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Draft Lakeview Resource Management Plan/ Environmental Impact Statement

Volume 2 [of 2]

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

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Abbreviations and Acronyms

Reader note: *Refer to the list below for abbreviations or acronyms that may be used in this document.*

ACEC ~ area of critical environmental concern
APHIS ~ Agricultural Plant and Animal Health Inspection Service
AUM ~ animal unit month
BIA ~ Bureau of Indian Affairs
BLM ~ Bureau of Land Management
BMP ~ best management practice
BOR ~ Bureau of Reclamation
BPA ~ Bonneville Power Administration
CAA ~ "Clean Air Act"
CFR ~ "Code of Federal Regulations"
CWA ~ "Clean Water Act"
DLCD ~ Department of Land Conservation and Development
DOD ~ Department of Defense
DOE ~ Department of Energy
DOGAMI ~ Oregon Department of Geology and Mineral Industries
DOI ~ Department of the Interior
EIS ~ environmental impact statement
EPA ~ Environmental Protection Agency
FAA ~ Federal Aviation Administration
FERC ~ Federal Energy Regulatory Commission
FLPMA ~ "Federal Land Policy and Management Act"
ICBEMP ~ Interior Columbia Basin Ecosystem Management Project
IMP (wilderness) ~ "Interim Management Policy for Lands Under Wilderness Review" 1995
ISA ~ instant study area
LCDC ~ Land Conservation and Development Commission
LRA ~ Lakeview Resource Area
NCA ~ national conservation area
NEPA ~ "National Environmental Policy Act"
NRHP ~ National Register of Historic Places
NOAA ~ National Oceanographic and Atmospheric Administration
NPS ~ National Park Service
NRCS ~ Natural Resources Conservation Service
ODA ~ Oregon Department of Agriculture
ODEQ ~ Oregon Department of Environmental Quality
ODF ~ Oregon Department of Forestry
ODFW ~ Oregon Department of Fish and Wildlife
ODOT ~ Oregon Department of Transportation
ODSL ~ Oregon Division of State Lands
ODWR ~ Oregon Department of Water Resources
OHV ~ off-highway vehicle
ONHP ~ Oregon Natural Heritage Program
PRIA ~ "Public Rangelands Improvement Act"
RMP ~ resource management plan
RNA ~ research natural area
SHPO ~ State Historic Preservation Office
SMA ~ special management area
T&E ~ threatened and endangered
TNC ~ The Nature Conservancy
USDA ~ U.S. Department of Agriculture
USDI ~ U.S. Department of the Interior
USFS ~ U.S. Forest Service
USFWS ~ U.S. Fish and Wildlife Service
USGS ~ U.S. Geological Survey
VRM ~ visual resource management
WSA ~ wilderness study area
WSR ~ wild and scenic river

Appendix A — Interior Columbia Basin Ecosystem Management

This appendix contains a summary of the scientific findings and assessments from the various reports and publications of the Interior Columbia Basin Ecosystem Management Project (ICBEMP). Appendix A1 is the summary report of the subbasin review that was completed in the Lakeview District in 2000. The intent of that review, in part, was to review the ICBEMP findings and to determine their relevance to the four subbasins in the review area. The following subbasin review area report is taken directly from the "Summary of the Analysis of the Management Situation" completed in 2000, and references some resource management plan (RMP) steps as though they will be completed in the future. However, many of these steps have been completed or will be completed soon. A subbasin review area guide with its appendices is available at http://www.icbemp.gov/implement/subbas.shtml

A1: Subbasin Review Report

Introduction

ICBEMP was established in 1994 ". . . to develop and then adopt a scientifically sound, ecosystem-based strategy for managing all U.S. Forest Service (USFS)- or Bureau of Land Management (BLM)-administered lands within the (interior Columbia) Basin." (USDA-FS and USDI-BLM 1996). The ICBEMP covered an area of 145 million acres, 53 percent of which was public land managed by the BLM or the USFS. The size of this area requires some means to bring findings and information down to a level where they could be applied in a USFS or BLM management unit such as a ranger district or resource area. A process was developed with which the pertinent information could be "stepped down" to the local level. This is called the subbasin review process.

The ICBEMP area was divided for analysis and review into four geographic scales: broad-scale (interior Columbia Basin), mid-scale (subbasins or groups of subbasins), fine-scale (watershed), and site scale (project). The mid-scale or subbasin level is the level at which field offices would do long-range planning for all resources within their respective administrative boundaries. This scaled analysis is summarized in Table A1-1.

The subbasins are based on the U.S. Geological Survey (USGS) 4th field hydrologic unit codes. On average these 4th field hydrologic unit codes comprise an area of 500,000 to 1,000,000 acres. The Lakeview Subbasin Review Area included four subbasins identified in the ICBEMP scientific assessment: Summer Lake, Lake Abert, Warner Valley, and Guano comprising and area of approximately 6.5 million acres. Land ownership and administrative responsibilities included private, State of Oregon, USFS, BLM, U.S. Fish and Wildlife Service (USFWS), and Department of Defense (DOD). The majority of the land in the subbasin review area is administered by BLM, Lakeview Field Office. Approximately 3.2 million acres of the BLM-administered land is within the RMP planning area.

The resource area staff identified a list of approximately 55 offices, agencies, Tribal groups, and individuals who were thought to have an interest in resource management in the subbasin review area. These included representatives from other BLM offices, USFS offices, USFWS, Oregon Department of Fish and Wildlife (ODFW), Oregon State Lands Department (ODSL), Oregon Department of Agriculture (ODA), county and city government, and several Tribal groups. Private landowners were not asked to participate since this was to be a collaborative interagency and intergovernmental process.

In anticipation of preparing a comprehensive RMP, the Lakeview Field Office had collected a considerable amount of data and information about the resources on BLM lands. Much of this information was in a geographic information system format. Kinds of information needed for the resources in the subbasin review area and from other agencies were identified prior to the first meeting.

A BLM team was assembled to be the core group responsible for gathering data and putting it into a written or geographic information system format. This team was composed of planning and "National Environmental Policy Act" (NEPA) specialists, wildlife biologist, fisheries biologist, hydrologist, botanist, weeds specialists, fire ecologist, forester, and range management specialist. The subbasin review team would deal primarily with health-of-the-land issues.

Table A1-1.—*Concept of scaled analysis*

Scale	Type of analysis	Issues addressed
Broad-scale (region)	Interior Columbia Basin Ecosystem Management Project	Addresses issues that can only be seen or analyzed at a broad-scale (example: decline of greater sage-grouse in the shrub-steppe ecosystem). Does not address or make decisions for issues that can only be addressed at a more local level.
Mid-scale (BLM resource area, national forest, subbasin, or group of subbasins)	Resource management plan, forest plan, or subbasin review	Addresses issues more appropriately addressed at the mid-scale level, such as land use allocations within a BLM resource area or national forest. Provides a means to "step down" broad-scale decisions and direction to the local level.
Fine-scale (watershed, allotment, or project area)	Watershed analysis, allotment management plan, or project plan	Addresses issues and decisions that are site-specific, such as individual projects or objectives for an allotment or watershed.

Source: "Ecosystem Review at the Subbasin Scale (Subbasin Review)" (USFS and BLM 1999).

Issues and Findings

Broad-scale information from ICBEMP provides a general characterization of the Lakeview Subbasin Review Area relative to the rest of the Interior Columbia River Basin. The broad-scale information indicates that about 20 percent of this subbasin review area is forest and 80 percent rangeland.

Forests in the subbasin review area are described as being dominated by dry forests with approximately 60 percent of the area showing changes in fire frequency. Mid-seral structure has increased with a decline in early- and late-seral stages. Most of the area is classified as low forest integrity and low to moderate hydrologic integrity.

Rangeland in the subbasin review area is also classified as low integrity. The rangeland is described as being dominated by dry shrubland vegetation which is highly sensitive to overgrazing and susceptible to invasion by noxious weeds. Hydrologic integrity is low to moderate and the integrity of riparian environments is commonly low. Native fish species generally occur in highly fragmented habitat.

The conditions described above significantly increase the subbasins' susceptibility to wildland fire, insects and disease, soil erosion, loss of native species, and other problems that threaten ecological integrity, water quality, species recovery, timber and forage production, and other uses of public lands (USDA-FS and USDI-BLM 1996). The subbasin review team agreed that these findings were generally accurate in describing conditions in the Lakeview Subbasin Review Area.

The following potential issues were identified by the Lakeview Resource Area (LRA) prior to the beginning of the subbasin review process. These would be addressed in the RMP/environmental impact statement (EIS) pending any changes.

Issue 1. What areas, if any, should be designated and managed as special management areas (SMA's) including areas of critical environmental concern (ACEC's), wild and scenic rivers (WSR's), or other?

- Which areas should be designated as special management areas (SMA's)?
- Which designations are most appropriate?
- How should designated areas be managed?
- How should the Lost Forest/Sand Dunes/Fossil Lake existing ACEC be managed?
- Should boundaries or management of existing SMA's be changed, and if so, how?

Issue 2. How can upland ecosystems be managed and restored to achieve desired future conditions?

- What is the current condition of the various ecosystems and plant communities in the resource area, and how can their conditions be improved or maintained?
- How should the public lands in the resource area be managed to improve and maintain water quantity and quality and to promote hydrologic recovery?
- How should the public lands be managed to maintain the existence, and also promote recovery, of threatened and endangered (T&E) species?
- What sensitive species occur in the resource area, and how should the lands be managed to avoid listing of these species as T&E?
- Where are noxious weeds located in the resource

area, and how can their spread be controlled?
- What is the fire history in the resource area, and what is the appropriate role of fire in the management of vegetation resources on the public lands?

Issue 3. How can riparian areas and wetlands be managed to protect and restore their natural functions?

- How should riparian vegetation communities be managed to improve or maintain proper functioning condition while providing for resource uses such as livestock grazing, recreation, and mineral exploration and development?
- How should riparian systems be managed to improve or maintain habitat quality for fish, wildlife, plants, and invertebrates?
- How should riparian and wetland areas be managed to incorporate State of Oregon water quality standards and approved management plans addressing water quality concerns?
- How should management actions in upland ecosystems be developed or designed to be compatible with the needs of riparian communities?

Issue 4. How should recreation be managed to meet public demand while protecting natural values and health and safety of the public?

- Which, if any, roads within the existing transportation system should be closed to protect resource values?
- Is there a need for any additional roads to provide access to areas currently inaccessible to BLM, commercial interests, or the public?
- Which areas should be designated open, limited, or closed to motorized vehicle use?
- How should wilderness therapy groups be managed to meet the needs of these groups while ensuring safety of the public and adjacent property owners?
- Should other recreation sites be developed to provide for public use?

Issue 5. How should public lands be managed to meet the needs of local communities and Native American Tribes?

- What is an appropriate role for BLM in providing support to local communities?
- How should the public lands be managed to provide economic support to local communities?
- How should the public lands be managed to meet the needs of Tribal self-sufficiency and traditions?
- How can conflicts between agency actions and Tribal needs and expectations be minimized or avoided?

These mid-scale issues generally reflect many of the broad-scale findings of the ICBEMP scientific assessment.

At the first meeting the group was introduced to the subbasin review process and the objectives and expectations. The above issues were introduced and briefly discussed.

At the second meeting, the similarities between the subbasin review process and the analysis of the management situation was discussed. These similarities are shown in Table A1-2. In addition, the group examined the list of broad-scale findings documented in the ICBEMP scientific assessment (USFS and BLM 1996) and EIS. The meeting participants determined that most of the findings applied to the Lakeview Subbasin Review Area. Some of the findings were rewritten slightly to fit the Lakeview Subbasin Review Area. Other findings were added that were applicable to the local situation. Of the approximately 60 findings or conditions listed, only 7 were considered not to be applicable to the Lakeview Subbasin Review Area. Either the resource(s) do not occur in the area, or conditions are known to be better than indicated by the findings.

The findings dealt primarily with terrestrial and aquatic habitat, water quality, riparian health, landscape health, and social and economic concerns including Tribal rights.

At the third meeting the refined list of broad-scale findings was presented and small changes were made (these follow shortly). Several findings dealt with what were determined to be priority issues including noxious weed expansion, juniper expansion, water quality, T&E species management, aquatic habitat, and riparian and wetland vegetation.

The following is a list of key broad-scale findings derived from the ICBEMP scientific assessment applicable to the Lakeview Subbasin Review Area. This list was developed during the Lakeview subbasin review. The list has been modified slightly in that it deals primarily those findings that are applicable to the Lakeview resource management planning area. Following each finding is a notation indicating under which of the five RMP/EIS issue(s) the finding is being addressed.

Table A1-2.—*Steps in the subbasin review and analysis of management situation*

Subbasin review	Analysis of the management situation
1) Prepare for the review	1) Collect and consolidate data
2) Identify mid-scale issues	2) Conduct internal and public scoping
3) Describe mid-scale character (describe character of the review area in relation to the issues)	3) Resource area profile (describe the condition of the resource area, including its physical, biological and human environment).
4) Develop recommendations and integrated priority setting (develop recommended actions and determine urgency and timing of actions)	4) Existing management situation (describe for each resource its current uses, production, or protection problems and the management practices and direction).
5) Subbasin review report (document the subbasin review results and the process) and provide information for further planning	5) Identify management opportunities (identify and evaluate all reasonable opportunities and/or actions to address the planning issues and management concerns).
	6) Prepare the analysis of the management situation (develop a comprehensive document for use by BLM and a summary document for public distribution; provide information for RMP/EIS).

Revised List of Key Broad-Scale Findings Used in Issue Identification for the Lakeview Subbasin Review Area

(From "Draft Subbasin Review Guide," Appendix A, Using Key Broad-Scale Findings in Issue Identification (USDA-FS and USDI-BLM 1999.)

The underlined text indicates a change or addition to the original ICBEMP finding that makes the finding more specific to the Lakeview RMP area. Findings that were determined by the subbasin review group to be applicable to the neighboring national forests are presented at the end of the list . Those findings were not addressed in the RMP/EIS. The ICBEMP findings that the subbasin review group felt did not apply to the Lakeview Subbasin Review Area are listed at the end of this section.

Terrestrial Habitat/Landscape Health

Rangelands

- Noxious weeds are spreading rapidly, and in some cases exponentially, on rangelands in every range cluster as well as in most dry forest types. **(Issue 2)**

- Woody species (such as sagebrush and juniper) encroachment and increasing density, especially on dry grasslands and cool shrublands, have reduced herbaceous understory and biodiversity. **(Issue 2)**

- Cheatgrass has taken over many dry shrublands, with the potential to increase soil erosion and fire frequency and reduce biodiversity and wildlife habitat. Cheatgrass and other exotic plant infestations have simplified species composition, reduced biodiversity, changed species interactions and forage availability, and reduced the systems' ability to buffer against changes. **(Issue 2)**

- Expansion of agricultural and urban areas on non-Federal lands has reduced the extent of some rangeland vegetation types compared to historic conditions. However, this trend does not continue today, due to limitations placed on water use for agricultural irrigation. These changes may have contributed to loss of native species diversity and some wildlife species population declines, some to the point of special concern (such as greater sage-grouse and pygmy rabbit). **(Issues 2 and 5)**

- Increased fragmentation and loss of connectivity within and between blocks of habitat, especially in shrub steppe and riparian areas, have isolated some habitats and wildlife populations (greater sage-grouse, neotropical migrant birds, big game species, and other wide-ranging species). In turn, this has reduced the ability of populations to move across the landscape, resulting in potential long-term loss of genetic interchange. **(Issues 2 and 3)**

- Fire frequency has decreased in many range habitats resulting in an increase in juniper encroachment into sagebrush/grass shrub steppe; an increase in tree density in formerly open, savanna-like stands of juniper and ponderosa pine; and increased density and/or coverage of big sagebrush and other shrubs, with an accompanying loss of herbaceous vegetation. **(Issue 2)**

- There is interest in protecting and managing juniper woodland including old growth woodlands on the landscape. In addition, there is increased interest in juniper woodlands for consumptive uses such as firewood, posts, boughs, berries, and Tribal medicine, while maintaining nonconsumptive uses such as deer winter range. **(Issues 1, 2, and 5)**

Source Habitats

- Source habitats for the majority of species in the basin declined strongly (>20 percent decline) from historical to current. **(Issues 1, 2, and 3)**

- The strongest declines were for species dependent on low-elevation, old-forest habitats, species dependent on combinations of rangeland or early-seral forests, and species dependent on native grassland and open-canopy sagebrush habitats. **(Issue 2)**

- Primary causes for decline in native herbland, woodland, grassland, and sagebrush habitats are excessive livestock grazing, invasion of exotic plants, and conversions of land to agriculture. Altered fire regimes have also contributed to a decline in grassland and shrubland habitats. **(Issues 1 and 2)**

- A variety of road-associated factors negatively affect habitats or populations of many species. **(Issues 2, 3, and 4)**

- Habitats for many riparian-dependent terrestrial species, especially shrubland habitats, have declined. **(Issue 3)**

- Snags and down wood habitats in managed forests and riparian areas have declined. **(Issue 3)**

Hydrology and Watershed Processes

- Management activities in watersheds throughout the subbasin review area have affected the quantity, flow rate, and quality of water. These activities have also negatively affected sedimentation and erosion; production and distribution of organic material; and physical structure of banks, stream beds and lake shores; thereby reducing hydrologic conditions. **(Issue 2 and 3)**

Streams, Rivers, and Lakes

- Many streams on BLM-administered lands are "water quality limited" as defined by the CWA ("Clean Water Act"), primarily due to high temperatures and, to a lesser extent, sedimentation. **(Issue 3)**

- Streams are highly variable across the subbasin review area, reflecting diverse physical settings and disturbance histories. Nevertheless, important aspects of fish habitat, such as pool frequency, have decreased throughout much of the area. **(Issue 3)**

Riparian Areas and Wetlands

- The overall extent and continuity of riparian/wetland areas have decreased from historic conditions. Riparian ecosystem function, as determined by the amount and type of vegetation cover, has decreased in the subbasins compared to historic conditions. However, on most BLM-administered riparian areas, conditions and trends have improved significantly in the last 20 years due to changes in livestock grazing and other management practices. **(Issue 3)**

- Within riparian woodlands, the abundance of mid-seral vegetation has increased, whereas the abundance of late- and early-seral structural stages have decreased. There is an overall decrease in large trees and late-seral vegetation in riparian areas, primarily on USFS lands in the subbasin review area. **(Issue 3)**

- Within riparian shrublands and quaking aspen stands there has been extensive spread of western juniper and introduction of exotic grasses and forbs. Within quaking aspen stands, there has been a decrease in early- and mid-seral vegetation. **(Issues 2 and 3)**

- The frequency and extent of seasonal floodplain and wetland inundation have been altered by changes in flow regime, and by changes in channel morphology. **(Issue 3)**

- There is an overall decrease in large trees, particularly cottonwoods, and late-seral vegetation in

riparian areas. **(Issue 3)**

- Riparian areas are important for three-fourths of the terrestrial wildlife species (neotropical migrant birds in particular). Riparian dependent wildlife numbers have declined in proportion to the decline in riparian habitat conditions. **(Issues 2 and 3)**

- In general, spring developments have altered the surrounding riparian zone and overall spring function. In those areas where springs have been fenced and livestock grazing have been removed from the spring source, the riparian zone and spring function have been restored to some extent. **(Issues 2 and 3)**

Fish

- The composition, distribution, and status of fishes within the planning area are substantially different from what they were historically. Some native fishes have been eliminated from large portions of their historical ranges. **(Issue 3)**

- Many native nongame fish are vulnerable because of their restricted distribution or fragile or unique habitats. **(Issue 3)**

- Although several of the key salmonids are still broadly distributed (notably the cutthroat trouts and redband trout), declines in abundance, loss of life history patterns, local extinctions, and fragmentation and isolation in smaller blocks of high quality habitat are apparent. **(Issue 3)**

- Core areas for rebuilding and maintaining biological diversity associated with native fishes still exist within the planning area. **(Issue 3)**

Air Quality

- The current condition of air quality in the project area is considered good, relative to other areas of the country. There is no major industrial source of air pollution, but wood burning in winter for home heating combined with local industrial sources is a fairly major Environmental Protection Agency (EPA)/Oregon Department of Environmental Quality (ODEQ) air quality issue (nonattainment area) around Lakeview and possibly other population centers which may or may not fall within the subbasin area. **(Issue 2)**

- Wildland fires can significantly affect air quality. However, current numbers of wildland fires and total numbers of acres burned is probably lower than historic levels due to increased fire suppression activities. For this reason, total smoke emissions from wildland fires are probably lower than they were historically. **(Issue 2)**

- Within the project area, the current trend in prescribed fire use is expected to result in increased smoke emissions during certain times of the year. **(Issue 2)**

Human Uses and Values

- Recreation is an important use of agency lands in the subbasin review area in terms of economic value and amount of use. Most recreation use is tied to roads and accessible water bodies, though primitive and semiprimitive recreation is also important. Recreation use is increasing in the subbasin review area though not as much as in other places within the interior Columbia Basin closer to large population centers. Increases in off-highway vehicle (OHV) use, wilderness therapy groups, fishing, hunting, camping, and other activities are expected. This can result in long-term cumulative effects. **(Issue 4)**

- Industries served by agency land uses, such as logging, wood products manufacturing, mining, and livestock grazing, no longer dictate the economic prosperity of the subbasin area, but remain economically and culturally important. The economic dependence of local communities on these industries is high due to geographic isolation and lack of alternative employment opportunities. **(Issues 4 and 5)**

- The public has invested substantial land and capital to develop road systems on agency lands, primarily to serve commodity uses. On USFS lands, commercial timber harvest has financed most of the construction cost and maintenance cost. On BLM lands most roads are for access to grazing allotments and range projects. However, recreation now accounts for the majority of the use of the roads of both agencies. Trends in timber harvesting and new road management objectives make the cost of managing these road systems (as well as those on BLM land) an issue of concern. There is also a need to determine which roads should be left open for public access, versus which should be seasonally or permanently closed and rehabilitated for resource protection purposes. **(Issues 4 and 5)**

- For those counties that have benefitted from Federal sharing of gross receipts from commodity sales on agency lands, changing levels of commodity outputs affect county budgets. Lake and surrounding counties are concerned over the potential loss of Payment-in-Lieu-of-Taxes funds from BLM lands which have been an important component of funding county services such as road maintenance. **(Issue 5)**

- Agency social and economic policy has emphasized the goal of supporting rural communities, specifically promoting stability in those communities deemed dependent on commodity production and processing from agency administered land. Regulation of grazing practices has been important on BLM-administered rangelands. **(Issues 2, 4 and 5)**

- The factors that appear to help make communities resilient to economic and social change include population size and growth rate, economic diversity, social and cultural attributes, amenity setting, and quality of life. The agencies need to develop management strategies to positively influence these factors. **(Issue 4)**

American Indian Rights and Interests

- In some cases there is low confidence and trust among Tribes that American Indian rights and interests are considered when decisions are proposed and made for actions to be taken on BLM- or USFS-administered lands. In some instances, Indian Tribes do not feel that they are involved in the decision-making process commensurate with their legal status. They may not feel that government-to-government consultation is taking place in all situations or for all projects. **(Issue 5)**

- American Indian values on Federal lands may be affected by proposed actions on forest lands and rangelands because of changes in vegetation structure, composition, and density; existing roads; and watershed conditions. **(Issues 1, 2, and 5)**

- Culturally significant species (such as anadromous fish, mule deer, and cultural plants) and the habitat necessary to support healthy, sustainable, and harvestable populations constitute a major, but not the only concern. The local Tribal groups including the Klamath Tribes and the Burns Paiute Tribe have a number of concerns about ecosystem management issues within the subbasin review area. **(Issues 1, 2, 3, and 4)**

The following findings were determined to be applicable only to the adjacent national forests (primarily the Fremont National Forest) and are not addressed in this RMP/EIS. They are presented here for information purposes only.

- Old multi-story and old single-story ponderosa pine have decreased significantly across its range. The primary transition is from ponderosa pine dominant stands to white fir becoming a significant stand component. The loss of the large trees (live and dead) within roaded/harvested areas has affected terrestrial wildlife species closely associated with these old forest structures.

- Mid-seral forest structures have increased and current communities have more dense stands of trees, and have higher fuel loadings with a resultant higher susceptibility to catastrophic crown fires than did historical communities.

- There has been an increase in fragmentation and a loss of connectivity within and between blocks of late-seral, old forests, especially in lower elevation forests and riparian areas. This has isolated some animal habitats and populations and reduced the ability of populations to move across the landscape, resulting in a potential long-term loss of genetic interchange.

- Insects and diseases always existed in forests, but the size and intensity of their attacks have increased in recent years due to increased stand density.

- Noxious weeds are spreading rapidly, and in some cases exponentially, in most dry forest types.

- Late seral lodgepole pine types are at risk of shifting to early-seral shrubland types primarily as a result of high intensity wildland fires.

- A majority of riparian areas on USFS-administered lands are either “not meeting objectives,” are “non-functioning,” or are “functioning-at-risk.” However, the rate has slowed and a few areas show increases in riparian cover and large trees.

Findings from the ICBEMP Scientific Assessment Not Applicable to the Lakeview Subbasin Review Area

The following findings that were determined by the review team to be not applicable to the subbasin review area on neither the national forests nor the Lakeview RMP/EIS planning area. The reasons why the findings are not applicable are given.

Finding: Slow-to-recover rangelands (in general, rangelands that receive less than 12 inches of precipitation per year) are not recovering naturally at a pace that is acceptable to the general public, and are either highly susceptible to degradation or already dominated by cheatgrass and noxious weeds.

Response: *The rangelands in the subbasin review area are generally in acceptable condition. The presence of cheatgrass is limited to a few isolated areas. Noxious weeds occur in several locations, however the Lakeview Field Office and the Silver Lake Ranger District have a proactive and aggressive weed containment and management program. There are no large areas (000's of acres) dominated by noxious weeds or annual grasses.*

Finding: Fire frequency has increased in some areas, particularly in drier locations where exotic annual grasses have become established. Increased fire frequency has caused a loss of shrub cover and reduction in bunch grasses.

Response: *In general, in the subbasin review area fire frequency has decreased. There are no widespread stands or infestations of exotic annual grasses susceptible to frequent fires in the subbasin review area.*

Findings: Western larch has decreased across its range. The primary transitions were to interior Douglas-fir, lodgepole pine, or grand fir/white fir. Western white pine has decreased by 95 percent across its range. The primary transitions were to grand fir/white fir, western larch, and shrub/herb/tree regeneration. The whitebark pine/alpine larch potential vegetation type has decreased by 95 percent across its range, primarily through transition to the whitebark pine cover. Over all, the whitebark pine cover type has also decreased, with compensating increases in Engelmann spruce/subalpine fir.

Response: *Western larch and whitebark pine/alpine larch vegetation types have not occurred historically and do not presently occur within the subbasin review area. Western white pine are widely scattered individual trees or small groups of trees. Western white pine was never abundant historically.*

Findings: Wild chinook salmon and steelhead are near extinction in a major part of their remaining distribution.

Response: *Chinook salmon and steelhead do not occur in the Lakeview Subbasin Review Area. No anadromous fish occur in the subbasin review area since none of the streams in the review area are tributaries to the Columbia River or any other stream system connecting to the Pacific Ocean. All streams flow into internal basins.*

Finding: The planning area is sparsely populated and rural, especially in areas with a large amount of agency lands. Some rural areas are experiencing rapid population growth, especially those areas offering high quality recreation and scenery.

Response: *The Lakeview Subbasin Review Area is sparsely populated and rural. However, it is not experiencing any rapid population growth. Populations are either stable or declining. The nearest growing population area is Bend, Oregon. This population growth is increasing recreation use in north Lake County, but the rural character of the subbasin review area is not changing.*

Finding: Development for a growing human population is encroaching on previously undeveloped areas adjacent to lands administered by the USFS and BLM. New development can put stress on the political and physical infrastructure of rural communities, diminish habitat for some wildlife, and increase agency costs to manage fire to protect people and structures.

Response: *There are no rapidly growing areas in or near the Lakeview Subbasin Review Area. There are only minor problems associated with the urban/wildland interface on either USFS- or BLM-administered lands.*

Finding: Indian Tribes do not feel that they are involved in the decision-making process commensurate with their legal status. They do not feel that government-to-government consultation is taking place.

Response: *Over the last several years the Lakeview District, BLM, has continually improved its relationship with the local Tribes. The staff has worked diligently to put a process in place that allows open communication regarding any major project or plan-*

ning effort the office undertakes. Relationships with the Tribes are generally quite good. The Tribes feel that we are doing what we are mandated to do and that the office is conducting government-to-government consultation as it should.

Mid-Scale Character Description (Resource Area Profile)

The Description of the Mid-scale Character, Step 3 of the subbasin review process, was combined with the resource area profile of the "Summary of the Analysis of the Management Situation." Both the resource area profile and the Mid-scale Character is a description of the existing resources in the subbasin review area as well as their condition and use. The only difference is that the resource area profile covers all resources in the LRA, whereas the Description of the Mid-scale Character is tied to the ICBEMP findings for issue identification. Resources addressed by the findings are described for the subbasin review area as a whole. These included rangelands, forests, vegetation, fish and wildlife habitat, water quality, riparian habitats, and human uses and values. Those resources not addressed by the findings are described for the LRA only.

Prior to the third meeting of the subbasin review team, the LRA staff had begun to prepare mid-scale characterization by resource as they pertained to the mid-scale findings and issues for the subbasin review area. This was the next step in the subbasin review process. At the meeting, the group went over the draft characterizations and suggested changes and additions. The current status of each resource pertaining to the findings was described, as well as any management concerns for that resource. These management concerns will be used in developing the Management Opportunities section of the "Summary of the Analysis of the Management Situation" and will also be used in setting priorities and making recommendations as the final step in the subbasin review process. Eventually, this information will feed into the development of alternatives for the RMP/EIS. The complete descriptions of the mid-scale character are in section 2 of the "Summary of the Analysis of the Management Situation" located in the Lakeview Field Office.

Priorities and Recommendations (Management Opportunities)

This is Step 4 of the subbasin review process. This step is analogous to the Management Opportunities step in preparing the analysis of the management situation. In both cases, management opportunities or management recommendations are identified and priority setting is begun. In the subbasin review, the priorities would set the stage for fine scale, or activity-level or project planning. However, in this situation where the subbasin review and analysis of the management situation are combined, the priority setting is begun at this stage, but carried forward and refined in preparing the RMP/EIS. After that would come the fine-scale planning. The Management Opportunities/ Priorities and Recommendations are in Section 4 of the "Summary of the Analysis of the Management Situation" document.

At the fourth meeting the group examined the mid-scale descriptions of three resources of priority concern: watershed and water quality management, juniper management, and noxious weeds. The team discussed the management concerns pertaining to these three resources and "brainstormed" management opportunities and recommendations to address these concerns. This set the stage for the BLM staff to go into their meeting the following week to identify management opportunities for all resources to be addressed in the RMP/EIS.

At the fifth meeting the recommendations or management opportunities that BLM staff had developed were presented. Those that were applicable to the subbasin review area were identified and discussed. Some minor changes were made to these recommendations. During the resource management planning process, BLM will set priorities for acting on these recommendations and opportunities. Emphasis will be placed on those opportunities for protecting and managing special areas such as ACEC's; on opportunities for managing resources across administrative boundaries such as watersheds and noxious weeds; and on opportunities for controlling juniper expansion. The USFS and USFWS will develop priorities through their respective project planning.

Chronology and Summary of Meetings

Meeting #1—August 5, 1999: The subbasin review process was discussed including objectives of process and benefits to agencies and participants. Regional Implementation Support Team gave a presentation on their role and RMP issues were introduced. Nineteen people attended representing BLM Lakeview Office; BLM Oregon/Washington State Office; Winema and Fremont National Forests; Forest Service Region 6 Office; Lake County Commissioners; ODA; Oregon Department of Water Resources (ODWR); ODEQ; ICBEMP Team; and the Southeast Oregon Resource Advisory Council.

Meeting #2—September 8, 1999: The relationship between subbasin review and analysis of the management situation was presented. The subbasin review area was described. The findings from the ICBEMP scientific assessment were discussed and refined. Data needs for the subbasin review process were identified. Fifteen people attended representing BLM Lakeview Office; BLM Oregon/Washington State Office; Lake County; ODA; Burns Paiute Tribe; ODFW; Fremont National Forest; and USFWS.

Meeting #3—November 9, 1999: The refined list of findings and issues as applicable to subbasin review area were presented. Data and information needs for the subbasin review area were discussed. Subbasin characterizations were discussed. Eleven people attended representing BLM Lakeview Office; ODA; USFWS; Fremont National Forest.

Meeting #4—January 4, 2000: The data thus acquired was discussed. Maps showing ICBEMP broad-scale classification of subbasin review area were distributed. Three priority management concerns were identified in the subbasin review area: water quality, juniper expansion, and noxious weeds. Some management opportunities for these three were identified. Fifteen people attended representing BLM Lakeview Office, ODFW, and Fremont National Forest.

Meeting #5—February 9, 2000: Management opportunities previously identified by BLM staff and which applied to subbasin review were presented and discussed. The group also discussed work with USGS regarding watershed boundaries. Thirteen people attended representing BLM Lakeview Office, ODFW, and USFWS.

BLM staff incorporated the descriptions of the mid-scale character and the recommendations into the resource area profile and management opportunities sections, recpectively, of the "Summary of the Analysis of the Management Situation." The similarities between the subbasin review process and the analysis of the management situation process are shown in the following table.

The integrated priority setting described in the subbasin review was not done in the meetings. For BLM actions, this will be done through the RMP. On the Fremont National Forest, this is being done through their watershed assessment and restoration process.

A2: ICBEMP Scientific Assessment of the Lakeview Planning Area

ICBEMP (1996h) documents the scientific assessment of 164 subbasins in the project area (Table A2-1). The Lakeview planning area is contained within four of these subbasins: Summer Lake, Lake Abert, Warner Lakes, and Guano. A subbasin is a fourth field hydrologic unit code of USGS and usually encompasses about 800,000 to 1,000,000 acres although some are much larger.

The composite ecological integrity was determined for each of the subbasins in the project area. This composite was based on the integrity of five components: forestlands, rangelands, forestland hydrology, rangeland hydrology, and aquatic systems. In general, the subbasin review group felt that the determinations made by ICBEMP did, for the most part, correspond to the actual on-the-ground-situation in the four subbasins.

Ecological Integrity

Ecological integrity is defined as the degree to which all ecological components and their interactions are represented and functioning; the quality of being complete; a sense of wholeness. Since absolute measures of integrity do not exist, proxies provide useful measures to estimate the integrity of major ecosystem components (forestland, rangeland, aquatic, and hydrologic). Estimating these integrity components in a relative sense across the project area (ICBEMP area) helps to explain current conditions and to prioritize future management. Thus, areas of high integrity would represent areas where ecological functions and processes are better represented and functioning than areas rated as low integrity (USDA-FS and USDI-BLM 2000a).

In rating the ecological integrity of the project area, the ICBEMP team did not have consistent measures of elements that might be considered direct measures of integrity across all ownerships within the Basin. Proxies were selected from the data available to represent a broad array of functions, processes, conditions, and outcomes.

In order to arrive at a composite ecological integrity for each of the subbasins, ICBEMP scientists rated the subbasins as having high, medium, or low ecological integrity for forestland, rangelands, forestland hydrol-

Table A2-1.—*Ecological ratings for the four subbasins in the planning area*

		Integrity ratings					
Subbasin	Acres [1]	Forestland	Rangeland	Forest hydrologic	Range hydrologic	Aquatic	Composite ecological
Silver Lake	2,624,000	Moderate	Low	High	ND	Low	Low
Lake Abert	652,800	Moderate	Low	High	ND	Low	Low
Warner Lakes	1,216,000	ND [2]	Moderate	ND	High	Low	Moderate
Guano	1,900,000	ND	Moderate	ND	High	Moderate	Moderate

[1] Includes all land ownership within the subbasin.
[2] ND ~ no data; ICBEMP did not determine integrity ratings for these components in these subbasins.

ogy, rangeland hydrology, and aquatic systems. These ratings were based on relative differences between subbasins.

A terrestrial system that exhibits high integrity is a mosaic of plant and animal communities consisting of well-connected, high-quality habitats that support a diverse assemblage of native and desired nonnative species, the full expression of potential life histories and taxonomic lineages, and the taxonomic and genetic diversity necessary for long-term persistence and adaptation in a variable environment. Areas exhibiting the most elements of a system with high integrity were rated as high and those with the fewest elements were rated low; the medium rating fell in between.

Forestland integrity ratings were estimated for each subbasin if the forested vegetation component was at least 20 percent. Measures of forest land integrity include such elements as: (1) consistency of tree stocking levels with long-term disturbance typical for the forest vegetation present; (2) the amount and distribution of exotic species; (3) the amount of snags and down woody material present; (4) disruption to the hydrologic regimes; (the absence or presence of wildland fire and its effect on the composition and patterns of forest types; and (6) changes in fire severity and frequency from historical (early 1800s) to the present. Specific proxies for forestland integrity include: (1) proportion of area in dry and moist forest potential vegetation groups; (2) proportion of area estimated road densities of moderate or greater (>0.7 miles of road per square mile of land); (3) proportion of the area in wilderness or essentially unroaded (<0.1 miles of road per square mile of land); proportion of the area where fire severity increased between historical and current periods by at least one class (nonlethal to mixed severity, mixed to lethal, or nonlethal to lethal); and (5) portion of the area where fire frequency declined between historical and current periods by at least one class (fire frequency classes: 0–25 year return interval, 26–75 year interval, 76–150 year return interval, and greater than 150 years.

The Silver Lake and Lake Abert Subbasins were rated as having moderate forestland integrity. Although there is very little forestland on the Lakeview RMP area, most of the watersheds in these two subbasins originate on USFS land and flow onto BLM or private land below. Therefore, conditions at the head of the watershed directly affect conditions at the foot of the watershed. Forestland integrity affects conditions on BLM-administered lands.

Measures of rangeland integrity include such elements as (1) grazing influences on vegetation patterns and composition; (2) disruptions to the hydrologic regimes; (3) expansion of exotic species; (4) changes in fire severity and frequency; (5) increases in bare soils; and (6) expansion of woodlands into herblands and shrublands. Specific proxies for rangeland integrity include: (a) portion of area in dry grassland and shrubland potential vegetation groups; (b) proportion of area having estimated road densities of moderate or greater (>0.7 miles per square mile of land); (c) proportion of area in potential agriculture vegetation groups; and (d) the proportion of the area comprised of western juniper and big sagebrush vegetation types.

The Silver Lake and Lake Abert Subbasins were rated as having low rangeland integrity. The Warner Lakes and Guano Subbasins were rated as having moderate rangeland integrity.

A hydrologic system that exhibits high integrity is a network of streams, and their ground water ecosystems within the broader landscape where the upland, floodplain, and riparian areas have resilient vegetation—where capture, storage, and release of water limits the effects of sedimentation and erosion, and where infiltration, percolation, and nutrient cycling provide for diverse and productive aquatic and terrestrial environments. Watersheds with high impact (disturbance) and low recovery potential have higher prob-

abilities of containing altered hydrologic functions than other areas, and are consequently classified as low integrity. Conversely, areas with low relative effect from mining, dams, roads, cropland conversion, and grazing, and which also have high recovery potentials, are considered to have the highest probable hydologic integrity.

Measures of hydrologic integrity include such elements as: (1) disturbance to water flow; (2) bare soil and disturbance to soil structure; (3) riparian vegetation; (4) sensitivity of stream banks and hill slopes to disturbance; (5) cycling of nutrients, energy, and chemicals; (6) surface and subsurface flows; (7) stream-specific measurements such as gradient, streambed substrate, full bank width and depth; and, (8) recovery potential following disturbance. Specific proxies for forest and rangeland hydrologic integrity include: (a) hydrologic effect variables (such as mining, dams, cropland conversion, and roads); and (b) sensitivity of stream banks and stream channel function to disturbance. Ratings include potential for sediment loading, particularly after fire or road construction; inherent stream bank sensitivity; rating of riparian vegetation importance to stream function; and potential for watershed recovery following disturbance.

The Silver Lake and Lake Abert Subbasins were rated as having high forest hydrologic integrity. The Warner Lakes and Guano Subbasins were rated as having high rangeland hydrologic integrity.

Aquatic integrity measures the connectedness and quality of water and habitats to support a diverse assemblage of native and nonnative species with the full expression of life histories and genetic diversity. High aquatic integrity are those subbasins which most closely resemble natural, fully functional aquatic ecosystems. These subbasins provide a system of large, well-dispersed habitats that are resilient to large-scale catastrophic disturbances. Medium aquatic integrity are those subbasins which support important aquatic resources, often with watershed classified as strongholds for one or more species scattered throughout. The integrity of fish assemblage is moderate or high. The most important difference between high integrity and medium integrity is increased fragmentation that has resulted from habitat disruption or loss. Low aquatic integrity are those subbasins which may support key salmonids or have other important aquatic values such as T&E species, narrow endemics, introduce or hatchery supported sport fisheries. In general, these watersheds are strongly fragmented by extensive habitat loss throughout the component watersheds.

Silver Lake, Lake Abert, and Warner Lakes Subbasins were rated as having low aquatic integrity. Guano Subbasin was rated as having moderate aquatic integrity.

