's false-caraway (*Perideridia howellii*), and Bellinger's meadow-foam (*Limnanthes bellingeriana*).

Management Restrictions

The Medford District RMP (USDI 1995a) established the following management requirements on the Oregon Gulch RNA. The RNA is not available for timber harvest and was closed to Off-highway vehicles (OHV) use and mineral entry. Minerals leasing was subject to no surface occupancy (NSO).

The presidential proclamation (Appendix A) 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 restoration purposes; prohibits unauthorized OHV use; but permits continued grazing within the monument until completion of a study of grazing impacts on natural ecosystem dynamics.

NATURAL AREA DESCRIPTION

Oregon Gulch Area Description

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 Ecological National Monument. The RNA is approximately 18 air miles southeast of Ashland, Oregon.

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/

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.

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; 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 Cascades Slope Ecoregion. Because of 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 (3,800 - 7,000 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 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*). Ecoregion 78g has less precipitation, more sunny days, and a greater number of cold clear nights than the Inland Siskiyou Ecoregion (78e) to the west.

9i Southern Cascade Slope (3,600 - 6,300 ft.)

The Southern Cascades Slope ecoregion is a transitional zone between the Cascades (4) and the drier Eastern Cascades 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 Cascades Slopes and Foothills Ecoregions.

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 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 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 4,200 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 M-1.

Table M-1. Average Monthly Maximum, Minimum, 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

Topography

The northwest/southeast valley formed by Oregon Gulch lies 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 ft. 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 by 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 south-facing slopes; and exposed, bare scabland hummocks.

Geology

Oregon Gulch RNA is made up of Miocene and Oligocene Western Cascade volcanic, pyroclastic, volcanoclastic, and sedimentary rocks (Smith, et al. 1982). 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, et al. 1982). 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 40S04E29 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.

Soils

Soil information for Oregon Gulch RNA is based on Soil Survey of Jackson County Area, Oregon (USDA 1993). There are eight 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 M-2. About 60 percent of the RNA consists of rock outcrop soil complexes. The balance (40 percent) is soil types capable of supporting mixed conifer stands.

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

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

[1]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.
[2]Site Index (SI). 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 dominant 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.
[3]PSME. *Pseudotsuga menziesii*, Douglas-fir.

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 Quadrant and one on the Parker Mountain Quadrant, 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 larger 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 2000).

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 76.8˚F (max 80.1˚F - min 58.2˚ F). At the Jenny Creek confluence site the 7-day average daily temperature was 76.0˚F (max 77.9˚F - min 52.8˚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. In 1999, road restoration work occurred on the Rosebud road (40-3E-19.0, 19.1) on BLM lands, stabilizing this portion of the road. The eastern portion of the 40-3E-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.

Vegetation

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

1. Garry Oak/Wedgeleaf ceanothus grass or scrubland
2. Western Juniper/Garry Oak scrubland
3. Garry Oak/Ponderosa Pine forest
4. Mixed Conifer/California Black Oak forest
5. 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 1989); the occurrence of this community type was an error in the original RNA nomination. Manzanita communities are not documented to occur in the RNA.

Garry Oak/Wedgeleaf ceanothus grass or scrubland

The balance between Garry 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. Garry 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 Garry 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, *Balsamorhiza deltoidea*; wooly sunflower, *Eriophyllum lanatum*; *Lomatium macrocarpum*) to seasonally wet meadow species (heal-all, *Prunella vulgaris*; death camas, *Zigadenus venenosus*).

Western Juniper/Garry Oak scrubland

This community is found on the driest sites. Western juniper is the dominant tree with a few ponderosa pine and Garry 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 cuneatus*) 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.*).

Garry Oak/Ponderosa Pine forest

This community consists primarily of Garry oak with greater diversity of conifers, particularly ponderosa pine than the tree composition in the Garry 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's meadowfoam

(*Limnanthes floccosa ssp. bellingeriana*) occur in the riparian zone. Howell's false caraway is fairly common; however, Bellinger's meadowfoam is only known for a single site.

Exotic 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 Dyer's 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.

Special Status Plants

Three BLM 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 Garry 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 (ONHP) 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 species is rare, it has apparently stable populations across its range.

It is BLM 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.

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. Many mature trees have been found 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 forested plant associations are likely more dense at present than at any time since their initiation. 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.

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 Nelson (1997); Appendix 10 in the Medford RMP (USDI 1995b); St. John (1984); and Trail (1999)]. 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 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 southeast 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 not surprising, 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 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 BLM, unpublished data), 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, unpublished data; 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□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 16 were visited twice. A total of 42 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 (USDI BLM unpublished data). 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 pictus*), 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*).

Exotic 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 a 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.

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 1999, 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, and 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 Draft Plan.

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 M-3). The BLM also retains water rights on several springs within the RNA.

Table M-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 Oregon Gulch 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.

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 area 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 (e.g., 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 1999). 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 700 Port Ave. St. Helens, OR) and was recently logged.

MANAGEMENT CONSIDERATIONS

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 within the RNA were considered to be of overall high quality when the area was nominated as an RNA in the 1990s (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.

Garry 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/Garry Oak scrubland

Management goals, issues, and actions are similar to Garry Oak/Wedgeleaf ceanothus grass or scrubland. However, more attention needs to be focused on the relationship between Garry 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.

Garry Oak/Ponderosa Pine forest

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.

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.
- 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 and ponderosa 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 are not properly functioning based on results of Riparian surveys.

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 1986).

Take any action necessary to prevent unnecessary or undue degradation of the lands Federal Land Policy & Management Act (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 . . . ."

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 Dyer's 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 an 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 (1) reduce weed infestations; and (2) not increase existing populations.
- As part of the grazing study, evaluate whether grazing is increasing noxious or exotic weeds.

Endangered and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1973, Fight Wildlife Service 88, as amended) 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 BLM actions will not contribute to the need to list sensitive or state listed species as federally listed (BLM Manual 6840).

Goals

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

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.

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 was dropped from the Oregon Natural Heritage lists (ONHP 2004) and is no longer included. While it is a southwestern Oregon endemic, populations are apparently secure. Bellinger's meadowfoam is quite rare, and is known for a single location in the RNA. It has an Oregon Natural Heritage 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.

Insects and Pathogens

Policy and Agency Standards

Ideally, catastrophic natural events, such as insect infestations, should 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 1986).

Goals and Objectives

- 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 pines 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. In the summer of 2000, Master's 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 that the mixed conifer/California black oak forest type continues to be at risk because of slow growth and overly dense stocking. Pine mortality currently 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, given fire exclusion and high resultant densities of smaller competing trees.

Management Actions

Risk reduction management activities will involve thinning small Douglas-fir, piling and burning, and then conducting a prescribed underburn. Thinning would not involve cutting larger trees. 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 Doug-fir, white fir, incense cedar and ponderosa pine. 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, which is likely due to some microclimate effect due to moisture. Gooseberries and currents (*Ribes* sp.), which 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 outgrew the infections earlier.

Douglas-fir dwarf mistletoe is present in heavy amounts in some groups of old growth Douglas-fir within the RNA and 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 occasionally attacks 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 in 1999 in the RNA. It is spread by root grafts or beetles. 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 fire exclusion 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 re-established 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.

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 for which the RNA was designated are no longer intact on the adjacent private lands.

Management Actions

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

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 may be considered appropriate in some instances (USDI 1986). Roads are generally prohibited in RNAs. However, old roads or unimproved 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 (ROW) in the RNA. Several old jeep roads exist within the RNA and most have been closed and 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 grant requests are anticipated through the RNA.

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 1986).
- 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 the following:

- Increase 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 landowners.
- 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 1996). 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 that 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 in turn increased the threat of crown fires, once historically rare.

Many seedling and pole size forests are not on a trajectory to develop into late successional or old-growth forests because of the lack of natural thinning once associated with low intensity fires. Frequent low intensity fires historically served as a thinning mechanism, thereby naturally regulating the density of the forests by killing unsuited and small trees. Bark beetles currently are thinning forests in the absence of fire. Ponderosa pine that thrive in fire prone environments are competing with more shade tolerant Douglas-fir or white fir species in the absence of fire. Trees growing at lower densities tend to be more fire-resistant and vigorous. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests have developed high tree densities and slower growth rates than historically after 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 Low-Severity (68 percent) and Moderate-Severity (32 percent) 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 and Huff 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 ODF. 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 were 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 one 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 is 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 those factors which can be influenced by humans, 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 that 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.

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 Aquatic Conservation Strategy (ACS) is to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Included in the ACS 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 Off-highway vehicle (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 Aquatic Conservation Strategy and to prevent further damage to hydrologic and ecological 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, or actions necessary for this resource.

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.

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 that 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 percent since the 1970s. Cattle generally utilize the RNA from June 1 into early July on alternating years. The current number of Animal Unit Months (AUMs) is 1,174. 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 percent) and moderate (41-60 percent) utilization in portions of the RNA.

The Oregon Gulch RNA contains significant areas of native grassland communities, especially in the Garry oak/wedgeleaf ceanothus/grass or scrubland, and the western juniper/Garry oak scrubland communities. Grasslands are also a component under the Garry 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 [Dyer's woad (*Isatis tinctoria)*, bull thistle (*Cirsium vulgare*), yellow alyssum (*Alyssum alyssoides*), and hedgehog dogtail (*Cynosurus echinatus*)]. Soil and vegetation disturbance from over-grazing could 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 over-grazing or congregating livestock.
- Terms and conditions in the existing grazing lease may 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 ongoing livestock impact 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 a tool to maintain these communities.
- Install additional monitoring plots in utilized areas within the RNA to ensure that grazing promotes maintenance or enhancement of key plant communities.

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 1986).

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 the 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 abut 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, should 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. 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.

Public Use/Recreation

Policy and Agency Standards

Recreation, camping, wood cutting, trapping, plant gathering, and off-highway vehicle (OHV) use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Hunting and fishing activities are typically permitted, but camping associated with these uses is prohibited

in RNAs (see Wildlife sub-section below).. Educational use such as class field studies is 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 power lines should avoid the RNA. Road closures or way closures or restrictions may be considered appropriate in some instances (see Rights of Way section) (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 RNAs 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 1986).

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.

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 camps were present when the road was open. Camping occurs seasonally 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, "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).

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 of the RNA that might appeal to hikers are wild flowers, wildlife, 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).

Equestrian Activities

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. Heavy use by 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. Incidental use by riders moving cattle is allowed under the grazing lease.

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.

Off-Highway Vehicles (OHVs)

Policy and Agency Standards

Management directions for all RNAs specify 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).

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 1986). Management of fish and wildlife populations is controlled by the Oregon Department of Fish and Wildlife (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.

Special Forest Products

Policy and Agency Standards

Commercial or personal harvest of Special Forest Products (SFPs) within RNAs, such as boughs, burls, fungi, medicinal plants, etc., are not compatible with the overall 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 personal 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 as 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

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 ongoing 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 1986)

Issues

- Lack of funding for treatments in RNA's
- 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- 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.

MONITORING

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 (RNA) 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 to minimizing disturbance in the RNA (USDI 1995a). 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.

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 Green's 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 Measure: 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 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 Measure: 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

Defensibility Monitoring

Defensibility monitoring involves on-the-ground assessment of factors that 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, OHVs, special forest products, interpretation and research, trespass livestock grazing, timber harvesting).

Monitoring 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

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

Unit of Measure: 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 Measure: 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

Monitoring 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 Measure: 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

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 about 1943 and it's changed hands several times since. "Bert" Dodendoaph bought it from Miller, but about three months [later], 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 [part of the harness] 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 has 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.

I 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 their 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 there has been a little log cabin there, probably someone's 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 86 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-1920s, Ireane Wehhli, a young lady of Ashland, 43 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 acquired 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 1930s the end of the road going north to Oregon Gulch, known as the Shake Road, ended at Shake Spring. In the mid-1930s 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 1920s 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."

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APPENDIX N

Special Status Species

SPECIAL STATUS PLANT SPECIES

The monument's unique geology, climate, and topography contribute to the presence of many rare and endemic plants. The region including and surrounding the monument has one of the highest rates of plant endemism in the United States (The Nature Conservancy 2000). The monument contains known populations of 33 plant species that are on the current Special Status Species list (Table N-1), including Gentner's fritillary, which is listed as threatened under the Endangered Species Act.

Occurrences of special species plants are documented in grasslands, chaparral, oak woodlands, conifer communities, rocky openings, vernal pools, seeps, and riparian areas within the Diversity Emphasis Area (DEA) and in the Old-Growth Emphasis Area (OGEA). Open grasslands, chaparral and oak woodlands, and conifer communities blend into a mosaic on the landscape, providing a diversity of habitats for groups of special species plants. As a result, many of these communities are spread out across the landscape.

Some special status species are known for fairly specific habitats: California milkvetch (*Astragalus californicus*) occurs only in open grasslands; the rare fungi *Plectani milleri,* and *Bondarzewia mesenterica* occur only in white fir communities; Coralseed popcorn flower (*Plagiobothrys figuratus* spp. *corallicarpus*) is found only in vernal pools and meadows; and a terrestrial orchid, clustered lady's slipper (*Cypripedium fasciculatum*), is found in old growth Douglas-fir in the monument, often under older madrone and canyon live oak. Other special status plant species can be found in several different types of communities, or are found in transitional zones between different community types. Species like Gentner's fritillary is known from mixed evergreen, oak woodlands, and chaparral and grassland edges. Green's mariposa lily (*Calochortus greeni*) can be found in Oregon white oak-western juniper/wedgeleaf ceanothus-klamath plum communities, Ponderosa pine-white oak/savanna , and on the margin of open grasslands in heavy clay soils (now often dominated by annual grasses). Some species occur in microsites within larger, more discrete communities. Special status plant species like *Nemacladus capillaris, Monardella glauca* and *Hieracium greenei* are documented in "rocky openings" within many different community types. Thus, management activities within grasslands, riparian areas, oak woodlands, mixed conifer and old growth conifer communities have the potential to influence special status plant species.