Subbasins were also examined to determine whether they clustered into groups with common conditions, risks, and opportunities. This analysis was conducted separately for forested landscapes and nonforested (range) landscapes. For the cluster analysis, conditions within forest clusters and range clusters are summarized for the entire landscape, including both terrestrial and aquatic components. Within any cluster, predominant conditions are an average—some locations within the cluster may have specific conditions that are better or worse than indicated.

Subbasins with at least 20 percent of their area composed of dry forest, moist forest, or cold forest potential vegetation groups were classified as forest clusters. Relations among variables reflecting vegetative conditions, hydrologic sensitivity, and human caused disturbance of native forests were studied to identify dominant patterns and differences. Six forest clusters of subbasins with similar conditions emerged.

The Summer Lake and Lake Abert Subbasins were placed in Forest Cluster 5. Subbasins in Forest Cluster 5 have low forest integrity and low or moderate aquatic integrity. Forest Cluster 5 is dominated by dry forests that are extensively roaded and have little if any wilderness. Forest structure and composition have been substantially altered from historical conditions. These subbasins show large changes in fire frequency but less change in fire severity.

Selected subbasins that historically had at least 20 percent of their area comprising dry grass, dry or cooled shrub, woodland, and dry forest potential vegetation groups were classified as range clusters. Relations among variables cited above were used in a way similar, but not identical to that used for forest clusters. Range cluster analysis identified dominant patterns and differences between subsets of these variables. Six clusters emerged, where subbasins within clusters were more like each other than subbasins in other clusters.

All four subbasins in the Lakeview Subbasin Review Area fell into Range Cluster 6. In Range Cluster 6, subbasins and rangelands have been significantly altered by grazing and fire exclusion. They are dominated by dry shrubland vegetation. This potential vegetation group is highly sensitive to overgrazing and susceptible to invasion by exotic grasses and forbs.

Shrublands and herblands have declined owing to conversion to agriculture, changes in fire regimes, increases in conifer woodlands, and encroachment by exotics, including the conversion to crested wheatgrass and other desirable exotic grasses. Dyers woad, diffuse knapweed, yellow starthistle, leafy spurge, medusahead, cheatgrass, Mediterranean sage, and whitetop are examples of problematic exotic weed species in this cluster on rangeland. Warner Lakes and Guano Subbasin support large infestations of medusahead and Mediterranean sage. Hydrologic and aquatic integrity are low to moderate. The integrity of the riparian environments is commonly low. The subbasins in this cluster represent some of the most strongly altered conditions for aquatic systems in the assessment area (USDA-FS and USDI-BLM 1996).

A primary risk to ecological integrity in Range Cluster 6 is the sensitivity of the dry shrubland potential vegetation group to overgrazing. In the LRA, grazing has been well-managed since the implementation of the record of decision of the "Lakeview Grazing EIS" in 1982. There are few areas, including riparian areas, that would be considered to be overgrazed. However, adjustments in grazing numbers, season of use, and locations, continued to be made as needed to protect resources. Additional adjustments would be made as a result of the RMP/EIS.

Scenic integrity or visual intactness was determined for the basin. This measure combined vegetative structure, landform categories, and road density models to provide a broad depiction of existing scenic integrity for BLM- and USFS-administered lands within the Basin. The five classes of Existing Scenic Integrity for those lands are:

1) **very high** ~ settings where the landscape is visually intact with only minute deviations;

2) **high** ~ settings where the landscape appears intact and human activities are not evident;

3) **moderate** ~ settings where the landscape appears slightly fragmented;

4) **low** ~ settings where the landscape appears fragmented, human activities dominate the landscape; and

5) **very low** ~ settings where the landscape is heavily fragmented and human activities strongly dominate the landscape (USDA-FS and USDI-BLM 1996h).

Most of the planning area was rated as having moderately high to very high scenic integrity except for agricultural lands in the north end of the county.

Increasing road density is correlated with declining aquatic habitat conditions and aquatic habitat integrity and is associated with declines in the status of four nonanadromous salmonid species. Road density in the four subbasins was rated low to moderate.

Social and Economic Findings

The ICBEMP project also looked at social and economic resiliency of the counties in the basin. Both social and economic resiliency measure the adaptability of human systems. Social resiliency was measured using four factors: (1) civic infrastructure (leadership, preparedness for change); (2) economic diversity; (3) social/cultural diversity (population size, mix of skills); and (4) amenity infrastructure (attractiveness of the community and surrounding area). Economic resiliency was measured by the diversity among employment sectors. The assumption is that people in high resiliency counties have ready access to a range of employment opportunities if specific firms or business sectors experience downturns.

Lake County was placed in the low economic resiliency class. This basically means that the county has fewer options for employment than do larger communities.

After the project measured social and economic resiliency separately, a measure of social and economic resiliency was devised to assess the broad goal for ecosystem management. The composite rating combined three factors: population density, economic resiliency, and lifestyle diversity. Lake County was given a low socioeconomic resiliency rating. A low rating is defined as counties with low population density (<11 people per square mile), low or medium economic resiliency defined as economic diversity, and low or medium lifestyle diversity (low adaptability to social change and high vulnerability to social change) (USDI-BLM 1996h).

Assessment of the Northern Great Basin Ecological Reporting Unit

Another way in which ICBEMP gathered and analyzed data was by ecological reporting unit. Ecological reporting units are based on physiographic units in the Basin. The project scientists prepared a description by ecological reporting unit of the trends in potential vegetation group composition, vegetation succession,

and disturbance dynamics from the historical to the current period. They also highlighted the abiotic factors such as geology, hydrology, climate, and soil, that affected trends. This resulted in findings of regional and landscape conditions that focused on (1) the historical to current period changes in vegetation and disturbances and their interactions that were significantly different from those predicted for the biophysical templates, and (2) the susceptibility of rangeland health to management-induced disturbance stresses.

The LRA is in the Northern Great Basin Ecological Reporting Unit. The description of this ecological reporting unit is summarized as follows (USDI-BLM 1996h):

1. Nonforest landscapes have been extensively fragmented. The frequency distribution of patch sizes did not coincide with the size ranges typical of the biophysical templates. Patch sizes may be controlled by physical characteristics such as shallow soil or by a dominant fire regime.

2. The areal extent of shrubland cover types (for example, big sagebrush and mountain big sagebrush) declined from the historical to the current period. This was partially attributable to colonization by exotic plants such as Mediterranean sage.

3. Western juniper woodlands increased significantly in areal extent from the historical to the current period at the expense of the upland herbland and upland shrubland (specifically the mountain big sagebrush cover type) terrestrial communities. The increase in woodlands was caused by excessive livestock grazing pressure and lengthening of fire-return intervals, which were initiated in the early historical period.

4. Ponderosa pine woodlands and forests encroached into other physiognomic types due to excessive livestock grazing pressure and fire exclusion.

5. Many riparian areas have been degraded by excessive livestock grazing pressure and are no longer functioning at their full capacity.

6. Soils in the Northern Great Basin Ecological Reporting Unit were particularly susceptible to erosion by wind and shrinking or swelling from drying or wetting. Soils on about 70 percent of BLM/USFS lands were susceptible to erosion by wind. Saline soils were prevalent on BLM/USFS lands, particularly in the southeastern and northeastern portions of the Northern Great Basin Ecological Reporting Unit.

7. Rangeland health is of high or moderate susceptibility to management-induced disturbance stresses across a great areal extent of the Northern Great Basin Ecological Reporting Unit (>40 percent of BLM/USFS lands). The causes of this susceptibility are aridity, saline soils, soils susceptible to erosion by wind, and soils susceptible to shrinking or swelling from drying or wetting.

8. Many rangeland potential vegetation types in the ecological reporting unit, subsequent to prolonged periods of excessive livestock grazing pressure, were in degraded stable states. Succession and vegetation recovery, frequency and extent of disturbances, and the interaction of succession with disturbances, were unpredictable in their rate and extent, even with removal or reduction in livestock grazing pressure.

9. Excessive livestock grazing pressure initiated in the early historical period has been deleterious to microbiotic crust development and extent. Until science findings are more definitive regarding the ecological roles of microbiotic crusts and their response to disturbances, the importance of microbiotic crusts to rangeland health in the Northern Great Basin Ecological Reporting Unit remains speculative.

Appendix B — Planning Criteria, Legal Authorities, and Relationship/Consistency to other Plans

B1: Planning Criteria, Legal Authorities, and Relationship to other Plans

General Planning Criteria

The following general planning criteria will guide the preparation of the RMP/EIS and will continue to guide land-use decisions made in the future.

- Apply the principles of multiple use and sustained yield as set forth in the "Federal Land Policy and Management Act" (FLPMA) and other applicable laws.
- Use a systematic, interdisciplinary approach to achieve integrated consideration of physical, biological, economic, social, and environmental aspects of public land management.
- Give priority to identification, designation, protection and special management of ACEC's and WSR's.
- Give consideration to the relative significance of the public land products, services, and uses to local economies.
- Rely on available inventories of the public lands, their resources, and other values with updating to the extent necessary to reach sound management decision.
- Give consideration to present and potential uses of the public lands.
- Consider impacts of uses on adjacent or nearby non-Federal lands and on non-public land surface over federally-owned minerals.
- Consider the relative scarcity of the values involved and the availability of alternative means (including recycling) and sites for realization of those values.
- Weigh long-term benefits and detriments against short-term benefits and detriments.
- Comply fully with applicable pollution control laws, regulations, and policies, including state and Federal air, water, noise, or other pollution standards or implementation plans.
- Coordinate BLM resource inventory, planning, and management activities with the resource planning and management programs of other Federal departments and agencies, state and local governments, and Native American Tribes to the extent consistent with the laws governing the administration of the public lands.
- Provide for public involvement including early notice and frequent opportunity for citizens and interested groups and others including Native American Tribes to participate in and comment on the preparation of plans and related guidance.
- Apply S&G's as approved by the BLM State Director on August, 12, 1997.
- Consider the large-scale ecological context and priorities provided by the ICBEMP scientific findings and Supplemental EIS record of decision (currently expected sometime in 2001) as they apply to the planning area.
- Comply fully with all Federal laws that guide management of specific resources such as the "Endangered Species Act," CWA, the "National Historic Preservation Act," the "Taylor Grazing Act," and others.
- Comply fully with the BLM national policy on special status species policy that "BLM shall carry out management consistent with the principles of multiple use, for the conservation of candidate (and sensitive) species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered." (BLM 6840 Manual)
- Apply the "Management Guidelines for Greater Sage-Grouse and Sagebrush-Steppe Ecosystem" (August 2000).
- Reflect Federal land management agency obligations under applicable Tribal treaties and laws or

Executive orders relating to Native American reserved rights, religious freedoms, traditional use areas, etc.

Planning Criteria Specific to Resolving the Issues

As noted previously, five issues have been identified that need to be resolved through the planning process. In addition to the general planning criteria identified above, other specific planning criteria to aid in resolving the issues have been developed. These criteria are described below and are the standards that BLM will consider in developing resolutions to the issues.

Issue 1. What areas, if any, should be designated and managed as SMA's including ACEC designations, WSR's, or other?

To resolve this issue, BLM will consider:

- Resource to be managed
- Manageability of the areas
- Existing ACEC representation
- Current and potential land uses
- Effects of designation on other resources and use
- Effects of nondesignation on resources
- Social and economic effects
- Public interests and attitudes
- Consistency of designation with resource plans of other agencies, local government, or Tribes
- Long-term versus short-term benefit
- Public health and safety

Issue 2: How can upland ecosystems be managed and restored to achieve desired future conditions?

To resolve this issue, BLM will consider:

- Resource values
- Current and potential land uses
- Social and economic effects
- Public interests and attitudes
- Condition and trend of native plant communities
- Presence of special status species, both plants and animals
- Habitat needs for sensitive or priority species (including greater sage-grouse).
- Need for increased vegetation cover to reduce soil erosion, increase livestock forage, improve wildlife habitat and improve water quality
- Habitat fragmentation/connectivity for all wildlife species
- Areas chiefly valuable for livestock grazing
- Effects on other resources
- Use of land treatments to maintain or improve plant communities
- use of fire, both natural and prescribed, in vegetation management
- Maintenance or enhancement of biological diversity
- Presence of noxious weeds and conflicts between exotics and native species
- Input from the scientific community
- Watershed condition and trend and productivity potential

Issue 3: How should riparian areas and wetlands be managed to protect and restore their natural functions?

To resolve this issue, BLM will consider:

- Condition and trend of riparian vegetation
- Resource values
- Watershed condition and trend
- Current and potential land uses
- Effects on other resources and uses
- Potential for improvement
- Presence of special status species, plants, animals, or fish
- Social and economic effects
- Current and future demands for surface water, including need for in stream flows
- T&E species population goals and habitat requirements including current range, key areas, and potential habitats
- Conflicts with other uses
- Water quality standards

Issue 4: How should recreation be managed to meet public demand while protecting natural resources and health and safety of the public?

To resolve this issue, BLM will consider:

- Existing recreation uses, use areas, and facilities
- Public demand for additional recreation activities, settings, and experiences
- Compatibility with adjacent land uses and resources
- Effects of recreation uses on other resources and uses
- Public health and safety
- Planned or projected recreation developments
- Public interests and attitudes
- Social and economic effects
- Public access to public land
- Special recreation groups

Issue 5: How should the public lands be managed to meet the needs of local communities and Native American Tribes?

To resolve this issue, BLM will consider:

- Historical, present, and potential economic uses of the public land
- Economic condition of the local communities
- Effects of environmental protection stipulations on local communities
- Effects of public land management on adjacent private landowners
- Service to the public
- Public interests and attitudes
- Relative importance and sensitivity of known and anticipated cultural resources
- Historical use of the resource area by local Tribes
- Threats to cultural resources and traditional use areas
- Tribal needs, interests, and attitudes

Planning Criteria for Selecting the Preferred Alternative

In selecting the preferred alternative and the RMP, BLM will consider:

- The degree of accomplishment of the identified management goals and resolution of issues.
- The discretionary limits established through applicable laws, regulations, and agency policies.
- Reasonable, feasible, and practical guidance for managing public lands and resources through a full range of options.
- Adequacy for a complete land use plan.

Legal Authorities

A number of Federal statutes have been enacted over time to establish and define the authority of BLM to make decisions on the management and use of resources on public land. Following is a list of major legal authorities relevant to BLM land use planning.

- FLPMA ("Federal Land Policy and Management Act") of 1976, as amended, 43 U.S.C. 1701 et seq., provides the authority for BLM land use planning.

  Sec. 102 (a) (7) and (8) sets forth the policy of the United States concerning the management of BLM lands.

  Section 201 requires the Secretary of the Interior to prepare and maintain an inventory of all BLM lands and their resource and other values, giving priority to ACEC's; and, as funding and workforce are available, to determine the boundaries of the public lands, provide signs and maps to the public, and provide inventory data to state and local governments.

  Section 202 (a) requires the Secretary, with public involvement, to develop, maintain, and when appropriate, revise land use plans that provide by tracts or areas for the use of the BLM lands.

  Section 202 (c) (9) requires that land use plans for BLM lands be consistent with Tribal plans and, to the maximum extent consistent with applicable Federal laws, with state and local plans.

  Section 202 (d) provides that all public lands, regardless of classification, are subject to inclusion in land use plans, and that the Secretary may modify or terminate classifications consistent with land use plans.

  Section 202 (f) and 309 (e) provide that Federal, state, and local governments and the public be given adequate notice and an opportunity to comment on the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for the management of the public lands.

  Section 302 (a) requires the Secretary to manage the BLM lands under the principles of multiple use and sustained yield, in accordance with, when available, land use plans developed under section 202 of FLPMA, except that where a tract of BLM lands has been dedicated to specific uses according to any other provisions of law, it shall be managed in accordance with such laws.

  Section 302 (b) recognizes the entry and development rights of mining claimants, while directing the Secretary to prevent unnecessary or undue degradation of the public lands.

- NEPA ("National Environment Policy Act") of 1969, as amended, 42 U.S.C. 4321 et seq., requires the consideration and public availability of information regarding the environmental impacts of

major Federal actions significantly affecting the quality of the human environment. This includes the consideration of alternatives and mitigation of impacts.

- The "Clean Air Act" (CAA) of 1990, as amended, 42 U.S.C. 7418, requires Federal agencies to comply with all Federal, state, and local requirements regarding the control and abatement of air pollution. This includes abiding by the requirements of state implementation plans.

- CWA ("Clean Water Act") of 1987, as amended, 33 U.S.C. 1251, establishes objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's water.

- The "Federal Water Pollution Control Act," 33 U.S.C. 1323, requires the Federal land manager to comply with all Federal, state, and local requirements, administrative authority, process, and sanctions regarding the control and abatement of water pollution in the same manner and to the same extent as any nongovernmental entity.

- The "Safe Drinking Water Act," 42 U.S.C. 201, is designed to make the Nation's waters "drinkable" as well as "swimmable." Amendments in 1996 establish a direct connection between safe drinking water and watershed protection and management.

- The "Endangered Species Act" of 1973, as amended, 16 U.S.C. 1531 et seq.:

  Provides a means whereby the ecosystems upon which T&E species depend may be conserved and to provide a program for the conservation of such T&E species (section 1531 (b), Purposes).

  Requires all Federal agencies to seek to conserve T&E species and utilize applicable authorities in furtherance of the purposes of the "Endangered Species Act" (Sec. 1531 (c) (1), Policy).

  Requires all Federal agencies to avoid jeopardizing the continued existence of any species that is listed or proposed for listing as T&E or destroying or adversely modifying its designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation).

  Requires all Federal agencies to consult (or confer) in accordance with section 7 of the "Endangered Species Act" with the Secretary of the Interior, through the USFWS and/or the National Marine Fisheries Service, to ensure that any Federal action (including land use plans) or activity is not likely to jeopardize the continued existence of any species listed or proposed to be listed under the provisions of the "Endangered Species Act," or result in the destruction or adverse modification of designated or proposed critical habitat (Sec. 1536 (a), Interagency Cooperation, and 50 CFR 402).

- The "Wild and Scenic Rivers Act," as amended, 16 U.S.C. 1271 et seq., requires the Federal land management agencies to identify potential river systems and then study them for potential designation as wild, scenic, or recreational rivers.

- The "Wilderness Act," as amended, 16 U.S.C. 1131 et seq., authorizes the President to make recommendations to the Congress for Federal lands to be set aside for preservation as wilderness.

- The "Antiquities Act" of 1906, 16 U.S.C. 431-433, protects cultural resources on Federal lands and authorizes the President to designate national monuments on Federal lands.

- The "National Historic Preservation Act," as amended, 16 U.S.C. 470, expands protection of historic and archaeological properties to include those of national, state, and local significance and directs Federal agencies to consider the effects of proposed actions on properties eligible for or included in the "National Register of Historic Places" (NRHP).

- The "American Indian Religious Freedom Act" of 1978, 42 U.S.C. 1996, establishes a national policy to protect and preserve the right of American Indians to exercise traditional Indian religious beliefs or practices.

- The "Recreation and Public Purposes Act" of 1926, as amended, 43 U.S.C. 869 et seq., authorizes the Secretary of the Interior to lease or convey BLM lands for recreational and public purposes under specified conditions.

- The "Federal Coal Leasing Amendments Act" of 1976, 30 U.S.C. 201 (a) (3) (A) (i), requires that coal leases be issued in conformance with a comprehensive land use plan.

- The "Surface Mining Control and Reclamation Act" of 1977, 30 U.S.C. 1201 et seq., requires application of unsuitability criteria prior to coal leasing and also to proposed mining operations for minerals or mineral materials other than coal.

- The "Mineral Leasing Act" of 1920, as amended, 30 U.S.C. 181 et seq., authorizes the development and conservation of oil and gas resources.

- The "Onshore Oil and Gas Leasing Reform Act" of 1987, 30 U.S.C. 181 et seq., provides:

  Potential oil and gas resources be adequately addressed in planning documents;

  The social, economic, and environmental consequences of exploration and development of oil and gas resources be determined; and

  Any stipulations to be applied to oil and gas leases be clearly identified.

- The "General Mining Law" of 1872, as amended, 30 U.S.C. 21 et seq., allows the location, use, and patenting of mining claims on sites on public domain lands of the United States.

- The Mining and Mineral Policy Act of 1970, 30 U.S.C. 21a, establishes a policy of fostering development of economically stable mining and minerals industries, their orderly and economic development, and studying methods for disposal of waste and reclamation.

- The "Taylor Grazing Act" of 1934, 43 U.S.C. 315, "[T]he Secretary of the Interior is authorized, in his discretion, by order to establish grazing districts or additions thereto... of vacant unappropriated and unreserved lands from any part of the public domain...which in his opinion are chiefly valuable for grazing and raising forage crops[.]..." The Act also provides for the classification of lands for particular uses.

- The "Public Rangelands Improvement Act"(PRIA) of 1978, 43 U.S.C. 1901, provides that the public rangelands be managed so that they become as productive as feasible in accordance with management objectives and the land use planning process established pursuant to 43 U.S.C. 1712.

- Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), 49 *Federal Register* 7629 (1994), requires that each Federal agency consider the impacts of its programs on minority populations and low income populations.

- Executive Order 13007 (Indian Sacred Sites), 61 Fed. Reg. 26771 (1996), requires Federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions to:

  Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners; and

  Avoid adversely affecting the physical integrity of such sacred sites.

- Executive Order 13084 (Consultation and Coordination with Indian Tribal Governments) provides, in part, that each Federal agency shall establish regular and meaningful consultation and collaboration with Indian Tribal governments in the development of regulatory practices on Federal matters that significantly or uniquely affect their communities.

- Executive Order 13112 (Invasive Species) provides that no Federal agency shall authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk or harm will be taken in conjunction with the actions.

- Secretarial Order 3175 (incorporated into the Departmental Manual at 512 DM 2) requires that if Department of the Interior (DOI) agency actions might impact Indian trust resources, the agency explicitly address those potential impacts in planning and decision documents, and the agency consult with the Tribal government whose trust resources are potentially affected by the Federal action.

- Secretarial Order 3206 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the "Endangered Species Act") requires DOI agencies to consult with Indian Tribes when agency actions to protect a listed species, as a result of compliance with "Endangered Species Act," affect or may affect of Indian lands, Tribal trust resources, or the exercise of American Indian Tribal rights.

Relationship of the RMP to BLM Policies, Programs, and Other Plans

Existing Federal Plans

A number of land use or RMP's have been developed by the BLM and other Federal agencies which relate to or otherwise govern how management is carried out within the allotment planning area. The BLM is responsible for determining if the RMP/EIS is in conformance with these plans. The following Federal plans have been identified as applicable to the planning area and, unless otherwise noted, are believed to be in conformance with the RMP/EIS. Where appropriate, the management direction and previous management decisions set forth by these documents, and the impacts outlined therein, are used to tier analyses performed in this RMP/EIS, or are incorporated by reference, and therefore, are not repeated in detail within this document. Therefore, pertinent decisions already established by these documents are not being revisited here, but are mentioned to give the reader a broad perspective of all management activities occurring within the planning area.

- "Warner Lakes Management Framework Plan" (BLM 1983)—A summary of the management direction outlined in this plan is included in Chapter 3 as part of the description of the no action alternative.

- "Lakeview Grazing Management Final Environmental Impact Statement" (BLM 1982a) and record of decision (BLM 1982b)—A summary of current range management and grazing direction for the planning area is included in Chapter 3 as part of the description of the no action alternative.

- "Oregon Wilderness Final Environmental Impact Statement" (BLM 1989a) and summary report to Congress (BLM 1991a)—These documents cover the environmental impacts of wilderness designation and recommended to Congress designation of certain wilderness areas within the State of Oregon, including approximately 430,000 acres in 12 wilderness study areas (WSA's) and one instant study area (ISA) located wholly or partially in the planning area. Pending final designation as wilderness or release from wilderness study by Congress, WSA's are managed in accordance with the 1995 "Interim Management Policy for Lands Under Wilderness Review" (wilderness IMP) (USDI-BLM 1995b).

- "Integrated Noxious Weed Control Program Environmental Assessment (OR-013-93-03), Lakeview Resource Area" (BLM,1994a) and associated decision record—These documents cover the environmental impacts of conducting an integrated noxious weed control plan throughout the LRA. This environmental assessment is tiered to the following three programmatic Final EIS's and record of decisions: "Northwest Area Noxious Weed Control Program Final Environmental Impact Statement" (BLM 1985b), "Supplement to the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement" (BLM 1987), and "Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement" (BLM 1991b).

- "Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement and ROD" (BLM 1991b)—These documents cover the impacts of the use of prescribed fire, mechanical, manual, biological, and chemical methods to treat rangeland to establish desired vegetation types/conditions.

- "National Wildland Fire Policy"—Directs development of plans that address prescribed burning and wildland fire suppression to meet resource objectives and reincorporate fire as a component in the ecosystem. A resource area fire management plan has been developed to address wildland fire suppression (BLM 1998)

- "Beaty Butte Herd Management Area Plan" (BLM, 1977), "Lakeview District Wild Horse Gather Environmental Assessment" (#OR-010-95-10; BLM, 1995c) and associated decisions—These documents direct wild horse management activities within the Beaty Butte Herd Management Area including managing horse numbers between 100 and 250 head.

- Site-Specific environmental assessment tiered to the 1987 "Final Environmental Impact Statement for Rangeland Grasshopper Cooperative Management Program" (APHIS 1995a)—This document covers the periodic need to control grasshopper outbreaks in various rangeland and agricultural areas within Lake County. The lead for this type of action rests with Agricultural Plant and Animal Health Inspection Service (APHIS), but the BLM does cooperate when treatment involves lands under its administration. This environmental assessment is tiered to the "Rangeland Grasshopper Cooperative Management Program Final Environ-

mental Impact Statement" (APHIS 1987).

- "Environmental Assessment, Wildlife Damage Management in the Roseburg Animal Damage Control District in Southwestern Oregon and ROD" (APHIS 1995b)—These documents cover wildlife damage management activities in the LRA. APHIS is the lead agency for this action. The BLM served as a cooperating agency in the preparation of this environmental assessment and record of decision. The record of decision requires the preparation of an interagency annual animal damage control workplan. This workplan has been completed for fiscal year 1997 and is available in the Lakeview District file. The environmental assessment is tiered to the "Animal Damage Control Final Environmental Impact Statement" (APHIS 1994) programmatic Final EIS and record of decision.

- "Hart Mountain National Antelope Refuge Comprehensive Management Plan Final EIS and ROD" (USFWS 1980)—These documents cover the management of Hart Mountain National Antelope Refuge. Management activities generally include removal of livestock grazing from the entire refuge and use of prescribed fire to achieve resource management objectives.

- "Sheldon National Wildlife Refuge Renewable Natural Resource Management Plan and Final EIS" (USFWS 1980)—This plan calls for the use of fire, mechanical treatment, chemical treatment, and intensive grazing management to manage vegetation to enhance wildlife values and the use of special management in areas with fragile soils, special wildlife, special status plants, or sensitive habitats. Livestock and wild horse/burro grazing were allowed by the plan. However, in recent years the livestock grazing permits have been purchased and no livestock grazing or intensive grazing management occurs.

- "Standards for Rangeland Health and Guidelines for Livestock Grazing Management" (BLM 1997)—The "Range Reform '94 final Environmental Impact Statement and ROD" (BLM and USFS 1994) evolved into what is now referred to as the Healthy Rangelands Initiative and amends current grazing administration and management practices. The record of decision required that region-specific standards and guidelines be developed and approved by the Secretary of the Interior. In the State of Oregon, several resource advisory councils were established to develop these regional standards and guidelines. The resource advisory council established for the part of the state covering the LRA is the Southeastern Oregon Resource Advisory Council. These standards and guidelines for Oregon and Washington were finalized on August 12, 1997 and include:

  Standard 1—Upland Watershed Function

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

  Standard 2—Riparian/Wetland Watershed Function

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

  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.

  Standard 4—Water Quality

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

  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.

Guidelines for Livestock Grazing Management cover the following categories and are presented in detail on pages 15-18 of BLM (1997): general, livestock grazing management, facilitating the management of livestock grazing, and accelerating rangeland recovery.

An assessment of the ability of the selected alternative to conform to these standards and guidelines will be included in the record of decision.

BLM policy requires that RMP's be consistent with the plans of other Federal agencies so long as those plans

follow applicable laws and regulations. To ensure consistency in site-specific planning and management activities, this plan has been coordinated with the Southeastern Oregon RMP (Burns District), RMP's for the Three Rivers Resource Area (Burns District), and the Brothers Planning Area (Prineville District) in Oregon and the Surprise Field Office (Cedarville District) in California. All appropriate Federal agencies are being provided with an opportunity to review the RMP/EIS and provide comments on its consistency with their plans, policies, and directives.

B2: Consistency of the Resource Management Plan with Oregon Statewide Plans

Table B2-1 highlights the consistency of the alternatives of the Lakeview RMP/EIS with the goals, objectives, and prescriptions of various applicable State of Oregon management plans.

Table B2-1.—*Consistency with Oregon statewide plans*

State plan	Goals, objectives, prescriptions	Consistency of alternatives
Oregon Department of Fish and Wildlife		
"Mule Deer Management Plan" (1990)	▪Maximize recruitment of mule deer populations and maintain buck ratios at approved levels.	Under Alternatives B, C, and D, forage would be allocated to meet management objective numbers.
	▪Maintain, enhance, and restore mule deer habitat.	Mule deer habitat would be maintained under Alternatives A, B, and E, and enhancement and restoration would be maximized under Alternatives C and D.
	▪Enhance consumptive and nonconsumptive recreational uses of the resource.	Public access would be greatest under Alternative B, and dispersed recreation would be emphasized under all alternatives. Watchable Wildlife sites would be established/maintained under all alternatives except Alternative E.
"Oregon's Elk Management Plan" (1992)	▪Maximize recruitment into elk populations and maintain bull ratios at management objective levels. Establish management objectives for population size in all herds, and maintain populations at or near those objectives.	Under Alternatives B, C, and D, forage would be allocated to meet management objective numbers.
	▪Maintain, enhance, and restore elk habitat.	Elk habitat would be maintained under Alternatives A, B, and E, and enhancement and restoration would be maximized under Alternatives C and D.
	▪Enhance consumptive and nonconsumptive recreational uses of Oregon's elk resource.	Public access would be greatest under Alternative B. Dispersed recreation would be emphasized under all alternatives. Watchable Wildlife sites would be established and maintained under all alternatives except Alternative E.
Department of Land Conservation and Development		
Statewide planning goals and guidelines	**Goal 1: Citizen Involvement**—To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.	FLPMA requires BLM to provide for public involvement in developing land use plans. This was (will be) done during public scoping, public review of the planning criteria, public review of the Draft RMP/EIS, and public review of the Proposed RMP/Final EIS.
	Goal 2: Land Use Planning—To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions.	This goal is similar to that of the BLM planning process. The BLM process also mandates collaboration with state and local governments and consideration state and local land use plans.

State plan	Goals, objectives, prescriptions	Consistency of alternatives
	Goal 3: Agricultural Lands—To preserve and maintain agricultural lands.	The vast majority of the public lands in the planning area are not suitable for intensive agriculture. All the alternatives, except Alternative E, provide for continued use of the public land for livestock gazing, except for some unalloted or excluded areas. Land sold or exchanged in Zone 2 or 3 could be converted into agricultural development or other uses.
	Goal 4: Forest Lands—To conserve forest lands as forest land and woodlands.	Forests on the planning area would not be allocated for planned commercial development under any alternative, but would be managed to preserve forest integrity, wildlife habitat, and scenic and scientific values. Old growth juniper woodland would be maintained, while other juniper woodland would be open to commercial use including firewood, posts, poles, and biomass fuel for cogeneration plants under all alternatives except Alternative E.
	Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources—To protect natural resources and conserve scenic and historic areas and open spaces.	This is incorporated into all the alternatives; however, there are some tradeoffs across the various alternatives. Management and protection of biological resources would be greatest under Alternative C. Lack of management under Alternative E could have a detrimental effect on all resources. Sodium and energy minerals and resources would be available for leasing to various degrees in all alternatives except Alternative E. Locatable (hardrock) minerals would continue to be available to various degrees in all alternatives except Alternative E. Salable or free-use common mineral materials would continue to be available to various degrees in all alternatives except Alternative E. Visual resources would be protected or enhanced based on updated inventories. Cultural and historic resources would be protected or enhanced under all alternatives.
	Goal 6: Air, Water, and Land Resources Quality—To maintain and improve the quality of the air, water, and land resources of the state.	This is incorporated into all the alternatives; however, there are some tradeoffs across the various alternatives. The greatest benefit to water resources would be accomplished under Alternatives C and D. BLM will develop water quality restoration plans which will be incorporated into water quality management plans developed by the State.

State plan	Goals, objectives, prescriptions	Consistency of alternatives
	Goal 7: Areas Subject to Natural Disasters and Hazards—To protect life and property from natural disasters and hazards.	Natural hazard areas, particularly floodplains and areas with highly erosive soils, have been identified. All the alternatives provide for appropriate management of natural hazards. BLM-authorized developments within natural hazard areas would be minimal under each alternative, with project construction engineering reflecting local conditions.
	Goal 8: Recreational Needs—To satisfy the recreational needs of the citizens of the State and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destinations resorts.	All the alternatives emphasize dispersed recreation with some minimal development under Alternatives B and D. OHV recreation opportunities would be maximized under Alternatives B and D. All alternatives, except Alternative E, would be consistent with the "State Comprehensive Outdoor Recreation Plan." No destination resort opportunities were identified.
	Goal 9: Economy of the State—To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens.	Economic use of the public lands is provided in all the alternatives except Alternative E. Economic production would be maximized under Alternative B.
	Goal 11: Public Facilities and Services—To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.	Under all alternatives, public lands could be available for rural or urban development through a BLM land sale or exchange.
	Goal 12: Transportation—To provide and encourage a safe, convenient, and economical transportation system.	All the alternatives except Alternative E provide for the continuation of existing rights-of-way and the placement of new ones for powerlines, pipelines, roads, communication facilities, and other pubic or private purposes. The use of public lands for such purposes would be greatest under Alternative B and least under Alternative C.
	Goal 13: To Conserve Energy—	Conservation and efficient use of energy sources are objectives in all BLM activities. Sale and harvest of minor forest products (such as post, poles, and firewood) from woodlands would be permitted in most areas. Electrical generating facilities such as geothermal plant, cogeneration plants, or wind farms, would be considered under all alternatives except Alternative E.
	Statewide LCDC goals which do not apply to the subject planning area or resource management opportunities include; Goal 10: Housing; Goal 14: Urbanization; Goal 15: Willamette River Greenway; Goal 16: Estuarine Resources; Goal 17: Coastal Shorelands; Goal 18: Beaches and Dunes; and Goal 19: Ocean Resources.	

State plan	Goals, objectives, prescriptions	Consistency of alternatives
Division of State Lands		
Rangelands	▪Rangelands will be managed to ensure forage yields for livestock grazing consistent with BMP's. Grazing levels may be adjusted, in consultation with lessees, on both trust and nontrust lands to protect rangeland health and the long-term value of the land.	All alternatives except Alternative E are consistent with this prescription.
	▪Rangelands will be managed to prevent human-induced loss of rangeland health. Work with lessees to continue to implement rangeland practices that maintain, achieve, or restore healthy functioning ecosystems and maintain, restore or enhance water quality.	All alternatives except Alternative E are consistent with this prescription. Rangeland health would be maximized under Alternative C.
Special interest lands	▪Special interest lands will be managed primarily to ensure the protection of unique scenic, wildlife, cultural, natural, or recreation values. Revenue generation activities will generally be permitted only if they do not adversely impact these values.	Management of special designations such as WSA's, WSR's, ACEC's, or National Register of Historic Places would be consistent with this prescription. However, there are no known State special interest lands in the planning area. The alternatives consider opportunities to designate RNA's which would fill important cell needs in the State Natural Heritage [Conservation] Data Base.
Minerals	▪Land owned by the land board will be open to mineral exploration and development subject to existing laws, regulations, and management plans. Land will be open to mineral activity unless the proposed use (1) would have significant adverse and nonmitigatible impacts on watershed integrity, and natural, cultural, and archeological features, (2) be located within a WSR, state scenic waterway, or similarly designated area, and (3) the proposal would not be permitted under the appropriate management plan.	Access to State land for mineral exploration and development would be available under all alternatives. Exploration and development of adjacent public land could be constrained or prohibited depending on the alternative and management of the adjacent parcel.

Appendix C — Soils and Ecological Site Inventory

C1: Soils

Table C1-1 lists prime farmlands within the planning area.

C2: Ecological Site Inventory Process

An ecological site inventory was conducted in the LRA between 1993 and 2001. An ecological site inventory survey is a 100 percent survey of an area where ecological data of many types is collected and represented on maps. Many times, the data collected in an ecological site inventory survey is represented as a county soil survey which is available for almost every state located in the continental United States, at your local library, or from the Natural Resources Conservation Survey.

The primary tool or unit that is developed during the inventory is called a map unit description. A map unit description primarily defines the soil and the vegetative community that exists in a given location. Map unit descriptions also consider precipitation, geology, elevation, slope, aspect, and the general setting of the unit which may have influenced its development. In the case of the LRA, there have been many influences such as volcanic activities, past glaciation, and the encroachment and egress of inland lakes in the past (>10,000 years ago).

The data that is collected for the ecological site inventory project is done by three vegetation specialists and three soils scientists. This mix is broken down to three teams of two, one specialist from each profession. The two members work to develop the map unit descriptions previously mentioned. The ecological site inventory project is defined by being an Order 3 soil survey by the "National Cooperative Soil Survey Handbook" which means that the main focus is the current or projected management needs of the managing agency or owners of the land and a minimum delineation or unit size of 160 acres. Ecological site inventory has been given the discretion to map at a smaller scale if a management-oriented need exists that should be addressed such as a wetlands, sensitive plant area, or a mineral deposit.

The soil scientist digs and describes at least one pedon (pit) per map unit. The scientist delineates the horizons of the pedon taking physical measurements on details such as depths of a horizons; sand, silt, and clay content (texture) of the horizons, rock fragmentation, structure and rupture resistance, nature of roots and pores, effervescence, pH and any other notable details such as cementation or occurrence of various types of deposits. The data collected is expected to conform to the standards of the "National Soil Survey Manual" and other internal guidance tools as appropriate.

The range specialists collect the vegetative data from a map unit according to the standards set by the "National Range Handbook." To develop this data, the range specialists walk the unit being described and makes an ocular estimation of the percent composition by weight of the vegetation present. The specialist also collects data on vegetative cover, production, observed apparent trend, soil surface factors, etc. This data is then compared to existing ecological site descriptions (rangesites) and a condition class is determined in relation to the potential natural community defined in the ecological site description. A great deal of the data collected by the vegetative specialist is used in making range and pasture allotment plans, grazing management decisions, and is used in rehabilitating areas after fire suppression.

The information collected by each team of specialists is represented on a map using a number and a polygon or area to represent the map unit. The map unit number is defined in a legend which relates to a map unit description for the unit. The map unit description describes the characteristics of the unit in relation to many utilization capabilities, such as for rangeland, commercial development, or an agricultural field, etc. Order 3 ecological site inventory data is not expected to answer every question that might be asked about a unit of land, but it is meant to be a framework of strong scientific analysis that supports the development of future answers.

When the survey is completed and all details are finalized, the data is published as a county soil survey in book form. In the future, the data will be available over the internet through geographic information systems which will make access easier and the color maps will be most helpful to interested persons in making management plans.

Table C1-1.—*Prime farmlands within the planning area*

Map symbol	Code [1]	Map unit name
Lake County		
40B	4	Calimus silt loam, 0 to 5% slopes
51A	6	Crump muck, 0 to 1% slopes
52A	4	Crump silty clay loam, drained, 0 to 1% slopes
54A	4	Crump-Ozamis complex, drained, 0 to 1% slopes
64B	4	Deter loam, 0 to 5% slopes
65B	4	Deter loam, low precipitation, 0 to 5% slopes
69B	4	Donica gravelly loam, 0 to 5% slopes
73B	4	Drews loam, 0 to 5% slopes
76B	4	Drewsgap loam, 0 to 5% slopes
95B	4	Fordney gravelly loamy sand, 0 to 5% slopes
95C	4	Fordney gravelly loamy sand, 5 to 15% slopes
97A	6	Goose Lake silt loam, 0 to 1% slopes
109B	4	Harriman loam, 1 to 5% slopes
124A	4	Lakeview loam, 0 to 2% slopes
125A	4	Lakeview silty clay loam, moist, 0 to 2% slopes
127A	4	Lakeview silty clay loam, low precipitation, 0 to 2% slopes
153A	4	McConnel very gravelly sandy loam, 0 to 2% slopes
153C	4	McConnel very gravelly sandy loam, 2 to 15% slopes
182A	4	Norad silt loam, 0 to 2% slopes
191A	6	Ozamis loam, 0 to 1% slopes
192A	6	Ozamis silty clay loam, 0 to 1% slopes
243B	4	Salisbury loam, 0 to 5% slopes
246A	4	Spangenburg complex, 0 to 2% slopes
253A	4	Tulana mucky silty clay loam, drained, 0 to 1% slopes
282B	4	Zorravista fine sand, 0 to 5% slopes
283B	4	Zorravista-Hinton complex, 0 to 8% slopes
Harney County		
71	4	Defenbaugh Loam, 0 to 2% slopes
75	4	Dixon gravelly fine sandy loam, 0 to 5% slopes
76	4	Dixon gravelly fine sandy loam, alkali, 0 to 2% slopes
83	4	Drewsey very fine sandy loam, 1 to 5% slopes
93	4	Enko loamy sand, 2 to 8% slopes
94	4	Enko-Catlow complex, 1 to 7% slopes
173	4	Legler silty clay loam, 0 to 3% slopes
181	6	Loupence silt loam, 0 to 2% slopes
212	4	Morfitt loam, 0 to 2% slopes
235	4	Norad silt loam, 0 to 1% slopes
236	4	Norad-Spangenburg complex, 0 to 2% slopes

Map symbol	Code [1]	Map unit name
251	6	Ozamis silt loam, 0 to 1% slopes
282	4	Rio King loam, 1 to 6% slopes
310	4	Spangenburg silty clay loam, 0 to 1% slopes
311	4	Spangenburg silty clay loam, moist, 0 to 1% slopes
312	4	Spangenburg silty clay loam, thick surface, 0 to 2% slopes
358	6	Wenas-Loupence-Cumulic Haploxerolls complex, 0 to 3% slopes

[1] 4 = only irrigated areas are prime farmland; 6 = only irrigated areas that have been drained are prime farmland.