In 2004, the Oregon Natural Heritage Program re-evaluated all rare Oregon plants and fungi. A few species documented for the monument were dropped, and no longer have ONHP or Bureau status. These species were left on the following table for reference as they are still found in the Cascade-Siskiyou National Monument.

Table N-1. Overview of Current Special Status Plant Species within the CSNM.

BS=Bureau Sensitive **BA**=Bureau Assessment **BT**=Bureau Tracking **FE**=Federally Endangered

Species	Status	Habitat	Emphasis Area	Number Sites[1]	Documented Individuals
Astragalus californicus (California milk-vetch)	BA	Grassland	DEA	15	972
Asarum wagneri (green-flowered ginger)	BT	Moist conifer	OGEA	1	Unknown
Boletus pulcherrimus	BS	White fir	OGEA	1	Unknown
Bondarzewia mesenterica (Bondarzew's polypore)	Dropped	White fir	OGEA	1	Unknown
Calochortus greenei (Green's mariposa lily)	BS	Oak woodlands – chaparral	DEA	110[2]	13,355
Carex livida (livid sedge)	BA	Riparian – meadow	DEA	1	20
Carex praticola (meadow sedge)	BT	Riparian – wet meadow	DEA	1	45
Carex serratodens (two-tooth sedge)	BA	Riparian – wet meadow	DEA	1	30
Cirsium ciliolatum (Ashland thistle)	BS	Grasslands – oak woodlands	DEA	18	10,327
Cypripedium fasciculatum (clustered lady's slipper)	BA	Mixed conifer	OGEA	2	48
Cypripedium montanum (mountain lady's slipper)	BT	Mixed conifer – evergreen – oak woodland	OGEA DEA	10	246
Delphinium nudicale (red larkspur)	BA	Rock outcrop	OGEA	1	10,000
Fritillaria gentneri (Gentner's fritillary)	FE	Mixed conifer – oak woodland – mountain mahogany chaparral	DEA	22	368
Fritillaria glauca (Siskiyou fritillary)	BA	Dry, open, rocky ridgeline with mountain mahogany	DEA	7	315
Hackelia bella (greater showy stickseed)	BA	Riparian – grassy meadows – openings in white fir	OGEA	23	896
Hieracium greenei (Greene's hawkweed)	BT	Dry, open, ponderosa pine ridgelines	DEA	1	7
Iliamna bakeri (Baker's wild hollyhock)	BS	White fir openings	OGEA	4	9
Enemion stipitatum [Isopyrum stipitatum] (Siskiyou false rue- anemone)	BT	Grasslands – oak woodlands with ceanothus	DEA	28	177,530
Lathyrus lanzwertii tracyi (Tracy's peavine)	BT	Oak woodland – mountain mahogany chaparral	DEA	3	64
Limnanthes floccosa bellingeriana (Bellinger's meadowfoam)	BS	Wet meadows – vernal pools	DEA (moist meadows in OGEA)	11	16,151

Table N-1. Overview of Current Special Status Plant Species within the CSNM.

BS=Bureau Sensitive **BA**=Bureau Assessment **BT**=Bureau Tracking **FE**=Federally Endangered

Species	Status	Habitat	Emphasis Area	Number Sites[1]	Documented Individuals
Mimulus kelloggii (Kellogg's monkeyflower)	BT	Moist microsites in oak woodland	DEA	1	100
Microseris laciniata detlingii (Detling's silverpuffs)	BS	Grasslands – oak woodlands	DEA	21	2,212,193
Monardella glauca (pale monardella)	BT	Open mixed conifer – rocky openings	OGEA	1	Unknown
Nemacladus capillaris (common threadplant)	BA	Rocky openings in mixed conifer	OGEA	4	4,705
Perideridia howellii (Howell's false-caraway)	Dropped	Wet meadows, moist slopes, riparian	DEA OGEA	11	101,034
Plagiobothrys austinae (Austin's popcorn flower)	BA	Grassy meadows – vernal pools	DEA	1	10
Plagiobothrys figuratus corallicarpus (coral seeded popcorn flower)	BS	Grassy meadows – vernal pools	DEA	4	14,500
Plectania milleri (Miller's cup fungus)	BT	White fir	OGEA	4	Unknown
Poa rhizomata (rhizome bluegrass)	BA	Grasslands – oak woodlands	DEA	10	3,340
Ranunculus austro-oreganus (southern Oregon buttercup)	BS	Grasslands – oak woodlands – chaparral	DEA	1	2,000
Ribes inerme klamathense (Klamath gooseberry)	BT	Riparian – moist meadow edge	DEA	3	25
Solanum parishii (Parish's nightshade)	BA	Oak – pine woodlands – chaparral	DEA	3	20
Tremiscus helvelliodes	Dropped	White fir	OGEA	1	Unknown

[1]Based on 2004 data from the BLM Medford Rare Plant Database

[2]Does not include 20 new sites documented in 2003 by non-government surveys that report to have over 3,000 plants.

SPECIAL STATUS ANIMAL SPECIES - TERRESTRIAL WILDLIFE

The diverse plant communities, varied topography, and broad range of climatic zones come together to foster a diverse assemblage of terrestrial wildlife species. The monument is home to 44 animal species that are on the current special status species list (Table N-2).

Some special status animal species occupy well-defined habitat areas (e.g. Oregon spotted frog (*Rana pretiosa*) occurs only in association with ponds or lakes). Other species range widely across the landscape, utilizing a variety of habitats. For example, great gray owls (*Strix nebulosa*) choose nest sites in late-successional and old-growth conifer stands while foraging in meadows and other open areas, as well as traveling 10 miles or more and utilizing a variety of habitat including oak savannah, and mixed conifer.

Management activities across all habitat types have the potential to affect terrestrial wildlife species.

Table N-2. Terrestrial Wildlife Species Documented or Likely to Occur in the CSNM.

Species	Status
Acorn Woodpecker *Melanerpes formicivorus*	Bureau Tracking
American Peregrine Falcon *Falco peregrinus anatum*	Bureau Sensitive
American Marten *Martes Americana*	Bureau Tracking
Bald Eagle *Haliaeetus leucocephalus*	Federally Threatened
Band-tailed Pigeon *Columba fasciata*	Bureau Tracking
Black Salamander *Aneides flavipunctatus*	Bureau Assessment
California Mountain Kingsnake *Lampropeltis zonata*	Bureau Tracking
California Myotis *Myotis californicus*	Bureau Tracking
Cascade Frog *Rana cascadae*	Bureau Tracking
Common Kingsnake *Lampropeltis getula*	Bureau Tracking
Common Nighthawk *Chordeiles minor*	Bureau Tracking
Coronis Fritallary Butterfly *Speyeria coronis coronis*	Bureau Tracking
Fisher *Martes pennanti pacifica*	Federal Candidate
Flammulated Owl *Otus flammeolus*	Bureau Sensitive
Foothill Yellow-legged Frog *Rana boylii*	Bureau Assessment
Fringed Myotis *Myotis thysanodes*	Bureau Assessment
Great Gray Owl *Strix nebulosa*	Bureau Tracking

Table N-2. Terrestrial Wildlife Species Documented or Likely to Occur in the CSNM.	
Species	**Status**
Greater Sandhill Crane *Grus Canadensis*	Bureau Tracking
Hoary Bat *Laiurus cinereus*	Bureau Tracking
Klamath Mardon Skipper *Polites mardon klamathensis*	Federal Candidate
Lewis' Woodpecker *Melanerpes lewis*	Bureau Sensitive
Long-eared Myotis *Myotis evotis*	Bureau Tracking
Long-legged Myotis *Myotis volans*	Bureau Tracking
Mountain Quail *Oreortyx pictus*	Bureau Tracking
Northern Goshawk *Accipiter gentilis*	Bureau Sensitive
Northern Pygmy Owl *Glaucidium gnoma*	Bureau Tracking
Northern Sagebrush Lizard *Sceloporus graciosus graciosus*	Bureau Tracking
Northern Spotted Owl *Strix occidentalis caurina*	Federally Threatened
Northwestern Pond Turtle *Clemmys marmorata marmorata*	Bureau Sensitive
Olive-sided Flycatcher *Contopus cooperi*	Bureau Tracking
Oregon Shoulderband *Helminthoglypta hertleini*	Bureau Sensitive
Pacific Pallid Bat *Antrozous pallidus pacificus*	Bureau Assessment
Pileated Woodpecker *Dryocopus pileatus*	Bureau Tracking
Pygmy Nuthatch *Sitta pygmaea*	Bureau Tracking
Ringtail *Bassariscus astutus*	Bureau Tracking
Silver-haired Bat *Lasionycteris noctivagans*	Bureau Tracking
Spotted Frog *Rana pretiosa*	Federal Candidate
Townsend's Big-eared Bat *Corinorhynus townsendii*	Bureau Sensitive
Western Bluebird *Siala mexicana*	Bureau Tracking
Western Gray Squirrel *Sciurus griseus*	Bureau Tracking
Western Meadowlark *Stunella neglecta*	Bureau Tracking

Table N-2. Terrestrial Wildlife Species Documented or Likely to Occur in the CSNM.	
Species	**Status**
Western Toad *Bufo boreas*	BT
White-headed Woodpecker *Dendrocopos albolarvatus*	BS
Willow Flycatcher *Empidonax traillii adastus*	BT
Yuma Myotis *Myotis yumanensis*	BT

SPECIAL STATUS ANIMAL SPECIES – AQUATIC WILDLIFE

The monument is home to a variety of aquatic organisms including several special status species: Jenny Creek redband trout (*Oncorhynchus mykiss spp*.) a BLM special status species, Jenny Creek sucker (*Catostomus rimiculus*) a BLM special status species, and Fredenberg pebblesnail (*Fluminicola n. sp. 17*), Nerite pebblesnail (*Fluminicola n. sp. 10*), Toothed pebblesnail (*Fluminicola n. sp. 11*), Diminutive Pebblesnail (*Fluminicola n. sp. 12*), Fall Creek pebblesnail (*Fluminicola n. sp. 14*), Keene Creek pebblesnail (*Fluminicola n. sp. 16*), all Bureau Sensitive Species in Oregon.

APPENDIX O

Fire Suppression Tactics

During suppression activities on all BLM lands within the Cascade-Siskiyou National Monument (CSNM) the following guidelines would be followed:

- BLM resource advisors will be dispatched to all fires that occur on BLM land. These resource advisors are utilized to ensure that suppression forces are aware of all sensitive areas and to ensure a minimum of damage to resources as a result of suppression efforts.
- During fire suppression activities it may be necessary to open decommissioned roads or construct roads with a dozer. Where emergency actions are required for fire suppression, a project inspector, in consultation with a resource advisor, will be the on-the-ground BLM representative authorized to permit opening decommissioned roads or constructing roads within the monument.
- When feasible, existing roads or trails will be used as a starting point for burn-out or backfire operations designed to stop fire spread. Backfires will be designed to minimize fire effects on habitat. Natural barriers will be used whenever possible and fires will be allowed to burn to them.
- In the construction of fire lines, minimum width and depth will be used to stop the spread of fire. The use of dozers would be minimized and resource advisors will give approval of the use of dozers.
- Dozer line will not be constructed within or along stream channels or dry draws. If dozer line construction is proposed within riparian areas, it would be perpendicular to stream channels or dry draws and the resource advisor would be consulted prior to line construction. Hand line may be used parallel to stream channels and dry draws; however, hand line should be constructed as far as possible from the main channel.
- Live fuels will be cut or limbed only to the extent needed to stop fire spread.
- The felling of snags and live trees will only occur when they pose a safety hazard or will cause a fire to spread across the fire line.
- The construction of helispots should be minimized and all helispots will be approved by the resource advisor. Past locations or natural openings should be used when possible. Helispots will not be constructed within riparian reserves or areas of special concern.
- Retardant or foam will not be dropped on surface waters, riparian reserves, or on occupied spotted owl or eagle nests.
- Resource advisors will determine rehabilitation needs and standards in order to reduce the impacts associated with fire suppression efforts.
- Properly designed and adequately spaced water bars would be constructed on all fire lines at the completion of fire suppression activities.

In addition to the guidelines described above, several areas have been identified where suppression methods will be limited to provide additional protection for these areas. Maps identifying these areas are made available to suppression forces before the start of each fire season. Areas of special concern which require specific fire suppression tactics or limit tactics within the Cascade Siskiyou National Monument are displayed in Table O-1.

Table O-1. Suppression Tactics for Designated Special Management Areas within the CSNM.

Designation	Fire Suppression Tactics
Owl Core Areas	× Protect nest tree and adjacent trees from felling or any type of damage. × Minimize fire damage to owl core area.
Archaeological Sites	× No use of dozer or hand-line construction through these sites
Scotch Creek and Oregon Gulch RNAs	× Confine use of vehicles to existing roads adjacent to the RNAs. × No use of dozers within the RNA boundaries.
Bean Cabin	× Minimize disturbance to this historic site.
Pacific Crest Trail	× Minimize impacts from suppression efforts to trail and the immediate area that is visible from the trail. × Allow fire to burn across trail and in surrounding area rather constructing dozer lines to suppress fire.
Mariposa Lily Botanical Area	× Confine use of vehicles to existing roads. × No use of tractors within the boundary of the preserve. × No hand-line construction through areas where Mariposa Lily populations are located.
Soda Mountain Wilderness	× Refer to the fire suppression guidelines following this table.