Appendix D — Best Management Practices

Introduction

Best management practices (BMP's) are those land and resource management techniques designed to maximize beneficial results and minimize negative impacts of management actions. Interdisciplinary site-specific analysis is necessary to determine which management practices would be necessary to meet specific goals. BMP's described in this appendix are designed to assist in achieving the objectives for maintaining or improving water quality, soil productivity, and the protection of watershed resources. These guidelines will apply, where appropriate, to all use authorizations, including BLM-initiated projects. Modifications may be necessary on a site-specific basis to minimize the potential for negative impacts. Each of the following BMP guidelines is a part of the coordinated development of this plan and may be updated as new information becomes available. Applicants can suggest alternate conditions that could accomplish the same result.

BMP's are selected and implemented as necessary, based on site-specific conditions, to meet water, soil, and watershed objectives for specific management actions. This document does not provide an exhaustive list of BMP's. Additional BMP's may be identified during an interdisciplinary process when evaluating site-specific management actions. Implementation and effectiveness of BMP's need to be monitored to determine whether the practices are achieving water, soil, and other watershed resource objectives and accomplishing desired goals. Adjustments will be made as necessary to ensure objectives are met and as needed to conform with changes in BLM regulations, policy, direction, or new scientific information.

These BMP's are a compilation of existing policies and guidelines and commonly employed practices to minimize water quality degradation from nonpoint sources, to minimize the loss of soil productivity, and to provide guidelines for aesthetic conditions within watersheds from surface disturbing activities.

BMP's are considered one of the primary mechanisms to achieve Oregon water quality standards and reduce impacts from nonpoint source pollution. Nonpoint sources of pollution result from natural causes, human actions, and the interactions between natural events and conditions associated with human use of the land and its resources. Nonpoint source pollution is caused by diffuse sources rather than from a discharge at a specific, single-source location. Such pollution results in alteration of the chemical, physical, and biological integrity of water.

BMP's are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level. BMP's include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMP's can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2 (m), Environmental Protection Agency Water Quality Standards Regulation).

BMP's are identified as part of the NEPA process, with interdisciplinary involvement. Because the control of nonpoint sources of pollution is an ongoing process, continual refinement of BMP design is necessary. This process can be described in five steps which are: (1) selection of design of a specific BMP; (2) application of the BMP; (3) monitoring; (4) evaluation; and (5) feedback. Data gathered through monitoring is evaluated and is used to identify changes needed in BMP design, application, or in the monitoring program.

Road Design and Maintenance

1) Design roads to minimize total disturbance, to conform with topography, and to minimize disruption of natural drainage patterns.

2) Base road design criteria and standards on road management objectives such as traffic requirements of the proposed activity and the overall transportation plan, economic analysis, safety requirements, resource objectives, and minimizing damage to the environment.

3) Locate roads on stable terrain such as ridgetops, natural benches, and flatter transitional slopes near ridges and valley bottoms and moderate sideslopes and away from slumps, slide prone areas, concave slopes, clay beds, and where rock layers dip parallel to the slope. Locate roads on well-drained soil types; avoid wet areas.

4) Construct cut and fill slopes to be approximately 3(h):1(v) or flatter where feasible. Locate roads to minimize heights of cutbanks. Avoid high, steeply-sloping cutbanks in highly-fractured bedrock.

5) Avoid head walls, midslope locations on steep,

unstable slopes, fragile soils, seeps, old landslides, sideslopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope. Implement extra mitigation measures when these areas can not be avoided.

6) Construct roads for surface drainage by using outslopes, crowns, grade changes, drain dips, waterbars and/or insloping to ditches as appropriate.

7) Sloping the road base to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. This is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is wanted. Out-sloping is not recommended on steep slopes. Sloping the road base to the inside edge is an acceptable practice on roads with steep sideslopes and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.

8) Crown and ditching is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are considerations. Recommended gradients range from 0 to 15 percent where crown and ditching may be applied, as long as adequate drainage away from the road surface and ditch lines is maintained.

9) Minimize excavation when constructing roads through the use of balanced earthwork, narrowing road widths, and end hauling where sideslopes are between 50 and 70 percent.

10) If possible, construct roads when soils are dry and not frozen. When soils or road surfaces become saturated to a depth of 3 inches, BLM-authorized activities should be limited or cease unless otherwise approved by the authorized officer.

11) Consider improving inadequately surfaced roads that are to be left open to public traffic during wet weather with gravel or pavement to minimize sediment production and maximize safety.

12) Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Roadside brushing of vegetation should be done in a way that prevents disturbance to root systems and visual intrusions (i.e., avoid using excavators for brushing).

13) Retain adequate vegetation between roads and streams to filter runoff caused by roads.

14) Avoid riparian/wetland areas where feasible; locate in these areas only if the roads do not interfere with the attainment of proper functioning condition and riparian management objectives.

15) Minimize the number of unimproved stream crossings. When a culvert or bridge is not feasible, locate drive-through (low water crossings) on stable rock portions of the drainage channel. Harden crossings with the addition of rock and gravel if necessary. Use angular rock if available.

16) Locate roads and limit activities of mechanized equipment within stream channels to minimize their influence on riparian areas. When stream crossing is necessary, design the approach and crossing perpendicular to the channel where practical. Locate the crossing where the channel is well-defined, unobstructed, and straight.

17) Avoid placing fill material in floodplain unless the material is large enough to remain in place during flood events.

18) Use drainage dips instead of culverts on roads where gradients would not present a safety issue. Locate drainage dips in such a way so water would not accumulate or where outside berms prevent drainage from the roadway. Locate and design drainage dips immediately upgrade of stream crossings and provide buffer areas and catchment basins to prevent sediment from entering the stream.

19) Construct catchment basins, brush windrows, and culverts in a way to minimize sediment transport from road surfaces to stream channels. Install culverts in natural drainage channels in a way to conform with the natural streambed gradients with outlets that discharge onto rocky or hardened protected areas.

20) Design and locate water crossing structures in natural drainage channels to accommodate adequate fish passage, provide for minimum impacts to water quality, and capable of handling a 100-year event for runoff and floodwaters.

21) Use culverts that pass, at a minimum, a 50-year storm event and/or have a minimum diameter of 24 inches for permanent stream crossings and a minimum diameter of 18 inches for road crossdrains.

22) Replace undersized culverts and repair or replace damaged culverts and downspouts. Provide energy

dissipators at culvert outlets or drainage dips.

23) Locate culverts or drainage dips in such a manner as to avoid discharge onto unstable terrain such as head walls or slumps. Provide adequate spacing to avoid accumulation of water in ditches or road surfaces. Culverts should be placed on solid ground to avoid road failures.

24) Proper sized aggregate and riprap should be used during culvert construction. Place riprap at culvert entrance to streamline water flow and reduce erosion.

25) Establish adapted vegetation on all cuts and fill immediately following road construction and maintenance.

26) Remove berms from the downslope side of roads, consistent with safety considerations.

27) Leave abandoned roads in a condition that provides adequate drainage without further maintenance. Close abandoned roads to traffic. Physically obstruct the road with gates, large berms, trenches, logs, stumps, or rock boulders as necessary to accomplish permanent closure.

28) Abandon and rehabilitate roads no longer needed. Leave these roads in a condition that provides adequate drainage. Remove culverts.

29) When plowing snow for winter use of roads, provide breaks in snow berms to allow for road drainage. Avoid plowing snow into streams. Plow snow only on existing roads.

30) Maintenance should be performed to conserve existing surface material, retain the original crowned or out-sloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump-prone areas. Avoid undercutting back slopes.

31) Do not disturb the toe of cut slopes while pulling ditches or grading roads. Avoid sidecasting road material into streams.

32) Grade roads only as necessary. Maintain drain dips, waterbars, road crown, in-sloping and out-sloping, as appropriate, during road maintenance.

33) Maintain roads in SMA's according to SMA guidance. Generally, retain roads within existing disturbed areas and sidecast material away from the SMA.

34) When landslides occur, save all soil and material usable for reclamation or stockpile for future reclamation needs. Avoid side casting of slide material where it can damage, overload, and saturate embankments, or flow into down-slope drainage courses. Reestablish vegetation as needed in areas where vegetation has been destroyed due to side casting.

35) Strip and stockpile topsoil ahead of construction of new roads, if feasible. Reapply soil to cut and fill slopes prior to revegetation.

Surface-Disturbing Activities

1) Special design and reclamation measures may be required to protect scenic and natural landscape values. This may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, use of low profile permanent facilities, and painting to minimize visual contrasts. Surface-disturbing activities may be moved to avoid sensitive areas or to reduce the visual effects of the proposal.

2) Above ground facilities requiring painting should be designed to blend in with the surrounding environment.

3) Disturbed areas should be contoured to blend with the natural topography. Blending is defined as reducing form, line, and color contrast associated with the surface disturbance. Disturbance in visually sensitive areas should be contoured to match the original topography, where matching is defined as reproducing the original topography and eliminating form, line, and color caused by the disturbance as much as possible.

4) Reclamation should be implemented concurrent with construction and site operations to the fullest extent possible. Final reclamation actions shall be initiated within 6 months of the termination of operations unless otherwise approved in writing by the authorized officer.

5) Fill material should be pushed into cut areas and up over back slopes. Depressions should not be left that would trap water or form ponds.

Rights-of-way and Utility Corridors

1) Rights-of-way and utility corridors should use areas adjoining or adjacent to previously disturbed areas whenever possible, rather than traverse undisturbed communities.

2) Waterbars or dikes should be constructed on all of the rights-of-way and utility corridors, and across the full width of the disturbed area, as directed by the authorized officer.

3) Disturbed areas within road rights-of-way and utility corridors should be stabilized by vegetation practices designed to hold soil in place and minimize erosion. Vegetation cover should be reestablished to increase infiltration and provide additional protection from erosion.

4) Sediment barriers should be constructed when needed to slow runoff, allow deposition of sediment, and prevent transport from the site. Straining or filtration mechanisms may also be employed for the removal of sediment from runoff.

Forest Management

1) Design harvest units and forest health treatments to blend with natural terrain.

2) Consider clearcutting only where it is silverculturally essential to accomplish site-specific objectives. Areas with fragile watershed conditions or high scenic values should not be clearcut.

3) When soils or road surfaces become saturated to a depth of 3 inches, BLM-authorized activities, such as log yarding and hauling, should be limited or cease unless otherwise approved by the authorized officer.

4) Scatter unmerchantable material (tops, limbs, etc.) in cutting units and treatment areas, consistent with fuel loading limitations.

5) Ground yarding systems are not recommended on slopes that are of 30 percent or greater.

6) Utilize designated skid trails and haul roads, where feasible, when ground yarding timber harvest operations.

7) Locate skid trails on upper slope positions, as far as possible from surface water. Avoid skidding across drainage bottoms or creating conditions that concentrate and channelize surface flow.

8) Use directional felling, when applicable, to minimize skidding distance and locate skid trails as far as possible from sensitive areas.

9) Install waterbars and apply native seed, when available, to skid trails and landings prior to temporary seasonal closures and following harvest operations. Consider ripping or subsoiling on skid trails and abandoned haul roads to reduce compaction where soil and slope conditions permit.

10) When ground or cable yarding, logs should be fully, or at least have the lead end, suspended.

11) Locate landings away from surface water. Design landings to minimize disturbance consistent with safety and efficiency of operation.

12) Use low pressure grapple equipment, if possible, when piling slash.

13) Conduct forested land treatments when soil surfaces are either frozen, dry, or have adequate snowpack to minimize impacts to soil and water resources.

Fire Suppression

1) Minimize surface disturbances and avoid the use of heavy earth-moving equipment where possible, on all fire suppression and rehabilitation activities, including “mop-up,” except where high value resources (including lives and property), are being protected.

2) Install waterbars and seed all constructed firelines with native or adapted non-native species as appropriate.

3) Avoid dropping fire retardant that is detrimental to aquatic communities on streams, lakes, ponds and in riparian/wetland areas.

4) The location and construction of hand lines should result in minimal surface disturbance while effectively controlling the fire. Hand crews should locate lines to take full advantage of existing land features that represent natural fire barriers. Whenever possible, handlines should follow the contour of the slope to protect the soil, provide sufficient residual vegetation to capture and retain sediment, and maintain site productivity.

5) Suppression in riparian areas should be by hand crews when possible.

Prescribed Burning

1) To protect soil productivity, burning should be conducted if possible, under conditions when a low-intensity burn can accomplish stated objectives. Burn only when conditions of organic surface or duff layer have adequate moisture to minimize effects to the

physical and chemical properties of the soil. When possible, maximize the retention of the organic surface or duff layer.

2) Slash should not be piled and burned within riparian/wetland areas. If riparian/wetland areas are within or adjacent to the prescribed burn unit, piles should be firelined or scattered prior to burning.

3) When preparing the unit for burning, avoid piling concentrations of large logs and stumps; pile small material (3 to 8 inches diameter). Slash piles should be burned when soil and duff moisture are adequate to reduce potential damage to soil resources.

Livestock Grazing Management

Rangeland projects and improvements are constructed as a portion of adaptive management to reduce resource management conflicts and to achieve multiple use management objectives. They have been standardized over time to mitigate impacts and will be adhered to in the construction and maintenance of rangeland projects within the planning area.

Grazing schedules are developed and adjusted through the adaptive management process on an allotment specific basis. This is to mitigate impacts to resource values and progress toward multiple-use management objectives and sustainability of desirable values.

Mining

1) Reclaim all disturbed surface areas promptly, preforming concurrent reclamation as necessary, and minimize the total amount of all surface disturbance.

2) All surface soil should be stripped prior to conducting operations, stockpiled, and reapplied during reclamation, regardless of soil quality. Minimize the length of time soil remains in stockpiles and the depth or thickness of stockpiles. When slopes on topsoil stockpiles exceed 5 percent, a berm or trench should be constructed below the stockpile to prevent sediment transport offsite.

3) Strip and separate soil surface horizons where feasible and reapply in proper sequence during reclamation.

4) Locate soil stockpiles and waste rock disposal areas away from surface water to minimize off-site drainage effects.

5) Establish vegetation cover on soil stockpiles that are to be in place longer than 1 year.

6) Construct and rehabilitate temporary roads to minimize total surface disturbance, consistent with intended use.

7) Consider temporary measures such as silt fences, straw bales, or mulching to trap sediment in sensitive areas until reclaimed areas are stabilized with vegetation.

8) Reshape to the approximate original contour all areas to be permanently reclaimed, providing for proper surface drainage.

9) Leave reclaimed surfaces in a roughened condition following soil application.

10) Complete reclamation and seeding during the fall if possible.

Noxious Weed Management

1) All contractors and land-use operators moving surface-disturbing equipment in or out of weed infested areas should clean their equipment before and after use on public land.

2) Control weeds annually in areas frequently disturbed such as gravel pits, recreation sites, road sides, livestock concentration areas.

3) Consider livestock quarantine, removal, or timing limitations in weed infested areas.

4) All seed, hay, straw, mulch, or other vegetation material transported and used on public land weed-free zones for site stability, rehabilitation, or project facilitation should be certified by a qualified Federal, state or county officer as free of noxious weeds and noxious weed seed. All baled feed, pelletized feed, and grain transported into weed-free zones and used to feed livestock should also be certified as free of noxious weed seed.

5) It is recommended that all vehicles, including off road and all terrain, traveling in or out of weed infested areas should clean their equipment before and after use on public land.

Developed Recreation

1) Construct recreation sites and provide appropriate sanitation facilities to minimize impacts to resource

values, public health and safety, and minimize user conflicts of approved activities and access within an area as appropriate.

2) Minimize impacts to resource values or to enhance a recreational setting and recreation experience. Harden site and locations subject to prolonged/repetitive concentrated recreational uses with selective placement of gravel or other porous materials and allow for dust abatement, paving and engineered road construction.

3) Use public education and/or physical barriers (e.g., rocks, posts, vegetation) to direct or preclude uses and to minimize impacts to resource values and the quality of recreation experience.

4) As appropriate, employ limitations of specific activities to avoid or correct adverse impacts to resource values, public safety issues, and/or conflicts between recreational uses.

5) Employ land use ethics programs and techniques such as Leave No Trace and Tread Lightly. Use outreach efforts of such programs to lessen needs to implement more stringent regulatory measures to obtain resource protection and a quality recreation experience

Appendix E — Livestock Grazing

E1: Allotment Management Summaries

The following summaries provide multiple-use information for each allotment in the resource area. Information is organized under (1) Allotment Identification, (2) Grazing Administration, (3) Identified Resources Conflicts/Concerns and Management Direction.

Allotment Identification—This section identifies each allotment by name and allotment number. The Selective Management Category (M, I, C) is identified and acreage within the allotment is provided.

Grazing Administration—This section provides basic information on grazing license and other forage demands within the allotment including active preference, suspended nonuse, total preference, exchange of use, and permitted use. *Note:* Blanks under acres or AUM's (animal unit months) indicate the value of 0.

Identified Resources Conflicts/Concerns and Management Direction—This section presents the major resource conflicts or concerns that have been identified in each allotment through public input and interdisciplinary team collaborations. For each conflict/concern identified, management direction has been developed. This section forms the basis for establishing or revising allotment management plans during the implementation of the RMP. This section also forms the basis for the conveyance of other resource values into the allotment monitoring, assessment, and evaluation process.

Number: 00100		**Name: PETER CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	13,800	Active preference:	329	Bighorn sheep:	0
Other acres:	640	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	329	Elk:	30
				Other wildlife:	30
				Wild horses:	0
				Total:	60

Identified resource conflicts/concerns:	**Management direction:**
No forage allocated for elk.	Allocate forage for elk.
Improve big sagebrush habitats with juniper invasion to early- or mid-seral stage.	Through management prescriptions, remove juniper invading big sagebrush habitat.
Maintain/improve old growth juniper stands.	Manage old growth juniper to preserve old growth characteristics.

Continue livestock management practices under the 1990 allotment management plan. Revise the following objectives as needed to meet multiple use objectives:

1. Maintain current allocation of 329 AUM's for livestock and 30 AUM's for wildlife. The wildlife use is the normal deer winter range in the north pasture of the allotment.

2. Determine the full grazing capacity of each pasture in the allotment through monitoring, and allocate the forage on a permanent sustained yield basis.

3. To provide each pasture of the allotment periodic growing season rest (April 1 to peak of flowering on or about June 20).

4.To manage for an average maximum 50 % utilization on key forage species.

5. To maintain the range condition as measured by existing nested frequency monitoring studies.

a. On PC-1, maintain Idaho fescue at 50 % or greater, maintain bottlebrush squirreltail at 20% or greater and maintain Thurber's needlegrass at 20% or greater.

b. On PC-2, maintain Idaho fescue, bottlebrush squirreltail, and Thurber's needlegrass at 30% each or greater.

c. On PC-3, maintain Idaho fescue and bottlebrush squirreltail at 30 % or greater, maintain Thurber's needlegrass at 20% or greater.

Number: 00101		**Name: EAST GREEN MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	17,241	Active preference:	980	Bighorn sheep:	0
Other acres:	1,440	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	980	Elk:	50
				Other wildlife:	315
				Wild horses:	0
				Total:	365

Identified resource conflicts/concerns:	**Management direction:**
No forage allocated for elk.	Allocate forage for elk.
Special status plant species and habitat.	Protect special status plant species/habitat from impact from BLM-authorized actions.
Squaw Ridge WSA is part of the allotment.	Manage Squaw Ridge WSA under the wilderness IMP.

Continue livestock management practices under the 1993 allotment management plan. Revise the following objectives as needed to meet multiple use objectives.

1. To maintain current allocation of 980 AUM's for livestock and 315 AUM's for wildlife.

2. To provide each pasture in the allotment periodic growing season rest (April 1 to peak of flowering on or about June 20).

3. To manage each pasture so that AUM ratings are not exceeded. Current ratings are:

Jack's Place	90 AUM's
Lava Burn	516 AUM's
Sixteen Well	118 AUM's
Bunchgrass	119 AUM's
Green Mountain	452 AUM's

4. To manage for an average maximum utilization of 50% on key native forage species, and 60% utilization on crested wheatgrass seedings.

5. To maintain range condition by existing nested plot frequency and photo plot monitoring studies. Objectives for percent composition of the key species are:

a. At study sites EG-1 and EG-4, maintain crested wheatgrass at 75% or greater; maintain shrub species at < 20% composition.

b. At site EG-2, maintain Idaho fescue at 35% or greater, needle-and-thread grass at 10% or greater, and restrict shrub species to < 50% composition.

c. At EG-3, maintain Idaho fescue at 30% or greater, needle-and-thread grass at 10% or greater, and junegrass at 5% or greater. Maintain shrub species at < 50% composition.

d. At study site EG-6, maintain Idaho fescue at 40% or greater and shrub species at < 50%.

6. To maintain all existing range improvements.

Number: 00102		**Name: CRACK-IN-THE-GROUND**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	15,419	Active preference:	298	Bighorn sheep:	0
Other acres:	400	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	298	Elk:	40
				Other wildlife:	143
				Wild horses:	0
				Total:	183

Identified resource conflicts/concerns:	**Management direction:**
No forage allocated for elk.	Allocate forage for elk forage demands.
No objectives for playa management.	As they are developed, incorporate playa management objectives into the allotment.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution through improved management practices and installation of livestock management facilities.

Number: 00103		**Name: ZX-CHRISTMAS LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	524,180	Active preference:	31,069	Bighorn sheep:	0
Other acres:	54,640	Suspended nonuse:	6,588	Deer/pronghorn:	0
Category:	I	Total preference:	37,657	Elk:	260
				Other wildlife:	529
				Wild horses:	408
				Total:	1197

Identified resource conflicts/concerns:	**Management direction:**
No forage allocated for elk.	Allocate forage for elk forage demands.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution through improved management practices and installation of livestock management facilities.
Insufficient forage allocated for wild horses at appropriate management levels.	Increase forage allocation for wild horses to 785 AUM's.
Portions of the area in the Great Basin ecosystem are in unsatisfactory condition and cannot be healed through management strategies.	Restore portions of the Great Basin ecosystem to promote plant community diversity, allowing the communities to be more resilient to invasive species and disturbance.
Appropriate management levels for wild horses.	Maintain current appropriate management levels for wild horse populations.
Limiting pronghorn habitat in less than satisfactory condition.	Maintain/improve pronghorn habitat condition.
Noxious weed encroachment.	Monitor/control perrenial pepperweed and other noxious weeds using integrated weed management in the Brim Well area and within the allotment.
Special status species habitats occur within the allotment: prostrate buckwheat and greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Develop a conservation agreement for special status plant protection. Implement interim greater sage-grouse guidelines.
Current range condition, level, or pattern of utilization may be unacceptable; carrying capacity (under current management practices) may be exceeded.	Maintain/improve rangeland condition and productivity through a change in management practices, reseeding, or project implementation. Adjust permitted use as needed.
Status of microbiotic crust is unknown.	Develop monitoring sites for microbiotic crust to determine distribution.
Lost Forest RNA exists within the allotment.	Manage livestock grazing to protect the Lost Forest RNA.
	Coordinated resource management plan objectives. The following are the BLM objectives within the "Sycan X Coordinated Resource Management Plan," which includes numerous objectives for other private land ownerships: 1. Revise objectives as needed to meet multiple use objectives. 2. Maintain or improve vigor of crested wheatgrass seedings for BLM grazing allotment #103, Christmas Lake. 3. Comply with objectives of the allotment management plans for BLM grazing allotments #712, Bridge Well, and #713, Silver Creek.

Number: 00200		**Name: BLUE CREEK SEEDING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	600	Active preference:	131	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	131	Elk:	0
				Other wildlife:	50
				Wild horses:	0
				Total:	50

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
Maintenance of range improvement projects.	Maintain existing exclosures, including those along the proposed WSR.
Status and location of special status species and cultural plant communities are unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.

Number: 00201		**Name: VINYARD**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,600	Active preference:	460	Bighorn sheep:	100
Other acres:	160	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	460	Elk:	10
				Other wildlife:	112
				Wild horses:	0
				Total:	212

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No forage allocated for bighorn sheep.	Allocate forage for bighorn sheep. Monitor population expansion of both species to ensure sufficient forage and habitat are available.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plan for other listed fish in the Warner Basin.
No conservation strategy for redband trout.	Develop/implement redband trout conservation strategy.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1969 allotment management plan, with those modifications made in 1999. Revise the following objectives as needed to meet multiple use objectives:

1. To reduce accelerated gully soil erosion in Sweeny Canyon and the numerous short side drainages along Deep Creek, and moderate sheet soil erosion on the table land area of the West pasture, by increasing the density of bluebunch wheatgrass, bottlebrush squirreltail, and *Stipa* spp. 50%, increasing the composition of bluebunch wheatgrass 50% from that recorded in photo trend plots 460/487, and indicated by observance of photo stations 461–464.

2. To increase the availability of forage for deer annually from December–April in the seeding pasture of the allotment by establishing crested wheatgrass seeding to a 10–15% density, yet not allowing crested wheatgrass wolf plants to develop, and increasing the density of bluebunch wheatgrass, bottlebrush squirreltail, and Thurber's needlegrass 50%, and composition of bluebunch wheatgrass 50% from that recorded in photo trend plot 460 and 487, and indicated by observance of photo stations 461–464. To have available for deer use in those months 80% of the current year's growth of bitterbrush in the allotment.

3. To restore 244 AUM's of suspended nonuse and maintain an average 610 AUM's of annual actual livestock use within this allotment by increasing the density of bluebunch wheatgrass, bottlebrush squirreltail, and Thurber's needlegrass 50%, and increasing the composition of bluebunch wheatgrass 50% from that recorded in photo stations 461–464. Maintaining this level of density and composition should afford sufficient annual forage to obtain the desired average actual use stated above within 4 years.

Number: 00202		Name: HICKEY INDIVIDUAL			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	10,906	Active preference:	583	Bighorn sheep:	0
Other acres:	90	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	583	Elk:	30
				Other wildlife:	102
				Wild horses:	0
				Total:	132

Identified resource conflicts/concerns:	Management direction:
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plan for other listed fish in the Warner Basin.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Proposed Fish Creek Rim ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Fish Creek Rim WSA occurs within the allotment.	Manage WSA under the wilderness IMP.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1975 allotment management plan. Revise the following objectives as needed to meet multiple use objectives.

1. To reduce accelerated and potential accelerated gully soil erosion in the several short side drainages along Camas Creek and moderate sheet soil erosion on the table land in the Fish Creek Rim area by increasing litter accumulation, vegetative cover, and vigor 50% from that recorded in photo trend plots 475, 477–479, and 484–485.

2. To increase the availability and the amount of forage for deer in the months of January–March in seeding pasture of the allotment by maintaining the crested wheatgrass seeding, yet not allowing crested wheatgrass wolf plants to develop, and increase the density of Idaho fescue and bluebunch wheatgrass and composition of Idaho fescue and bluebunch wheatgrass from that recorded in photo trend plot 474 and indicated by observance of photo station 475. To have available for deer use in those 3 months 80% of the current year's growth of bitterbrush in the allotment.

3. To restore 100 AUM's of suspended nonuse and maintain an average 1,112 AUM's of annual actual livestock use within the allotment. Increase vegetative cover and vigor of Idaho fescue, bottlebrush squirreltail, and bluebunch wheatgrass from that recorded in photo trend plots 473–474, 476, 509A, and indicated by observance of photo stations 475, 477–479, 484–485, and 510A.

The key species are crested wheatgrass, Idaho fescue and bluebunch wheatgrass. Saltgrass) and bottlebrush squirreltail are key species in Fisher Lake.

Number: 00203		**Name: O'KEEFFE FRF**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	565	Active preference:	48	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	48	Elk:	9
				Other wildlife:	2
				Wild horses:	0
				Total:	11

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
Maintenance of range improvement projects.	Maintain existing exclosures, including those along the proposed WSR.
Status and location of special status species and cultural plant communities are unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.

Number: 00204		**Name: CRUMP INDIVIDUAL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,930	Active preference:	92	Bighorn sheep:	100
Other acres:	395	Suspended nonuse:	106	Deer/pronghorn:	0
Category:	I	Total preference:	198	Elk:	0
				Other wildlife:	50
				Wild horses:	0
				Total:	150

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No forage allocated for bighorn sheep.	Allocation forage for bighorn sheep. Monitor population expansion to ensure sufficient forage and habitat are available.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plans for other listed fish in the Warner Basin.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
The Fish Creek Rim WSA occurs within the allotment.	Manage the WSA under the wilderness IMP.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00205		**Name: GREASER DRIFT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	9,210	Active preference:	356	Bighorn sheep:	30
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	356	Elk:	0
				Other wildlife:	100
				Wild horses:	0
				Total:	130

Identified resource conflicts/concerns:	**Management direction:**
No forage allocated for bighorn sheep.	Allocate forage for bighorn sheep. Monitor population expansion to ensure sufficient forage and habitat are available.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Waterfowl habitat management.	Continue implementation of the habitat management plan/management framework plan objectives to improve waterfowl habitat.
Currently, no fall grazing use is authorized.	Modify the term grazing permit to include fall grazing.
Noxious weed encroachment.	Eradicate yellow starthistle.
	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00206		Name: LANE PLAN II			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	9,910	Active preference:	450	Bighorn sheep:	0
Other acres:	3,330	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	450	Elk:	30
				Other wildlife:	146
				Wild horses:	0
				Total:	176

Identified resource conflicts/concerns:	Management direction:
Exclosure maintenance.	Continue maintenance of existing exclosures.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion of both species to ensure sufficient forage and habitat are available.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plans for other listed fish in the Warner Basin.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1970 allotment management plan. Revise the following objectives as needed to meet multiple use objectives: 1. To reduce gully erosion in the steep topography of the allotment, mainly along Parsnip and Drake Creeks, and moderate sheet erosion throughout the allotment by increasing the density and composition of Idaho fescue 50% from that recorded in photo trend plots 426 and 496-97, and indicated by observance of photo stations 438–49, 450–52, 499, and 500. Maintaining this level of density and composition on the trend plots and photo stations should afford sufficient soil cover and holding ability on the allotment to stabilize erosion at a tolerable level. 2. To increase the availability and amount of forage for deer in the months of January–March in that portion of the allotment in the Deep Creek deer winter range, mainly in Pasture 3, by not allowing crested wheatgrass and Idaho fescue wolf plants to develop, yet increasing the density and compositon of Idaho fescue 50% from that recorded in photo trend plot 426 and 496–97, and indicated by observance of photo stations 438–39, 450–52, 499, and 500. To have available for deer use in those 3 months 80% of the current year's growth of bitterbrush in the allotment. 3. To restore 459 AUM's of suspended nonuse and maintain an average of 867 AUM's of annual actual livestock use within this allotment by increasing and maintaining the density of Idaho fescue 50% from that recorded in photo trend plots 426 and 496–97, and

Number: 00206 [CONTINUED] **Name: LANE PLAN II**

indicated by observance of photo stations 438–39, 450–52, 499, and 500. Maintaining this level of density and composition should afford sufficient annual forage to obtain the desired average actual use date above in 4 years.

The grazing system will meet the objectives in Pastures 1 and 2 by:

a. Increasing plant density and improving plant composition for improved watershed protection and increased livestock forage by allowing deferment during the critical growth period of key forage species to allow vigor, restoration, and occasional seed trampling.

b. Increasing wildlife forage by providing deferment for key wildlife forage species. Also will not allow the development of crested wheatgrass wolf plants in Pasture 3.

The grazing system in Pasture 3 will accomplish the objectives by not allowing crested wheatgrass wolf plants to develop, yet allow root reserve restoration preceding use each spring.

Key species are Idaho fescue and *Stipa* spp. in Pastures 1 and 2 and crested wheatgrass in Pasture 3.

Number: 00207		**Name: LANE PLAN I**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	24,725	Active preference:	1,942	Bighorn sheep:	0
Other acres:	1,370	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,942	Elk:	30
				Other wildlife:	200
				Wild horses:	0
				Total:	230

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plans for other listed fish in the Warner Basin.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1971 allotment management plan. Revise the following objectives as needed to meet multiple use objectives: 1. To reduce gully erosion in the steep topography of the Big Valley pasture and moderate sheet erosion throughout the allotment by increasing the density, vigor, and litter 50% from that recorded in photo trend plots 415–17, 420, and 501–02, and indicated by observance of photo stations 455, 503, and 506. Maintaining this level of density and composition on the trend plots and photo stations should afford sufficient soil cover and holding ability on the allotment to stabilize erosion at a tolerable level. 2. To increase the availability and amount of forage for deer in the months of January–March in that portion of the allotment within the Deep Creek deer winter range mainly in the Grain Camp pasture, by not allowing crested wheatgrass wolf plants to develop. Increase the composition and vigor of Idaho fescue and bluebunch wheatgrass, if soil conditions allow such, from that recorded in photo trend plots 415-17, 420, 501, and 502, and indicated by observance of photo stations 445, 455, 503, and 506. To have available for deer use in those 3 months 80% of the current year's growth of bitterbrush in the allotment. 3. Maintain an average of 2,097 AUM's of annual actual livestock use within this allotment. Increase the density, composition, and vigor of Idaho fescue and bluebunch wheatgrass. Maintain the density of crested wheatgrass in the Grain Camp pasture from that recorded in photo trend plots 415-17, 420, 501, and 502, and indicated by observance of photo stations 445, 455, 505, and 506.

Number: 00208		**Name: SAGEHEN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	3,280	Active preference:	266	Bighorn sheep:	0
Other acres:	2,050	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	266	Elk:	30
				Other wildlife:	60
				Wild horses:	0
				Total:	90

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Special status species habitats occur within the allotment: greater sage-grouse and prostrate buckwheat.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plan for other listed fish in the Warner Basin.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00209		**Name: SCHADLER**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	790	Active preference:	57	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	57	Elk:	15
				Other wildlife:	20
				Wild horses:	0
				Total:	35

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
Maintenance of range improvement projects.	Maintain existing exclosures, including those along the proposed WSR.
Status and location of special status species and cultural plant communities are unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.

Number: 00210		**Name: RIM**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,376	Active preference:	39	Bighorn sheep:	0
Other acres:	680	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	39	Elk:	15
				Other wildlife:	20
				Wild horses:	0
				Total:	35

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
Maintenance of range improvement projects.	Maintain existing exclosures, including those along the proposed WSR.
Status and location of special status species and cultural plant communities are unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.

Number: 00211		**Name: ROUND MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	16,330	Active preference:	1,102	Bighorn sheep:	0
Other acres:	21,640	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,102	Elk:	90
				Other wildlife:	183
				Wild horses:	0
				Total:	273

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion for Warner sucker.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion of both species to ensure sufficient forage and habitat are available.
WSR is part of the allotment.	Based on its scenic values, Twelvemile Creek is a designated WSR. Management will continue to emphasize fisheries as its outstanding remarkable value. Grazing will be excluded from Twelvemile Creek.
Special status species habitats occur within the allotment: greater sage-grouse, prostrate buckwheat, and *Grateola* spp.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plan for other listed fish in the Warner Basin. Increase the size of the Grateola exclosure to provide additional protection.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1971 allotment management plan. Revise the following objectives as needed to meet multiple use objectives: 1. To completely or nearly stop accelerated gully erosion in the Long Canyon drainage by establishing adequate vegetative cover in the drainage bottom through periodic relief from trampling and grazing. Progress of this objective will be pictorically recorded in photo station #467–68. 2. To restore, as a minimum, 132 AUM's of suspended nonuse and maintain an average 1,200 AUM's of annual actual use within the allotment by increasing the vigor of the key species—Idaho fescue, Thurber's needlegrass, and bluebunch wheatgrass—and subsequently maintaining that increased vigor at an optimum level through periodic rest and deferment. The implementation of the proposed grazing system should meet the goal of this objective after one three-year cycle. Relative vigor of the key species will be documented in photo trend plots 419, 466, and 470. 3. To ensure the continued availability of adequate late winter–early spring forage for mule deer by resting 1/3 of the allotment from all grazing in any one year. This objective will be monitored with the help of previously-mentioned photo stations, photo trend plots, and by bitterbrush transects maintained by the district wildlife biologist.

Number: 00212		**Name: RAHILLY-GRAVELLY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	33,285	Active preference:	1,781	Bighorn sheep:	0
Other acres:	2,031	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	1,781	Elk:	0
				Other wildlife:	350
				Wild horses:	0
				Total:	350

Identified resource conflicts/concerns:	**Management direction:**
Exclosure maintenance.	Continue maintenance of existing exclosures to comply with/implement biological opinion Warner sucker.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Proposed Rahilly-Gravelly ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat and stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Water quality is potentially impacted by grazing.	Where BLM-authorized activities are determined to be impacting water quality, modify management to improve surface water quality to meet/exceed state standards.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines. Implement recovery plan for other listed fish in the Warner Basin.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1984 allotment management plan. Revise the following objectives as needed to meet multiple use objectives:
	Provide a sustained, high-level, regular output of the various renewable resources within the allotment, by allowing the vegetation affected by grazing to recover vigor, produce seed, establish seedlings, and accumulate litter between plants.
	1. Meadow and mixed-browse types should receive special attention in livestock grazing manipulation. Some "shock" grazing of browse types may be necessary to shape browse. In certain wet meadow areas, temporary fencing may be needed to provide additional rest and allow more rapid vigor recovery.
	2. Allow sufficient rest periods for healing gullies by increasing vegetative production, root systems, and litter accumulation.
	3. Annually provide 1,700–2,000 AUM's of useable livestock forage, as reflected by actual use records.
	4. Reduce the erosion caused by poorly-constructed or inadequately-drained roads and trails by properly draining some and abandoning others, with adequate drainage and seeding of disturbed areas where necessary.

Number: 00213		**Name: BURRO SPRINGS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	7,500	Active preference:	279	Bighorn sheep:	20
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	279	Elk:	0
				Other wildlife:	60
				Wild horses:	0
				Total:	80

Identified resource conflicts/concerns:	**Management direction:**
Proposed Spanish Lakes ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and to allow for species reestablishment.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for bighorn sheep.	Allocate forage for bighorn sheep. Monitor population expansion to ensure sufficient forage and habitat are available.
Current range condition, level, or pattern of utilization may be unacceptable.	Maintain/improve rangeland condition and productivity through a change in management practices, reseeding, or project implementation.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00214		**Name: CHUKAR SPRINGS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,764	Active preference:	52	Bighorn sheep:	20
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	52	Elk:	0
				Other wildlife:	15
				Wild horses:	0
				Total:	35

Identified resource conflicts/concerns:	**Management direction:**
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological condition.	Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for bighorn sheep.	Allocate forage for bighorn sheep. Monitor population expansion to ensure sufficient forage and habitat are available.
Current range condition, level, or pattern of utilization may be unacceptable.	Maintain/improve rangeland condition and productivity through a change in management practices, reseeding, or project implementation.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00215		**Name: HILL CAMP**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	30,790	Active preference:	3,932	Bighorn sheep:	45
Other acres:	2,710	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	3,932	Elk:	0
				Other wildlife:	300
				Wild horses:	0
				Total:	345

Identified resource conflicts/concerns:	**Management direction:**
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Crested wheatgrass seedings are in declining condition.	Treat crested wheatgrass seedings to improve ecological condition.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Special status species habitats occur within the allotment: greater sage-grouse and Tui chub.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines and manage Tui chub in accordance with the final conservation agreement.
No forage allocated for bighorn sheep.	Allocate forage for bighorn sheep. Monitor population expansion to ensure sufficient forage and habitat are available.
Current range condition, level, or pattern of utilization may be unacceptable.	Maintain/improve rangeland condition and productivity through a change in management practices, reseeding, or project implementation.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1989 allotment management plan. Revise the following objectives as needed to meet multiple use objectives: 1. Allow an opportunity for maximum herbage production, and thereby substantially restore vigor, three out of four years on all plants affected by grazing. 2. Allow an opportunity for maximum seed production two or three years out of four on all plants substantially affected by grazing. 3. Acquire substantial trampling by domestic livestock of all seed and foliage litter produced, into and on the soil surface, at least two out of four years. 4. Allow all new seedings one full year and two grazing seasons of rest from grazing every four years. 5. Close and lay to rest (by filling in and seeding) all unnecessary roads, trails, and accelerated erosion scars. 6. Require all new construction and maintenance of roads, reservoirs, and waterholes to be done in a manner which will: a) Cause the least disturbance of topsoil and vegetation. b) Result in the least amount of erosion possible. c) Acquire quick revegetation of disturbed areas (seeding may be required).