Fire suppression guidelines for the Soda Mountain Wilderness Study Area (WSA) are as follows:

- Protection agencies will notify the BLM immediately when a fire is reported in, or has the potential to enter the WSA.
- A BLM resource advisor shall be dispatched to all fires within the WSA. This individual will assist in identifying threatened resource, cultural, or social values within the WSA, and will act as a liaison between the protection agency and the BLM Medford District.
- Earth moving equipment shall not be used without prior approval of the Medford District Manager. This authority may not be delegated and there will be no exceptions.
- Fire lines will be located to take advantage of natural barriers such as rock outcrops, streams, and changes in vegetation.
- Unburned material may be left inside the fire line. All such material will be felt/tested with bare hands to ensure no sparks or glowing embers remain. Limbs, logs or other material turned parallel to the slope to prevent rolling will be placed or scattered to resemble natural conditions.
- Water barring of fire lines will be done to prevent accelerated erosion.
- Limbing of trees adjacent to fire lines will be done only if needed for fire suppression and/or fire fighter safety.
- Burning snags or trees will only be felled when they pose a definite threat to the containment of the fire or the safety of fire fighters.
- Logs within the proposed fire line location will be rolled out of their beds. If rolling is not possible fire lines shall be constructed around these logs where possible.
- Helispots should use natural openings where only minimal improvements are necessary, and should be constructed outside the WSA when possible.
- With the exception of removing obstructions, trails and waterways should not be improved. If improvement is necessary they should be restored to pre-fire conditions if possible.
- Fire engines and other non-earth moving equipment used in suppression efforts should use existing roads adjacent to the WSA. When this is not feasible, efforts shall be taken to minimize crossings of streams, springs or wet areas. Steep slopes should be avoided.
- Use of fire retardant may be used except on surface waters or in riparian reserves.

APPENDIX P

Existing Withdrawals, Linear and Site Authorizations in the CSNM

Table P-1. Existing Withdrawals in the CSNM

Authority	Acreage[1]	Purpose	Effect	Recommendation
PLO No. 3869	444.35	Recreation Site	B	Continue
Water Power Designation 3	5,631.54	Water Power	C	Revoke
Water Power Designation 13	127.27	Water Power	C	Revoke
Power Site Classification 218	1,482.21	Power Site	C	Revoke
Power Site Reserve 583	1,799.03	Power Site	C	Revoke
Power Site Reserve 584	160.00	Power Site	C	Revoke
Power Site Reserve 649	Unknown	Power Site	C	Revoke
Federal Power Commission, Order #2082	Unknown	Power Project	B	Continue
Public Land Order No. 5490, as modified by Public Land Order No. 7043	All PD Lands	Multiple Use Management	B	Revoke

[1]Acreage figures are for the entire area included in the Withdrawal. With some of the Withdrawals, there are acres outside the monument area.
B: Withdrawn from operations of the General Land and Mining Laws
C: Withdrawn from operation of the General Land Law.

Table P-2. Linear and Site Authorizations in the CSNM

OR\ORE #	Holder	Type or Use	Remarks
20137	Qwest	Communication Site	
34999	Oregon Highway Department	Communication Site	
36203	COBI[1]	Communication Site	with sub-lessee
38053	PP&L	Communication Site	
44980	ODF	Lookout and Communication Site	with sub-lessee
48563	AT&T Wireless	Communication Site	with sub-lessee
49604	US Cellular	Communication Site	
54336	SOU (JPR)[2]	Communication Site	with sub-lessees
17317	PP&L	Utility Line	
20544	PP&L	Transmission	Line 19 (115 kV)
24416	PP&L	Transmission	Line 59 (230 kV)
24876	Qwest	Utility Line	
34269	Qwest	Utility Line	
37585	R. Taylor	Ditch	
42014	US Sprint	Fiber Optic Line	
43005	S. Young	Water Line	
43975	AT&T	Fiber Optic Line	
45363	L. Tynes	Road	Private Access Road
46542	PP&L	Fiber Optic Line	
47421	MCI	Road	Soda Mountain Road
47454	PP&L	Utility Line	
48560	PP&L	Utility Line	
50516	C. & M. McLaughlin	Road	BLM Road #40-3E-3
54223	M. George\K. Freeman	Road	Soda Mountain Road
0497	Qwest	Utility Line	
03235	R. Taylor	Water Facility	
06936	Bureau of Reclamation	Canal & Laterals	Serves Talent Irrigation District
013754	Oregon Highway Department	Interstate Highway	I-5
R011947	Qwest	Utility Line	
R022462	Oregon Highway Department	State Highway	Old Highway 99
R023045	Oregon Highway Department	Interstate Highway	I-5
5439	Qwest	Utility Line	
13745	PacifiCorp	Transmission Line	500 kv line
14956	Qwest	Utility Line	
18550	SOPTV[3]	Communication Site	Chestnut Mountain
23467	State of Oregon	Communication Site	Chestnut Mountain
24498	M. McLaughlin	Water Line	
35917	Qwest	Utility Line	
36695	Qwest	Utility Line	
36784	State of Oregon	Airport Lease	Pinehurst Airstrip
37836	M. McLaughlin	Water Line	
41384	G. Willey	Road	
42492	Corral Creek Home Owner's Association	Road	

Table P-2. Linear and Site Authorizations in the CSNM

OR\ORE #	Holder	Type or Use	Remarks
44943	D. Rowlett	Agricultural Lease	
44944	D. Rowlett	Road	
45379	Bureau of Reclamation	Canal	
45385	D. Cleland	Road	
45495	Roskamp Services	Water Line	
45999	K. Stark	Road	
46052	C. Russell	Road	
46135	J. Walt	Road	
48248	D. Rowlett	Ditch	
49214	D. Ragnell	Road	
49413	E. Milsom	Road	
50516	M. McLaughlin	Road	
50673	Roskamp Services	Road	
50687	H. Cassells	Road	
53772	S. Tall Hunter	Road	
53615	L. Scheer	Water Line	
56788	E. Coker	Road	
56941	J. Impara	Road	
57141	C. Harrison	Road	
57804	L Davoli	Road	
03490	PacifiCorp	Utility Line	
05569	Qwest	Communication Site	Chestnut Mountain
05609	PacifiCorp	Utility Line	
57296	A.M. Fields	Event Permit	Sundance Group
06936	Bureau of Reclamation	Canal and Laterals	
012019	PacifiCorp	Utility Line	
013626	Pinehurst School	Recreation and Public Purposes Act Lease	Elementary School
013794	Oregon Highway Department	Maintenance Facility	Highway 66
R014637	Bureau of Reclamation	Hyatt Reservoir	

[1] California-Oregon Broadcasting, Inc.
[2] Southern Oregon University, Jefferson Public Radio
[3] Southern Oregon Public Television
AR @ Roseburg General Land Office (GLO) cases

Glossary of Terms

Access Agreements - (a) Generally construed to mean a Reciprocal Rights-of-Way agreement. It is an exchange of grants between the United States and a permittee, which provides for each party using the other's roads or constructing roads over the other's lands; (b) the rights granted to the United States through the purchase of a Rights-of-Way easement.

Adaptive Management - A systematic process to better achieve management objectives and practices by learning from the outcomes of operational programs. It's most effective form–"active" adaptive management–employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed.

Air Quality - A measure of the health-related and visual characteristics of the air often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Air Quality Class I and II Areas - Regions in attainment areas where maintenance of existing good air quality is of high priority. Class I areas are those that have the most stringent degree of protection from future degradation of air quality. Class II areas permit moderate deterioration of existing air quality.

Allocation - Process to specifically assign use between and rationing among competing users for a particular area of public land or related waters.

Allotment - An area allocated for livestock use by one or more qualified grazing lessees including prescribed numbers and kinds of livestock under one plan of management.

Allotment Management Plan (AMP) - A written program of livestock grazing management including supportive measures, if required. An AMP is designed to attain specific management goals in a grazing allotment and is prepared cooperatively with the lessee(s).

All-Terrain Vehicle (ATV) - All-terrain vehicle; 42" width or smaller. A small, amphibious motor vehicle with wheels or tractor treads for traveling over rough ground, snow, or ice, as well as on water.

Alternative - One of at least two proposed means of accomplishing planning objectives.

Animal Unit Month (AUM) - The amount of forage required to sustain the equivalent of 1 cow and a calf for 1 month.

Aquatic - Living or growing in or on the water.

Archaeological Site - A geographic locale that contains the material remains of prehistoric and/or historic human activity. (See also Historic Site)

Archaeology - The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern (ACEC) - An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and /or provide safety from natural hazards.

Assessment - A form of evaluation based on the standards of rangeland health, conducted by an interdisciplinary team at the appropriate landscape scale (pasture, allotment, sub-watershed, watershed, etc.) To determine conditions relative to standards.

Authorized Officer - Any person authorized by the Secretary to the Interior to administer regulations.

Awns - A more or less stiff bristle on the bracts or scales within a grass inflorescence, usually a prolongation of a nerve.

Best Management Practices (BMPs) - Methods and/or measures, selected on the basis of site specific conditions, to ensure that water quality will be maintained at its highest practicable level. BMPs are not limited to structural and nonstructural controls, and procedures for

operations and maintenance. BMPs can be applied before and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. (40 CFR 130.2, EPA Water Quality Standards Regulations)

Biodiversity - The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

Casual Use - Activities ordinarily resulting in negligible disturbance of federal lands and resources.

Connectivity - A measure of the extent to which conditions among late-successional and old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of wildlife and fish species associated within late successional and old-growth forests.

Consultation - Formal consultation is a process that occurs between the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) and a federal agency that commences with the federal agency's written request for consultation under Section 7(a)(2) of the Endangered Species Act regarding a federal action which may affect a listed species or its critical habitat. It concludes with the issuance of the biological opinion under Section 7(b)(3) of the Act. Informal consultation is an optional process that includes all discussions, correspondence, etc., between the USFWS or NMFS and the federal agency, or the designated non-federal representative, prior to formal consultation, if required. If the listing agency determines that there is no likely adverse affect to the listed species, it may concur with the action agency that formal consultation is unnecessary.

Cubic feet-per-second (cfs) - As a rate of stream flow, a cubic foot of water passing a referenced section in 1 second of time.

Cultural Resources - Those resources of historical and archaeological significance.

Cumulative Effects - Those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Decommission - To remove those elements of a road that reroute hillslope drainage and present slope stability hazards. This usually involves removing the culverts, ripping the road prism, installing drainage facilities (i.e. waterbars, waterdips, etc.), and replanting the road surface with grasses, legumes, shrubs, and trees.

Degree of Function - A level of physical function relative to properly functioning condition commonly expressed as properly functioning, functioning-at-risk, or non-functional.

Designated Road - A linear transportation facility on which state licensed, four- wheeled vehicles can travel. By definition, these do not qualify as trails.

Designated Sites/Areas - Sites and areas that receive regular maintenance, and are primarily used by the public for recreation purposes.

Developed Recreation Site - A site developed with permanent facilities designated to accommodate recreation. Such sites or areas may include such features as: delineated spaces for parking, camping, or boat launching, sanitary facilities, potable water, grills or fire rings, tables, or controlled access.

Dispersal - The movement of an individual from their origin to a new site.

Dispersal Habitat - Habitat that supports the life needs of an individual animal during dispersal. Generally satisfies needs for foraging, roosting, and protection from predators.

Dispersed Recreation - A general term referring to recreation use outside of developed sites. This includes but is not limited to activities such as scenic driving, hiking, bicycling, hunting, fishing, horseback riding, cross-country skiing,

snowmobiling in a primitive to semi-primitive environment.

Diversity - The aggregate of species assemblages (communities), individual species, the genetic variation within species, and the processes by which these components interact within and among themselves. The elements of diversity are -1) community diversity (habitat, ecosystem), 2) species diversity, and 3) genetic diversity within a species; all three of which change over time.

Easement - A right or privilege one may have on another's land.

Ecosystem - A system made up of a community of animals, plants, and micro-organisms and its interrelated physical and chemical environment.

Endangered Species - Any animal or plant species in danger of extinction throughout all of a significant portion of its range. These species are listed by the U. S. Fish and Wildlife Service.

Endemic - A species that is unique to a specific locality.

Ephemeral Stream - A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

Equestrian - Of horses, horsemen, or horseback riding.

Exclusive Easement - An exclusive easement grants control of the right-of-way to the Untied States and may allow it to authorize third-party use (i.e. public) and set rules of its use. (See also Non-Exclusive Easement)

Facility - Refers to administrative or recreational areas/structures installed and operated by the Bureau of Land Management. Areas include campgrounds, trailheads, pullouts, picnic areas, and parking areas. Structures include buildings, shelters, hiking trails, kiosks, signs, toilets, picnic tables, fire rings, water hydrants, and fences.

Fauna - The animals of a specified region or time.

Floodplain - A plain along a stream or river onto which the flow spreads at flood stage.

Flora - The plants of a specified region or time.

Forage - Vegetation of all forms available and of a type used for animal consumption.

Four-wheel-drive (4wd) - Four-wheel-drive, differential transfer case disperses 50/50 front and rear displacement. Trucks, cars, buses, or sport utility vehicles with high clearance and the ability to operate off-pavement as well as on highways.

Functioning-at-risk - Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Grazing System - A prescribed method of grazing a range allotment having two or more pastures or management units to provide periodic rest for each unit.

Ground Water -Water in the ground that is in the zone of saturation; water in the ground that exists at, or below the water table.

Guideline -Practices, methods, techniques and considerations used to ensure that progress is made in a way and at a rate that achieves the standard(s).

Habitat - A specific set of physical conditions in a geographic area(s) that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Habitat Fragmentation - The breakup of extensive habitat into small, isolated patches which are too limited to maintain their species stocks into the indefinite future.
(See also Connectivity)

Habitat Types -The BLM modified the McKelvie system by dividing two of his habitat types for a total of six types instead of four. A definition of each category can be found in Chapter 2, in the OGEA section.