Number: 00216		**Name: O'KEEFE INDIVIDUAL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	51,785	Active preference:	4,808	Bighorn sheep:	0
Other acres:	3,010	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	4,808	Elk:	0
				Other wildlife:	266
				Wild horses:	0
				Total:	266

Identified resource conflicts/concerns:	**Management direction:**
Proposed High Lakes ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1989 allotment management plan. Revise the followng objectives as needed to meet multiple use objectives: 1. Maintain current allocation of 4,808 AUM's for livestock and 266 AUM's for wildlife, allowing for adjustments as monitoring data becomes available over the next 10 years. 2. Provide for an upward trend in pastures where it is determined through monitoring data that the key species composition in key areas could be increased over the next 10 years.

Number: 00217		**Name: COX INDIVIDUAL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,246	Active preference:	74	Bighorn sheep:	0
Other acres:	60	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	74	Elk:	0
				Other wildlife:	70
				Wild horses:	0
				Total:	70

Identified resource conflicts/concerns:	**Management direction:**
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines and manage.
High Lakes ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by ACEC management plan.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
	Continue livestock management practices under the 1972 allotment management plan. Revise the following objectives as needed to meet multiple use objectives: 1. To reduce potential accelerated erosion in Fisher Canyon watershed by maintaining/improving present vegetative cover. Deferring and/or resting those small livestock concentration areas every other year will afford a vegetative cover which will provide sufficient soil holding capacity to stabilize erosion. This objective will be evaluated by use of photo trend plots 518 and 520, and photo station 519. 2. Provide a sustained yield of at least 350 AUM's of annual actual livestock use in the allotment. 3. Maintain perennial forage in a form which is most desirable for spring deer use. This could be accomplished by grazing 1/2 the allotment season long each year. Old growth will be removed by cattle concentration, and new green growth will be available to mule deer in early spring through deferment of that area grazed the year before. 4. Key species will be recorded on appropriate forms.

Number: 00218		**Name: SANDY SEEDING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,850	Active preference:	600	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	600	Elk:	0
				Other wildlife:	30
				Wild horses:	0
				Total:	30

Identified resource conflicts/concerns:	**Management direction:**
Juniper encroachment is impacting watershed functions, wildlife habitat, quaking aspen/bitterbrush stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines and manage.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Special plant communities and plant community cells.	Monitor area to determine plant community location.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00219		**Name: CAHILL FRF**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	470	Active preference:	280	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	280	Elk:	0
				Other wildlife:	20
				Wild horses:	0
				Total:	20

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00222		**Name: FISHER LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,320	Active preference:	781	Bighorn sheep:	0
Other acres:	656	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	781	Elk:	0
				Other wildlife:	50
				Wild horses:	0
				Total:	50

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Continue livestock management practices under the 1975 allotment management plan. Revise the following objectives as needed to meet multiple use objectives:

1. To reduce accelerated and potential accelerated gully soil erosion in the several short side drainages along Camas Creek, and moderate sheet soil erosion on the table land in the Fish Creek Rim area by increasing litter accumulation, vegetative cover, and vigor 50% from that recorded in photo trend plots 475, 477–479, and 484–485.

2. To increase the availability and the amount of forage for deer in the months of January–March in seeding pasture of the allotment by maintaining the crested wheatgrass seeding, yet not allowing crested wheatgrass wolf plants to develop. To increase the density and composition of Idaho fescue and bluebunch wheatgrass and from that recorded in photo trend plot 474 and indicated by observance of photo station 475. To have available for deer use in those 3 months 80% of the current year's growth on the bitterbrush in the allotment.

3. To restore 100 AUM's of suspended nonuse and maintain an average 1,112 AUM's of annual actual livestock use within the allotment. Increase vegetative cover and vigor of Idaho fescue, bottlebrush squirreltail, and bluebunch wheatgrass from that recorded in photo trend plots 473–474, 476, and 509A, and indicted by observance of photo stations 475, 477–479, 484–485, and 510A.

The key species are crested wheatgrass, Idaho fescue, and bluebunch wheatgrass. Saltgrass and bottlebrush squirreltail are key species in Fisher Lake.

Number: 00223		**Name: HICKEY FRF**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	412	Active preference:	64	Bighorn sheep:	0
Other acres:	656	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	64	Elk:	15
				Other wildlife:	61
				Wild horses:	0
				Total:	76

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities are unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00400		**Name: PAISLEY COMMON (COGLAN HILLS)**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	12,774	Active preference:	117	Bighorn sheep:	40
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	117	Elk:	0
				Other wildlife:	120
				Wild horses:	0
				Total:	160

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Monitor fences to protect ACEC values.	Maintain fences to protect Lake Abert ACEC.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Abert Rim Weed Management Area plan.

Number: 00400		**Name: PAISLEY COMMON (DIABLO PEAK)**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	74,098	Active preference:	0	Bighorn sheep:	120
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	0	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	120

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Monitor fences to protect ACEC values.	Maintain fences to protect Lake Abert ACEC.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Abert Rim Weed Management Area plan.
	Decrease current forage allocation for wild horses from 123–0 AUM's, because this area is not in a herd area.

Number: 00400		**Name: PAISLEY COMMON (ABERT RIM)**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	14,659	Active preference:	0	Bighorn sheep:	180
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	0	Elk:	0
				Other wildlife:	180
				Wild horses:	0
				Total:	360

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Monitor fences to protect ACEC values.	Maintain fences to protect Lake Abert ACEC.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Abert Rim Weed Management Area plan.

Number: 00401		**Name: FENCED FEDERAL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	160	Active preference:	16	Bighorn sheep:	0
Other acres:	520	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	16	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Noxious weeds occur in the allotment.	Implement the Warner Basin Weed Management Area plan.

Number: 00403		**Name: PINE CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	400	Active preference:	18	Bighorn sheep:	0
Other acres:	1,160	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	18	Elk:	0
				Other wildlife:	2
				Wild horses:	0
				Total:	2

Identified resource conflicts/concerns:	**Management direction:**
No objectives for riparian habitat and stream channels. Water quality is potentially impacted by grazing.	Exclude grazing along Pine Creek.
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00404		**Name: WILLOW CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	11,805	Active preference:	472	Bighorn sheep:	0
Other acres:	8,845	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	472	Elk:	0
				Other wildlife:	200
				Wild horses:	0
				Total:	200

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Proposed Tucker Hill ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Need to assess existing closures.	
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitats occur within the allotment: long-flowered snowberry and greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim sagegrouse guidelines.

Number: 00405	**Name: COYOTE CREEK [1]**	
General	**Grazing information (AUM's)**	**Other forage demands (AUM's)**
Public acres: 2,395	Active preference:	Bighorn sheep:
Other acres: 1,972	Suspended nonuse:	Deer/pronghorn:
Category:	Total preference:	Elk:
		Other wildlife:
		Wild horses:
		Total:

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status plant species habitat occurs within the allotment: long-flowered snowberry.	Protect special status species and habitat from BLM-authorized activities.
Special status animal species occurs within the allotment: greater sage-grouse.	Implement interim greater sage-grouse guidelines.

[1] Coyote Creek Allotment is a proposed allotment; the management category, season of use, grazing system, and AUM allocations will be determined at a later date.

Number: 00406		**Name: WEST CLOVER FLAT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	748	Active preference:	15	Bighorn sheep:	0
Other acres:	2,776	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	15	Elk:	0
				Other wildlife:	2
				Wild horses:	0
				Total:	2

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Proposed Tucker Hill ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.

Number: 00407		**Name: CLOVER FLAT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,521	Active preference:	200	Bighorn sheep:	0
Other acres:	4,851	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	200	Elk:	0
				Other wildlife:	40
				Wild horses:	0
				Total:	40

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Proposed Tucker Hill ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
No spring grazing use.	Implement change from no grazing to spring use on Moss Creek.
Grazing management needs modification.	Improve grazing management by moving more use to the seeded areas.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.

Number: 00410		**Name: TIM LONG CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	340	Active preference:	15	Bighorn sheep:	0
Other acres:	1,155	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	15	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Avery Creek needs a management plan.	Conduct proper functioning condition assessment on Avery Creek and develop/implement appropriate management.

Number: 00411		**Name: JONES CANYON**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	636	Active preference:	13	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	13	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
There are special status and cultural plant species.	Manage to protect special status and cultural plant species (nodding melic grass) and habitat.
Special status plant species habitat occurs within the allotment: nodding melic grass *(Melica stricta)*.	Protect special status species/habitat from BLM-authorized activities.

Number: 00412		Name: FIR TIMBER BUTTE			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	3,462	Active preference:	58	Bighorn sheep:	30
Other acres:	3,172	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	58	Elk:	0
				Other wildlife:	30
				Wild horses:	0
				Total:	60

Identified resource conflicts/concerns:	Management direction:
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Juniper encroachment is impacting ecological conditions.	Restore productivity and biodiversity in juniper stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire.
BLM land is located outside the allotment.	Improve grazing management by adjusting fences to encompass allotment-associated BLM land.
Special status plant species occurs within the allotment: nodding melic grass *(Melica stricta)*.	Manage to protect special status and cultural plant species (nodding melic grass) and habitat.

Number: 00415		**Name: BRIGGS GARDEN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	785	Active preference:	42	Bighorn sheep:	0
Other acres:	899	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	42	Elk:	0
				Other wildlife:	7
				Wild horses:	0
				Total:	7

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Juniper encroachment is impacting ecological conditions.	Restore productivity and biodiversity in juniper stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire.

Number: 00416		**Name: WHITE ROCK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	565	Active preference:	10	Bighorn sheep:	0
Other acres:	438	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	10	Elk:	0
				Other wildlife:	1
				Wild horses:	0
				Total:	1

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Juniper encroachment is impacting ecological conditions.	Restore productivity and biodiversity in juniper stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire.

Number: 00418		**Name: SQUAW LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	43,269	Active preference:	834	Bighorn sheep:	0
Other acres:	520	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	834	Elk:	0
				Other wildlife:	96
				Wild horses:	69
				Total:	165

Identified resource conflicts/concerns:	**Management direction:**
Proposed Black Hills ACEC exists within allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by ACEC management plan.
Juniper encroachment is impacting ecological conditions.	Restore productivity and biodiversity in juniper stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire.
Special status species habitats occur within the allotment: greater sage-grouse and Cusick's buckwheat.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement LRA-wide noxious weed plan/environmental assessment.
Paisley herd management area boundary needs modification.	Modify herd management area for 0420 and west half of 0418.
Grazing is poorly distributed.	Modify grazing and improve distribution.

Number: 00419		**Name: ST. PATRICKS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	23,460	Active preference:	750	Bighorn sheep:	0
Other acres:	1,240	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	750	Elk:	0
				Other wildlife:	53
				Wild horses:	39
				Total:	92

Identified resource conflicts/concerns:	**Management direction:**
There are special status and cultural plant species.	Manage to protect special status and cultural plant species and habitat.
Special status species habitats occur within the allotment: greater sage-grouse and snowline cymopterus.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Currently, no summer grazing use is authorized.	Modify the term grazing permit to include spring/summer grazing.
Noxious weed encroachment.	Implement LRA-wide noxious weed plan/environmental assessment.

Number: 00420		**Name: EGLI RIM**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	21,052	Active preference:	925	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	925	Elk:	0
				Other wildlife:	31
				Wild horses:	14
				Total:	45

Identified resource conflicts/concerns:	**Management direction:**
There are special status and cultural plant species.	Manage to protect special status and cultural plant species and habitat.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Develop LRA-wide noxious weed plan/environmental assessment.
Paisley Herd Management Area boundary needs modification.	Modify herd management area for 0420 and west half of 0418.
Reallocate grazing use from Table Rock 0714 allotment to 0420.	Allocate AUM's and increase use on the seeding in 0420.

Number: 00421		Name: ROSEBUD			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	10,640	Active preference:	158	Bighorn sheep:	0
Other acres:	2,040	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	158	Elk:	0
				Other wildlife:	6
				Wild horses:	0
				Total:	6

Identified resource conflicts/concerns:	Management direction:
Noxious weed encroachment.	Implement a noxious weed management strategy.
Diablo Mountain WSA occurs within the allotment.	Manage the WSA under the wilderness IMP.
Maintain/improve current status of habitat management plan.	Continue existing management of Rosebud Habitat Management Plan. The goals and objectives are:

Goal 1: To reestablish a functioning wetland ecosystem, containing both wetland and associated upland components, on the 12,120 acres of public land within the habitat management plan area.

Objective 1: Within 6 years of implementation, enhance/improve the ecological condition on 609 acres of existing wetlands (1987 National Wetland Inventory) from 100% low-seral stage to at least 5% high-seral stage, 40% mid-seral stage, and 55% low-seral stage; and within 12 years to at least 24% high-seral stage, 35% mid-seral stage, and 40% low-seral stage.

Objective 2: Within 10 years of implementation, restore wetland habitats on 264 acres where those habitats have been converted to upland vegetation through past land-use activities.

Objective 3: Within 6 years of full implementation of the work necessary to achieve Objective 2, attain an ecological condition in the wetland vegetal communities that is at least 24% high-seral stage, 35% mid-seral stage, and 40% low-seral stage.

Goal 2: To improve and enhance the overall biotic diversity of the wetland and associated upland ecosystem on the 12,120 acres of public land within the habitat management plan area by providing habitats for the greatest diversity of water-related species at the highest densities consistent with maintaining that diversity.

Objective 1: Within 5 years of full implementation, maintain, enhance, and develop sufficient nesting, feeding, and brooding habitats to support a minimum breeding population of 200 pairs of deep-water emergent marsh nesting species (canvasback, redhead, ruddy duck, pied-billed and Clark's grebe, black tern, least bittern, and Virginia rail).

Objective 2: Within 5 years of implementation, maintain, enhance, and develop sufficient nesting, feeding and brooding habitats to support a minimum breeding population of 300 pairs of (teal, lesser scaup, Wilson's phalarope, eared grebe, white-faced ibis, American bittern, coot, and sora rail).

Objective 3: Within 5 years of full implementation, maintain, enhance, and develop sufficient nesting, feeding, and brooding habitats to support a minimum breeding population of 300 pairs of intermingled marsh, meadow, and upland habitats nesting species (mallard, teal, gadwall, greater sandhill crane, Great Basin Canada goose, northern shoveler, green-winged teal, willet, and common snipe).

Objective 4: Maintain, enhance, and develop sufficient meadow spring and seep feeding and brooding habitats to support a minimum nesting population of 25 pairs of western snowy plovers within 5 years of full implementation.

Number: 00422		**Name: PAISLEY FLAT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,549	Active preference:	585	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	585	Elk:	0
				Other wildlife:	20
				Wild horses:	0
				Total:	20

Identified resource conflicts/concerns:	**Management direction:**
Maintain and improve forage production.	Continue to manage for forage production in seeded areas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area wherever found.
Impacts to biotic crust.	Install monitoring sites to measure impacts of livestock to biotic crust.

Number: 00423		**Name: HILL FIELD**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,198	Active preference:	238	Bighorn sheep:	150
Other acres:	1,140	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	238	Elk:	0
				Other wildlife:	90
				Wild horses:	0
				Total:	240

Identified resource conflicts/concerns:	**Management direction:**
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Noxious weed encroachment: medusahead.	Develop/implement a medusahead management strategy.
Juniper encroachment is impacting ecological conditions.	Restore productivity and biodiversity in juniper stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire.
Grazing capacity needs review.	Adjust licensed livestock use if necessary.

Number: 00424		**Name: WEST LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,886	Active preference:	550	Bighorn sheep:	0
Other acres:	320	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	550	Elk:	0
				Other wildlife:	120
				Wild horses:	0
				Total:	120

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Monitor fences to protect ACEC values.	Maintain fences to protect Lake Abert ACEC.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.

Number: 00425		**Name: PIKE RANCH**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,560	Active preference:	95	Bighorn sheep:	0
Other acres:	1,600	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	95	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Implement a noxious weed management strategy.
Lake Abert ACEC exists within the allotment.	Implement Lake Abert ACEC plan objectives identified in the August 12, 1996 record of decision.
Livestock grazing associated with private land.	Continue exchange-of-use agreement with private land owner/permittee.
Improve wildlife management and other ACEC values.	Consider land exchanges in 0425 to enhance wildlife management and other ACEC values.

Number: 00426		**Name: FIVE MILE BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	41,815	Active preference:	1,021	Bighorn sheep:	100
Other acres:	1,216	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	1,021	Elk:	0
				Other wildlife:	120
				Wild horses:	0
				Total:	220

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise improve livestock management/distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area wherever found.
Livestock impacts are unknown to microbiotic crusts.	Initiate studies to determine livestock impacts to microbiotic crust.

Number: 00427		**Name: XL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	37,003	Active preference:	4,220	Bighorn sheep:	0
Other acres:	190	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	4,220	Elk:	0
				Other wildlife:	175
				Wild horses:	0
				Total:	175

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Lake Abert ACEC exists within the allotment.	Maintain fences to protect ACEC values around Lake Abert (primarily riparian).
Maintain and improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area.
Special status species habitats occur within the allotment: desert allocarya *(Plagyiobothyrs salsus)* and greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement the interim greater sage-grouse guidelines.

Number: 00428		**Name: SHEEPROCK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	144,025	Active preference:	4,000	Bighorn sheep:	220
Other acres:	4,460	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	4,000	Elk:	0
				Other wildlife:	117
				Wild horses:	490
				Total:	827

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Portions of the area in the Great Basin ecosystem are in unsatisfactory condition and cannot be healed through management strategies.	Restore portions of the Great Basin ecosystem to promote plant community diversity, allowing the communities to be more resilient to invasive species and disturbance.
Maintain/improve the condition of the wild horse in the herd management area.	Implement wild horse herd management area plan and improve fences along the east boundary to keep the horses in the area. Increase the forage allocation for wild horses to 936 AUM's, and adjust as necessary.
Improve upland watershed and ecological condition.	Improve upland watershed and ecological condition by vegetative treatment, including seeding; opportunities for restoration of poor range condition in this area.
Diablo Peak WSA occurs within the allotment.	Manage WSA under wilderness IMP.

Number: 00429		**Name: TWIN LAKES**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	17,050	Active preference:	2,272	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	2,272	Elk:	0
				Other wildlife:	150
				Wild horses:	0
				Total:	150

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area wherever found.
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.

Number: 00430		**Name: SOUTH POVERTY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	35,382	Active preference:	4,201	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	4,201	Elk:	0
				Other wildlife:	80
				Wild horses:	0
				Total:	80

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area.
Livestock distribution.	As opportunities arise, improve livestock distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.

Number: 00431		**Name: NARROWS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,486	Active preference:	275	Bighorn sheep:	100
Other acres:	180	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	275	Elk:	0
				Other wildlife:	40
				Wild horses:	0
				Total:	140

Identified resource conflicts/concerns:	**Management direction:**
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area.

Number: 00432		**Name: COLEMAN SEEDING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	5,839	Active preference:	920	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	920	Elk:	0
				Other wildlife:	35
				Wild horses:	0
				Total:	35

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Lake Abert ACEC exists within the allotment.	Maintain fences to protect ACEC values around Lake Abert (primarily riparian).
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Grazing capacity needs review.	Adjust licensed livestock use, if necessary.

Number: 00433		**Name: EAST JUG MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	12,325	Active preference:	2,236	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	2,236	Elk:	0
				Other wildlife:	80
				Wild horses:	0
				Total:	80

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Maintain/improve the condition of the Paisley Herd Management Area.	Remove wild horses outside of the Paisley Herd Management Area.
Livestock distribution.	As opportunities arise, improve livestock distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Grazing capacity needs review.	Adjust licensed livestock use, if necessary.

Number: 00435		**Name: SHALE ROCK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	12,853	Active preference:	1,220	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	1,220	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve forage production.	Continue to manage for forage production in seeded areas.
Noxious weed encroachment.	Develop/implement a noxious weed management strategy.
Lake Abert ACEC exists within the allotment.	Maintain fences to protect ACEC values around Lake Abert (primarily riparian).
Livestock distribution.	As opportunities arise, improve livestock distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock effects on microbiotic crusts.	Establish monitoring sites to research livestock effects.
Grazing capacity needs review.	Adjust licensed livestock use, if necessary.

Number: 00501		**Name: FRF FLYNN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,780	Active preference:	120	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	120	Elk:	0
				Other wildlife:	55
				Wild horses:	0
				Total:	55

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
No recovery plan for other fish listed in the Warner Basin.	Implement recovery plan for other listed fish in the Warner Basin.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00502		**Name: FRF FITZGERALD**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	5,150	Active preference:	329	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	329	Elk:	15
				Other wildlife:	60
				Wild horses:	0
				Total:	75

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition..
Maintenance of range improvement projects.	Maintain existing exclosures, including those along Twelvemile Creek.
No forage allocated for elk.	Allocate forage for elk.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00503		**Name: FRF TAYLOR**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,110	Active preference:	295	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	295	Elk:	15
				Other wildlife:	60
				Wild horses:	0
				Total:	75

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00505		**Name: FRF LYNCH**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	180	Active preference:	20	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	20	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Maintenance of range improvement projects.	Maintain existing exclosures, including those along Twelvemile Creek.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00507		**Name: FRF LAIRD**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,030	Active preference:	120	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	120	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species /habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00508		**Name: ROCK CREEK RANCH**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	280	Active preference:	9	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	9	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00509		**Name: COX BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	38,340	Active preference:	1,196	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	124	Deer/pronghorn:	0
Category:	I	Total preference:	1,320	Elk:	0
				Other wildlife:	63
				Wild horses:	0
				Total:	63

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.

Number: 00510		**Name: ORIJANA RIM**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	57,280	Active preference:	1,423	Bighorn sheep:	50
Other acres:	352	Suspended nonuse:	352	Deer/pronghorn:	0
Category:	I	Total preference:	1,775	Elk:	0
				Other wildlife:	100
				Wild horses:	0
				Total:	150

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Better habitat for bighorn sheep needed.	Improve bighorn sheep habitat in Orijana Canyon area.
Maintain/improve the condition of the Warm Springs Herd Management Area area.	Remove wild horses outside of the Warm Springs Herd Management Area area.
Orijana WSA occurs within the allotment.	Manage WSA under the wilderness IMP.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00511		**Name: NORTHEAST WARNER**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	139,019	Active preference:	6,151	Bighorn sheep:	120
Other acres:	234	Suspended nonuse:	234	Deer/pronghorn:	0
Category:	I	Total preference:	6,385	Elk:	0
				Other wildlife:	550
				Wild horses:	0
				Total:	670

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Maintain/improve the condition of the Warm Springs Herd Management Area area.	Remove wild horses outside of the Warm Springs Herd Management Area area.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00512		**Name: NORTH BLUEJOINT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	22,440	Active preference:	289	Bighorn sheep:	0
Other acres:	3,640	Suspended nonuse:	79	Deer/pronghorn:	0
Category:	I	Total preference:	368	Elk:	0
				Other wildlife:	100
				Wild horses:	0
				Total:	100

Identified resource conflicts/concerns:	**Management direction:**
Livestock distribution/season.	As opportunities arise, improve livestock distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Orijana WSA occurs within the allotment.	Manage to protect WSA values.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00514		**Name: CORN LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	78,476	Active preference:	2,663	Bighorn sheep:	0
Other acres:	1,710	Suspended nonuse:	1,034	Deer/pronghorn:	0
Category:	I	Total preference:	3,697	Elk:	0
				Other wildlife:	140
				Wild horses:	0
				Total:	140

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Maintain/improve area.	Maintain present management.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.
Grazing capacity needs review.	Adjust licensed livestock use, if necessary.

Number: 00515		**Name: JUNIPER MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	91,720	Active preference:	3,621	Bighorn sheep:	40
Other acres:	760	Suspended nonuse:	796	Deer/pronghorn:	0
Category:	M	Total preference:	4,417	Elk:	60
				Other wildlife:	356
				Wild horses:	0
				Total:	456

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitats occur within the allotment: greater sage-grouse and Shelly's ivesia (*Ivesia rhyparia* var. *shellyi*).	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Maintain/improve area's condition.	Maintain present management.
Better habitat for bighorn sheep needed.	Improve bighorn sheep habitat in Orijana Canyon area.
No forage allocated for elk.	Allocate forage for elk.
Sensitive plant species Shelly's ivesia (*Ivesia rhyparia* var. *shellyi*) exists on the allotment.	Monitor/manage grazing to protect sensitive plant species Shelly's ivesia (*Ivesia rhyparia* var. *shellyi*).
Livestock effects on microbiotic crusts.	Continue monitoring microbiotic crust and maintain exclosure fences around study sites.
Proposed Juniper Mountain ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00516		**Name: RABBIT BASIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	32,211	Active preference:	1,846	Bighorn sheep:	0
Other acres:	400	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	1,846	Elk:	0
				Other wildlife:	60
				Wild horses:	0
				Total:	60

Identified resource conflicts/concerns:	**Management direction:**
Possibility of whitetop encroachment.	Control whitetop where it occurs.
Livestock distribution/movement.	As opportunities arise, improve livestock movement/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Maintain/improve forage production.	Continue to manage for forage production in seeded areas. Continue present management.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00517		**Name: COYOTE-CALVIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	123,038	Active preference:	5,091	Bighorn sheep:	30
Other acres:	15,002	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	5,091	Elk:	75
				Other wildlife:	1,000
				Wild horses:	0
				Total:	1,105

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitats occur within the allotment: greater sage-grouse, nodding melic grass (*Melica stricta*), prostrate buckwheat, four-winged milkvetch *(Astragalus tetrapterus),* long-flowered snowberry, and Columbia cress.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
No forage allocated for elk.	Allocate forage for elk.
Limiting pronghorn habitat in less-than-satisfactory condition.	Maintain/enhance pronghorn winter habitat.
No objectives for on-going allotment evaluation.	Incorporate recommendations from on-going allotment evaluation, standards and guides assessment for.
Conservation strategy for Columbia cress.	Continue management in accordance with existing conservation agreement.
Lake Abert WSA is within the allotment.	Manage to protect WSA values.
Wildland fire hazards are at a high level.	Conduct fuel treatments to reduce wildland fire hazards.
Proposed Foley Lake and Fish Creek Rim ACEC exists within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Status and distribution of special status plants and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spatial distribution and grazing impacts.
Noxious weed encroachment.	Implement the objectives for the Abert Rim and Warner Basin Weed Management Area plans.

Number: 00518		**Name: CLOVER CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	10,050	Active preference:	435	Bighorn sheep:	0
Other acres:	1,354	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	435	Elk:	15
				Other wildlife:	100
				Wild horses:	0
				Total:	115

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Fish Creek Rim WSA is within the allotment.	Manage to protect WSA values.
Proposed Juniper Mountain ACEC is within the allotment.	
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00519		**Name: FISH CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	11,805	Active preference:	575	Bighorn sheep:	0
Other acres:	10,446	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	575	Elk:	75
				Other wildlife:	44
				Wild horses:	0
				Total:	119

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Project maintenance.	Maintain fence projects along Twelvemile for riparian habitat enhancement.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00520		**Name: LYNCH-FLYNN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	18,800	Active preference:	882	Bighorn sheep:	0
Other acres:	4,260	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	882	Elk:	30
				Other wildlife:	55
				Wild horses:	0
				Total:	85

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLMauthorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Juniper encroachment is impacting ecological conditions and quaking aspen/bitterbrush stands.	Restore productivity and biodiversity in juniper and quaking aspen/bitterbrush stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Manage quaking aspen to maintain age class diversity and allow for species reestablishment.
Fish Creek Rim WSA is in the allotment.	Manage grazing in order to protect WSA values.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00521		**Name: PRIDAY RESERVOIR**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	780	Active preference:	65	Bighorn sheep:	0
Other acres:	720	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	65	Elk:	5
				Other wildlife:	139
				Wild horses:	0
				Total:	144

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No objectives for riparian habitat/stream channels.	Develop riparian and stream channel/desired future conditions objectives based on riparian and stream condition classifications for streams not in desired future condition.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00522		**Name: ABERT SEEDING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	9,200	Active preference:	2,619	Bighorn sheep:	0
Other acres:	320	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	2,619	Elk:	0
				Other wildlife:	60
				Wild horses:	0
				Total:	60

Identified resource conflicts/concerns:	**Management direction:**
Possibility of whitetop and Mediterranean sage encroachment.	Control whitetop and Mediterranean sage where they occur
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Maintain/improve forage production.	Continue to manage for forage production in seeded areas. Continue present management.
Revise allotment management plan objectives.	Bring forward objectives from existing allotment management plans; revise objectives where needed.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00523		**Name: WARNER LAKES**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	38,788	Active preference:	1,138	Bighorn sheep:	0
Other acres:	5,650	Suspended nonuse:	86	Deer/pronghorn:	0
Category:	I	Total preference:	1,224	Elk:	0
				Other wildlife:	50
				Wild horses:	0
				Total:	50

Identified resource conflicts/concerns:	**Management direction:**
Warner Wetlands ACEC exists within the allotment.	Maintain fences to protect ACEC values around Warner Wetlands.
Fluctuations in water level.	Maintain existing fences around the core wetland area, due to water level fluctuations.
Special status species habitat occurs within the allotment: verrucose sea-purslane (*Sesuvium verrucosum).*	Protect special status species/habitat from BLM-authorized activities.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00524		**Name: LANE INDIVIDUAL**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,700	Active preference:	65	Bighorn sheep:	40
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	65	Elk:	0
				Other wildlife:	50
				Wild horses:	0
				Total:	90

Identified resource conflicts/concerns:	**Management direction:**
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Status and location of special status species and cultural plant communities is unknown.	Conduct inventory for special status species and cultural plant communities to determine distribution and grazing impacts.
No forage allocated for elk.	Allocate forage for elk. Monitor population expansion to ensure sufficient forage and habitat are available.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00529		**Name: SOUTH RABBIT HILLS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	9,028	Active preference:	1,266	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,266	Elk:	0
				Other wildlife:	40
				Wild horses:	0
				Total:	40

Identified resource conflicts/concerns:	**Management direction:**
Possibility of whitetop encroachment.	Control whitetop where it occurs.
Maintain/improve forage production.	Continue to manage for forage production in seeded areas. Continue present management.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00530		**Name: EAST RABBIT HILLS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,404	Active preference:	1,200	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,200	Elk:	0
				Other wildlife:	40
				Wild horses:	0
				Total:	40

Identified resource conflicts/concerns:	**Management direction:**
Possibility of whitetop encroachment.	Control whitetop where it occurs.
Maintain/improve forage production.	Continue to manage for forage production in seeded areas. Continue present management.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00531		**Name: NORTH RABBIT HILLS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	11,712	Active preference:	1,317	Bighorn sheep:	0
Other acres:	640	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,317	Elk:	0
				Other wildlife:	40
				Wild horses:	0
				Total:	40

Identified resource conflicts/concerns:	**Management direction:**
Possibility of whitetop encroachment.	Control whitetop where it occurs.
Maintain/improve forage production.	Continue to manage for forage production in seeded areas. Continue present management.
Noxious weed encroachment.	Implement the objectives for the Warner Basin Weed Management Area plan.

Number: 00600		**Name: BEATY BUTTE COMMON**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	506,985	Active preference:	26,121	Bighorn sheep:	240
Other acres:	68,510	Suspended nonuse:	14,466	Deer/pronghorn:	0
Category:	I	Total preference:	40,587	Elk:	0
				Other wildlife:	444
				Wild horses:	2,400
				Total:	3,084

Identified resource conflicts/concerns:	**Management direction:**
Revise allotment management plan/EIS objectives.	List/carry forward allotment management plan/EIS objectives.
Proposed Hawk Mountain I & II, High Lakes, and Guano ACEC's exist within the allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plans.
Wild horses.	Increase forage allocation for wild horses to 3,000 AUM's to provide 12 months of forage for all horses at the top appropriate management level of 250 horses.

Number: 00700		**Name: SILVER CREEK-BRIDGE CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,645	Active preference:	303	Bighorn sheep:	0
Other acres:	265	Suspended nonuse:	343	Deer/pronghorn:	0
Category:	I	Total preference:	646	Elk:	60
				Other wildlife:	69
				Wild horses:	0
				Total:	129

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Cultural inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	Continue to work with USFS on bald eagle management plans.
Noxious weed encroachment.	Manage noxious weeds.
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00701		**Name: UPPER BRIDGE CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,460	Active preference:	108	Bighorn sheep:	0
Other acres:	3,270	Suspended nonuse:	52	Deer/pronghorn:	0
Category:	M	Total preference:	160	Elk:	30
				Other wildlife:	29
				Wild horses:	0
				Total:	59

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	Continue to work with USFS on bald eagle management plans.
Noxious weed encroachment.	Manage noxious weeds.
52 AUM's suspended.	Reinstate 52 AUM's suspended nonuse.
Adjustments between 0701 and 0704 are not completed.	Finalize/implement grazinguse adjustments between 0701 and 0704 allotments.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00702		**Name: BUCK CREEK-BRIDGE CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,280	Active preference:	309	Bighorn sheep:	0
Other acres:	375	Suspended nonuse:	30	Deer/pronghorn:	0
Category:	M	Total preference:	339	Elk:	30
				Other wildlife:	142
				Wild horses:	0
				Total:	172

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and to allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
No forage allocated for elk.	Allocate forage for elk.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	
Noxious weed encroachment.	
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00703		**Name: BEAR CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,155	Active preference:	118	Bighorn sheep:	0
Other acres:	990	Suspended nonuse:	11	Deer/pronghorn:	0
Category:	M	Total preference:	129	Elk:	30
				Other wildlife:	36
				Wild horses:	0
				Total:	66

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting water-shed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	Continue to work with USFS on bald eagle management plans.
Noxious weed encroachment.	Manage noxious weeds.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Season of use.	Consider season of use changes combined with a grazing system that will address resource concerns.

Number: 00704		**Name: WARD LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	12,424	Active preference:	650	Bighorn sheep:	0
Other acres:	1,819	Suspended nonuse:	223	Deer/pronghorn:	0
Category:	I	Total preference:	873	Elk:	150
				Other wildlife:	187
				Wild horses:	0
				Total:	337

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	Continue to work with USFS on bald eagle management plans.
Noxious weed encroachment.	Manage noxious weeds.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00705		**Name: OATMAN FLAT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	28,503	Active preference:	2,082	Bighorn sheep:	0
Other acres:	6,075	Suspended nonuse:	623	Deer/pronghorn:	0
Category:	I	Total preference:	2,705	Elk:	150
				Other wildlife:	758
				Wild horses:	0
				Total:	908

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Proposed Connley Hills ACEC exists within allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00706		**Name: RYE RANCH**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,240	Active preference:	539	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	539	Elk:	40
				Other wildlife:	130
				Wild horses:	0
				Total:	170

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting water-shed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Complete cultural plant inventory.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00707		**Name: TUFF BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	9,330	Active preference:	536	Bighorn sheep:	0
Other acres:	2,310	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	536	Elk:	180
				Other wildlife:	340
				Wild horses:	0
				Total:	520

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Incomplete cultural plant inventory.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.

Number: 00708		**Name: ARROW GAP**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,720	Active preference:	135	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	25	Deer/pronghorn:	0
Category:	C	Total preference:	160	Elk:	6
				Other wildlife:	160
				Wild horses:	0
				Total:	166

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting water-shed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Incomplete cultural plant inventory.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Proposed Connley Hills ACEC exists within allotment.	Adjust allotment management, including levels and areas of authorized use, seasons of use, and grazing system, as required by proposed ACEC management plan.
No conservation strategy for special status plant species.	Continue management of special status plant species snowline cymopterus (*Cymopterus nivalis*) and Cusick's buckwheat (*Eriogonum cusickii*).in accordance with conservation agreement.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00709		**Name: DEAD INDIAN-DUNCAN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	18,790	Active preference:	586	Bighorn sheep:	0
Other acres:	2,420	Suspended nonuse:	112	Deer/pronghorn:	0
Category:	I	Total preference:	698	Elk:	150
				Other wildlife:	647
				Wild horses:	0
				Total:	797

Identified resource conflicts/concerns:	**Management direction:**
No conservation strategy for redband trout.	Develop/implement conservation agreement for redband trout.
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Bald eagle management plans are not complete.	Continue to work with USFS on bald eagle management plans.
Encroachment of noxious weeds.	Develop a strategy for medusahead and Mediterranean sage in proximity of Duncan Reservoir.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00710		**Name: MURDOCK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,468	Active preference:	545	Bighorn sheep:	0
Other acres:	1,668	Suspended nonuse:	160	Deer/pronghorn:	0
Category:	I	Total preference:	705	Elk:	60
				Other wildlife:	72
				Wild horses:	0
				Total:	132

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Current range condition, level, or pattern of utilization may be unacceptable.	Adjust livestock levels, if necessary.

Number: 00711		**Name: SOUTH HAYES BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,490	Active preference:	88	Bighorn sheep:	0
Other acres:	710	Suspended nonuse:	50	Deer/pronghorn:	0
Category:	I	Total preference:	138	Elk:	60
				Other wildlife:	17
				Wild horses:	0
				Total:	77

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory is incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00712		**Name: BRIDGE WELL SEEDING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,400	Active preference:	188	Bighorn sheep:	0
Other acres:	1,050	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	188	Elk:	60
				Other wildlife:	99
				Wild horses:	0
				Total:	159

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory is incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Continue livestock management practices under the 1992 allotment management plan. Revise objectives as needed to meet multiple-use objectives.	The allotment management plan objectives are: 1. On range study site SC-1 and BW-1, maintain 55-60% composition by weight of key perennial grasses (crested wheatgrass) through 1997. 2. Decrease soil loss and increase water capture, storage, and safe release on the four-wheel drive trails monitored using the photo trend method. 3. Allow adequate spring forage green-up for wintering deer herds. 4. Maintain/improve quality of crucial deer winter range habitat and restrict livestock bitterbrush use to < 10%.

Number: 00713		**Name: SILVER CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,785	Active preference:	200	Bighorn sheep:	0
Other acres:	870	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	200	Elk:	60
				Other wildlife:	62
				Wild horses:	0
				Total:	122

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory is incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Grazing might be affecting surface water quality.	Improve surface water quality to state standards or better where BLM-authorized grazing is having a negative effect.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
Continue livestock management practices under the 1992 allotment management plan. Revise objectives as needed to meet multiple-use objectives.	The allotment management plan objectives are: 1. On range study site SC-1 and BW-1, maintain 55-60% composition by weight of key perennial grasses (crested wheatgrass) through 1997. 2. Decrease soil loss and increase water capture, storage, and safe release on the four-wheel drive trails monitored using the photo trend method. 3. Allow adequate spring forage green-up for wintering deer herds. 4. Maintain/improve quality of crucial deer winter range habitat and restrict livestock bitterbrush use to < 10%.

Number: 00714		**Name: TABLE ROCK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,110	Active preference:	0	Bighorn sheep:	0
Other acres:	120	Suspended nonuse:	250	Deer/pronghorn:	0
Category:	C	Total preference:	250	Elk:	6
				Other wildlife:	173
				Wild horses:	0
				Total:	179

Identified resource conflicts/concerns:	**Management direction:**
Grazing conflicts with cultural practices.	Permanently retire/remove grazing from this allotment and reallocate a similar level of forage within the seeding in 0420 or move to 716.
No forage allocated for elk.	Allocate forage for elk.

Number: 00716		**Name: SILVER LAKE BED**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	680	Active preference:	0	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	0	Elk:	0
				Other wildlife:	30
				Wild horses:	0
				Total:	30

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory is incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
Status and distribution of special status plants and cultural species are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.
	Transfer AUM's from Table Rock Allotment (714) to this allotment in permanent instead of temporary allocation.

Number: 00900		**Name: FREMONT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	26,362	Active preference:	1,970	Bighorn sheep:	0
Other acres:	511	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,970	Elk:	60
				Other wildlife:	1,229
				Wild horses:	0
				Total:	1,289

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Protect ACEC and WSA values.	Fence south and east boundaries of 0906 and parts of 0900 to exclude livestock and protect/enhance WSA and ACEC values (Devils Garden). Some grazing does occur inside WSA in 0910.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00901		**Name: WASTINA**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,366	Active preference:	419	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	419	Elk:	40
				Other wildlife:	311
				Wild horses:	0
				Total:	351

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00902		**Name: CINDER BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	10,776	Active preference:	891	Bighorn sheep:	0
Other acres:	320	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	891	Elk:	40
				Other wildlife:	634
				Wild horses:	0
				Total:	674

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00903		**Name: BEASLEY LAKE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,460	Active preference:	232	Bighorn sheep:	0
Other acres:	534	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	232	Elk:	40
				Other wildlife:	66
				Wild horses:	6
				Total:	112

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other actions. Adjust livestock levels if necessary.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00904		**Name: HIGHWAY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,420	Active preference:	118	Bighorn sheep:	0
Other acres:	989	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	118	Elk:	40
				Other wildlife:	91
				Wild horses:	0
				Total:	131

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00905		**Name: HOMESTEAD**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	12,877	Active preference:	685	Bighorn sheep:	0
Other acres:	9,728	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	685	Elk:	40
				Other wildlife:	508
				Wild horses:	0
				Total:	548

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Protect ACEC and WSA values.	Fence south and east boundaries of 0905 and 0906 to exclude livestock and protect/enhance WSA and ACEC values (Devils Garden). Some grazing does occur inside WSA in 0910.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Devils Garden WSA occurs within the allotment.	Manage grazing to protect WSA values.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00906		**Name: NORTH WEBSTER**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	1,071	Active preference:	112	Bighorn sheep:	0
Other acres:	3,416	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	112	Elk:	40
				Other wildlife:	51
				Wild horses:	0
				Total:	91

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Protect ACEC and WSA values.	Fencing south and east boundaries of 0906, to exclude livestock and protect/enhance WSA and ACEC values (Devils Garden). Some grazing does occur inside WSA in 0910.
Status and location of sensitive monkey flower species and cultural plant communities is unknown.	Survey for sensitive monkey flower species and determine appropriate management needs.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Squaw Ridge WSA occurs within the allotment.	Manage grazing to protect WSA values.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00907		**Name: DEVIL'S GARDEN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,406	Active preference:	0	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	0	Elk:	600
				Other wildlife:	116
				Wild horses:	0
				Total:	716

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Protect ACEC and WSA values.	Fence boundaries of 0907 if needed to protect/enhance WSA and ACEC values (Devils Garden) (grazing occurs inside WSA in 0910 and 906). Adjacent allotments that may need fencing are 900, 905, and 908.
Grazing on emergency basis.	Grazing use within Devils Garden is on emergency basis only in the 907 allotment. Future grazing in the 907 allotment will be based on development of an ACEC management plan.
Status and location of sensitive monkey flower species and cultural plant communities is unknown.	Survey for sensitive monkey flower species and determine appropriate management needs.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Devils Garden WSA occurs within the allotment.	Manage grazing to protect WSA values.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00908		**Name: COUGAR MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,282	Active preference:	616	Bighorn sheep:	20
Other acres:	3,405	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	616	Elk:	40
				Other wildlife:	534
				Wild horses:	0
				Total:	594

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk or bighorn sheep.	Allocate forage for elk and bighorn sheep.
Protect ACEC and WSA values.	Fence south and east boundaries of 0906 and parts of 0908 to exclude livestock and protect/enhance WSA and ACEC values (Devils Garden). Some grazing does occur inside WSA in 0910.
Status and location of sensitive monkey flower species and cultural plant communities is unknown.	Survey for sensitive monkey flower species and determine appropriate management needs.
Livestock distribution/management.	As opportunities arise improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other actions.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00909		**Name: BUTTON SPRINGS**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,779	Active preference:	1,068	Bighorn sheep:	0
Other acres:	1,240	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,068	Elk:	40
				Other wildlife:	252
				Wild horses:	0
				Total:	292

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard rerduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.
Improve upland functions.	Treat areas of juniper and/or ponderosa pine expansion to improve upland watershed function and ecological site condition.

Number: 00910		**Name: HOGBACK BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	4,384	Active preference:	680	Bighorn sheep:	0
Other acres:	4,234	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	680	Elk:	40
				Other wildlife:	182
				Wild horses:	0
				Total:	222

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Protect ACEC and WSA values.	Boundary fencing south and east boundary of 0906, parts of 0910 to exclude livestock and protect/enhance WSA and ACEC values (Devils Garden). Some grazing does occur inside WSA in 0910.
Status and location of sensitive monkey flower species and cultural plant communities is unknown.	Survey for sensitive monkey flower species and determine appropriate management needs.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	
Coordinate fuel treatments with grazing management.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire.
Squaw Ridge WSA occurs within the allotment.	Manage grazing to protect WSA values.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00911		**Name: VALLEY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	6,120	Active preference:	613	Bighorn sheep:	0
Other acres:	769	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	613	Elk:	30
				Other wildlife:	137
				Wild horses:	0
				Total:	167

Identified resource conflicts/concerns:	**Management direction:**
Juniper expansion is impacting watershed functions, wildlife habitat, quaking aspen stands, and ecological conditions.	Restore productivity and biodiversity in juniper and quaking aspen stands. Manage juniper areas where encroachment or increased density is threatening other resource values. Maintain old growth characteristics in historic juniper sites not prone to frequent fire. Maintain quaking aspen to maintain age class diversity and allow for species reestablishment.
Cultural plant inventory incomplete.	Complete cultural plant surveys. Manage to protect plants and communities for potential use by Native Americans.
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.
Status and distribution of special status species and cultural plants are unknown.	Conduct inventory for special status species and cultural plant communities to determine spacial distribution and grazing impacts.

Number: 00914		**Name: WEST GREEN MOUNTAIN**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	21,656	Active preference:	1,395	Bighorn sheep:	0
Other acres:	4,246	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,395	Elk:	40
				Other wildlife:	213
				Wild horses:	0
				Total:	253

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire. Coordinate fuel treatments with grazing management.
Squaw Ridge WSA occurs within the allotment.	Manage grazing to protect WSA values.
Continue livestock management practices under the 1984 allotment management plan. Revise objectives as needed to meet multiple use objectives.	The allotment management plan objectives are: 1. Maintain cover of key species at existing levels as follows: Gerkin Pasture: 7% (from photo trend plot WG-5) Steigleder Pasture: 4% (from photo trend plot WG-4) Gerkin Pasture: 4% (from photo trend plot WG-3) Ward Well Pasture: 2% (from photo trend plot WG-2) Boundary Well: 4% (from photo trend plot WG-1) 2. Maintain or increase the grazing capacity of the entire allotment at its present level of production, 1,223 AUM's active preference. 3. Maintain overall ground cover at levels indicated by photo trend plots WG-4, WG-3, WG-2, and WG-1. 4. Maintain the vigor of desirable species over the entire area through grazing management, particularly on land treatment areas. 5. Improve winter deer habitat on the Gerkin Well area through grazing management, particularly on land treatment areas.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.

Number: 00915		**Name: SQUAW BUTTE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	8,230	Active preference:	1,000	Bighorn sheep:	0
Other acres:	460	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	1,000	Elk:	40
				Other wildlife:	535
				Wild horses:	0
				Total:	575

Identified resource conflicts/concerns:	**Management direction:**
Noxious weed encroachment.	Manage noxious weeds.
No forage allocated for elk.	Allocate forage for elk.
Livestock distribution/management.	As opportunities arise, improve livestock management/distribution, pasture, and allotment fencing through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Special status species habitat occurs within the allotment: greater sage-grouse.	Protect special status species/habitat from BLM-authorized activities. Implement interim greater sage-grouse guidelines.
Fire hazard reduction.	Implement fuel-loading treatments to protect Deschutes National Forest from catastrophic fire. Coordinate fuel treatments with grazing management.
Squaw Ridge WSA occurs within the allotment.	Manage grazing to protect WSA values.
Continue livestock management practices under the 1984 allotment management plan. Revise objectives as needed to meet multiple use objectives.	The allotment management plan objectives are: 1. To minimize forage competition between wintering deer herds and livestock, no turnout prior to May 1 will be allowed, and 535 AUM's of forage are allocated to wildlife. 2. To maintain present satisfactory watershed conditions. This will be monitored through utilization levels. 3. To preserve the wilderness characteristics of the Squaw Ridge WSA. Grazing will be done in accordance with wilderness IMP regulations. 4. To maintain the forage allocated to livestock at 1,000 AUM's on a sustained yield basis. 5. In accordance with the Rangeland Improvement Policy, the allotment is in the maintain category. Therefore, the objective is to maintain a static trend as measured by the quadrate frequency studies at site SB-1 and SB-2. 6. To manage for an average maximum forage utilization level of 50% on key forage species in the spring use pasture.
Improve/maintain range condition.	Improve/maintain range condition and productivity using management practices and/or better animal distribution, developing range improvement projects when appropriate. Adjust permitted use as needed.
Improve upland functions.	Treat areas of juniper and/or ponderosa pine expansion to improve upland watershed function and ecological site condition.

Number: 01000		**Name: LITTLE JUNIPER SPRING**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	116,836	Active preference:	5,418	Bighorn sheep:	0
Other acres:	780	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	I	Total preference:	5,418	Elk:	0
				Other wildlife:	480
				Wild horses:	0
				Total:	480

Identified resource conflicts/concerns:	**Management direction:**
Sensitive plant species Shelly's ivesia (*Ivesia rhyparia* var. *shellyi)* and *Astragalus tegetarioides* exist on the allotment.	Monitor/manage grazing to protect sensitive plant species.
Noxious weed encroachment.	Manage for noxious weeds.
No conservation agreement for snowline cymopterus.	Implement conservation agreement for snowline cymopterus.
Maintain/improve area's condition.	Maintain present management by authorizing winter livestock grazing.

Number: 01001		**Name: ALKALI WINTER**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	87,570	Active preference:	6,223	Bighorn sheep:	0
Other acres:	6,817	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	6,223	Elk:	0
				Other wildlife:	60
				Wild horses:	0
				Total:	60

Identified resource conflicts/concerns:	**Management direction:**
Livestock distribution/management.	As opportunities arise, improve livestock distribution through improved management practices, installation of livestock management facilities, and by providing additional water and other ideas.
Maintain/improve area's condition.	Maintain present management by authorizing winter livestock grazing.
Ground contamination.	Continue to work with ODEQ to monitor Alkali Lake site. Monitor groundwater contamination to prevent hazard to livestock, wildlife, and humans.
Noxious weed encroachment.	Manage noxious weeds.

Number: 01002		**Name: FRF BAR 75 RANCH**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	2,588	Active preference:	73	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	73	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management, authorizing winter use.
Ground contamination.	Continue to work with ODEQ to monitor Alkali Lake site. Monitor groundwater contamination to prevent hazard to livestock, wildlife, and humans.
Noxious weed encroachment.	Manage for noxious weeds.

Number: 01073		**Name: SOUTH BUTTE VALLEY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	3,710	Active preference:	900	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	900	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Current range condition, level, or pattern of utilization may be unacceptable; carrying capacity (under current management practices) may be exceeded.	Maintain/improve rangeland condition and productivity through a change in management practices, reseeding, or project implementation. Adjust permitted use as needed.

Number: 01300		**Name: BECRAFT**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	120	Active preference:	10	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	10	Elk:	0
				Other wildlife:	5
				Wild horses:	0
				Total:	5

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Management.	Consider disposal of this allotment by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.

Number: 01301		**Name: CROOKED CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	240	Active preference:	10	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	10	Elk:	0
				Other wildlife:	5
				Wild horses:	0
				Total:	5

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.

Number: 01302		**Name: THOMAS CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	40	Active preference:	30	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	30	Elk:	0
				Other wildlife:	14
				Wild horses:	0
				Total:	14

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.

Number: 01303		**Name: O'KEEFFE**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	280	Active preference:	20	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	20	Elk:	0
				Other wildlife:	10
				Wild horses:	0
				Total:	10

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.

Number: 01305		**Name: SCHULTZ**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	200	Active preference:	29	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	29	Elk:	0
				Other wildlife:	14
				Wild horses:	0
				Total:	14

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
No strategy for redband trout habitat protection.	Manage/protect redband trout habitat.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.
Continue current management.	Maintain riparian values.

Number: 01306		**Name: DICK'S CREEK**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	363	Active preference:	55	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	M	Total preference:	55	Elk:	0
				Other wildlife:	27
				Wild horses:	0
				Total:	27

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
No strategy for redband trout habitat protection.	Manage/protect redband trout habitat.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.
Continue present management.	Maintain riparian values.

Number: 01308		**Name: BARRY**			
General		**Grazing information (AUM's)**		**Other forage demands (AUM's)**	
Public acres:	129	Active preference:	0	Bighorn sheep:	0
Other acres:	0	Suspended nonuse:	0	Deer/pronghorn:	0
Category:	C	Total preference:	0	Elk:	0
				Other wildlife:	0
				Wild horses:	0
				Total:	0

Identified resource conflicts/concerns:	**Management direction:**
Maintain/improve area's condition.	Continue present management.
Management.	Consider disposal of these allotments by direct sale or exchange, where feasible. Some lands contain riparian or other values that would need to be matched during exchange proposals.

E2: Livestock Grazing Impacts to Vegetation Communities

Analysis of Impacts

Alternative A

Big Sagebrush Shrub/Grassland (1,707,966 acres)

This is the largest vegetation community with 1,707,966 acres in the resource area. Approximately 1,651,980 acres are grazed within allotments which have a known grazing system. The rest/rotation grazing system would significantly improve the composition of the key perennial herbaceous species in the big sagebrush shrub/grassland community on 982,307 acres (Table E2-1). This is about 59 percent of the acres in this vegetation type on which the grazing system is known. On the 111,438 acres (7 percent) operating under the winter or spring grazing systems, the composition of the key perennial species would be expected to be maintained or improved. Under deferred grazing and spring/fall grazing there are 24,639 acres (1 percent) where the composition of key perennial herbaceous species would be maintained, but the composition of palatable woody species (antelope bitterbrush) may decrease if utilization exceeds moderate levels on these species. The 264,177 acres under deferred rotation grazing would maintain the composition of key perennial herbaceous and palatable woody species. The remaining 270,419 acres would be under spring/summer grazing and about 60 percent or 162,251 acres would be expected to have decreases in the composition of key herbaceous species. This accounts for about 11 percent of the acres in the big sagebrush shrub/grassland community.

There are approximately 7,139 acres that comprise scattered public lands within allotments where the grazing system is unknown. There are 35,858 acres in allotments that are not grazed and 12,898 acres that are unallotted. These areas account for 3 percent of the total acreage in the big sagebrush shrub/grassland community.

Black Sagebrush/Grassland (4,170 acres)

There are 216 acres under a rest/rotation grazing system that would significantly improve composition of key perennial species in the black sagebrush/grassland community. There are 525 acres under a winter grazing system that will improve or maintain the composition of the key species. On the 735 acres under the spring/fall grazing system, the composition of the key herbaceous species would be maintained, but the composition of the palatable woody species would be expected to decrease. There are 2,518 acres (63 percent) under a spring/summer grazing system and 60 percent (1,511 acres) of these acres are expected to have a decrease in the composition of key perennial species. The acres impacted tend to be in the areas of livestock concentration and are grazed heavier.

There are about 176 acres in the black sagebrush/grassland community that are unallotted for grazing.

Silver Sagebrush Shrub/Grassland (27,162 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 15,641 acres or 63 percent of the acres in the silver sagebrush shrub/grassland community that are under a grazing system. The spring grazing system would maintain or improve the composition of key perennial species on 59 acres. The deferred rotation grazing system would maintain the composition of the key perennial species on about 4,555 acres. The spring/summer grazing system contains 4,575 acres of which 60 percent (2,745 acres) would have decreases in the composition of key perennial species .

There are about 2,332 acres in the silver sagebrush shrub/grassland community that are unallotted for grazing.

Low Sagebrush Shrub/Grassland (379,886 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 301,155 acres or 79 percent of the acres in the low sagebrush shrub/grassland community that are under a grazing system. The winter, spring, and deferred grazing systems would maintain or improve the composition of key perennial species on 12,810 acres. The deferred rotation grazing system would maintain the composition of the key perennial herbaceous species on about 41,042 acres. The spring/summer grazing system contains 24,547 acres of which 60 percent (14,728 acres) would have decreases in the composition of key perennial species.

There are about 11,677 acres in the low sagebrush shrub/grassland community that are unallotted for grazing. There are also 6,655 scattered acres in allotments where the grazing system is unknown.

Table E2-1.—*Acres in each vegetation community under each grazing system by alternative*

	Grazing system									
			Spring/summer [1]							
					Acres impacted [2]					
Vegetation communities	Winter	Spring	Alternative	Total in type	Short term	Long term [3]	Spring/ fall	Deferred	Deferred rotation	Rest rotation
Big sagebrush shrub/grassland	55,479	55,959	A	270,419	162,251	162,251	4,933	19,706	263,177	982,307
			B	270,419	178,477	3,088				
			C	270,419	129,801	2,246				
			D	270,419	162,251	2,807				
Black sagebrush/grassland	525	0	A	2,518	1,511	1,511	735	0	0	216
			B	2,518	1,662	0				
			C	2,518	1,209	0				
			D	2,518	1,511	0				
Silver sagebrush shrub/grassland	0	59	A	4,575	2,745	2,745	0	0	4,555	15,641
			B	4,575	3,020	0				
			C	4,575	2,196	0				
			D	4,575	4,575	0				
Low sagebrush shrub/grassland	125	12,586	A	24,547	14,728	14,728	0	99	41,042	301,155
			B	24,547	16,201	24				
			C	24,547	7,364	18				
			D	24,547	14,728	22				
Mountain big sagebrush/grassland	0	0	0	0	0	0	61	0	0	8,004

	Grazing system									
			Spring/summer [1]							
					Acres impacted [2]					
Vegetation communities	Winter	Spring	Alternative	Total in type	Short term	Long term [3]	Spring/ fall	Deferred	Deferred rotation	Rest rotation
Miscellaneous shrub/grassland	381	2,198	A	545	327	327	0	1,008	18,569	44,423
			B	545	360	0				
			C	545	262	0				
			D	545	327	0				
Western juniper woodland	1,253	4,343	A	4,340	2,604	2,604	430	191	105,021	93,405
			B	4,340	2,864	853				
			C	4,340	2,083	621				
			D	4,340	2,604	775				
Ponderosa pine woodland	0	4,471	A	4,775	2,865	2,865	0	2,139	10,954	4,781
			B	4,775	3,132	756				
			C	4,775	2,292	550				
			D	4,775	2,865	688				
Mixed conifer woodland	0	0	0	0	0	0	0	0	0	874
Quaking aspen	0	0	0	0	0	0	302	0	0	1746
Riparian and wetlands	2,283	6	A	644	386	386	136	2,284	4,616	13,498
			B	644	425	425				
			C	644	309	309				
			D	644	386	386				

Vegetation communities	Grazing system									
			Spring/summer [1]							
					Acres impacted [2]					
	Winter	Spring	Alternative	Total in type	Short term	Long term [3]	Spring/ fall	Deferred	Deferred rotation	Rest rotation
Salt desert shrub/grassland	39,159	17,653	A	54,465	32,679	32,679	5,518	16,478	30,782	55,183
			B	54,465	35,947	556				
			C	54,465	26,143	405				
			D	54,465	32,679	505				
Vegetated lava and sand dunes—*lava*	0	950	A	732	439	439	0	1,607	1,305	5,417
			B	732	483	8				
			C	732	351	6				
			D	732	439	7				
Vegetated lava and sand dunes—*sand dunes*	2,235	3,878	0		0	0	0	0	14,667	493
Unvegetated ground	2,039	186	A	6,721	4,033	4,033	0	23	0	3,225
			B	6,721	410	865				
			C	6,721	3,226	629				
			D	6,721	4,033	787				
Modified grassland-crested wheatgrass and cheatgrass	2,376	20,020	A	7,992	4,795	4,795	14,585	32,640	47,139	118,836
			B	7,992	5,275	429				
			C	7,992	3,816	312				
			D	7,992	4,795	390				
Agricultural lands	82	209	A	2,037	1,222	1,222	289	0	2,409	6,107
			B	2,037	1,344	70				
			C	2,037	978	51				
			D	2,037	1,222	63				

	Grazing system									
			Spring/summer [1]							
					Acres impacted [2]					
Vegetation communities	Winter	Spring	Alternative	Total in type	Short term	Long term [3]	Spring/ fall	Deferred	Deferred rotation	Rest rotation
Total	105,937	122,518	A	384,310	230,586	230,585	26,984	76,274	544,236	1,655,311
			B	384,310	253,645	7,074				
			C	384,310	184,448	5,147				
			D	384,310	230,586	6,431				
Total public land acres under a grazing system				2,915,575						
Public land acres not grazed				225,252						
Public land acres in allotments with unknown grazing systems				17,235						
Total public land acres in the resource area				3,158,062						

[1] The spring/summer grazing system allows for grazing during the entire growing season and this would impact the vegetation composition under all alternatives. This impact would occur around the areas livestock concentrate such as water sources, fencelines, and bottom land areas. This constant grazing use during the growing season would result in a decrease in the vigor, production, and reproduction of the key species, and ultimately a decrease in species composition of key species.

[2] The difference in the acres impacted in the short term are the result of the different livestock numbers and allowed utilization levels. Under Alternatives A and D, the livestock number is 107,046 and allowed utilization rate is 50%. The area impacted is expected to be 60% of the acreage in the pasture. Under Alternative B, the livestock number is 10% higher and the allowed utilization rate is 60%. The impacted area is expected to be 66% of the acres in the pasture. Under Alternative C, the livestock number is 20% lower than Alternative A and the allowed utilization rate would be 30%. The expected impacted area is 48% of the acres in the pasture.

[3] The long-term impacts are different from the short-term impacts because the spring/ summer grazing system would be phased out through individual management plans on most allotments. The allotments would be put under spring grazing, deferred, deferred rotation, or rest rotation grazing systems . Therefore, the acres that are no longer in the spring/summer systems would be in one of the other grazing systems, but until the individual allotment management plans are developed it is impossible to determine which system would be the best.

Mountain Big Sagebrush/Grassland (8,065 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 8,004 acres or 99 percent of the acres in the mountain big sagebrush/grassland community. There are 61 acres of mountain big sagebrush/grassland in an allotment with the spring/fall grazing system and it is expected the composition of key herbaceous species would be maintained but the composition of palatable woody species would decrease.

Miscellaneous Shrub/Grassland (70,474 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 44,423 acres or 66 percent of the acres in the miscellaneous shrub/grassland community that are under a grazing system. The winter and deferred grazing systems would maintain or improve the composition of key perennial species on 1,389 acres. There are 18,569 acres under deferred grazing where the composition of palatable woody species (antelope bitterbrush) may decrease if utilization exceeds moderate levels on these species. The deferred rotation grazing system would maintain the composition of the key perennial species on about 18,569 acres. The spring/summer grazing system contains 545 acres of which 60 percent (327 acres) would have decreases in the composition of key perennial species.

There are 1,963 scattered acres in allotments where the grazing system is unknown, 102 acres that are in allotments that are unallotted, and 1,285 acres that are unallotted.

Western Juniper Woodland (214,666 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 93,405 acres or 42 percent of the acres in the western juniper woodland community that are under a grazing system. The winter, spring, and deferred grazing systems would maintain or improve the composition of key perennial herbaceous species on 5,787 acres. There are 191 acres under deferred grazing where the composition of palatable woody species (antelope bitterbrush) may decrease if utilization exceeds moderate levels on these species. The deferred rotation grazing system would maintain the composition of the key perennial species on about 105,021 acres. The spring/summer grazing system contains 4,340 acres of which 60 percent (2,604 acres) would have decreases in the composition of key perennial species.

There are about 1,577 acres in the western juniper woodland community that are unallotted for grazing. There are also 4,105 scattered acres in allotments where the grazing system is unknown.

Ponderosa Pine (29,663 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 4,781 acres or 18 percent of the acres in the ponderosa pine community that are under a grazing system. The spring and deferred grazing systems would maintain or improve the composition of key perennial species on 6,610 acres. The deferred rotation grazing system would maintain the composition of the key perennial species on about 10,954 acres. The spring/summer grazing system contains 4,775 acres of which 60 percent (2,865 acres) would have decreases in the composition of key perennial species.

There are about 2,543 acres in the ponderosa pine community that are unallotted for grazing.

Mixed Conifer (1,253 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 874 acres or 70 percent of the acres in the mixed conifer community that are under a grazing system.

There are about 379 acres in the mixed conifer community that are unallotted for grazing

Quaking Aspen (1,746 acres)

The rest/rotation grazing system would maintain the composition of the key perennial species on 1,746 acres or 85 percent of the acres in the quaking aspen community that are under a grazing system. On about 302 acres under the spring/fall grazing system the composition of the key herbaceous species would be maintained, but the composition of the palatable woody species would be expected to decrease.

Riparian and Wetlands (40,543 acres)

The key shrub species (willows) are very important in this community and grazing in the late summer or fall has a greater negative impact than it would in most of the other vegetation communities. The rest/rotation grazing system would maintain the composition of the key perennial species on 13,498 acres or 33 percent of the acres in the riparian and wetlands community that are under a grazing system. The winter and spring

grazing systems would maintain or improve the composition of key perennial herbaceous species on 2,289 acres. The spring only grazing system would significantly improve the composition of the key shrub species, but there are only 6 acres under this system. The winter grazing system would only maintain the composition of the key shrub species. On about 136 acres under the spring/fall grazing system the composition of the key herbaceous species would be maintained but the composition of the palatable woody species (willows) would be expected to decrease significantly. On the deferred grazing system (2,284 acres) a utilization level of 30–40 percent would be needed to maintain the composition of key perennial herbaceous species and the composition of the palatable woody species (willows) would decrease. The deferred rotation grazing system would maintain the composition of the key perennial, both herbaceous and shrub species, on about 4,616 acres. The spring/summer grazing system contains 644 acres of which 60 percent (386 acres) would have decreases in the composition of key perennial species, both herbaceous and shrub.

Salt Desert Shrub/Grassland (260,950 acres)

The rest/rotation grazing system would maintain the composition of the key perennial species on 55,183 acres or 25 percent of the acres in the salt desert shrub/grassland community that are under a grazing system. The winter grazing systems would improve the composition of key perennial species on 39,159 acres, which is 18 percent of the salt desert shrub/grassland under a grazing system. The spring and deferred grazing systems would maintain or improve the composition of key perennial herbaceous species on 34,131 acres. On about 5,518 acres under the spring/fall grazing system the composition of the key herbaceous species would be maintained. The deferred rotation grazing system would maintain the composition of the key perennial species on about 30,782 acres. The spring/summer grazing system contains 54,465 acres of which 60 percent (32,679 acres) would have decreases in the composition of key perennial species.

There are about 41,712 acres in the salt desert shrub/grassland community that are unallotted for grazing.

Vegetated Lava and Sand Dunes (73,370 acres)

Lava (10,110 acres): The rest/rotation grazing system would significantly improve the composition of the key perennial species on 5,417 acres or 54 percent of the acres in the vegetated lava community that are under a grazing system. The spring and deferred grazing systems would maintain or improve the composition of key perennial species on 2,656 acres. There are 1,706 acres under deferred grazing where the composition of palatable woody species (antelope bitterbrush) may decrease if utilization exceeds moderate levels on these species. The deferred rotation grazing system would maintain the composition of the key perennial species on about 1,305 acres. The spring/summer grazing system contains 732 acres of which 60 percent (439 acres) would have decreases in the composition of key perennial species.

Sand Dunes (21,273): In the sand dunes the rest/rotation grazing system would improve the composition of the key perennial species on 493 acres. The winter grazing would improve or maintain the composition of key perennial species on 2,235 acres. The spring and deferred rotation grazing systems would maintain the composition of key perennial species on 18,545 acres.

There are about 41,987 acres in the vegetated lava and sand dunes communities that are unallotted for grazing.

Unvegetated Ground (56,687 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 3,225 acres or 26 percent of the acres in the unvegetated ground that are under a grazing system. The winter, spring, and deferred grazing systems would maintain or improve the composition of key perennial species on 2,248 acres. The spring/summer grazing system contains 6,721 acres of which 60 percent (4,032 acres) would have decreases in the composition of key perennial species.

There are about 44,493 acres or 78 percent of the unvegetated ground community that are unallotted for grazing.

Modified Grassland (249,048 acres)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 118,836 acres or 49 percent of the acres in the modified grassland community that are under a grazing system. The winter, spring, and deferred grazing systems would maintain or improve the composition of key perennial species on 55,036 acres. On about 14,585 acres under the spring/fall grazing system the composition of the key herbaceous species would be maintained. The palatable woody species would be rare in this community but where found would be expected to decrease under spring/fall grazing. The deferred rotation grazing system would maintain the composition of the key perennial species on about 47,139 acres.

The spring/summer grazing system contains 7,992 acres of which 60 percent (4,795 acres) would have decreases in the composition of key perennial species.

There are about 5,460 acres in the modified community that are unallotted for grazing.

Agriculture (14,263)

The rest/rotation grazing system would significantly improve the composition of the key perennial species on 6,107 acres or 55 percent of the acres in the modified grassland community that are under a grazing system. The winter and spring grazing systems would maintain or improve the composition of key perennial species on 291 acres. On about 289 acres under the spring/fall grazing system the composition of the key herbaceous species would be maintained but the composition of the palatable woody species would be expected to decrease. The deferred rotation grazing system would maintain the composition of the key perennial species on about 2,409 acres. The spring/summer grazing system contains 2,037 acres of which 60 percent (1,222 acres) would have decreases in the composition of key perennial species.

There are about 3,002 acres in the modified community that are unallotted for grazing. There are also 128 scattered acres in allotments where the grazing system is unknown.

Alternative B

Big Sagebrush Shrub/Grassland (1,707,966 acres)

The acreage figures for each grazing system are the same as in Alternative A The main difference between Alternatives A and B is the impact to vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing. The 982,307 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter system (55,479 acres) would still improve or maintain key herbaceous species but any palatable woody species (antelope bitterbrush) would be expected to have a decrease in composition with the increased utilization levels under Alternative B. Spring grazing (55,959 acres) would only maintain key herbaceous species and not show any of the improvement expected in Alternative A. The deferred rotation grazing system (263,177) would have a decrease in the composition of palatable woody species that would not be expected in Alternative A, while the deferred grazing system (19,706 acres) and spring/fall grazing system (4,922 acres) would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be additional acres (16,358 acres) of big sagebrush decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 4,679 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 3,088 acres still undergoing a reduction in species composition. This is a 98 percent reduction in acres negatively impacted.

Black Sagebrush/Grassland (4,170 acres)

The acreage figures for each grazing system are the same as in Alternative A The main difference between Alternatives A and B is the impact to vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

The 216 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing (525) acres) would still maintain or improve key herbaceous species but reduce the composition of palatable woody species. The spring/fall grazing would accelerate the loss of palatable woody species on 735 acres.

Under spring/summer grazing in Alternative B, there would be 151 additional acres of black sagebrush decreasing in key species composition (Table E2-1) However, with the mitigation under Alternative B, better grazing management would replace all the acres under spring/summer grazing with a rest rotation system.

Silver Sagebrush Shrub/Grassland (27,162 acres)

The acreage figures for each grazing system are the same as in Alternative A The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's

and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

The 15,641 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The spring grazing (59 acres) would only maintain species composition and not have any of the improvement expected under Alternative A. The spring/fall grazing system would accelerate the loss of palatable woody species on 4,555 acres.

Under spring/summer grazing in Alternative B, there would be 275 additional acres of silver sagebrush decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace all the acres under spring/summer grazing with a deferred, deferred rotation, or rest rotation system.

Low Sagebrush Shrub/Grassland (379,886 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

The 301,155 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. Spring grazing (12,586 acres) would only maintain species composition and not have any of the improvement expected under Alternative A.

Under spring/summer grazing in Alternative B, there would be 1,473 additional acres of low sagebrush decreasing in key species composition (Table E2-1) However with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 37 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 24 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Mountain Big Sagebrush/Grassland (8,065 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 8,004 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The spring/fall grazing system would accelerate the loss of palatable woody species on 61 acres.

Miscellaneous Shrub/Grassland (70,474 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 44,423 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter system (381 acres) would still improve or maintain key herbaceous species but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. Spring grazing (2,198 acres) would only maintain key herbaceous species and not have any of the improvement expected under Alternative A.
The deferred rotation grazing system would have a decrease in the composition of palatable woody species and the deferred grazing would accelerate the loss of palatable woody species that would not be seen in Alternative A.

Under spring/summer grazing in Alternative B, there would be 33 additional acres of miscellaneous shrub decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace all the acres

under spring/summer grazing with a spring, deferred, deferred rotation, or rest rotation system.

Western Juniper Woodland (214,666 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 93,405 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter system (1,253 acres) would still improve or maintain key herbaceous species but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. Spring grazing and deferred grazing (4,534 acres) would only maintain key herbaceous species and not have any of the improvement expected under Alternative A. The deferred rotation grazing system would have a decrease in the composition of palatable woody species not be seen in Alternative A and the spring/fall and deferred grazing would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 260 additional acres of western juniper woodland decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 1,292 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 853 acres still undergoing a reduction in species composition. This is a 70 percent reduction in acres negatively impacted.

Ponderosa Pine (29,663 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 4,781 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. Spring grazing (4,471 acres) would only maintain key herbaceous species and not have any of the improvement expected under Alternative A. The deferred rotation grazing system would have a decrease in the composition of palatable woody species that was not seen in Alternative A and the deferred grazing would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 287 additional acres of ponderosa pine decreasing in key species composition (Table E2-1). However with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 1,146 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 756 acres still undergoing a reduction in species composition. This is a 76 percent reduction in acres negatively impacted.

Mixed Conifer (1,253 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 874 acres under the rest rotation system would maintain or have some improvement in species composition, but not make significant improvement like in Alternative A.

Quaking Aspen (1,746 acres)

The acreage figures for each grazing system are the same as in Alternative A The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 1,746 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The spring/fall grazing (302 acres) would accelerate the loss of palatable woody species even more than in Alternative A.

Riparian and Wetlands (40,543 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 13,498 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing systems (2,283 acres) would still improve or maintain key herbaceous species, but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. The deferred rotation grazing system would have a decrease in the composition of palatable woody species that was not seen in Alternative A and the spring/fall and deferred grazing would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 39 additional acres of riparian and wetlands community decreasing in key species composition (Table E2-1).

Salt Desert Shrub/Grassland (260,950 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 55,183 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing systems (39,159 acres) would still improve or maintain key herbaceous species, but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. The deferred rotation grazing system would have a decrease in the composition of palatable woody species that was not seen in Alternative A and the spring/fall and deferred grazing would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 3,268 additional acres of salt desert shrub decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 842 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 556 acres still undergoing a reduction in species composition. This is a 98 percent reduction in acres negatively impacted.

Vegetated Lava and Sand Dunes (73,370 acres)

Lava (10,110 acres): The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 5,417 acres under the rest rotation system would maintain or have some improvement in species composition, but not make significant improvement like in Alternative A. The deferred rotation grazing system would have a decrease in the composition of palatable woody species that was not seen in Alternative A and the deferred grazing would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 44 additional acres of lava decreasing in key species composition (Table E2-1). However with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 12 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 8 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Sand Dunes (21,273): The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 493 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing systems (2,235 acres) would still improve or maintain key herbaceous species, but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. The spring grazing (3,878 acres) would also only maintain key herbaceous species and not have any of the improvement expected under Alternative A. The deferred rotation grazing system (14,667 acres) would have a decrease in the composition of palatable woody species that was not seen in Alternative A.

Unvegetated Ground (56,687 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 3,225 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing systems (2,039 acres) would still improve or maintain key herbaceous species, but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. The spring grazing (186 acres) would only maintain key herbaceous species and not have any of the improvement expected under Alternative A. The deferred grazing (23 acres) would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 403 additional acres of unvegetated ground decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 1,311 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 865 acres still undergoing a reduction in species composition. This is a 79 percent reduction in acres negatively impacted.

Modified Grassland (249,048 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing. Under this alternative, the 118,836 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The spring grazing (2,376 acres) would also only maintain key herbaceous species and not have any of the improvement expected under Alternative A.

Under spring/summer grazing in Alternative B, there would be 480 additional acres of unvegetated ground decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 650 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 429 acres still undergoing a reduction in species composition. This is a 91 percent reduction in acres negatively impacted.

Agriculture (14,263)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and B is the impact to the vegetation composition caused by the larger number of AUM's and the higher utilization level (60 percent) in Alternative B. This difference reduces the acres where species composition would improve and increases loss of key palatable woody species in systems with late season grazing.

Under this alternative, the 6,107 acres under the rest rotation system would maintain or have some improvement in species composition, but not make the significant improvement expected in Alternative A. The winter grazing systems (82 acres) would still improve or maintain key herbaceous species, but any palatable woody species would be expected to have a decrease in composition with the increased utilization levels under Alternative B. The spring grazing (209 acres) would also only maintain key herbaceous species and not have any of the improvement expected under Alternative A. The deferred rotation grazing system (2,409 acres) would have a decrease in the composition of palatable woody species that was not seen in Alternative A and the spring/fall grazing (289 acres) would accelerate the loss of palatable woody species.

Under spring/summer grazing in Alternative B, there would be 122 additional acres of agricultural ground decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative B, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative B leaves 109 acres still under spring/summer grazing, and with 66 percent of the acres being impacted, the result would be 72 acres still undergoing a reduction in species composition. This is a 94 percent reduction in acres negatively impacted.

Alternative C

Big Sagebrush Shrub/Grassland (1,707,966 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The spring/fall and deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. The spring/summer system would initially have 129,801 acres (Table E2-1) decreasing in key species composition. However, with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The implementation of Alternative C leaves 4,679 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 2,246 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Black Sagebrush/Grassland (4,170 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer and spring/fall grazing systems. The spring/fall grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. The spring/summer system would initially have 1,209 acres (Table E2-1) decreasing in key species composition. However with the mitigation under Alternative C, better grazing management would replace all the acres under spring/summer grazing with either spring, deferred, deferred rotation, or rest rotation.

Silver Sagebrush Shrub/Grassland (27,162 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing. The impacts are the same except in the spring/summer grazing systems. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (2,196) in the acres of silver sagebrush decreasing in key species composition (Table E2-1). The mitigation under Alternative C of better grazing management would replace all the acres under spring/summer grazing with a spring, deferred, deferred rotation, or rest rotation grazing system.

Low Sagebrush Shrub/Grassland (379,886 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegeta-

tion composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (11,782) in the acres of low sagebrush decreasing in key species composition (Table E2-1). However with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation grazing. The implementation of Alternative C leaves 37 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 18 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Mountain Big Sagebrush/Grassland (8,065 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/fall grazing system. The spring/fall grazing system (61 acres) would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A.

Miscellaneous Shrub/Grassland (70,474 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer and deferred grazing systems. The deferred grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (262) in the acres of the miscellaneous shrub type, decreasing in key species composition (Table E2-1). The mitigation under Alternative C of better grazing management would replace all the acres under spring/summer grazing with a deferred, deferred rotation, or rest rotation system.

Western Juniper Woodland (214,666 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The spring/fall and deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (2,083) in the acres of juniper woodland decreasing in key species composition (Table E2-1). The final result of the mitigation in Alternative C leaves 1,292 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 621 acres still undergoing a reduction in species composition. This is a 76 percent reduction in acres negatively impacted.

Ponderosa Pine (29,663 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer and deferred grazing systems. The deferred grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (2,292) in the acres of ponderosa pine decreasing in key species composition (Table E2-1). The final result

of the mitigation in Alternative B leaves 1,146 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 550 acres still undergoing a reduction in species composition. This is a 81 percent reduction in acres negatively impacted.

Mixed Conifer (1,253 acres)

The acreage figures for each grazing system are the same as in Alternative A. The impacts on the 874 acres under the rest rotation grazing system would be the same as Alternative A.

Quaking Aspen (1,746 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/fall grazing system. The spring/fall grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A.

Riparian and Wetlands (40,543 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The spring/fall and deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (309) in the acres of riparian wetlands decreasing in key species composition (Table E2-1).

Salt Desert Shrub/Grassland (260,950 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The spring/fall and deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (26,143) in the acres of salt desert shrub decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The final result of the mitigation in Alternative C leaves 842 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 405 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Vegetated Lava and Sand Dunes (73,370 acres)

Lava (10,110 acres): The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (351) in the acres of lava decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The final result of the mitigation in Alternative C leaves 12 acres still under spring/summer grazing, and with 48 percent

of the acres being impacted, the result would be 6 acres still undergoing a reduction in species composition. This is a 99 percent reduction in acres negatively impacted.

Sand Dunes (21,273): The acreage figures for each grazing system are the same as in Alternative A. The impacts for winter, spring, deferred rotation and rest rotation grazing systems are the same as Alternative A.

Unvegetated Ground (56,687 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer and deferred grazing systems. The deferred grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (3,226) in the acres of unvegetated ground decreasing in key species composition (Table E2-1). However, with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The final result of the mitigation in Alternative C leaves 1,311 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 629 acres still undergoing a reduction in species composition. This is a 84 percent reduction in acres negatively impacted.

Modified Grassland (249,048 acres)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, spring/fall and deferred grazing systems. The spring/fall and deferred grazing systems would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (3,816) in the acres of modified grassland decreasing in key species composition (Table E2-1). However with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The final result of the mitigation in Alternative C leaves 650 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 312 acres still undergoing a reduction in species composition. This is a 93 percent reduction in acres negatively impacted.

Agriculture (14,263)

The acreage figures for each grazing system are the same as in Alternative A. The main difference between Alternatives A and C is the reduced impacts to vegetation composition caused by the lower number of AUM's and the lower utilization level (30 percent) in Alternative C. This difference increases the acres where species composition would improve and reduces the loss rate of key palatable woody species in systems with late season grazing.

The impacts are the same except in the spring/summer, and spring/fall grazing systems. The spring/fall grazing system would continue to have a decrease in palatable woody species, but the rate would be slower than in Alternative A. Under spring/summer grazing in Alternative C, there would be a 20 percent reduction (978) in the acres of agriculture lands decreasing in key species composition (Table E2-1). However with the mitigation under Alternative C, better grazing management would replace spring/summer grazing with spring, deferred, deferred rotation, or rest rotation. The final result of the mitigation in Alternative C leaves109 acres still under spring/summer grazing, and with 48 percent of the acres being impacted, the result would be 51 acres still undergoing a reduction in species composition. This is a 96 percent reduction in acres negatively impacted.

Plant communities are impacted by grazing in all alternatives except for Alternative E. Since there is no grazing in Alternative E, the discussion of grazing impacts on plant communities will only include Alternatives A–D unless otherwise stated.

Summary of Impacts

In summary the rest/rotation system is both the most common grazing system (56 percent) in the resource area and also the system that would be expected to most improve key species composition. Therefore, the vegetation composition on over half the acres in the resource area are improving under all alternatives The spring/summer grazing system would result in a decrease in key species composition across all alternatives. The key herbaceous vegetation composition would either be improved or maintained under the other five grazing systems across all alternatives; this accounts for 36 percent of the acres under a grazing system in the resource area.