Historic Site - A cultural resource site resulting from activities or events dating to the historic period (generally post 1830 in western Oregon).

Home Range - The area which an animal traverses in the scope of normal activities, not to be confused with territory which is the area animal defends.

Hydrologic Cycle - The process in which water enters the atmosphere through evaporation, transpiration, or sublimation from the oceans, other surface water bodies, or from the land and vegetation, and through condensation and precipitation returns to the earth's surface. The precipitation then occurs as overland flow, stream flow, or percolating underground flow to the oceans or other surface water bodies, or to other sites of evapo-transpiration and recirculation.

Hydrology - The science dealing with the properties, distribution, and circulation of water.

Impact - Synonymous with effects. Includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts may also include those resulting from actions which may have both beneficial and detrimental (adverse) effects. Impacts may be considered as direct, indirect, or cumulative

Indicators - Parameters of ecosystem function that are observed, assessed, measured, or monitored directly or indirectly to determine attainment of a standard(s).

Infiltration - The downward entry of water into the soil.

Infiltration Rate -The rate at which water enters the soil.

Interim Management Policy (IMP) - An interim measure governing lands under wilderness review. This policy protects Wilderness Study Areas from impairment of their suitability as wilderness.

Intermittent Stream - Seasonal stream; a stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

Invertebrate Species -Any animal without a backbone or spinal column.

Key Watershed - As defined by National Forest and Bureau of Land Management District fish biologists, a watershed containing 1) habitat for potentially threatened species of stocks of anadromous salmonids or other potentially threatened fish; or 2) greater than six square miles with high quality water and fish habitat.

Late-Successional Forest - Forest seral stages which include mature and old-growth age class.

Lease - An authorization or contract by which one party (lessor) conveys the use of property, such as real estate, to another (lessee) in return for rental payments.

Lessee - (Livestock Operator) A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.

Leasable Minerals - A mineral such as coal, oil shale, oil and gas, phosphate, potash, sodium, geothermal resources, and all other minerals that may be developed under the Mineral Leasing Act of 1920, as amended.

Leave-No-Trace - A land use ethic which involves many aspects to help eliminate or reduce impacts. It starts with proper planning to avoid high use periods, to repack food to avoid unnecessary packaging and waste. It includes traveling on existing trails and using existing campsites if available and if not camp in an area that is durable. Leave-no-trace promotes the proper methods to dispose of wastes, and use of stoves and candle lanterns for cooking and light rather than campfires. If a campfire is used, do not create new ones but use existing fire rings. Keep fires small and scatter the ashes when breaking camp. Camp at least 200 feet from streams and lakes, respect wildlife and other visitors by staying as inconspicuous as possible.

Mechanized Vehicle Use - Includes the use of any vehicle, device, or contrivance for moving people or material in or over land, water, snow, or air that has moving parts. This includes, but is not limited to, sailboats, sailboards, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. The term does not include wheelchairs, nor does it include horses or other pack stock, skis, snowshoes, non-motorized river craft including, but not limited to, drift boats, rafts, canoes, sleds, travois, or similar devices without moving parts.

Mineral Entry - The location of mining claims by an individual to protect his/her right to a valuable mineral.

Mineral Materials - Refer to saleable minerals.

Mineral Withdrawal - A withdrawal of public lands which are potentially valuable for leasable minerals. This precludes the disposal of the lands except with a mineral reservation, unless the lands are found to not be valuable for minerals.

Mitigating Measures - Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use. Committed mitigating measures are those measures BLM is committed to enforce (i.e., all applicable laws and their implementing regulations).

Monitoring - A process of collecting information to evaluate if objective and anticipated or assumed results of a management activity or plan are being realized or if implementation is proceeding as planned.

Montmorillonite Clay - Soils with aluminum/silicate clays with an expanding crystal lattice. Montmorillonitic clays have a high shrink/swell ratio which results in large cracks in the soil when it is dry and swelling upon wetting. These soils are, generally, very sticky and slippery when wet.

Mountain Bicycle - Bicycle designed for off-pavement use. Generally are multi-geared with fat knobby tires. Frames and tire rims are stronger than road bicycles. Sometimes referred to in this document as a non-motorized vehicle.

Multiple Use - Management of public lands and their resource values so that they are utilized in a combination that will best meet the present and future needs of the American people.

Non-exclusive Easement - A non-exclusive easement to the United States only allows use by it and its agents and those authorized to do business on the United States lands.

Non-Functioning - Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows.

Noxious Plants - Those plants which are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

Noxious Weeds - (see Noxious Plants)

Nutrient Cycling -The movement of essential elements and inorganic compounds between the reservoir pool (soil, for example) and the cycling pool (organisms) in the rapid exchange (i.e., moving back and forth) between organisms and their immediate environment.

O&C Lands - Public lands granted to the Oregon and California Railroad Company for the construction of track from California to Oregon and subsequently revested to the United States.

Off-Highway Vehicles (OHV) - Any motorized vehicle designed for or capable of cross-country travel over land, water, sand, snow, ice, marsh, swamp-land, or other terrain.

Off-Road Vehicle - Means any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies.

Old-Growth Forest - A conifer forest stand usually at least 180-220 years old with moderate to high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Organic Matter - Plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and

animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

Perennial Stream - A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Permit - A short-term, revocable authorization to use public lands for specific purposes.

Permittee (reciprocal agreements) - (a) The cooperating party to a reciprocal agreement (some early agreements refer to such a party as "applicant"); (b) A third party using a road controlled by the United States and constructed over lands belonging to the permittee in a reciprocal agreement; and (c) A party authorized to use roads controlled by the United States under the terms of a Unilateral O&C Rights-of-Way, mining, or grazing permit, etc.

Permeability - The ease with which gases, liquids or plant roots penetrate or pass through bulk mass of soil or a layer of soil.

Physiographic Region - Region of similar geologic structure and climate with a unified history of land formation.

Planning Area - All of the lands within the BLM management boundary addressed in a BLM resource management plan, however planning decisions apply only to BLM-administered lands and mineral estate.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Prescribed Fire - Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives for wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

Prey Species - An animal taken by a predator as food.

Properly Functioning Condition (PFC) - Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality. Properly functioning condition also acts to filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse pond and channel characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity.

Public Lands - Any land and interest in land owned by the United States within the several states and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except lands located on the Outer Continental Shelf; and lands held for the benefit of Indians, Aleuts, and Eskimos.

Rangeland Improvements - Any activity or program on or relating to rangelands that is designed to improve forage production, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and enhance habitat for livestock, wildlife, and wild horses and burros. Rangeland improvements include land treatments (e.g., chaining, seeding, burning, etc.), stockwater developments, fences, and trails.

Reasonable Access - Owners of non-federal land surrounded by public land managed under FLPMA are entitled to reasonable access to their land. Reasonable access is defined as access that the Secretary of the Interior deems adequate to secure the owner reasonable use and enjoyment of the non-federal land. Such access is subject to rules and regulations governing the administration of public land.