The number of acres with a decrease in species composition in the spring/summer grazing system would vary by alternative. In Alternatives A and D this would occur on about 7 percent of the acres in the resource area, while Alternatives B and C would be 8 percent and 6 percent, respectively. These impacts would be short term or as long as the spring/summer grazing systems are still in effect. Under Alternatives B, C, and D the long term impacts of spring/summer grazing would be reduced significantly as this system would be replaced by spring, deferred, deferred rotation, or rest rotation grazing systems. In the long term there would be less than 2 percent of the acres in resource area under spring/summer grazing in Alternatives B, C, and D.

The spring/fall and deferred grazing systems would result in a decrease in palatable woody vegetation such as willows, quaking aspen, and antelope bitterbrush across all alternatives. These grazing systems are found on about 4 percent of the acres that are grazed in the resource area. The antelope bitterbrush would be found as inclusions or understory in several of the vegetation communities (all the sagebrush communities, juniper woodland, ponderosa pine, and miscellaneous shrubs). These vegetation communities using the spring/fall and deferred grazing systems occupy about 30,316 acres (1 percent) of the resource area. The riparian vegetation with willows is likely to be impacted but it only accounts for 136 acres (Table E2-1) under these grazing systems. The quaking aspen vegetation communities which are under spring/fall and deferred grazing systems account for 302 acres (Table E2-1) in resource area. There are an unknown number, but relatively small acreage of quaking aspen stands that are inclusions in other vegetation communities that are using the spring/fall and deferred grazing systems.

The difference in the alternatives is the rate at which the palatable woody species composition would decline. Alternatives A and D would be the same, and in Alternative B the rate would be faster, and in Alternative C the rate would be slower. Another difference is under Alternative C there would be a decline in palatable woody species under winter, and deferred rotation grazing that would not be seen in the other alternatives.

Most of the individual vegetation communities follow about the same pattern with over half the acreage using the rest/rotation grazing systems, with the exceptions being black sagebrush/grassland, juniper woodland, and salt desert shrub. The black sagebrush community has 63 percent of its acreage using the spring/summer grazing and that is all in one allotment (0510). About 63 percent of the acres in juniper woodland communities are using the deferred rotation grazing system. This would negatively impact any palatable key woody species which may be found in the understory. The salt desert shrub community is about equally split across all grazing systems, with about 8 percent of the type benefitting from the winter grazing system and the 15 percent in the spring/summer system being negatively impacted. The remaining acres in the salt desert shrub would be maintained under the other grazing systems.

E3: Range Projects

Table E3-1 lists potential projects by allotment.

E4: Rangeland Standards and Guidelines

Introduction

These "Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington" (S&G's) were developed in consultation with resource advisory councils and provincial advisory committees, Tribes, and others. The standards and guidelines meet the requirements and intent of 43 CFR, 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 land 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," CWA, and "Endangered Species Act."

Table E3-1.—*Potential projects by allotment*

Allotment number	Allotment name	Type of improvement	Units
00100	Peter Creek		
10101	East Green Mountain		
10102	Crack-in-the-Ground	▪Fences	3 miles
10103	ZX-Christmas Lake	▪Restoration	20,000 acres
00200	Blue Creek Seeding		
00201	Vinyard Individual	▪Juniper removal	1,500 acres
00202	Hickey Individual	▪Parsnip Creek headcut stabilization	2 structures
00203	O'Keeffe FRF		
00204	Crump Individual	▪Juniper removal	25,000 acres
00205	Greaser Drift		
00206	Lane Plan Il	▪Drake Creek/Roaring Spring exclosures ▪Drake Creek headcut stabilization	1 mile 4 structures
00207	Lane Plan I	▪Juniper removal	1,000 acres
00208	Sagehen		
00209	Schadler	▪Juniper removal	600 acres
00210	Rim		
00211	Round Mountain	▪Lower Twelvemile stabilization	1 structure
00212	Rahilly-Gravelly		
00213	Burro Springs	▪Juniper removal	1,000 acres
00214	Chukar Springs	▪Juniper removal	1,000 acres
00215	Hill Camp		
00216	O'Keeffe Individual		
00217	Cox Individual		
00218	Sandy Seeding		
00219	Cahill FRF		
00222	Fisher Lake		
00223	Hickey FRF		
00400	Paisley Common		
	Coglan Hills		
	Diablo Peak		
	Abert Rim	▪Juniper removal	1,200 acres
00401	Fenced Federal		
00403	Pine Creek	▪Pine Creek fence	1.4 miles
00404	Willow Creek		
00406	West Clover Flat		
00407	Clover Flat	▪Moss Creek Pasture use and spring development	
00408	Schoolhouse	*Allotment no longer exists*	
00409	Tucker Hill	*Allotment is closed to grazing*	
00410	Tim Long Creek	▪Avery Creek fence	1 mile

Allotment number	Allotment name	Type of improvement	Units
00520	Lynch-Flynn	▪Pasture division fence	4 miles
00521	Priday Reservoir		
00522	Abert Seeding	▪Noxious weed treatment	
00523	Warner Lakes		
00524	Lane Individual	▪Juniper removal	1,000 acres
00529	South Rabbit Hills		
00530	East Rabbit Hills	▪Pasture division fence	3 miles
00531	North Rabbit Hills		
00600	Beaty Butte	▪Gathering/holding facility (fence)	5 miles
00700	Silver Creek-Bridge Creek		
00701	Upper Bridge Creek		
00702	Buck Creek-Bridge Creek		
00703	Bear Creek		
00704	Ward Lake	▪Juniper control	1,200 acres
00705	Oatman Flat	▪Juniper control ▪Pipeline	3,100 acres 2 miles
00706	Rye Ranch		
00707	Tuff Butte		
00708	Arrow Gap		
00709	Dead Indian-Duncan		
00710	Murdock	▪Fence relocation	3 miles
00711	South Hayes Butte		
00712	Bridge Well		
00713	Silver Creek		
00714	Table Rock		
00716	Silver Lake Lakebed		
00900	Fremont	▪Fence	2 miles
00901	Wastina		
00902	Cinder Butte		
00903	Beasley Lake		
00904	Highway		
00905	Homestead		
00906	North Webster		
00907	Devils Garden		
00908	Cougar Mountain		
00909	Button Springs		
00910	Hogback Butte		
00911	Valley		
00914	West Green Mountain		
00915	Squaw Butte		

Allotment number	Allotment name	Type of improvement	Units
00520	Lynch-Flynn	▪Pasture division fence	4 miles
00521	Priday Reservoir		
00522	Abert Seeding	▪Noxious weed treatment	
00523	Warner Lakes		
00524	Lane Individual	▪Juniper removal	1,000 acres
00529	South Rabbit Hills		
00530	East Rabbit Hills	▪Pasture division fence	3 miles
00531	North Rabbit Hills		
00600	Beaty Butte	▪Gathering/holding facility (fence)	5 miles
00700	Silver Creek-Bridge Creek		
00701	Upper Bridge Creek		
00702	Buck Creek-Bridge Creek		
00703	Bear Creek		
00704	Ward Lake	▪Juniper control	1,200 acres
00705	Oatman Flat	▪Juniper control ▪Pipeline	3,100 acres 2 miles
00706	Rye Ranch		
00707	Tuff Butte		
00708	Arrow Gap		
00709	Dead Indian-Duncan		
00710	Murdock	▪Fence relocation	3 miles
00711	South Hayes Butte		
00712	Bridge Well		
00713	Silver Creek		
00714	Table Rock		
00716	Silver Lake Lakebed		
00900	Fremont	▪Fence	2 miles
00901	Wastina		
00902	Cinder Butte		
00903	Beasley Lake		
00904	Highway		
00905	Homestead		
00906	North Webster		
00907	Devils Garden		
00908	Cougar Mountain		
00909	Button Springs		
00910	Hogback Butte		
00911	Valley		
00914	West Green Mountain		
00915	Squaw Butte		

Allotment number	Allotment name	Type of improvement	Units
01000	Little Juniper Spring	▪Dry Valley pipeline and storage ▪Waterhole cleanouts	11 miles 6–7 waterholes
01001	Alkali Winter	▪Poor Jug pipeline extension and movement of troughs; Hutton Springs pasture water development w/pipeline ▪E. Venator pasture boundary fence	4 miles 4 miles
01002	Bar 75 FRF		
01073	South Butte Valley	▪Water development from existing well	1 mile
01300	Becraft		
01301	Crooked Creek		
01302	Thomas Creek		
01303	O'Keeffe		
01305	Schultz		
01306	Simms		
01308	Barry		

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 BLM objectives such as meeting wildlife needs.

4) Habitats are, or are making significant progress toward being, restored or maintained for Federal T&E 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 BLM-administered land, 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 on 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 floodplain. 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 landforms on public rangelands throughout Oregon and Washington. The standards require site-specific information for full on-the-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 land 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 permittees and other interested parties, are appropriate at the watershed and subwatershed 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 judgment, 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 the “A” horizon;
- character of microrelief;
- 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 proper functioning 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.

Proper 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. Proper functioning condition should not be confused with the desired plant community or the desired range of conditions 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 landforms.

Potential indicators: Hydrologic, vegetation, 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 this land becomes 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 or not 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 ground water 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 landowners, 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 CWA and state implementing regulations).

Standard 5: Native, Threatened and Endangered, 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 T&E 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 T&E 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 permittees/lessees and the interested public. Guidelines enable managers to adjust grazing management on public land 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 subsurface 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 streamflows 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 manage-

ment and work 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 vegetation composition of a site, such as prescribed burning, western 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 nonnative 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 nonnative species are essential to the functional integrity of the site.

3) Structural and vegetation 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.

Standards for Land Health for Public Lands in Oregon and Washington

The S&G's were developed in consultation with the resource advisory councils and provincial advisory committees, Tribes, and others. The standards for land health are the same as the standards for rangeland health presented earlier with the addition of an air quality standard. The land health standards apply to all ecological sites and landforms on public lands throughout Oregon and Washington, not just rangelands.

The air quality standard is as follows: ***Air quality, influenced by agency actions, complies with the State implementation plan and all applicable Federal standards.***

Rationale and intent: The air quality of an airshed, air management basin, or region is determined by management actions across all ownerships and urban/

industrial areas, topographical features, prevailing climate and weather patterns and conditions, natural events, and to a certain extent, the physical and chemical properties of the soils. Standards 1 and 3 contribute to attaining this standard.

States are legally required to develop state implementation plans to maintain and/or improve air quality under the CAA and its amendments. Federal land management agencies are to comply with those standards, which are designed to protect human health, aesthetics, and ecosystem health. Similar to water quality management, air quality is managed across ownerships, but unlike watersheds, airsheds are much harder to define and rapidly change with wind patterns and other atmospheric characteristic. The actions taken by the agency will contribute to meeting applicable elements of the state implementation plans and Federal regulations.

Potential indicators: Air quality meets applicable air quality standards as evidenced by:

1) National ambient air quality standards; and

2) state implementation plans, including: smoke management plans, visibility protection plans, and prevention of significant deterioration.

Although the land health standards were never officially adopted by Oregon/Washington BLM, they are still applicable to land use planning.

E5: Grazing Systems within the Planning Area

The following descriptions outline the typical periods of grazing use in the planning area; however, there is some variations among allotments based on plant phenology, elevation, and climate. Table E5-1 shows grazing seasons in relation to calendar months.

Winter Grazing System

Under this system, grazing occurs approximately November 1–February 28. Grazing during this treatment will occur when most plant species are dormant. Most plants will have completed their life cycles and stored maximum carbohydrates for the next growing season.

The winter grazing systems would allow heavy (65 percent) utilization of the previous season's growth. Livestock would be removed prior to plant initiating growth in the early spring. Grazing during this season aids reproduction and seedling establishment as livestock help scatter and plant seeds.

Spring Grazing System

Under this system, grazing occurs approximately March 1–May 15. Spring grazing provides plants an opportunity to recover after utilization of early plant growth. By removing livestock before most spring and summer precipitation occurs, the plants will be able to store carbohydrates, set seed, and maintain their vigor. This spring treatment can be used every year with little effect on the plant.

Early use must take place before grass plants are in the boot stage. There must also be enough soil moisture in the ground to provide for regrowth after grazing. Therefore, flexibility in the early treatment will allow for use prior to April 1 but generally not after April 30, except at higher elevations with higher precipitation. At some of the higher elevation areas, spring use may occur into June.

Spring grazing would result in moderate utilization (50 percent) of a combination of the previous season's growth and the current season's early growth of herbaceous key species. Livestock are removed while plants are still growing; therefore, only 20–30 percent of the current season's growth is removed. The spring grazing period is the shortest of any grazing system, and plant regrowth continues about 30–45 days after livestock removal.

Grazing during this period requires plants to draw heavily upon food reserves to replace grazed portions. However, grazing would cease while adequate soil moisture is still available for the grazed plants to reach full growth, produce seed, and fully replenish food reserves. Consequently, this form of grazing is expected to promote the vigor of both herbaceous and woody key species (Stoddart, Smith, and Box 1975; Cook 1971). This system would enhance the production of perennial grasses since the production of a large number of viable seed is dependent upon vigorous mature plants (Hanson 1940). Seedling establishment would depend on the intensity of grazing in the spring following germination. If seedling plants are not physically damaged through trampling or being pulled up, they would normally be firmly established by the start of the third growing season (Stoddart, Smith, and Box 1975).

Table E5-1.—*Grazing seasons in relation to months*

November	December	January	February	March	April	May	June	July	August	September	October
Winter				Spring			Summer			Fall	

Spring/Summer Grazing System

Under this system, grazing occurs approximately May 1–August 31. This treatment allows for grazing during the critical growth period of most plants. Carbohydrate reserves are continually being utilized because the green parts of the plant are constantly being removed by livestock. The pastures that are under the summer treatment will generally experience some other treatment the following year.

Spring/summer grazing would allow 50 percent utilization of the annual production of key species during the late spring and summer each year. Grazing would begin each year at a time when carbohydrate reserves are low and continue until after seedripe.

Although the proposed stocking rates achieve 50 percent utilization on most areas, factors such as terrain, location of fences and water, and type of livestock and vegetation would often result in heavy grazing (60–80 percent of the annual vegetation production) in one portion of an allotment and light use (20–40 percent) in another area. A rapid decrease in key species composition is expected on those areas within an allotment which receives heavy utilization—primarily areas adjacent to water developments and valley bottoms. Spring/summer grazing at the Northern Great Basin Experiment Station (approximately 50 miles north of the resource area) resulted in heavy utilization on 37 percent of the range; over an 11-year period, this produced a change in species composition toward less desirable bunchgrasses such as Sandberg's bluegrass. In studies concerning the grazing response of cool season perennial bunchgrasses, Cook (1971) showed that 50 percent utilization was too severe for continuous late spring and summer use. The two species of grass in the study correspond in stages of vegetative growth to the key bunchgrasses in the resource area.

Fall

Under this system, grazing occurs approximately September 1–October 31. Grazing during this treatment will not begin until after most plants have reached seedripe and have stored adequate carbohydrate reserves. This treatment will assist in meeting the objectives by providing all plants an opportunity to complete their life cycles and produce the maximum amount of cover and forage.

Spring/Fall Grazing Season

Spring/fall grazing would result in utilization of the herbaceous key species during the early portion of their growing period. Very little use of the woody key species is expected during this time. Grazing would occur again in the fall when herbaceous key species are dormant; however, moderate utilization of woody key species would be expected. This system would maintain the vigor and reproduction of the herbaceous key species. Woody key species would decrease slowly in composition because stocking rates would be based on 50 percent utilization of herbaceous species, but utilization of the more palatable woody species during the fall season would be heavier.

Deferred Grazing System

Under the deferred system, grazing would occur after most of the herbaceous key species have completed growth. Moderate utilization (60 percent) of the shrubs encourages growth of additional twigs, and therefore increases forage production. Reproductive capacity is decreased over the years, since increased twig growth reduces the development of flowers and fruits (Garrison 1953, *cited b*y Stoddart, Smith, and Box 1975). Where woody key species are found in limited numbers, some individual shrubs would be selected by cattle and heavily browsed, resulting in reduced vigor and eventual death of these plants; however, the total shrub mortality is expected to be insignificant. The critical growth period for woody key species occurs in late summer.

Livestock normally concentrate in riparian areas under deferred grazing. Livestock use of the riparian areas under deferred grazing is expected to be light or moderate in several areas due to factors such as inaccessibility and lack of adequate shade and water on adjacent upland areas.

Deferred Rotation Grazing System

Under the deferred rotation grazing system, grazing use during the critical growing period would be alternated with grazing during early spring or late summer/fall in successive years. Early spring grazing would end soon enough to give most herbaceous key species an opportunity to replenish food reserves and maintain good vigor. Late summer grazing would occur after food

reserves of the key species have been stored. As a result, the vigor of the key species would be maintained at an acceptable level.

Reproduction of woody key species would not be improved because the sequence of grazing treatments does not provide sufficient protection from grazing to allow seed production and seedling establishment. No areas of riparian vegetation are located within the areas proposed for deferred rotation grazing.

Rotation Grazing System

Rotation grazing results in key species being grazed during part of the growing season every year. This system alternates grazing between early spring use one year and during the critical growing period the next year. The early spring grazing would end in time for the key species to replenish food reserves (see Spring Grazing System). As a result, the decline in vigor caused by use during the critical period of the growing season is somewhat offset by early grazing in alternate years.

Since utilization levels would be moderate (50 percent), the rotation grazing system is expected to only slightly enhance the reproduction of the herbaceous key species on native range because every pasture is grazed each year. Many new seedlings would be grazed or pulled up before becoming established. Woody key species would improve in vigor and reproduction because they are normally not grazed by livestock during the spring and early summer (Vavra and Sneva 1978).

Rest Rotation Grazing System

Rest rotation grazing results in moderate (50 percent) utilization of key species in the use pasture. Most of the use occurs during the growing season. Approximately 23-33 percent of the area is completely rested from grazing each year. The need for periodic complete rest from grazing arises from the fact that even at proper stocking rates, continuous grazing usually results in utilization of the most palatable plants beyond the proper use level. The heaviest use usually occurs on the most accessible areas, resulting in a decline in the key species composition. Hormay (1970) states that these species can be maintained by periodically resting the range from use by means of rest rotation grazing systems. Rest periods allow the plants to complete the stages of vegetative growth, seed production and food storage. In addition, it provides for seedling establishment and allows litter to accumulate. Rest rotation would allow flexibility in livestock management during periods of drought.

In the Lakeview District, a comparison of the range conditions in allotments under rest rotation management with conditions in allotments under other systems showed that conditions were significantly better on the allotments under rest rotation. Approximately 26 percent of the acres in the rest rotation system were rated good condition, while about 15 percent of the acres under all other systems were in good condition (USDI-BLM 1982a).

Appendix F — Watershed and Water Quality

F1: Ecosystem Analysis at the Watershed Scale

The following is taken from "Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis - Version 2.2."

Process Overview

Watershed analysis is a procedure used to characterize the human, aquatic, riparian, and terrestrial features, conditions, processes, and interactions (collectively referred to as "ecosystem elements") within a watershed. It provides a systematic way to understand and organize ecosystem information. In doing so, watershed analysis enhances our ability to estimate direct, indirect, and cumulative effects of our management activities and guide the general type, location, and sequence of appropriate management activities within a watershed.

Watershed analysis is essentially ecosystem analysis at the watershed scale. Ecosystem analysis at the watershed scale provides the watershed context for (aquatic and riparian habitat) protection, restoration, and enhancement efforts. The understanding gained through watershed analysis is critical to sustaining the health and productivity of natural resources. Healthy ecological functions are essential to maintain and create current and future social and economic opportunities.

Federal agencies are conducting watershed analyses to shift their focus from species and sites to the ecosystems that support them in order to understand the consequences of management actions before implementation. The watershed scale was selected because every watershed is a well-defined land area having a set of unique features, a system of recurring processes, and a collection of dependent plants and animals.

Watershed analyses are conducted by teams of specialists who follow a standard, interagency six-step process. The process is issue-driven. Rather than attempting to identify and address everything in the ecosystem, teams focus on seven core analysis topics along with watershed-specific problems or concerns. These problems or concerns may be known or suspected before undertaking the analysis or may be discovered during the analysis. Analysis teams identify and describe ecological processes of greatest concern, establish how well or poorly those processes are functioning, and determine the conditions under which management activities, including restoration, should and should not take place. The process is also incremental. New information from surveys and inventories, monitoring reports, or other analyses can be added at any time.

Watershed analysis is not a decision-making process. Rather it is a stage-setting process. The results of watershed analysis establish the context for subsequent decision making processes, including planning, project development, and regulatory compliance.

The results of watershed analysis can be used to:

- Assist in developing ecologically sustainable programs to produce water, timber, recreation, forage, and other commodities.
- Facilitate programs and budget development by identifying and setting priorities for social, economic, and ecological needs within and among watersheds.
- Establish a consistent, watershed-wide context for project-level NEPA analysis.
- Establish a watershed context for evaluating management activity and project consistency given existing plan objectives (such as the RMP).
- Establish a consistent, watershed-wide context for implementing the "Endangered Species Act," including conferencing and consulting under section 7.
- Establish a consistent, watershed-wide context for local government water quality efforts and for the protection of beneficial uses identified by the states and Tribes in their water quality standards under the Federal CWA.

Definition of "Watershed"

"Watershed" refers to any area of land that drains to a common point. However, the size of the area that one person associates with "watershed" may be quite different than the area another person has in mind. A watershed may be as large as the area that drains into the Columbia River or it may be as small as the area above a favorite fishing hole or hot springs. Both are technically correct. Before analysis at the watershed scale can begin, a consistent vision of the size of the area involved is needed.

Watersheds are hierarchical—little ones nest within larger ones. (See also the discussion of hierarchical scales in the appendix of the Subbasin Review Report.) A set of commonly used terms that describe relative sizes of geographic areas is shown in Table F1-1. Watershed refers to one level in the progression of geographic sizes. A watershed is smaller than a river basin or subbasin, but is larger than a drainage or site.

Summary of the Six-Step Process

The process for conducting ecosystem analysis at the watershed scale has six steps:

1. Characterization of the watershed:

The purpose of step 1 is to identify the dominant physical, biological, and human processes or features of the watershed that affect ecosystem functions or conditions. The relationship between these ecosystem elements and those occurring in the river basin or province is established. When characterizing the watershed, teams identify the most important land allocations, plan objectives, and regulatory constrains that influence resource management in the watershed. The watershed context is used to identify the primary ecosystem elements needing more detailed analysis in subsequent steps.

2. Identification of issues and key questions:

The purpose of step 2 is to focus analysis on the key elements of the ecosystem that are most relevant to the management questions and objectives, human values, or resource conditions within the watershed. The applicability of the core questions and level of detail needed to address applicable core questions is determined. Rationale for determining that a core question is not applicable are documented. Additional topics and questions are identified based on issues relevant to the watershed. Key analysis questions are formulated from indicators commonly used to measure or interpret the key ecosystem elements.

3. Description of current conditions:

The purpose of this step is to develop information (more detailed than the characterization in step 1) relevant to the issues and key question identified in step 2. The current range, distribution, and condition of the relevant ecosystem elements are documented.

4. Description of reference conditions:

The purpose of step 4 is to explain how ecological conditions have changed over time as a result of human influence and natural disturbances. A reference is developed for later comparison with current conditions over the period that the system evolved and with key management plan objectives.

5. Synthesis and interpretation of information:

The purpose of step 5 is to compare existing and reference conditions of specific ecosystem elements and to explain significant differences, similarities, or trends and their causes. The capability of the system to achieve key management plan objectives is also evaluated.

6. Recommendations:

The purpose of this step is to bring the results of the previous steps to conclusion, focusing on management recommendations that are responsive to watershed processes identified in the analysis. By documenting logical flow through the analysis, issues and key questions (from step 2) are linked with the step 5 synthesis and interpretation of ecosystem understanding from steps 1, 3, and 4. Monitoring activities are identified that are responsive to the issues and key questions. Data gaps and limitations of the analysis are also documented.

F2: Riparian/Wetland Areas

Introduction

BLM depicts natural riparian/wetland areas as resources whose capability and potential is defined by the interaction of three components: (1) vegetation, (2) landform/soils, and (3) hydrology; while the functioning condition of these natural riparian/wetland areas are characterized by the interaction of these elements.

One of the main goals of the BLM is to have riparian/wetland areas in proper functioning condition. An overall objective of this goal is to achieve an advanced ecological status, except where resource management objectives, including proper functioning condition, would require an earlier successional stage, thus providing the widest variety of vegetation and habitat diversity for wildlife, fish, and watershed protection.

In the past, considerable effort has been expended to inventory, classify, restore, enhance, and protect riparian/wetland areas, but the effort has lacked consistency. No single classification, survey, inventory, or

Table F1-1.—*Hierarchy of hydrologic units, Lower Crooked Creek (171200060901)*

Hierarchy term	Hydrologic unit code	Numeric identifier	Name	Size (acres)
Region	First field	17	Pacific Northwest	165,757,150
Subregion	Second field	12	Oregon Closed Basins	11,072,000
River Basin	Third field	00	The subregion and river basin are the same, as indicated by the 00	11,072,000
Subbasin	Fourth field	06	Lake Abert	652,800
Watershed	Fifth field	03	Crooked Creek	56,750
Subwatershed	Sixth field	01	Lower Crooked Creek	26,500

rating methods or systems have previously been developed to satisfy the complex interactions of healthy riparian/wetland areas. These areas are in dynamic equilibrium with streamflow forces and channel aggradation/degradation processes producing change with vegetative, geomorphic, and structural resistance. Ecological status determination of riparian/wetland vegetation does not necessarily take into account or address needed information that would be contained within aquatic habitat and stream surveys that is pertinent to the functionality of the riparian/wetland area. This is important because riparian/wetland areas will attain proper functioning condition long before they achieve an advanced ecological status.

When evaluating riparian/wetland areas, ecological status should not be confused with proper functioning condition. Riparian/wetland areas must be viewed with the understanding that the riparian system is inherently dynamic and proper functioning condition can and will occur within any or all ecological stages. Proper functioning condition should be evaluated in terms of and relationships to all physical and biological functions occurring within the entire watershed, including the uplands and tributary watershed systems.

To understand how riparian/wetland areas operate and to implement proper management practices, thus ensuring an area is healthy (functioning properly), the capability and potential of a riparian/wetland area must be understood. Assessing riparian vegetation and stream channel functionality is based upon a given riparian/wetland area's capability and potential. Here, capability is the highest ecological status a riparian/wetland area can attain given political, social, or economical constraints; whereas potential is the highest ecological status a riparian/wetland area can attain given no political, social, or economical constraints, often referred to as the potential natural community. Some riparian/wetland areas may be prevented from achieving their potential because of limiting factors such as human activities that alter the area's capability.

To summarize, proper functioning condition and ecological site status are two different characteristics of riparian systems. A site in any ecological status may be in functioning condition. Riparian/wetland areas should be judged on the functions that it provides compared to functions that should be present in relation to entire watershed. All riparian/wetland systems should not be expected to have identical physical and biological functions. Riparian/wetland health (functioning condition), an important component of watershed condition, refers to the ecological status of vegetation, geomorphic and hydrologic development, and a degree of structural integrity exhibited by the riparian/wetland area (see related information in Table F2-1).

Riparian Conservation Areas

Introduction

Riparian systems are water-influenced areas that include streams and other aquatic ecosystems. Riparian conservation areas are portions of watersheds where aquatic and riparian-dependent resources receive primary emphasis and where management activities are subject to specific standards and guidelines. Riparian conservation areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; (2) providing root strength for channel stability; (3) shading the stream; and (4) protecting water quality.

In riparian conservation areas, maintenance, protection, and restoration of aquatic processes and functions are

Table F2-1.—*Riparian trend analysis worksheet by category*

Usual study methods used to show trend	Downward indicators	Indicators of no change	Upward indicators
Woody riparian			
•Aerial imagery •Photo point studies •Key plant utilization studies	(A) Studies indicate a decline in the overall number of key woody plants	(A) Studies indicate no change in the overall number of key woody plants	(A) Studies indicate an increase in the overall number of key woody plants
	(B) Studies indicate a decline in the overall canopy volume (height and width) of key woody plants	(B) Studies indicate no change in the overall canopy volume (height and width) of key woody species	(B) Studies indicate an increase in the overall canopy volume (height and width) of key woody plants
	(C) Studies indicate that vegetation removal is preventing the estab-lishment of uneven-aged classes of key woody plants	(C) Studies indicate no change in the age class structure of key woody plants	(C) Studies show that healthy uneven-aged stands of key woody plants are present
Herbaceous cover			
•Aerial imagery •Line intercept transects	(D) Studies indicate a decline in the overall amount of herbaceous ground cover	(D) Studies indicate no change in the overall amount of herbaceous ground cover	(D) Studies indicate an increase in the overall amount of herbaceous ground cover
	(E) Studies indicate that herbaceous species composition has shifted toward more early succession species	(E) Studies indicate no change in the herbaceous species composition	(E) Studies indicate that herbaceous species composition has shifted toward more late-succession species
Stream banks and channel			
•Stream channel form measurements •Aerial imagery •Photo point studies	(F) Studies indicate an increase in the amount of streambank erosion attributable to trampling damage	(F) Studies indicate no change in the amount of streambank erosion attributable to trampling damage	(F) Studies indicate a decrease in the amount of streambank erosion attributable to trampling damage
	(G) Studies show that water depth is decreasing	(G) No changes in depth measurements	(G) Studies show that water depth is increasing
	(H) Studies show that stream channel is widening	(H) No change in stream channel	(H) Studies show that stream channel width is narrowing
	(I) Studies show incised channels are widening	(I) No change in channel depth	(I) Studies show that incised channels are healing with vegetation cover
	(J) Studies show that stream meanders are decreasing and channel is straightening	(J) No change in number and type of stream meanders	(J) Studies show that stream meanders are increasing

Usual study methods used to show trend	Downward indicators	Indicators of no change	Upward indicators
Water quality			
•Water turbidity samples •Fish and aquatic insect samples	(K) Increase in populations of fish and aquatic insects tolerant of high turbidity, low oxygen levels, high temperatures, or presence of contaminants	(K) Sampling indicates no change in the composition of aquatic insects and fish	(K) Increase in populations of fish and aquatic insects intolerant of high turbidity, low oxygen levels, high temperatures, or presence of contaminants
	(L) Sediment transport is increasing relative to baseline data	(L) Studies show no change in the amount of sedimentation	(L) Sediment transport is decreasing relative to baseline data

emphasized and goals and objectives for aquatic and riparian habitats are met. Conservation needs for aquatic and riparian systems can be summarized by the following four principles.

1) A stream requires nutrient inputs and energy to sustain its biological functions.

2) Riparian-associated plants and animals rely on the vegetation adjacent to streams.

3) Small streams are more affected by hillslope processes than larger streams.

4) The likelihood of disturbances resulting in instream effects increases as adjacent slopes become steeper.

Ecological function, processes, and disturbance mechanisms are guides for use and protection priorities in riparian areas. Boundaries between riparian areas and upslopes may need adjustment to address each of the larger-scale disturbance effects that may negatively or positively affect unique habitats or sensitive species in riparian environments. The actual size of riparian areas depends on local characteristics that define them; the dimensions of entire riparian areas are not always proportional to the size of aquatic systems.

Riparian conservation areas are delineated into zones or gradients of influence, with an inner zone (Zone 1) where many primary processes and functions occur and an outer zone (Zone 2) where processes and functions occur but at different, less important (secondary) levels to the stream channel. The outer riparian zone also functions as a transition and buffer between upslope uses and disturbances and the aquatic environment. Zoning delineates major influence areas, establishing a basis for different levels of disturbance and vegetation management in each zone. This scheme sets the foundation for cumulative effects determination that is spatially-sensitive in considering watershed disturbance.

Although the concept of zones applies to forestland and rangeland environments, it is more difficult to apply in rangelands. For the purposes of this document, zones are delineated only in forested environments. In rangeland environments, floodprone width is used to delineate riparian conservation areas.

Forested Lands

Zone 1 is the inner riparian area; it is the primary riparian community and energy influence area. It is most important for protection and maintenance of instream conditions. It also serves to transition processes, functions, and disturbances from streams to floodplains and adjacent riparian areas. Zone 1 is the area most sensitive to land management activities.

Zone 2 is the outer riparian area. It supports additional riparian area processes and functions (for example, microclimate) and also is a buffer area capable of absorbing disturbances from the uplands. It is the interface and transition between the inner riparian area and the uplands. In steeper landscapes where soils are subject to surface erosion, this zone may need extension using the slope adjustment factor. This extended area is referred to as Zone 2b.

Areas with landscapes or that are unstable or landslide prone will also be included in the riparian conservation area.

Riparian Conservation Area Delineation Process

Riparian conservation area delineation is based on three indicators: site potential tree heights, extent of

Table F2-2.—*Watershed conditions and relationship to non-point source pollution*

Watershed condition	Description	Nonpoint source pollution: relation to watershed condition
I. Upland	A. Insufficient vegetative basal and canopy cover to protect surface soils	*Sedimentation:* Soil surface erosion in uplands *Turbidity:* Sedimentation from soil surface erosion in uplands *Habitat modification:* Siltation of spawning gravels from sedimentation and reduction in primary productivity from turbidity
	B. Insufficient vegetation to allow soil infiltration	*Flow modification:* Reduced water retention *High sedimentation:* High peak runoff causing upland soil surface erosion and riparian bank erosion *High turbidity:* Sedimentation from erosion in uplands and riparian area *Habitat modification:* Siltation of spawning gravels from sedimentation and reduction in primary productivity from turbidity *High temperature:* Low summer flow and reduced cool ground water inflow *Low dissolved oxygen:* High temperature reduces oxygen solubility
II. Riparian area	A. Streambank shade insufficient to prevent excessive warming from direct solar radiation	*High temperature:* Increased exposure, allowing solar heating *Low dissolved oxygen:* High temperature reduces oxygen solubility *Algal growth:* High temperature from solar heating *Turbidity:* High algal growth
	B. Insufficient bank stability allowing excessive streambank erosion	*Sedimentation:* Streambank erosion *Flow modification:* Reduced floodplain development resulting in reduced water retention causing increased spring peak flows and decreased summer ground water inflow *High temperature:* Streambank erosion resulting in widening of stream allowing increased solar heating; reduced shade from overhanging banks; low summer flows and reduced cool ground water inflow *Low dissolved oxygen:* High temperature reduces oxygen solubility *Algal growth:* High temperature from solar heating *Turbidity:* High algal growth and sediments from bank erosion *Habitat modification:* Reduced point bar formation for pool formation in outer meander curves; reduced cover from undercut banks; reduced cover due to shallower waters; reduced edgewaters and floodplains for refuge from high runoff velocities and for fry habitat; reduced spawning gravel availability due to sedimentation
	C. Vegetation sparse or not vigorous, causing reduced infiltration	*Flow modification:* Reduced water retention *High temperature:* Low summer flow and reduced cool ground water inflow *Sedimentation:* Increased peak flow causing streambank erosion *Habitat modification:* See above on bank stability
	D. Vegetation sparse, reducing filtering capability	*Sedimentation:* Higher input of upslope sediments

flood prone width, or riparian vegetation width, whichever provide the greatest protection to aquatic and riparian resources.

Site potential tree height ~ (for purposes of defining widths) "The average maximum height of the tallest dominant trees (200 years or older) for a given site class" (FEMAT 1993, p.V-34).

The following site potential tree height shall be used as a minimum height for the forested potential vegetation group in the planning area. Potential vegetation group = dry forest, minimum site potential tree height (feet) = 120.

Slope adjustment factor ~ ddjustment of stream riparian conservation area widths for slope uses a curve based on probable sediment travel distance from concentrated sources of erosion and sediment from roads (Ketcheson and Megahan 1996).

The process for delineation of forested riparian areas (perennial and intermittent streams) involves dividing riparian conservation areas into two zones:

A) Minimum Widths for Perennial Streams

Zone 1 equals one site potential tree height, or the extent of the flood prone area, or the extent of wet and moist riparian vegetation, whichever best maintains, protects, and restores the aquatic environment.

Zone 2 equals one site potential tree height or the extent of dry riparian vegetation (Zone a), plus any width added from slope adjustment curve (Zone b).

B) Minimum Widths for Intermittent Streams

Zone 1 equals one-half site potential tree height, or the extent of the flood prone area, or the extent of wet and moist riparian vegetation, whichever best maintains, protects, and restores the aquatic environment. Zone 2 equals one-half site potential tree height, or the extent of dry riparian vegetation (Zone 2a), plus any width added from slope adjustment curve (Zone b).

C) Additional Requirements Applicable for All Streams

Additional special consideration is necessary where there are landslides and in landslide prone or unstable areas. Landslide prone determination shall be based on the procedure outlined in Tang and Montgomery (1995) or other comparable techniques.

D) Total Riparian Conservation Area Width

Total riparian conservation area width is the sum of the widths determined from steps A through C.

Rangeland Streams

The process of delineation for rangeland riparian riparian conservation areas (perennial or intermittent streams) relies on floodprone widths by stream type, or the extent of potential natural riparian vegetation, whichever provides the greater protection to aquatic and riparian resources. Riparian vegetation can be delineated by aerial photographs or field inspection. Floodplain area is essentially equivalent to floodprone width defined by Rosgen (1994).

The following steps can be used to determine the flood prone area. It is suggested that field units develop relationships between bankfull width and drainage area or use existing relationships for their area.

1) Determine bankfull width for the drainage area above the point on the stream.

2) Determine the stream type using Rosgen stream type (Rosgen 1994) from aerial photographs or existing classification data.

3) Select entrenchment ratio, which is the average maximum for the particular stream types from the following:

Stream type	A	B	C	E	F	G
Entrenchment ratio	1.4	2.2	5.3	56.9	1.2	1.3

Entrenchment ~ vertical containment of stream and the degree to which it is incised in the valley floor.

Entrenchment ratio ~ ratio of the width of the flood prone area to the bankfull surface width of the channel.

Because entrenchment ratio is not applicable in D stream types (braided systems), riparian width shall be determined on a case-by-case basis using site-specific or local information.

4) Calculate the floodprone area by multiplying the bankfull width and entrenchment ratio.

Floodprone area ~ width measured at an elevation which is determined at twice the maximum bankfull depth of the stream.

Local drainage area and bankfull width relationships should be used in place of graphs. Likewise, if field verified entrenchment ratios are known, this data should also be used in place of the average maximums shown in Step 3.

Forested Land and Rangeland Ponds, Lakes, Reservoirs, and Wetlands

Riparian conservation areas for ponds, lakes, reservoirs, and wetlands greater than 1 acre consist of:

- The body of water or wetland and the area to the outer edges of the riparian vegetation, or
- the extent of the seasonally saturated soil, or
- The extent of moderately and highly unstable areas, or
- A distance equal to the height of one site potential tree, or
- 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake, whichever is greatest.

For ponds, lakes, reservoirs, and wetlands less than 1-acre, the above riparian conservation area delineation shall apply, except that the minimum slope distance shall be 100 feet.

Riparian Management Objectives

Introduction

Riparian management objective values for stream channel conditions, when used in combination with objectives for this plan, provide criteria to help assess attainment of aquatic and riparian goals as described in the Desired Range of Conditions section of Chapter 3 . These values ("Interim Bull Trout Habitat Conservation Strategy" [1996]) formulated from the Pacific Native Fish Strategy (or PACFISH) and may be further refined by the Interior Columbia Basin Ecosystem Management Project) provide a description and characterization of watershed, riparian, and stream channel processes and existing conditions that can be expected to be achieved over time.

As indicated below, some riparian management objectives apply to forested ecosystems, some to rangeland ecosystems, and some to all ecosystems. Actions that reduce habitat quality are inconsistent with the purpose of this plan's direction. However, the intent of riparian management objectives are not to establish a ceiling for what constitutes good habitat conditions. The following statements provide the intent for the use of the riparian management objectives and their purpose in a comprehensive program:

1) Riparian management objectives are criteria (quantitative and/or qualitative) to help evaluate progress towards attainment of watershed, aquatic, and riparian goals described within the desired range of conditions.

2) Interim riparian management objectives are not to be viewed as independent from other components of the aquatic conservation strategy; rather, they are part of an aquatic conservation program. Riparian management objectives are not always sensitive to immediate effects but rather exhibit response to cumulative effects and factors influencing channel history over time.

3) Interim riparian management objectives do not replace state and Federal water quality standards promulgated under the CWA or state laws, but they should complement these standards in providing measurable habitat attributes.

Procedure for Riparian Management Objective Application

Riparian management objectives apply to all perennial streams during those times that the streams support aquatic life. Effects of land management activities on intermittent streams may influence the attainment of riparian management objectives in perennial streams. All instream and riparian variables should be used, in combination, to provide a comprehensive synopsis of watershed, riparian, and aquatic conditions, since placing emphasis on interpretations of individual variables may lead to erroneous conclusions related to watershed, riparian, and aquatic conditions.

Riparian management objective application or development can follow these steps:

1) The values apply where ecologically attainable. Locally developed riparian management objectives (quantitatively and/or qualitatively derived) supported with information from ecosystem analysis is preferred because of the variable nature of streams within the project and planning areas. Stream conditions can vary from disturbances and channel evolution histories that influenced channel form and conditions. It is recommended that

Table F2-3.—*Standards for rangeland health and relationship to watershed condition factors (Table 1) contributing to nonpoint source pollution*

Standard	Description	Relationship to watershed condition factor contributing to nonpoint source pollution
1	Upland soils exhibit infiltration and permeability rates, moisture storage and stability that are appropriate to soil, climate, and landform.	Protection of surface soils will increase because the improvement in species and structural diversity will result in increased vegetative basal and canopy cover to reduce erosive energy due to overland flow and precipitation. (IA) Soil infiltration will increase because the improvement in species and structural diversity will result in increased vegetative basal and canopy cover to intercept overland flow and precipitation. (IB)
2	Riparian/wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.	Streambank shade will be increased through improvement of shade-providing riparian woody species. (IIA) Streambank stability will improve through improvement of herbaceous and woody species to provide root mass to provide a matrix for holding the soil particles together. (IIB) Infiltration will be improved through increase in basal and canopy vegetative cover to intercept overland flow and precipitation. (IIC) Filtering capability will be improved through increase in basal vegetative cover to intercept sediments from overland flow, including floodplain overflow. (IID)
3	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.	Protection of surface soils will increase because the improvement in species and structural diversity will result in increased vegetative basal and canopy cover to reduce erosive energy due to overland flow and precipitation. (IA) Soil infiltration will increase because the improvement in species and structural diversity will result in increased vegetative basal and canopy cover to intercept overland flow and precipitation. (IB) Streambank shade will be increased through improvement of shade-providing riparian woody species. (IIA) Streambank stability will improve through improvement of herbaceous and woody species to provide root mass to provide a matrix for holding the soil particles together. (IIB) Infiltration will be improved through increase in basal and canopy vegetative cover to intercept overland flow and precipitation. (IIC) Filtering capability will be improved through increase in basal vegetative cover to intercept sediments from overland flow, including floodplain overflow. (IID)
5	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.	Habitat modification that is adverse to the fish species will be reduced as habitat is restored to support viable populations. (IA-B, IIA-D, IIIA) Temperature, sedimentation, algal growth, turbidity, summer flow, and dissolved oxygen should be at levels that support viable populations of the fish species. (IA-B, IIA-D, IIIA)

Table F2-4.—*Management actions (Chapter 3) that are directly related to or emphasize standards for rangeland health and watershed conditions that affect water quality* [1]

Management objective and action #	Alternative A	B	C	D	E	SRH	Watershed Condition
Energy and Mineral Resources							
Objective 1, Action 3	♦		♦	♦	♦	2	IIA, IIB, IIC, IID
Objective 2, Action 1					♦	2	IIA, IIB,IIC, IID
Objective 3, Action 1	♦		♦	♦	♦	2	IIA, IIB, IIC, IID
Rangeland Vegetation							
Objective 1, Action 2			♦	♦		1, 3	IA, IB, IIA, IIB, IIC, IID
Objective 1, Action 3			♦	♦		1, 3	IA, IB, IIA, IIB, IIC, IID
Objective 1, Action 5			♦	♦		1, 3	IA, IB
Forest and Woodlands							
Objective 1, Action 1	♦		♦	♦	♦	1, 3	IA, IB
Objective 1, Action 2	♦		♦	♦	♦	1, 3 ,5	IA, IB
Objective 2, Action 1			♦	♦		1, 2, 3	IA, IB
Objective 2, Action 2	♦	♦	♦	♦		1 ,3	IA, IB
Objective 2, Action 3	♦	♦	♦	♦	♦	1, 2, 3	IA, IB, IIA, IIB, IIC, IID
Water Resources and Riparian/Wetland Areas							
Objective 1, Action 1	♦					2, 4	IIA, IIB, IIC, IID
		♦	♦	♦	♦	1, 2, 3, 4	IA, IB, IIA, IIB, IIC, IID
Objective 2, Action 1	♦	♦				2, 4	IIA, IIB, IIC, IID
			♦	♦	♦	1, 2, 3, 4, 5	IA, IB, IIA, IIB, IIC, IID
Fish and Aquatic Habitat							
Objective 1, Action 2	♦					2, 4, 5	IIA, IIB, IIC, IID
			♦	♦	♦	1, 2, 3, 4, 5	IA, IB, IIA, IIB, IIC, IID
Wild Horses							
Objective 1, Action 2	♦		♦	♦		1, 2, 3	IA, IB, IIA, IIB, IIC, IID
Rangeland/Grazing Use							
Objective 1, Action 2			♦	♦	♦	1, 2, 3	IA, IB, IIA, IIB, IIC, IID
Recreation							
Objective 1, Action 2			♦	♦		1, 2, 3, 4, 5	IA, IB, IIA, IIB, IIC, IID

[1] The listed management actions apply throughout the planning area and either specifically require special management to improve or protect riparian and upland watershed conditions or emphasize improving or protecting native vegetation and natural values.

district(s) staff conduct their own analysis due to the variable conditions in the planning area. Staff should consider using similar techniques described by Overton et al. (1995) to define appropriate riparian management objectives. Riparian management objectives should be developed from evaluations of reference conditions in similar landforms, climate, stream type and valley bottom settings, and potential vegetation. In all cases, the rationale supporting these changes and the effects of the changes shall be documented.

2) Use information from Step 1 to develop management actions for conserving or restoring watershed, riparian, and channel processes.

3) Monitor implementation and effectiveness of management if they have the intended results. Provide feedback information for future management objectives, action, and evaluation of riparian management objectives.

Riparian Management Objectives

1. Instream Habitat Features

Pool frequency:

WE	10	20	25	50	75	100	125	150	200
PO	96	56	47	26	23	18	14	12	9

WE = wetted width (feet); PO = pools per mile.

Temperature ~ No measurable increase in maximum water temperature (7 day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperature will be below 59 degrees F within adult bull trout holding habitat and below 48 degrees F within bull trout spawning and rearing habitats.

Maximum water temperatures below 64 degrees F within anadromous fish migration and rearing habitats and below 60 degrees F within anadromous fish spawning habitats.

Large woody debris ~ >20 pieces per mile; >12 inch diameter; >35 foot length.
(forested systems)

Bank stability ~ >80 percent stable in nonforested systems (rangeland systems)

Lower bank angle ~ >75 percent of banks with <90 degree angle (i.e., undercut).

Width/depth ratio: ~ <10, mean wetted width divided by mean depth.

2. Riparian Vegetation

Applies to all forest and range riparian areas: mature and old forest, and late ecological status range riparian conditions adapted to fire regimes and other disturbances characteristic for the site. Riparian vegetation riparian management objectives should be measured by the percent similarity of current riparian vegetation to the mature forest and late ecological status range riparian community/composition. The percent similarity shall be greater than 60 percent (USDA 1992). The stepwise procedure for determining similarity is outlined in Figure 3 and in the Riparian Vegetation riparian management objective discussion.

Procedure for Determining Riparian Vegetation Riparian Management Objective: Functionality of aquatic and riparian environments can be fully evaluated with the inclusion of riparian vegetation. Riparian vegetation is generally more sensitive to immediate effects from management activities. In some vegetation and valley bottom settings, riparian vegetation can be responsive to restoration in short timeframes. Most instream riparian management objectives are dependent upon riparian vegetation condition; therefore, a riparian vegetation riparian management objective was included.

The following steps summarize a method to assess similarity of current riparian vegetation to potential riparian vegetation based on information presented within the Interior Columbia Basin area. The five-step method, Riparian Plant Association Groups and Associated Valley Bottom Types of the Columbia River Basin (Manning and Engelking 1995), could be used to determine the riparian vegetation riparian management objective.

1. Identify the potential vegetation group in which the riparian area occurs.

2. Identify potential vegetation type and valleybottom type.

3. Identify potential riparian vegetation.

4. Determine existing riparian vegetation group.

5. Compare potential riparian vegetation group to existing riparian vegetation group.

The existing riparian vegetation should be at least 60 percent similar to the potential vegetation to meet the riparian management objective. If there is less than 60 percent similarity and it is not attributable to absence of the potential riparian vegetation group within the valley bottom setting, then management actions that move riparian vegetation toward the potential should occur.

F3: Water Quality Restoration Plans

The BLM is responsible for managing public lands according to requirements of the CWA, and thus, is required to maintain water quality where it meets State water quality standards and to improve water quality where it does not meet standards. Water bodies within the planning area (see Table F3-1) that currently do not meet State water quality standards have been placed on the States's 303(d) list of affected waters.

Through the land use planning process BLM must demonstrate that the agencies activities are contributing to CWA compliance and toward reducing the number of listed segments on public lands. Among the ways listed segments may be removed from the 303(d) list are: (1) applicable water standards are attained; (2) sufficiently stringent measures for managing waters are applied and affect a change; and (3) total maximum daily loads designed to achieve water quality standards are implemented. Total maximum daily loads are quantifiable load allocations developed for individual pollutants that occur in amounts which violate State water quality standards and fail to protect associated beneficial uses.

For all watersheds that contain stream segments on the 303(d) list, a water quality restoration plan will be developed. The water quality restoration plan may address individual or groups of subbasins, watersheds, or subwatersheds. Water quality restoration plans outline specific actions for restoring water quality and include information, data, and analysis to support the ODEQ to develop total maximum daily loads. Development and implementation of water quality restoration plans according to the process outlined in the 1999 "Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters," will fulfill BLM responsibilities for addressing listed waters, and allow continued management activities of BLM land according to a strategy which ensures attainment of water quality standards and support beneficial uses.

Each water quality restoration plan will be developed following the guidance in the protocol mentioned above, and will include:

1) condition assessment and problem description,

2) goals and objectives,

3) management actions to achieve objectives,

4) implementation schedule,

5) monitoring and evaluation plan, and

6) public participation plan.

The water quality restoration plans will reference the Lakeview RMP and the preferred alternative, the approved record of decision, including objectives, methodologies, BMP's, livestock grazing practices, and project development proposed for the upland and riparian/wetland areas. Water quality restoration plans will also reference other existing plans (agreements, permits, biological assessments and opinions, or other documents which stipulate management) and will incorporate information and direction from the plans and review the plans for consistency with the CWA. The water quality restoration plans will outline a restoration strategy consistent with the Lakeview RMP and other plans but which will accomplish water quality restoration. Thus the water quality restoration plans may require periodic updating.

The Lakeview BLM will develop water quality restoration plans for Twentymile Watershed (including listed tributaries Twelvemile and Fifteenmile Creeks), Deep Creek Watershed (including listed tributaries Camas, Drake and Parsnip Creeks), Honey Creek Watershed (including listed tributary Snyder Creek), Chewaucan River (including listed tributary Willow Creek), and Silver Creek Watershed (including listed tributary West Fork Silver Creek).

The ODEQ has scheduled to complete total maximum daily loads for Warner Lakes Subbasin in 2003 and Summer Lake, Lake Abert, and Guano Subbasins in 2007.

Element 1: Condition Assessment and Problem

Table F3-1.—*1998 State of Oregon water quality impaired stream reaches on LRA-administered lands*

Subbasin	State identification	Waterbody	Parameter of concern
Summer Lake	OR42A-SILV0-1998	Silver Creek	Temperature
Summer Lake	OR42A-SIWF0-1998	Silver Creek, West Fork	Temperature
Lake Abert	OR42B-CHEW0-1998	Chewaucan River	Temperature
Lake Abert	OR42B-CHEW27.5-1998	Chewaucan River	Temperature, biological criteria
Lake Abert	OR42B-WILL0-1998	Willow Creek	Temperature
Warner Lakes	OR42C-CAMA0-1998	Camas Creek	Temperature
Warner Lakes	OR42C-DEEP0-1998	Deep Creek	Temperature
Warner Lakes	OR42C-DRAK0-1998	Drake Creek	Temperature
Warner Lakes	OR42C-FIFT0-1998	Fifteenmile Creek	Temperature
Warner Lakes	OR42C-HONE0-1998	Honey Creek	Temperature
Warner Lakes	OR42C-PARS0-1998	Parsnip Creek	Temperature
Warner Lakes	OR42C-SNYD0-1998	Snyder Creek	Temperature
Warner Lakes	OR42C-TWEL0-1998	Twelvemile Creek	Temperature
Warner Lakes	OR42C-TWEN0-1998	Twentymile Creek	Temperature
Goose Lake	OR42D-CRAN0-1998	Crane Creek	Temperature

Description

The impaired water quality standards and beneficial uses as defined in Oregon Administrative Rules Chapter 340 for the LRA are discussed below.

The beneficial uses that are most impacted by nonpoint source pollutants are salmonid fish (trout) spawning and salmonid fish rearing. Other beneficial uses such as aesthetics, resident fish and aquatic life, and water contact recreation could also be affected. Descriptions of these conditions are in Chapter 2, and risk of affects from management are in Chapter 4.

Although human-caused point-source pollution occurs in the subbasins, most of the pollution resulting from BLM management is nonpoint source. In general, the relationship between the upland and riparian conditions to water quality are identified in Table F2-2.

The landscape is dominated by the volcanic parent rock. There are massive basalt flows and lesser amounts of ash flows and rhyolite. The volcanic rock forms cones and peaks and large flows in which ancient streams cut deep canyons. The volcanic rock weathers to clay and the soil reflects this. This harsh environment is dominated by sagebrush steppe vegetation communities. The streams have very high flashy peak flows and very low base flows. The water quality restoration plans will describe the individual characteristics of each watershed with a listed stream segment.

Stream Water Temperature

Most perennial streams in the resource area exceed the State numeric water quality standard for water temperature. State water quality standards have three parts including a (1) numeric standard, (2) narrative description, and (3) description of beneficial uses. The narrative section of the stream water temperature standards acknowledges there may be natural conditions that cause exceedance of the numeric criteria. ODEQ has criteria for determining whether exceedances of water quality standards are anthropogenic or natural in origin. If a stream is found to have natural water temperatures that exceed the numeric criteria, it is in compliance with the Oregon State water quality standards. Exceedance of stream temperature has been well documented on the resource area but the process to assess whether the condition is natural or man caused has not been completed. There are a wide range of causes of increased stream temperatures, and distinguishing anthropogenic from natural effects is difficult. Stream water temperature in the area is dependant on solar radiation, stream-side shade, ambient air temperatures, heated water discharges (hot springs), channel morphology, and stream flow. Stream water temperature may also be affected by anthropogenic activities that discharge heated water, widen streams, or reduce shading, flows or depth.

To determine if a stream water temperature is natural or if it is affected by current management activities, an understanding of site condition is necessary. Streams

will be compared to natural geomorphology, potential natural riparian and upland vegetation, and soil condition. By identifying the site potential and comparing it to current condition, a determination of anthropogenic effects can be made. If it can be demonstrated that a stream segment has decreasing water temperatures with current management, then it meets the Oregon State water quality standards. If the stream segment has stable water temperatures which do not comply with the numeric standard, studies to determine the affects of current management will be initiated.

Currently the LRA is conducting an ecological site inventory for the uplands and a riparian inventory. Both of these efforts assess vegetation and soils, and will determine potential and current vegetation and soil condition. A stream geomorphology inventory which documents stream health and relationship to the stream's physical potential has been conducted and will be verified. A road inventory that documents road effects on streams has been conducted and will be verified. The vegetation, soils, water temperature, stream geomorphology, and road inventories will be analyzed to determine what causes the high stream water temperatures. Because the water quality restoration plans are scheduled to be completed with the Proposed RMP/Final EIS, this work will update the water quality restoration plan and will be done for all watersheds with contain a 303(d) listed water body.

Biological Criteria

The Chewuacan River from the headwaters to Bagley Ditch is listed for biological criteria. This segment was listed because the community of benthic macroinvertebrates were indicative of stressed conditions and high sediment in 1994 and were degraded from a "better" condition in 1990. The biological criteria standard is :

> "Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." (Oregon Administrative Rules Chapter 340-41-027).

The water quality restoration plan for this reach will focus on an assessment of the ecological health of the stream and associated riparian and upland communities. Because BLM manages less than 1 percent of the watershed, there will likely be no measurable change in water quality. The focus of the water quality restoration plan will be on preventing possible effects from BLM management on the river rather than on changing water quality.

Element 2: Goals and Objectives

The Lakeview RMP assumes there would be attainment of or significant progress toward water quality standards through natural (no management), active (physical structures), and passive (change in management) watershed restoration, as accomplished through the achievement of the desired range of conditions. The Lakeview RMP goals, objectives, and management directives are designed to achieve desired range of conditions. The expected results are improvement for water quality, riparian/wetland areas, vegetation in upland areas, habitat for special status species, fisheries and aquatic habitat, and other resources.

Watershed restoration potential is dictated by site potential of an area. For example, in areas where deep channel entrenchment has occurred such that the top of the bank is much greater than the bankfull stage, restoration is limited to the potential floodplain development within the incised channel and continued shifts in localized erosion and deposition as the channel continues to move towards equilibrium. Achievement of water quality goals through watershed restoration would be guided by the objectives of the 1997 "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."

The 1997 "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" were developed pursuant to 43 CFR, subpart 4180. Watershed restoration and, therefore, water quality would be achieved through the attainment of Standards 1, 2, 3, 4, and 5. Standard 4 requires that surface water and ground water quality that is influenced by agency actions, remain in compliance with State water quality standards. Standards 1 and 2 address the properly functioning condition of the watersheds. Standards 3 and 5 reflect the ecological processes in the watershed and habitat for native species.

The water quality restoration plans developed for the Twentymile, Deep, and Honey Watersheds will include the goals and objectives of the "Warner Sucker Recovery Plan." The objective of this recovery plan for fishes in the Warner Basin is to restore and maintain the natural aquatic and riparian habitats of the Warner Basin so that the Warner sucker's continued existence is ensured in its native ecosystem which results in its removal from the list of T&E species (see Appendix H—Objectives of the Recovery Plan for Endangered

Fish). Current Lakeview RMP goals and objectives of vegetation, watershed, and fisheries and other plans will be incorporated into all water quality restoration plans. Lakeview RMP goals are in Chapter 2 and 3 include:

Shrub Steppe Management Goal 1: Restore, protect and enhance the diversity and distribution of desirable vegetation communities, including perennial native and desirable introduced plant species. Provide for their continued existence and normal function in nutrient, water, and energy cycles.

Shrub Steppe Management Goal 2: Protect healthy, functioning ecosystems consisting of native plant communities. Restore degraded high-potential landscapes and decadent shrublands.

Riparian and Wetland Vegetation Management Goal: Restore, maintain, or improve riparian vegetation, habitat diversity, and associated watershed function to achieve healthy and productive riparian areas and wetlands.

Forest and Woodlands Management Goal 2: Restore productivity and biodiversity in western juniper woodlands and quaking aspen groves.

Noxious Weeds and Competing Undesirable Vegetation Management Goal: Control the introduction and proliferation of noxious weeds and competing undesirable plant species and reduce the extent and density of established populations to acceptable limits.

Watershed Health Management Goal 1: Protect or restore watershed function and processes which determine the rates of precipitation capture, storage, and release.

Watershed Health Management Goal 2: Ensure that surface water and groundwater influenced by BLM activities comply with or are making significant progress toward achieving State of Oregon water quality standards for beneficial uses as established by the ODEQ.

Fish and Aquatic Habitat Management Goal: Restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of wildlife, fishes, and other aquatic organisms.

Livestock Grazing Management Goal: Provide for a sustainable level of livestock grazing consistent with other resource objectives and public land-use allocations.

Wild Horse Management Goal: Maintain and manage wild horse herds in established herd management areas at appropriate management levels to ensure a thriving natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources and other resource values.

Human Uses and Values Management Goal: Manage public lands to provide social and economic benefits to local residents, businesses, visitors, and futures generations.

Fire Management Goal 2: Provide swift action to rehabilitate burned areas to mitigate the adverse effects of wildland fire on soil and vegetation in a cost-effective manner and minimize the possibility of wildland fire recurrence or invasion of weeds.

Fire Management Goal 3: Restore and maintain ecosystems consistent with land uses and historic fire regimes though wildland fire use and prescribed fire. Reduce areas of high fuel loading resulting from years of fire suppression that may contribute to extreme fire behavior.

Recreation Management Goal: Provide and enhance developed and undeveloped recreation opportunities, while protecting resources, to manage the increasing demand for resource-dependent recreation activities.

Off-Highway Vehicles Management Goal: Manage OHV's to protect resource values, promote public safety, provide off-highway vehicle use opportunities where appropriate, and minimize conflicts among various users.

Energy and Mineral Resources Management Goal: Provide opportunity for the exploration, location, development, and production of locatable minerals, oil and gas, geothermal energy, and solid minerals in an environmentally sound manner. Eliminate and rehabilitate abandoned mine hazards.

Energy and Mineral Resources Management Goal 3: In an environmentally sound manner, meet the demands of local, state and Federal agencies, and the public, for mineral material from public lands.

Roads and Transportation Management Goal: Close any roads or trails no longer needed or which are causing resource damage.

Element 3: Management Actions to Achieve Objectives

The Lakeview RMP identifies an adaptive management strategy to address and accomplish resource objectives on public lands for all permitted uses and activities, including livestock grazing. This adaptive strategy will evaluate permitted uses and activities, recommend and initiate adjustments as needed to meet the desired resource objectives, and monitor results for effectiveness. Actions and restrictions required for accomplishment of each resource objective are identified in Chapter 3, and, in some cases, Chapter 4. Adaptive management process will be the mechanism in each water quality management plan to address the issues associated with each stream segment, watershed, or subbasin. Effectiveness will be evaluated through monitoring plans developed for each water quality restoration plan. The ODEQ has agreed that water quality restoration plans will function as adaptive management plans, where goals or management measures are revised if monitoring or other data indicate necessity for modifications. The large range of BLM management has different ways to implement change in operations including, environmental analysis, annual operating permits, handbook regulations, voluntary change, and contract administration.

The Lakeview RMP addresses restoration or protection of the upland vegetation and soil as well as the riparian/wetland areas for attainment and maintenance of water quality standards. Upland vegetation and soil are key elements in the processes of infiltration, storage, and release of precipitation. A healthy uplands provides water to the riparian areas, wetlands, and streams at a rate which promotes healthy aquatic environments.

Element 4: Implementation Schedule

Every effort will be made to complete the documention of the water quality restoration plans for the Proposed RMP/Final EIS. If completed, implementation of the water quality restoration plans will begin when the record of decision is signed and ODEQ approves the document. Most of the watershed conditions and water quality will be evaluated for current and potential condition within the first 5 to 10 years of implementation. Implementation of management directives to meet plan objectives will occur initially within higher priority areas based upon input from the public, and local, state, and Federal agencies. Management in areas including 303(d) listed segments has already been adjusted to improve watershed conditions or water quality. Current and past management goes through an environmental documentation process which includes interdisciplinary teams. These teams work to achieve ecological health with the land management. Many chances in operations have occurred due to this work, including riparian exclosures and pastures, roads appropriately designed and located, recreation trails and developments appropriately designed and located, and other projects. Monitoring of these sites are mandated in resource management plans, biological opinions, laws and regulations.

Components of water quality restoration plans implementation schedule:

Activity	Year
•Collection and processing of ecological site inventory (uplands)	— 2003
•Collection of data for riparian score cards	— 2001
•Development of riparian score cards	— 2002
•Pilot test inventory of riparian areas with score cards	— 2003
•Complete riparian inventory with scorecards	— 2004
•Stream geomorphology inventory	— 2002
•Stream temperatures	— Ongoing
•Road inventory	— 2003
•Upland current condition inventory	— 2003
•Data analysis and conclusions	— 2004
•Development of changes in management	— 2005
•Conduct environmental analysis for management change	— 2006

Specific timeframes for meeting standards will be dependent upon stream segment, landscape potential, and budget priorities. Every degraded stream segment has an ecologically based rate of recovery—often it takes many years. The main tool for restoration will be design of land use activities. Any use or activities on public land that presently or in the future will not lead to the attainment of water quality standards, properly functioning condition, and riparian management objectives in riparian/wetland areas will be adjusted to improve the progress toward meeting plan objectives and attaining beneficial uses of each stream system.

The water quality restoration plans will be developed at the broad scale for the Proposed RMP/Final EIS. These will be living documents where detail will be added as watershed analysis and other small-scale analysis occur. The LRA processes over 100 land management activities a year. These management activities are required by law to be processed in a timely manner and through them the water quality, watershed health, fisheries, and ecological goals are accomplished. The workload associated with environmental documentation effects when watershed analysis is accomplished. Large projects including mining operations, hydroelectric operations, and fuels management require increased workload, and further delay the accomplishment of nonmandated analysis such as watershed, landscape, or ecosystem analysis.

Reasonable Assurance of Implementation

The BLM is required to comply with the CWA and to meet Oregon State water quality standards. The BLM and the ODEQ have also entered into a memorandum of agreement (April 1990) that provides a framework for the two agencies to "cooperate on projects of mutual concern to protect water quality statewide and to benefit the people of the State of Oregon." BLM conformance requirements with these standards for public lands, including the planning area, are reiterated in the 1997 Standards and Guidelines. Further CFR 4180.2.c states, "The authorized officer shall take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining that existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards ... made effective under this section."

In addition to the CWA, other numerous laws, regulations, policies, and Executive orders direct BLM to manage for water quality for the benefit of the Nation and its economic, social, and recreational needs. Legal authorities include FLPMA, NEPA, CAA, CWA, the "Federal Water Pollution Control Act," the "Safe Drinking Water Act," the "Endangered Species Act," and many more (see Appendix B—Planning Criteria, Legal Authorities, and Relationship to other Plans).

Water quality is not only important for beneficial human uses but also for proper ecosystem function. Management practices for grazing, mining, recreation, forest and woodland product harvest, and other forms of surface disturbing activities or vegetative management for restoring and maintaining water quality will be designed for healthy sustainable and functional rangeland ecosystems. This healthy system includes streams, riparian areas and wetlands that have adequate vegetation, landform, or large woody debris present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood water retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding and other uses; and support greater biodiversity (Process for Assessing Proper Functioning Condition, TR 1737-9, 1993). Desired healthy and functional ecosystems requirements are described in the 1997 S&G's and in the standards for aquatic/riparian strategies in "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins" (1997).

Discussion of Costs and Funding

Guarantee of commitment to outyear budgets is not possible for the BLM because appropriations and priorities are subject to annual congressional action. The BLM will make every attempt to secure funding for implementation of approved plans, including monitoring and required projects. Depending upon the responsible participants, BLM will attempt to develop alternatives to secure needed funding, including matching-funds and cost-sharing. Two options for other sources of funding are:

DEQ 319 Grants: The 319 program provides formula grants to the states and Tribes to implement nonpoint source projects and programs in accordance with section 319 of the CWA. Nonpoint source pollution reduction projects can be used to protect source water areas and the general quality of water resources in a watershed.

Challenge Cost Share: Challenge Cost Share projects are partnerships with other government agencies, private organizations, institutions, share corporations, etc., working together to accomplish common objectives.

Element 5: Monitoring and Evaluation

The Lakeview RMP contains an adaptive management strategy; therefore, if monitoring indicates that progress toward the State water quality standards is not occurring, evaluations and adjustments will be implemented achieving the desired outcomes. A monitoring plan will be developed and incorporated into the approved

record of decision to address the specific objectives, management directives, and methodologies.

Monitoring for each stream, watershed, or subbasin will be dependent upon the issues and problems identified for that particular geographic area. Potential monitoring parameters may be those that are identified as potential indicators in the 1997 S&G's and in the standards for aquatic/riparian strategies in "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins" (1997). The monitoring will be to the level of intensity and frequency needed to address each listed segment on a case-by-case basis. The steps used to develop monitoring plans are:

1) identify issues and concerns,

2) stratify and classify streams, riparian, wetlands and uplands,

3) conduct reconnaissance: assess existing condition and refine issues,

4) establish specific goals and objectives,

5) select parameters and monitoring design,

6) develop quality control plan**,**

7) select representative monitoring and reference sites,

8) conduct first year of pilot project monitoring, and

9) reassess assumptions and objectives and modify the monitoring plan.

This type of process to develop the monitoring plan will increase the time necessary to develop a water quality restoration plan. The monitoring plan will be one section that will be updated as necessary.

Element 6: Public Involvement

The Lakeview RMP public involvement process will potentially satisfy requirements for public involvement in water quality restoration plans. The water quality restoration plans will be in the Proposed RMP/Final EIS and available for review by the public. Lakeview RMP is being developed with cooperation from the public at scheduled public scoping meetings and public review. This required NEPA process occurred prior to and during the development of the Lakeview RMP and provided the public a platform to input their concerns and comments on resource issues and management objectives.

It is the BLM's intent that public comments on the listed 303(d) streams, the parameters of their listing, and any management measures which address them will serve as partial fulfillment of the public comment requirement for a water quality restoration plan. The water quality restoration plan will be sent directly to ODEQ and will be open to public comment through that agency's public comment process. ODEQ is responsible for the final public comment on any water quality restoration plan or total maximum daily load and may conduct further public involvement through their own procedures.

F4: Water Resources and Basic Hydrologic Principles

Introduction

This appendix describes many of the principles and procedures used in the management of water resources in the LRA. The description contained in the appendix is meant to supplement what is contained in the Watershed Health and Water Resource sections of this document.

Water Quantity

Oregon's latitude, topography, and location near the Pacific Ocean have a great influence upon its climate. The Coast and Cascade ranges play a major role in determining precipitation type and distribution. The prevailing air masses that move across Lake County from the Pacific Ocean have been greatly modified as a result of their passage over the Cascade Range. Continental air masses that move down from the interior of western Canada are also a major weather factor.

Precipitation is an important climatic variable that influences land productivity and management. Interception occurs when rain or snow lands on vegetation rather than the ground. Some of this intercepted water evaporates and the remainder falls to the ground. Water also evaporates from the surface of water bodies and soil. Evapotranspiration is the process in which water is taken up by plants and then evaporates into the atmosphere.

Infiltration is the movement of water into the soil surface. Surface runoff is the distribution of water over land until it reaches a water body, or penetrates the

ground, or evaporates. For example, when rainfall rates exceed infiltration rates water will travel over the ground as surface runoff or form puddles (surface retention). Generally, surface runoff can be quantified as the precipitation amount minus surface retention, infiltration, and evapotranspiration.

Soil compaction can significantly change the hydrology of a watershed by reducing infiltration rates and soil storage capacity. Infiltration rates and storage capacity are reduced by soil disturbance and compaction. Other changes in hydrology occur from the routing of runoff though culverts and ditches which cause rapid delivery of water to stream channels, possibly increasing the size of peak flows. Increases in peak flows appear to be related to the amount of soil compaction in a watershed, and can cause increased channel degradation and downstream sedimentation.

Soil compaction and vegetation or ground cover removal can cause increases in surface runoff which can affect the magnitude and duration of peak flows. The manipulation or removal of vegetation can affect the accumulation and melting of snow or the interception of rain. The level of change is related to the type of vegetation treatment and the various climatic and physical conditions of the site. Wildland fire, prescribed burning brush treatments (such as crushing), and grazing can reduce ground cover (live vegetation and litter) and, in turn, increase surface runoff. It is important to manage for a healthy groundcover because vegetation and plant litter keep surface runoff spread out over the land and physically slows down runoff. This provides for more opportunity for infiltration and subsequent uptake by vegetation.

Livestock grazing can affect watershed function and process by alteration of plant cover, composition, and diversity and by soil disturbance and compaction from the physical action of animal hooves. Reductions in vegetation cover increases the impact of raindrops and decreases soil organic matter. These effects may cause increased runoff, reduce soil water content, decrease soil productivity, and increase erosion. The hydrologic effects of intense grazing are primarily related to infiltration and runoff. Increased runoff can increase upland sheet, rill, and gully erosion, resulting in stream sedimentation. Increase peak runoff can also increase stream energy causing bank erosion and downcutting. Reductions in water infiltration and storage can reduce the magnitude and duration of peak and low flows. Grazing can remove protective ground cover and disturb litter and soil; and trampling by grazing animals can compact surface soils. Adverse impacts to riparian vegetation from grazing can negatively affect the hydrology of a stream because riparian and wetland areas contribute to groundwater recharge and maintenance of low flows.

Streamflow

Streamflow is the water that reaches the stream channel. Total streamflow is a product of all the other processes in the hydrologic cycle. Distribution of the annual streamflow is related to the distribution and type of precipitation. In the LRA, normal high flows occur in the spring and low flows are from July to October. Naturally low summer flows, combined with withdrawls for irrigation or other consumptive uses, can significantly reduce or eliminate summer streamflows.

The amount (magnitude) of water draining from a given area in a year is the annual water yield and is usually express in acre-feet (1 acre-foot = 43,560 cubic feet). The average annual flow of streams is expressed in cubic feet per second.

The condition of a watershed which drains into a stream or lake determines how much water will be available for streamflow. Watersheds which capture, store, and release water at a rate appropriate to the physical and climate conditions will have the healthiest streams. Streamflows in the LRA are dependent on surface water and groundwater. Watersheds with healthy vegetation and soils will capture water with little surface runoff. Surface runoff at snow melt or heavy summer rainstorms can occur with the best conditions in some watersheds. Watersheds with little compaction will store the most water and it will be available to vegetation on site. When there is excess water it will percolate down to the groundwater or move through the soil to a lower elevation stream, lake, or spring. Any management which changes the rate of capture, amount of storage, or rate of release will change the amount of water available for streamflow.

Water Quality

Sediment, stream temperature, turbidity, dissolved oxygen, and chemical composition are important water quality components that indicate the ability of a stream or lake to support the beneficial use designated by the State. The State's water quality requirements pertaining to BLM management in the planning area are found in Oregon Administrative Rules 340-41-0001 to 340-41-975. The ODEQ is required by the CWA to review water quality standards every 3 years. Currently ODEQ is reviewing and proposing changes to the stream water temperature standard.

Stream Temperature

Water temperature is an important factor for survival of aquatic life. Most aquatic organisms are adapted to thrive with a limited range of temperatures. The primary concern with increases in water temperature is the potential for detrimental effects on fish and other aquatic organisms. Water temperatures above optimum can be attributed to natural and human-induced factors. Natural factors include low summer flows, high summer air temperatures, wide channels, stream orientation, and geology.

Increases in the amount of sunlight (solar radiation) which reaches the water surface is the main cause of increase water temperatures from management activities. Shade from riparian vegetation can be a factor in keeping streams cool. Steam temperatures may be affected if riparian vegetation is removed from streambanks. Livestock grazing can cause water temperature to increase by removal of riparian vegetation and widening and shallowing the stream channel by trampling. These changes in the shape of the stream increase surface area and exposure to solar radiation. Because of the increased surface area, a wide shallow stream will heat more quickly than a deep narrow stream. The color and composition of the streambed, the amount of water in a stream, the amount of sediments suspended in the water, and the direction that a stream flows all affect how fast and how much a stream may become heated. The magnitude of change is dependent on the temperature and quantity of groundwater inflow as well as inflow from other tributaries.

Sediment and Turbidity

Sediment, or particulate matter, is suspended and settleable solids of organic and inorganic material in the water column. Sediments occur naturally in water as products of weathering and erosion. Wind, water, or frost action exert a force on rock surfaces resulting in the gradual breakdown of rock into fine particles. Nutrients necessary to plant and animal life (iron, phosphorous, sodium, and others) are transported as sediments using rivers and streams as pipelines.

Erosion and sediment transport are natural processes that can improve, maintain, or degrade streams and riparian areas. Water erodes gravel streambanks to provide a continuing source of gravel for a stream, shifts gravel bars, and forms or deepens pools—all of which benefit spawning and rearing fish. However, excess erosion of fine-textured soils such as clays, silts, and fine sand can reduce habitat quality by filling in or smothering spawning gravels. This type of sediment can cause adverse effects when suspended in the water column or when deposited. Some common measurements of sediment are turbidity, suspended sediment, settleable solids, and percent accumulated fine materials.

Suspended sediments are those carried in suspension in the water column. Rapidly flowing water can carry more suspended sediments than slow moving water. As water flow slows, the largest particles settle to the bottom first. The lightest sediment particles are suspended the longest. Thus, clay particles which are quite small stay suspended longer than sand particles. Suspended sediments can give water a murky or cloudy appearance by reducing light penetration. Excessive suspended sediment clouds water and can cause fin and gill damage to adult fish. Excessive deposition of suspended sediment in lower-gradient reaches clogs interstitial spaces in gravel and cobble of spawning habitat and can reduce pool volume, which in turn lowers production of fish, macroinvertebrates, and most other aquatic life. Chemicals, pesticides, and nutrients often bind to sediment particles, thus they can be retained in the stream system with the deposition of sediment.

Turbidity is the measurement of how light is scattered and absorbed. How light passes through the water column is dependent on the amount and type of suspended sediment. Water quality requirements are usually set in turbidity units rather than in terms of suspended sediment. Chapter 340 of the Oregon Administrative Rules sets a standard of no more than a 10 percent cumulative increase in natural stream turbidity to be allowed, as measured relative to a control point immediately upstream of the management activity.

The effects of management uses and activities on sediment transport are directly related to the effects on high precipitation and peak flow events. The supply of sediment available for transport depends on the slope of the sediment contributing area and the type of erosion processed dominate in the area. On gently sloping topography with competent bedrock, little if any natural erosion can be expected. Management which changes the condition of vegetation or soils can change the amount of material available for transport to steams of lakes. Soil erosion is a source of sediment in streams and lakes. Some soil erosion is natural and transported by water and wind. However, the main causes of excess soil loss are agricultural practices, timber harvesting, road and building site construction, livestock grazing, and mining activities.

Ground disturbing activities can affect sediment levels in streams by increasing the capacity of the stream to entrain and transport sediment and increase the amount of sediment available for transport. Increases in peak flows have a direct relationship to increase in sediment transported downstream. Management practices can also influence the amount of sediment entering streams though increased surface erosion. This influence is dependent on natural rates of surface erosion, climatic factors, and the type of management.

Roads can be a source of stream sediment. Surface erosion from road surfaces, stream crossings, and drainage ditches can result in a continuous sediment source for nearby streams. Roads that encroach on stream channels permanently alter the stream flow characteristics by diverting or constricting the channel. Increased water velocities associated with constriction frequently lead to accelerated channel erosion.

Livestock grazing can alter water quality by changing hydrologic conditions with a given watershed, primarily surface cover and soil infiltration rates. Lack of ground cover and amount of exposed soil can influence the amount of surface runoff, soil erosion, and transport of eroded material to streams and lakes. Moderate to heavy livestock grazing can decrease infiltration rates, and increase surface runoff, soil compaction, soil erosion, and sediment yields. Livestock grazing can cause collapse of streambanks from trampling and the subsequent increase in sediment entering the stream or lake.

Dissolved oxygen

Oxygen is as essential to life in water as it is to life on land. Oxygen availability determines whether an aquatic organism will survive and affects its growth and development. The amount of oxygen found in water is called the dissolved oxygen concentration and is measured in milligrams per liter of water. Dissolved oxygen levels are affected by altitude, water agitation, water temperature, the types and amount of plants in the water, light penetration, and the amount of suspended sediment. Water absorbs oxygen from the atmosphere and the mixing of air and water in turbulent stretches of a stream add significant amounts of oxygen to the water. Temperature directly affects the amount of oxygen in water—the colder the water the more oxygen it can hold. Warming of water will cause reductions in dissolved oxygen concentrations. Oxygen can also be added to water as a result of plant photosynthesis. If photosynthesis is inhibited by sediments either by making the water murky or by burying organic material, then the plants will add less oxygen to the water.

Macroinvertebrates

Macroinvertebrates are those invertebrates that can be detected with the unaided eye. Macroinvertebrates in the aquatic environment provide a link in the food chain between microscopic, multi-celled organisms and fish. They are essential to the growth and production of fish, and because of their strict habitat requirements, are very useful indicators of aquatic habitat changes. A healthy stream usually has a rich and varied range of macroinvertebrates, while streams with poor water quality will have just a few different species. The diversity of macroinvertebrates is important, but the types of organisms can also indicate water quality. Other factors also influence the types of aquatic organisms that can be found in the stream. Each organism had needs for specific habitat and food; if the stream does not have either, then the organism will not be present. For example, some aquatic organisms feed on leaves or other organic material, others filter out small particles from the water, some scrape algae off of rocks, and some are predators that feed off of other macroinvertebrates. Also, some aquatic organisms attach to rocks while other live in vegetation. If a macroinvertebrate is not found in an area where it has food and habitat available, then poor or stressful water quality conditions may be present.

Appendix G — Noxious Weeds

Herbicides approved for use ("Vegetation Treatment on BLM Lands in Thirteen Western States EIS and ROD").

- Atrazine
- Bromacil
- Bromacil + Diuron
- Chlorsulfuron
- Clopyralid
- 2,4-D [1]
- Dicamba [1]
- Dicamba + 2,4-D [1]
- Diuron
- Glyphosate [1]
- Glyphosate + 2,4-D [1]
- Hexazinone
- Imazapyr
- Metfluidide
- Metsulfuron Methyl
- Picloram [1]
- Picloram + 2,4-D [1]
- Simazine
- Sulfometuron Methyl
- Tebuthiuron
- Triclopyr

[1] Chemicals currently approved for noxious weed control on BLM-administered lands in Oregon.

Appendix H — Fish and Wildlife

H1: Objectives of the Recovery Plan for Endangered Fish

Recovery Objective and Criteria

The objective of this recovery plan for fishes in the Warner Basin and Alkali Subbasin is to restore and maintain the natural aquatic and riparian habitats of the Warner Basin and Alkali Subbasin so that: (1) the Warner sucker's continued existence is ensured in its native ecosystem which results in its removal from the list of T&E species; and (2) the springs and outflow channels occupied by the Hutton tui chub and the Foskett speckled dace are protected, resulting in the long-term persistence of these two species. Because the Hutton tui chub and Foskett speckled dace inhabit such small and isolated habitats, it is not likely that any measures taken by the USFWS, or other governmental or nongovernmental entities, are likely to significantly reduce the risk of extinction to these species to the point that delisting would be prudent. All recovery criteria may be revised on the basis of new information (including research specified as recovery tasks).