Reference Area - Sites that, because of their condition and degree of function, represent the ecological potential or capability of similar sites

in an area or region (ecological province); and serve as a benchmark in determining the ecological potential of sites with similar soil, climatic, and landscape characteristics.

Relict Plant Community - Areas of plants that have persisted despite the pronounced warming and drying of the interior west over the last few thousand years and/or have not been influenced by settlement and post-settlement activities.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act (FPLMA).

Research Natural Area (RNA) - An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. RNAs are areas designated to ensure representative samples of as many of the major naturally occurring plant communities as possible are preserved. The public may be excluded or restricted from such areas to protect studies.

Right-Of-Way (ROW) - Federal land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

Riparian Area - An area surrounding, influencing, and influenced by a water body such as a stream or wetland. Typically, riparian areas include a community of plants, animals, and insects that are only present due to the moist environment (e.g. groundwater, humidity) created by the water body. Typically, riparian areas also include the adjacent forest, shrublands, grasslands, soils, etc. that provide nutrients, wood, and sediment to a water body.

Riparian Habitat – The living space for plants, animals, and insects provided by the unique character of a riparian area.

Riparian Reserve – A federally designated buffer around streams, springs, ponds, lakes, reservoirs, fens, wetlands, and areas prone to slumping, on federal lands only. The Northwest Forest Plan's Aquatic Conservation Strategy defines riparian reserve widths for the above water bodies. For example, minimum widths are 150 ft. around a wetland, or 150 ft. on each side of a fishless stream.

Riparian Vegetation - Plants adapted to moist growing conditions along streams, waterways, ponds, etc.

Route - A path, way, trail, road, or other established travel corridor.

Saleable Minerals - Minerals that may be sold under the Material Sale Act of 1947, as amended. Included are common varieties of sand, stone, gravel, and clay.

Scarification - Removal of targeted woody vegetation using heavy machinery such as a tractor or dozer. Rear mounted rippers are used to uproot vegetation which is piled using a front mounted blade. Disturbed areas are generally seeded with non-native perennial grasses and the piles burned during the wet season.

Season-Of-Use - The timing of livestock grazing on a rangeland area.

Sediment Yield - The quantity of soil, rock particles, organic matter, or other dissolved or suspended debris which is transported through a cross-section of stream in a given period. Measured in dry weight or by volume.

Silvicultural System - A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

Species - Any species or subspecies of fish or wildlife or plants (and in the case of plants, any varieties), and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.

Special Forest Products - Monument resources such as rocks and minerals, petrified wood, fossils, archaeological and cultural items, plants and parts of plants, Christmas trees, fish and animals not regulated by ODFW, insects or other invertebrate animals, bones, waste, and other products from animals.

Special Status Species - includes the following:

Proposed Species - species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the Federal Register.

Listed Species - species officially listed as threatened or endangered by the Secretary of the Interior under the provisions of the ESA. A final rule for the listing has been published in the Federal Register.

Endangered Species - any species which is in danger of extinction throughout all or significant portion of its range.

Threatened Species - any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate Species - species designated as candidates for listing as threatened or endangered by the FWS and/or NMFS. A list has been published in the Federal Register.

State Listed Species - species listed by a state in a category implying but not limited to potential endangerment or extinction. Listing is either by legislation or regulation.

Sensitive Species - those designated by a State Director, usually in cooperation with the state agency responsible for managing the species and State Natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a state, or within a significant portion of its distribution; (2) are under status review by the FWS and/or NMFS; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or State Listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State Listed but which may be better conserved through application of BLM sensitive species status.

Stabilization - A process to reduce risk of erosion and landslides by constructing drainage structures such as dips and water bars. This also includes seeding, planting other vegetation, or mulching on slopes. Unstable fill embankments that exceed the required road/trail width may be partially or fully removed.

Subwatershed - The sixth level in the hydrologic unit hierarchy. A subwatershed is a subdivision within a fifth level watershed.

Succession - A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax.

Topography - The configuration of a surface area including its relief, or relative elevations, and position of its natural and manmade features.

Total Dissolved Solids (TDS) - The total quantity (reported in milligrams per liter) of dissolved materials in water.

Total Maximum Daily Loads (TMDLs) - Pollution load limits calculated by DEQ for each pollutant entering a water body. TMDLs describe the amount of each pollutant a waterway can receive and still not violate water quality standards. Both point and non-point source pollution are accounted for in TMDLs as well as a safety margin for uncertainty and growth that allows for future discharges to a water body without exceeding water quality standards.

Trail - A created or evolved transportation facility administratively designated for certain non-mechanized types of use. Examples of use on the trails in the monument include hiking, running, equestrian riding, and snowmobiling and cross country skiing.

Trailhead - A designated point of access to a recreation route or trail. It may include a parking area, kiosk, or toilet and can be reached by vehicular or pedestrian access.

Transient Snow Zone (TSZ) - The area where a mixture of snow and rain occurs is referred to as either the rain-on-snow zone or transient snow zone. The snow level in this zone fluctuates

throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events originate in the transient snow zone.

Understory - That portion of trees or other woody vegetation which form the lower layer in a forest stand which consists of more than one distinct layer (canopy).

Uplands - Lands that exist above the riparian/wetland area, or active flood plains of rivers and streams; those lands not influenced by the water table or by free or unbound water; commonly represented by the toe slopes, alluvial fans, side slopes, shoulders and ridges of mountain and hills.

Utility - A service provided by a public utility, such as electricity, telephone, or water.

Valid Existing Rights (VER) - Those rights in existence within the boundaries of the Cascade-Siskiyou National Monument before the monument was established on June 9, 2000. Valid existing rights were established by various laws, leases, and filings made with the BLM.

Vehicle - Any motorized transportation conveyance designed and licensed for use on roadways, such as an automobile, bus, or truck, and any motorized conveyance originally equipped with safety belts.

Vertebrate Species - Any animal with a backbone or spinal column.

Visitor Day - Twelve visitor hours which may be aggregated by one or more persons in single or multiple visits.

Watershed - All land and water within the confines of a drainage divide.

Watershed Analysis - A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning.

Watershed Function - The principle functions of a watershed include the capture of moisture contributed by precipitation; the storage of moisture within the soil profile, and the release of moisture through subsurface flow, deep percolation to groundwater, evaporation from the soil, and transpiration by live vegetation.

Wetlands - Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

Wilderness Area - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint on human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, education, scenic, or historical value as well as ecological and geological interest.

Wilderness Study Area (WSA) - Areas under study for possible inclusion as a Wilderness Area in the National Wilderness Preservation System.

Windthrow - A tree or trees uprooted or felled by the wind.

Withdrawal - Removal or "withholding" of public lands from operation of some or all of the public land laws (settlement, sale, mining, and/or mineral leasing). An action which restricts the use or disposal of public lands, segregating the land from the operation of some or all of the public land and/or mineral laws and holding it for a specific public purpose. Withdrawals may also be used to transfer jurisdiction of management to other federal agencies.

Yarding - The act or process of conveying logs to a landing.

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