The Warner sucker may be considered for delisting when:

1) A self-sustaining metapopulation is adequately distributed throughout the Twentymile, Honey, and Deep Creek (below the falls) drainages, and in Pelican, Crump, and Hart Lakes. Self-sustaining populations will be determined based on parameters such as; comprised of age-classes which approximate normal frequency distributions, a stable or increasing population size, and documented reproduction and recruitment.

2) Adequate passage is restored within and among the Twentymile Creek, Honey Creek, and Deep Creek (below the falls) drainages so that the individual populations of Warner suckers can function as a metapopulation.

3) Self-sustaining populations form a viable metapopulation large enough to maintain sufficient genetic variation to enable it to evolve and respond to natural habitat changes. The number of individuals needed and the amount and quality of habitat required to meet this criterion will be determined for the species as one of the recovery tasks.

4) No foreseeable threats exist that would likely threaten the survival of the species over a significant portion of its range.

Specific information on Warner sucker life history and habitat requirements is necessary to determine the characteristics of self-sustaining and viable Warner sucker populations and the extent and connectivity of habitats needed to support them. After this information is obtained, the measurable characteristics of self-sustaining populations and adequate passage among populations will be defined and the plan objectives expanded as appropriate.

The conservation and long-term sustainability of the Hutton tui chub and the Foskett speckled dace will be met when:

1) Long-term protection to their respective habitats, including spring source aquifers, spring pools and outflow channels, and surrounding lands is assured.

2) Long-term habitat management guidelines are developed and implemented to ensure the continued persistence of important habitat features and includes monitoring of current habitat and investigation for and evaluation of new spring habitats.

3) Research into life-history, genetics, population trends, habitat use and preference, and other important parameters are conducted to assist in further developing and/or refining criteria 1 and 2 above.

Tasks necessary to achieve the recovery plan objective of delisting the Warner sucker are listed below. These same tasks are necessary to facilitate the conservation and long-term sustainability of the Hutton tui chub and the Foskett speckled dace. The individual actions required to accomplish each task are described in the following Step-down Outline and Narrative of Recovery Actions.

1) Protect and rehabilitate fish populations and habitat;

2) Conserve genetic diversity of fish populations;

3) Ensure adequate water supplies are available for listed fish recovery;

4) Monitor fish populations and habitat conditions; and

5) Evaluate long-term effects of climatic trends on the recovery of fishes.

Step-down Outline and Narrative of Recovery Actions

The following step-down outline identifies and describes recovery tasks. A narrative is not given if the task is self-explanatory. Tasks may apply to private lands. Where that occurs, the USFWS would pursue conservation agreements. Conservation agreements are voluntary agreements between the USFWS, one or more landowners, agencies, conservation district watershed councils, and other governmental or nongovernmental entities that are jointly interested in the conservation of a listed or nonlisted species. Conservation agreements may be accompanied by financial support that is costshared among all participants. Many programs are available that involve Federal funding. Most of these programs include minimum time periods for agreements to be in effect. By outlining the areas in which the USFWS believes these recovery tasks might be applied as conservation recommendations, the USFWS is in no way seeking regulatory control or oversight over land management activities in these areas.

Protect and Rehabilitate Fish Populations and Habitat

Protect Fish Populations

Identify existing habitats: Though Warner sucker habitats are generally well known, a complete summary of available information on locations of known sucker habitats is needed. Known habitat areas would then be the starting focus of subsequent tasks. Additional spring habitats for Foskett speckled dace and Hutton tui chub are uncertain, since the status of the second population of each species is in question. Check spring habitat annually for fish presence and survey for new spring habitats.

Assess quality of existing habitats:

Assess quality of existing habitats on Federal lands: Federal agencies should gather data on condition of habitats and riparian areas in or upstream of Warner sucker habitats, or near Foskett and Dace Springs. Determine any changes to land management needed to maintain or improve habitat conditions.

Assess quality of existing habitats on non-Federal lands: Seek landowner permission to study and assess habitat quality on these lands. Discuss with landowners the potential for making land management changes, if deemed prudent, that would maintain or improve habitat conditions yet still provide for the social and economic value of the lands in question.

Maintain high quality habitats to prevent species declines:

Maintain high quality habitats on Federal lands to prevent species declines: Federal agencies should develop goals to maintain high quality habitats. Where current agency land management is deemed inadequate to protect (i.e., maintain or improve upon current conditions) high quality habitat conditions, recommend modifications to agencies to bring about needed changes in land use. Set management recommendations conservatively until such time as watershed analyses are completed, or other long-term plans can be made for spring-dwelling fishes. Such analyses may provide for additional information that may allow for a relaxation of some habitat or species protection measures.

Maintain high quality habitats on non-Federal lands to prevent species declines: With landowner permission, develop land management recommendations to maintain high quality habitats, as needed. Where it would help the landowner or to secure funds, develop conservation agreements with landowners to formalize habitat management strategies. Because landowners are not likely to have significant resources for research and development of land management strategies, recommendations are not likely to be as restrictive as for Federal lands (unless agreed to by landowner). Where appropriate, consider and pursue exchange or acquisition of these lands from willing landowners. Incentives, such as long-term grazing leases and development of watering facilities away from these habitats should also be considered as a part of such exchange or acquisition plans.

Improve poor quality habitat conditions:

Improve poor quality stream habitat conditions on Federal lands: Federal agencies should develop goals to restore poor quality stream habitats. Encourage Federal agencies to modify land management activities to bring about restoration as quickly as is feasible by making restoration the

primary goal of land management, with other uses secondary. Some prioritization of habitats or stream reaches may be necessary to meet budget constraints and reduce overall impacts to Federal land or resource users, but management recommendations should be designed conservatively until such time as watershed analyses are completed. Such management strategies should be coordinated through development of conservation agreements with the Federal agencies.

Investigate, and install as appropriate, physical improvements to Foskett and Dace Springs: Investigations are needed to determine the habitat requirements of Foskett speckled dace. Once this information is gathered, modifications may be suggested for Foskett Spring. Dace Spring is currently not providing habitat for Foskett speckled dace and may need more immediate modifications. If refugial sites are selected, these same activities may need to be carried out at such sites as well.

Improve poor quality habitat conditions on non-Federal lands: Seek opportunities to establish riparian or aquatic species/habitat conservation agreements on non-Federal lands to implement habitat improvement or restoration activities. When funds allow, assist in funding of restoration actions through such programs as Partners for Wildlife or "Endangered Species Act" section 6 funds.

Improve Watershed Conditions Throughout Warner Basin and Alkali Subbasin

Assess current watershed conditions: Watershed analysis is a technically rigorous procedure with the purpose of developing and documenting a scientifically-based understanding of the ecological structure, functions, processes, and interactions occurring within a watershed.

Assess current watershed conditions on Federal lands: Federal agencies should conduct watershed analyses on their lands within the Warner Basin Watershed. These analyses would focus on identifying the current health and function of watersheds and on identifying areas in need of management changes to meet overall watershed function goals and objectives. Current guidelines are provided in the "Federal Guide for Watershed Analysis" (Regional Interagency Executive Committee 1995), but updates of this guide and other appropriate documentation can also be used. Apply these principles, as appropriate, to Foskett Spring.

Assess current watershed conditions on non-Federal lands: Where landowners are willing, the current status of non-Federal lands within the Warner Basin Watershed and Alkali Subbasin should be analyzed. These analyses would focus on identifying the current health and function of watersheds, and on identifying areas in need of management changes to meet overall watershed function goals and objectives.

Improve watershed conditions:

Improve watershed conditions on Federal lands: On Federal lands the outcome of watershed analyses will be recommendations for changes in land management to bring about the improvement of watershed structure and function. These changes may be described as long-term goals and objectives for managing the lands addressed in the analyses, or they may be short term immediate changes in management, or both. These strategies should be documented through conservation agreements between the USFWS and Federal agencies. Whatever the nature of these recommendations, Federal agencies should be encouraged to pursue immediate implementation of short-term changes and of working towards achieving long-term goals and objectives. The result should be a timely improvement of watershed conditions with benefits to listed and unlisted fish species.

Improve watershed conditions on non-Federal lands: Where willing landowners have worked with the USFWS or other state and Federal agencies to address watershed conditions, they should be encouraged to modify their land management to be consistent with the recommendations developed through the watershed analysis process. Where it would help the landowner, develop conservation agreements with landowners to formalize land management strategies in compliance with watershed analyses.

Reestablish Stream Migration Corridors for Warner Suckers and Warner Valley Redband Trout

Evaluate problems with fish passage in Warner Basin streams and develop plans for passage and screening: These passage and screening plans would involve willing landowners to improve or establish migration past diversion structures both upstream and downstream between habitats. Where landowners are willing, any passage and/or screening improvements to diversion structures should be made the focus of conservation agreements.

Implement the passage and screening plans on Warner Basin:

Monitor the effectiveness of Warner Basin passage and screening structures: Any conservation agreements established should allow for continued access to facilities for maintenance and/or monitoring of their effectiveness. Monitoring would be designed to determine how effective the passage and screening structures are, and how to improve them if needed. Maintenance responsibilities should be spelled out in the conservation agreement.

Control Populations of Exotic Fishes in the Warner Basin

Prevent future stocking of exotic fishes in listed fish habitats: Prevent the future stocking of exotic fishes such as largemouth bass, crappie, and other species like hatchery trout in the lakes and streams of the Warner Basin and in other listed and unlisted fish habitats.

> *Develop a conservation agreement with ODFW to prevent future stocking of nonnative species in listed and unlisted fish habitats:*
>
> *Develop and implement a public education program to reduce or eliminate illegal translocations of exotic fishes within habitats in the Warner Basin, or from outside basins into the Warner Basin*: Methods could include publications, signage, and/or other means of getting information out to the public. Public education aimed at the fishing public should focus on the merits of fishing already introduced exotics and of protecting the habitats of native species.

Investigate impacts of exotic fish populations on the Warner sucker: While it is suspected that exotic game fishes have had a major impact on the warner sucker through predation and competition, research to determine the exact nature and impact of these interactions is difficult and has been done only incidental to other Warner sucker research. Consequently, little is known about these interactions. Conduct research such as stomach contents analyses of exotic game fishes to determine the impacts of these introduced species on the Warner sucker. Other studies on habitat preferences of exotics and small suckers may help define areas of overlap that may be eliminated in the future.

Monitor exotic fish populations in the Warner basin: The abundance and distribution of exotic game fishes may greatly affect Warner sucker survival and recruitment in a given year. This monitoring could be done in conjunction with the monitoring of Warner sucker populations.

Evaluate options to further control or eliminate exotic fishes: Such opportunities as droughts that reduce habitats to small areas, or other means that would allow for the eradication of exotics, should be utilized to reduce populations and effects of exotic fishes. Special emphasis should be placed on piscivorous exotic fishes.

Conserve Genetic Diversity of Fish Populations

Conserving the genetic diversity found within and between populations and/or morphs of Warner sucker, Foskett speckled dace, and/or Hutton tui chub will greatly increase the likelihood of long-term survival and recovery of these species as environmental conditions change. Conserving genetic diversity is best done by protecting extant habitats and populations of a species, which is the intention of task 1, above. However, other means of conserving genetic diversity, such as the establishment of refugial populations and/or artificial propagation, should be considered for these fishes because of their limited number of populations and individuals.

Assess Need for Refugial Populations

The establishment of refugial populations is one method of ensuring the survival of a species if its habitat and/or wild populations are threatened. Determine if the establishment of one or more refugial populations of listed fishes is necessary to ensure the survival of these species and maintain genetic diversity.

Assess need for establishment or reestablishment of refugial populations within the Warner Basin, Coleman Subbasin, or Alkali Subbasin: Water quality and watershed improvements will require many years of restoration efforts. During that time, listed fish populations will continue to be exposed to stressful environmental conditions due to poor water quality, continued lack of recruitment, and other potential risks. However, any refugial populations of listed fish should be within their native basins to prevent escapement into nonnative waters. Determine if the establishment of one or more refugial populations of listed fishes in each basin is logistically possible and necessary for recovery of the species.

Develop genetic management plan for any refugial populations deemed important to the Warner Basin, Coleman Subbasin, or the Alkali Subbasin: A genetic management plan would assist managers in

determining the appropriate frequency, timing, and numbers of fish to be transferred in inter-population transfers to maintain refugial populations. The plan would be designed to comply with accepted tenets of conservation genetics and endangered species policy, and would be implemented after its completion.

Determine how to manage extant refugial populations outside the Warner Basin and the feasibility of reintroducing individuals from extant refugial populations back into the Warner Basin: Captive populations of Warner suckers now exist in Summer Lake Wildlife Management Area, Oregon, and at Dexter National Fish Hatchery and Technology Center, New Mexico. Determine how these populations should be managed to contribute to recovery of the species. Warner suckers from the extant refugial populations could be reintroduced into the Warner Basin to bolster wild populations if the individuals in the refugial populations have not been hybridized with other suckers and are free of disease. Determine if such reintroductions would contribute to the recovery of the species.

Evaluate Captive Propagation

Evaluate the need for captive propagation and potential for improving listed fish populations through supplementation.

Assess the need for captive propagation: Evaluate the status of listed fish populations and assess the need for captive propagation using the best available information and expertise.

Refine captive propagation techniques: Propagation techniques should be refined to improve survival and reproduction. Full consideration should be given to the development of genetic management plans if it is decided that a captive propagation program is to be implemented for returning Warner suckers from captive populations to the wild. The Dexter National Fish Hatchery and Technology Center is currently propagating Warner suckers captured from Summer Lake Wildlife Management Area. These fish are a mixture of several generations of offspring from the original Warner suckers salvaged from Hart Lake in 1991.

Maintain Adequate or Improve Inadequate Water Supplies for Fish Recovery

The most important component of fish habitat in the Warner Basin, and the Coleman and Alkali Subbasins is water. Water in these areas is a scarce resource in an arid area regularly subject to drought. Stream diversions and livestock watering further reduce the amount of water available to fishes in springs and streams. In the Warner Basin, the timing and magnitude of flows is most important in meeting needs of fishes. In the Coleman and Alkali Subbasins, the groundwater sources producing spring habitats of listed fishes is of concern. Maintaining adequate flows or improving inadequate flows needed to provide for fish recovery is an important step.

Determine Stream Flows Required for Warner Sucker Recovery

In the Warner Basin, determine stream flow conditions in Honey, Deep, and Twentymile Creeks required to maintain adequate sucker habitat in these streams as well as the associated lakes. Consider migration corridor, spawning habitat, and stream and lake habitat maintenance needs when making such determinations.

In Coleman and Alkali Subbasins, similar studies should be done that focus on the groundwater sources to the surface springs. Determine the amount of flows necessary to maintain and improve habitat conditions for recovery.

Develop Plans for Ensuring Stream and Spring Flows

In the Warner Basin, develop a plan for ensuring adequate stream flows in Honey, Deep, and Twentymile Creeks required to maintain sucker habitat to the extent that both the stream- and lake-resident suckers can recover. Although it is impossible to ensure stream flows sufficient to meet this objective 100 percent of the time due to the constant and unpredictable threat of drought and the inherent variability of flows as compared to existing water rights, such a plan could minimize the effects of droughts on stream flows and decrease the likelihood of lakes and streams drying up during droughts. Such a plan would likely include and complement components of other recovery tasks, and could perhaps be developed simultaneously or merged with them. Planning should include the development of conservation agreements with landowners based on willing participation.

In Coleman and Alkali Subbasins, develop a plan to protect spring inflows deemed necessary to support recovery. Such concepts as administrative withdrawal of the groundwater sources to these springs from further appropriation or development for geothermal uses should be considered, as well as any other means to protect these flows.

Implement the Plans for Ensuring Water Flows

Incentives to landowners to maintain adequate stream flows should be investigated. Purchase of water rights from willing sellers in the Warner Basin and Alkali Subbasin should also be considered.

Monitor Fish Populations and Habitat Conditions

Monitoring is necessary to determine trends in fish population sizes and the conditions of the habitat they occupy. This information is essential in determining the effectiveness of recovery efforts. Monitoring is also needed to determine whether land management decisions made during watershed analyses are having the effects predicted and are bringing watershed conditions to the goals established.

Monitor Fish Populations

One delisting criterion for the Warner sucker calls for self-sustaining sucker populations in lakes and streams in the Warner Basin; thus, data obtained from monitoring suckers will be the basis for determining recovery success and delisting status. This will also apply to criteria for long-term conservation of the Foskett speckled dace and Hutton tui chub.

Develop monitoring plans for each species to define monitoring protocols, including methodologies and frequencies of surveys: All life history stages need to be surveyed to determine abundances of both lake and stream morph Warner sucker year-classes, and all stages of Foskett speckled dace and Hutton tui chub. Data on the abundance of each year-class or life history stage within each fish habitat is necessary for a successful monitoring project. Develop appropriate sampling methods for obtaining these data. Adapt monitoring strategies as necessary to improve data collection and/or value.

Monitor populations and spawning success of lake and stream morph Warner suckers, and Foskett speckled dace and Hutton tui chub: Monitor populations of lake and stream morph Warner suckers, Foskett speckled dace, and Hutton tui chub, including abundance of each year-class or life history stage to determine recruitment success. One component of monitoring should focus on habitat features that may have been directly or indirectly impacted by tasks listed above. Other components of monitoring should focus on the biology of these species.

Conduct research aimed at developing population viability analyses for Warner sucker, Hutton tui chub, and Foskett speckled dace, respectively: Research should include, but not be limited to, the goals of providing information on: (1) the abundance of young-of-the-year, juvenile, and adult (of multiple year-classes) suckers in all populations, and the relationship of their abundance to climate; (2) factors influencing the recruitment of all three species into their respective populations; (3) the genetic variability of each species across their respective population(s); (4) life history attributes such as age at first spawning, residence time of larvae and young-of-the-year, spawning behavior, etc.; and (5) other characteristics of these species that may assist in further defining and expanding recovery plan objectives.

Monitor Fish Habitats

As land management changes are made through implementation of tasks in this plan, the conditions of fish habitats should be monitored to see if the changes have the effect(s) predicted. This monitoring may be helpful in adapting tasks to be implemented later in time to improve overall effectiveness of recovery plan tasks.

Evaluate Long-term Effects of Climatic Trends on the Recovery of Fishes

The effects of current land and water use on these fishes are greatly exacerbated by drought, and a prolonged drought could make the recovery of the species more difficult. For example, the drought of 1987–1994 reduced stream habitat and desiccated the Warner Lakes, extirpating the lake-resident Warner sucker population. Evaluate the effects of climate on the recovery effort over the entire period of recovery for each species, and revise recovery tasks and time frames if necessary.

Develop and Implement a Public Outreach Program

An effective public outreach program should be developed to increase awareness and understanding of recovery efforts for the T&E and rare native fishes of the Warner Basin and Alkali Subbasin. Interested parties should be continually involved in and updated on all aspects of this recovery effort so that potential conflicts can be identified and resolved as soon and as much as possible.

H2: Wildlife and Wildlife Habitat of the Lakeview Resource Area

Introduction

As a public land administrator in Oregon, the BLM is responsible for management of a wide array of habitats used by native and introduced wildlife species. The ODFW is responsible for managing animal populations. An animal, however, is inseparable from its habitat. Therefore, a management program designed to benefit wildlife must consider both the animal population and its habitat (food, water, and cover). The BLM's role in the management of wildlife species and their habitat is in cooperation with ODFW and is directed toward the maintenance, improvement, and expansion of the quality and quantity of habitat under multiple use management. The BLM has coordinated with ODFW during development of the analysis of the management situation and the RMP/EIS to ensure that adequate data was assembled on both wildlife populations and their habitat to form the information base needed for the development of the RMP.

Numerous species of wildlife occur in the LRA. However, only priority species or taxa and their associated habitats are discussed here. These animals are recognized as either being of particular interest to the public, federally listed as T&E species, designated as special status by the BLM, and species of concern designated by the USFWS. A subset of the priority taxa will be highlighted to provide background information and specific management opportunities relative to them.

Priority Habitats

Priority habitats are the major plant communities or terrestrial features that are important to wildlife. Certain species or groups of species of wildlife require these priority habitats for parts or all of their life cycle. Priority wildlife habitats include streamside riparian, seasonal wetlands, playas and lake beds, cliffs, talus slopes, wet meadows, dry meadows, dryland shrub, juniper woodlands, and ponderosa pine forests.

Wet Meadows

Wet meadows are unique riparian habitat. They occur on areas of saturated soils where the water table varies little by season. Usually there are few, if any, areas of free standing open water. The vegetation of wet meadows consists of sedges, grasses, and forbs. Shrubs are absent from wet meadows in proper functioning condition except along the margins, although some meadows may have willows present.

Wet meadows are often found in draws or depressions in the surrounding landscape. They often are associated with headwaters of streams or below natural seeps or springs. Wet meadows furnish a unique habitat type for several vertebrate wildlife species such as jumping mice, microtene rodents, sparrows, and greater sage-grouse. At night, these meadows are used by bats because of the abundance of insects and open flight conditions necessary for foraging.

Big game animals, such as elk and bear, sometimes use meadows as foraging sites and wallows. Deer also use wet meadows to feed and as fawning areas. Because plants and animals depend upon or use these areas, this habitat is a crucial component of habitat diversity.

Most wet meadow habitats are very easily impacted. Actions such as road building, grazing, and OHV use can severely impact or destroy wet meadows and their associated vegetation.

Adjacent road construction may interfere with or change water flows. In some instances, culvert placement can affect drainage which may affect the meadow. Roads also allow easier access by humans, livestock, and vehicular traffic.

Grazing results in direct impact to plants and if grazing consistently occurs during critical seasons, complete elimination of some plant species is possible. Plant reduction or elimination also reduces habitat for some small mammals and/or bird species. Trailing and trampling can cause erosion long after grazing ends.

OHV use causes severe impacts in a short period of time. Rutting and destruction of vegetation caused by vehicles may lead to annual erosion problems, change water flow patterns, and adversely impact vegetation.

Wet meadow habitat is very limited within the LRA and it is the riparian area that is most susceptible to damage from land use activities.

Dry Meadows, Playas, and Lakebeds

These areas are often caused by shallow soil conditions and are usually associated with a harsh environment. Because of the shallow soil and the exposure of these areas, they tend to warm up early in the spring. This allows early spring growth of forbs and some grasses.

This early green-up is extremely important to big game on winter ranges. The early flush of plants provides nutrition during this critical late winter/early spring period. The shallow soil, however, causes forage to dry up at a much faster rate than plants growing on deeper soil. These areas provide an array of early season forbs that are important to nesting greater sage-grouse and their broods, as well as pronghorn and their young. Both species are sagebrush obligates that feed on sagebrush 75 to 90 percent of the year but rely on the higher protein content of forbs when they are present. Dry meadows also provide seeds for small mammals and birds and insects, both terrestrial and aerial, for greater sage-grouse broods, and bats.

Impacts to these areas are similar to those impacting wet meadows. The severity of the impacts depend on soil conditions at the time of the disturbance. If the meadow is completely dry, impacts would be slight except for the removal of vegetation. However, repeated disturbance or disturbance during soil saturation could have major impacts.

In the planning area, the development of pits and reservoirs in natural lakebeds has concentrated livestock use and has caused a major shift in forb distribution, density, and availability. Available water is concentrated in the immediate pit instead of being spread out over the entire lake bed. This reduces the area of saturation available to forbs and the length of time different species of forbs are able to develop. Some pits have also broken the playa seal and water is completely lost from the lake bed system.

Seasonal Wetlands

These unique habitats are seasonally flooded marshes that contain water in early spring during normal water years and dry out progressively in late spring or summer. During drought cycles these marshes may contain little if any standing water throughout the year and during prolonged wet cycles may contain water and emergent marshland vegetation for many years in a row. Waterfowl and shorebirds forage in these areas during annual spring and fall migrations for insects and seeds, and many use these areas in the spring for courtship and nesting. As these seasonal marshlands dry up, the birds move their young to other more permanent marshes when available. If the water remains until mid to late July, most young birds have already fledged and are capable of flying to new areas.

As in the wet meadow environment, as the water recedes, a flush of forbs and grasses emerge along the water edge of the remaining marsh. This green growth is also important to deer, elk, pronghorn, greater sage-grouse, and many other species.

Major impacts to these areas in the planning area are OHV use, livestock grazing, and the introduction of noxious weeds and other undesirable plant species which are very difficult to control during high water years. OHV use can interfere with courtship and nesting, as well as destroy nest sites and cause serious erosion. If major erosion occurs below the high water mark of the wetland, it could cause the marsh to drain or not fill to its full potential. This could create a functioning-at-risk or nonfunctional situation for the wetland.

Grazing can be compatible with these marsh wetlands if timing, duration, and intensity is controlled. Grazing, along with haying/mowing and prescribed burning can be used as a management tool to remove old, decaying plant materials and open up closed cattail/tule marshes. If livestock grazing is used as a tool, close monitoring is necessary to assure that the objectives are met and there is no damage to the wetland integrity. All natural spillways, manmade dikes, and other structures must be closely monitored to protect the integrity of the system. Proper rest for the wetland is required after grazing to build up an adequate residual dense cover base for nesting waterfowl and shorebirds.

Prescribed burning is the preferred management tool for wetland vegetation. Natural and manmade structures can be easily protected and nutrients can be more efficiently cycled back into the system as opposed to the loss of nutrients from the system in the form of hay removal and beef production.

There are approximately 135,000 acres of wetlands in the LRA and in the planning area. Of that total, 46,000 acres are classified as palustrine and 89,000 acres are lacustrine. Proper functioning condition ratings have been completed on 126,000 acres of wetlands in the LRA or 93 percent completed. The remaining 7 percent will be prioritized and completed when allotment evaluations and rangeland health assessments are completed for each remaining allotment or at the completion of projects affecting wetland resources.

Results of the proper functioning condition assessments for the LRA's 126,000 acres completed are as follows: approximately 125,000 acres are in proper functioning condition, approximately 900 acres functioning-at-risk (100 acres showing an upward trend, 600 acres no apparent trend, and 200 acres downward trend), and 100 acres are rated as nonfunctional.

The three largest wetland complexes within the planning area are Warner Wetlands (approximately 20,000 acres of wetland habitat), Lake Abert (approximately 37,000 acres), and Summer Lake (approximately 18,000 acres). These three areas occupy 56 percent of the wetlands in the planning area with the remaining 45 percent spread across the resource area. These allotments range from 40 of the allotments with less than 50 acres of wetland habitat, 37 allotments with 50 to 999 acres, 11 allotments with 1,000 to 4,000 acres, 1 with 8,000 acres, and 1 with 15,000 acres.

Warner Wetlands and Lake Abert were designated ACEC's in the Warner Wetlands and Lake Abert plan amendments (1990), respectively. Summer Lake is managed cooperatively with the ODFW through a memorandum of uncerstanding and the 1993 "Sike's Act Habitat Management Plan." The ACEC plans and habitat management plan prescribe management direction for development and maintenance of the three areas to improve waterfowl and shorebird habitat.

Cliffs

Relative to wildlife, a cliff is any vertical rock face or structure that furnishes unique habitat niches for wildlife species. Cliff habitat may exist as rock spires, vertical scarps, volcanic dikes, or other vertical geomorphic structures. Cliff habitat may not always occur naturally. Structures such as buildings and bridges create cliff-type habitat that can be used by some species. Road cuts and quarry faces may also furnish satisfactory niches for cliff dwellers.

The physical qualities of individual cliff systems may affect the types or groups of species present. Natural cliffs are usually more complex than man-made habitat. Natural rock faces usually have a complex of habitat components such as crevices, cracks, and ledges. A species habitation of an area can be influenced by factors such as cliff aspect, height, relationship to the surrounding land forms, degree of disturbance, and types and extent of adjacent habitat.

Peregrine falcons use horizontal ledges to build nests located at a preferred height and aspect with the sun. They also locate their nest site close to an adequate prey base and at a specific distance from other peregrines. Swallows and bats also rely on cliff habitat to nest, roost, and raise their young.

Cliff habitat can be directly or indirectly impacted. Direct impacts can be through slumping or the modification of an area through mining, decorative stone collection, and construction projects. Indirect impacts can happen when nearby activities cause too much disturbance or when adjacent associated vegetation or habitats are modified.

The reduction or modification of vegetation cover influences the micro-climatic conditions of the site and can render some cliffs uninhabitable by certain species. A reduction in structural components, represented by changes in adjacent vegetation may remove critical elements that maintain food or prey bases, furnish cover, or provide other elements required by some species during some part of their life cycle.

Mining affects cliff habitat in several ways. Access and disturbance to the site may cause some species not to use the site. Removal of vegetative cover causes micro-climatic changes that may extend beyond the immediate mining area. The most direct impact caused by mining would be the modification or removal of the cliff face itself. Usually impacts to vegetation are temporary and may be reestablished given time and the reduction or elimination of the disturbance. Mining may completely remove or alter the base habitat to an extent that the intrinsic habitat values to many species will be totally eliminated.

Talus Slopes

Talus is an assemblage of loose, baseball-size to large, boulder-size rock that is located at the base of a cliff or steep slope. Talus slopes are described by the size of the talus accumulation. Those with smaller rock are called scree slopes while those containing large boulder-sized aggregations are called fell fields.

Rock size and moisture regimes usually determine which species use the interspaces between the rocks. Amphibians use the moist areas; they require this micro-climate to survive. Drier talus slopes are important to reptiles such as lizards and snakes. If the talus is deep and protected from severe weather, snakes will use the area for denning sites. Woodrats and mice also use the dry areas of the talus, especially if some vegetation is present nearby.

Animals such as pika and yellow-bellied marmots may be present in a talus that contains large boulder-sized rock components. If the talus contains boulder spaces that are large enough, it can serve as hibercula for bats and can be used as den sites for large mammals such as coyote, bobcat, and mountain lion.

Brushfields and Mountain Mahogany

There are several types of brushfields in the LRA.

They range from the greasewood, basin big sagebrush, and silver sagebrush communities found at lower elevations surrounding playas and lakebeds, to Wyoming and mountain big sagebrush sites at middle to high elevations, to low sagebrush found in scabflats with shallow soil, to Ponderosa pine/antelope bitterbrush/mountain mahogany sites that are located on the forest fringe and crucial to the wintering of big game animals.

Brushfields are important to several species of wildlife. Several passerine birds depend on brushfields for most of their life cycle. These birds nest in the fields and forage on seeds, buds, or insects in the area. Some birds such as quail and greater sage-grouse also rely on them as wintering habitat. Sage grouse and pronghorn rely on sagebrush for the majority of their life cycle needs. They forage on sagebrush throughout the year and switch to forbs and some grasses when this vegetation is green and available. Deer and elk winter on antelope bitterbrush, big sagebrush, and mountain mahogany, then switch to early green-up grasses and forbs in the spring.

The potential impacts to brushfields are wildfire conversion, juniper encroachment, and habitat modification by livestock grazing which can reduce or eliminate the herbaceous component over time. Grazing can also impact brushlands by competing with big game for forage and eliminating flowering and seed set. Competition between domestic livestock and wintering mule deer for bitterbrush and early green-up grasses has been minimized in the Fort Rock/Silver Lake mule deer winter range allotments through turn-out date adjustments. There is no turn-out prior to April 15 each year in the 700 series allotments.

Large catastrophic wildfires or escaped prescribed burns can remove hundreds of thousands of acres of crucial wildlife habitat. It could be many decades before the land could regenerate itself and provide adequate habitat for greater sage-grouse, mule deer, pronghorn, and many shrub-steppe obligate species. The reason it could take many decades is because many of the shrubs throughout the resource area do not always respond favorably to fire, and/or they are located in areas where cheatgrass, rabbitbrush, or noxious weed invasion is likely.

The cumulative impacts of present and future brushland losses in combination with agricultural conversions and crested wheatgrass seedings installed in the past has been hypothesized as a possible reason for the current decline of the sage grouse throughout the western states.

Juniper encroachment into brushlands is causing a shift in some areas from shrub-steppe sage brushlands to closed juniper woodlands and the eventual loss of the shrub component. This would negatively impact shrub-steppe species and positively impact juniper woodland obligates.

Road development through brushfields increase access and potential disturbance to wintering big game and strutting greater sage-grouse. This problem has been minimized in the Fort Rock/Silver Lake mule deer winter range through a 1995 “Cooperative Road Closure Memorandum of Understanding”. This memorandum restricts certain activities between the period of December 1 through March 31 each year and stipulates that motor-propelled vehicles shall be restricted to open roads only and a special use permit is required for entry. Persons granted a permit by the BLM or USFS are not allowed to carry firearms in vehicles. This road closure is in cooperation with the BLM, USFS, ODFW, Oregon State Police, and private landowners.

Priority Species

A listing of priority animal taxa (groups such as species, genus, family, order, class, and phylum) was developed using the following criteria: Federal threatened, Federal endangered, proposed threatened, proposed endangered, BLM special status, species of high public interest, and USFWS species of concern. The last category includes game animals, raptors, and species proposed for listing.

Birds

Bald eagle: The bald eagle was listed in 1978 as a Federal threatened species in Oregon under the "Endangered Species Act" and may be taken off the list in the future by the USFWS. Under the "Endangered Species Act", Federal agencies are directed to ensure that any actions authorized, funded, or conducted by them do not jeopardize the continued existence of a listed species or result in the modification or destruction of critical habitat. The Act also applies to old candidate species now considered BLM sensitive and relates to actions that would cause the need to further list the species.

The reason for possibly removing the bald eagle from the threatened list is that recovery goals identified in the 1986 “Recovery Plan for the Pacific Bald Eagle” have been met. Habitat for bald eagles within the seven-state Pacific Recovery Zone (Oregon, Washington, Nevada, California, Idaho, Montana, and Wyo-

ming) has been secured; population levels in specific geographic areas has been reached.

The following population goals have been met for the recovery of bald eagles as identified in the recovery plan:

- A minimum of 800 nesting pairs in the Pacific Recovery Area.
- Average reproductive rate of 1.0 fledged young per pair, with an average success rate per occupied site of not less than 65 percent.
- A breeding population in at least 80 percent of the management zones with nesting potential.
- Stable or increasing wintering populations.

The management/maintenance needs identified in the plan to keep the species recovered are habitat protection and management, augmentation of populations, increased law enforcement and public awareness, and continued research on eagle requirements to provide future management direction.

The key to reaching recovery goals is management of habitat important to the species' survival. Key occupied areas and potential nesting habitat have been identified. Land management agencies should provide for eagle requirements in both key areas and potential nesting areas, and eagle habitat management must be a primary consideration in key occupied areas.

Habitat occupied by bald eagles must continue to be protected and managed after bald eagles have reached their recovery levels. Forest stands used by eagles must be managed to maintain the long-term availability of nest sites, roosts, and foraging habitat.

Another critical element of post-recovery efforts will be the continued frequent monitoring of populations and productivity. Such monitoring will be the only means by which managers will be alerted to population declines.

Inventories of nesting bald eagles within the LRA have been conducted annually since 1979 by the Oregon Cooperative Wildlife Research unit out of Oregon State University, Corvallis, Oregon, the Oregon Eagle Foundation in cooperation with BLM, and USFS wildlife biologists. The surveys over the years have only found one bald eagle nest on BLM-administered lands and one on USFS-administered lands 1 mile from the USFS/BLM boundary. The surveys have also detected one nest located on private land surrounded by BLM land.

Inventories of wintering bald eagles, foraging areas, and communal night roosts have been conducted within Lake County by BLM, USFS, and Oregon Eagle Foundation biologists. Bald eagles forage in the winter in the Fort Rock, Warner, Goose Lake, Crooked Creek, and Chewaucan Marsh valleys. A communal winter roost has been located on the USFS/BLM-administrative boundary in North Lake County.

Bald eagles select large, old growth trees primarily in ponderosa pine, mixed-conifer forest types to nest (Anthony et al. 1982). Anthony also noted that most nests (84 percent) are located within 1 mile of large bodies of water, such as lakes and reservoirs. Nest trees were found to be the larger, dominant or codominant trees in the stand and were usually components of old growth forests. The nest trees selected usually have an open view of the area, a clear flight path to and from the tree, and suitable perch trees nearby. Occasionally large snags and osprey nesting platforms are used.

Bald eagles feed primarily on fish during the spring/summer but may shift to waterfowl, rodents, and carrion in the form of deer carcasses in the winter.

Nesting and wintering bald eagle habitat is affected by human disturbance. Activities such as urban and recreational development, timber harvesting, mineral exploration and extraction, and all other forms of human activity adversely affect the breeding, wintering, and foraging areas of bald eagles by both the immediate action and cummulative long-term effects (USFWS 1986).

Actual known losses of bald eagles in Lake County have been collisions with powerlines and vehicles, and electrocution. Other reported cases have been shooting, lead poisoning, and possible pesticide contamination, the latter causes egg shell thinning which leads to lower productivity (USFWS 1986).

Loss of known nesting or roosting habitat has not occurred on the planning area. Continued monitoring and inventory by BLM, USFS, and Oregon Eagle Foundation of eagle habitat during the past decade has identified the additional three nesting pairs within or directly adjacent to the planning area. This increase is indicative of increases shown statewide with the number of nesting sites doubling since 1980 (Isaacs and Anthony 1988). Although a portion of this increase can be attributed to intensified surveys, it suggests an

upward trend in the population and supports the population goals set forth in the "Recovery Plan for the Pacific Bald Eagle".

Our current management direction is outlined in the "Working Implementation Plan for Bald Eagle Recovery in Oregon and Washington,"(USFWS 1989). This plan provides specific direction for the management of bald eagle nests and roost sites. The LRA is also cooperating with the USFS and has set up a Bald Eagle Management Area for each of the nests occurring on the USFS/BLM administrative boundaries. The goals, objectives, and stipulations agreed to in the joint Bald Eagle Management Area are taken out of the implementation plan.

Golden eagle: The golden eagle is a species of high public interest and is given consideration when planning resource activities. The golden eagle is not federally listed; however, it is protected under the "Eagle Protection Act" of 1963. No systematic inventories have been completed for golden eagles or their habitats in the LRA. However, records of sightings and nest sites are maintained. We do not know of all the golden eagle nest sites on the LRA, but we have surveyed most of the better cliff habitat.

Golden eagles construct large stick nests on cliffs and sometimes will nest high within the canopy of large conifers. Golden eagles prey on rabbits and hares, marmots, squirrels, deer fawns, and other small to medium-sized animals. The major impacts to golden eagles or their habitat are disturbance near the nest during the nesting season as a result of mining and blasting operations and modification or destruction of the nest site itself.

Peregrine falcon: The peregrine falcon was federally listed as an endangered species throughout its range under the "Endangered Species Act", and as a State endangered species under the Oregon "Endangered Species Act" (ORS 1987). In 1999, the peregrine falcon was delisted after reaching the recovery goals set forth in the 1982 "Pacific Coast Recovery Plan for the American Peregrine Falcon".

The recovery plan called for 185 productive nesting pairs with a 5-year average fledging success of 1.5 young per active pair within its former range in the Pacific States to delist the species. This benchmark was met in 1999 and USFWS removed the peregrine from the list.

Inventories conducted by the Wilderness Research Institute, Incorporated, (1982) revealed no active peregrine nests in Lake County. However, it was determined that there was some suitable habitat along Fish Creek rim, between Plush and Adel, Oregon, where researchers concentrated their search. Peregrines have historically nested along Fish Creek rim prior to 1948, but no nesting has been observed since. Pagel surveyed all suitable nesting habitat in 1999 and found no active peregrine nests (Pagel 1999). He also expanded his search to other potentially suitable rims within the LRA and plans to continue the study in future years to cover the entire LRA.

There are two hack sites where young peregrines hatched in captivity were reintroduced into the wild in Lake County. One site is in the Warner Valley and one in the Summer Lake Basin. Approximately 15–20 peregrines were successfully reintroduced into the wild through cooperative efforts of the BLM, USFS, USFWS, ODFW, and the Peregrine Fund. Many of the released birds have been observed in the Warner Valley, Summer Lake Basin, and Abert Lake area since the reintroductions, and one pair has been observed successfully nesting on Winter Rim on USFS-administered lands.

The peregrine falcon is a cliff-nesting species, preferring tall cliffs with ledges, or small caves that are suitable for constructing a nest scrape (USFWS 1982). Nest sites are usually associated with cliffs near water with an abundant population of nongame birds, shorebirds, and waterfowl, the peregrine's primary prey. Fish Creek Rim contains suitable habitat but no known nests. One possible reason is that during prolonged drought cycles common to eastern Oregon, Warner Valley is totally dry and as a consequence, shorebird and waterfowl numbers are down or nonexistent. When a wet cycle occurs, it takes 2–3 years for waterfowl and shorebirds to relocate the area and provide the prey base necessary for peregrines to successfully nest.

Abert Rim contains some suitable nesting habitat. However, it, too, is susceptible to drying out, thus reducing the number of migrating and nesting shorebirds that visit it annually. Summer Lake Basin maintains some water even during drought years as a result of management on ODFW's Summer Lake Management Area. It attracts enough shorebirds and waterfowl to provide a prey base for nesting and resident peregrines.

Disturbance from development activities such as mining and decorative stone collection, chemicals in the environment, and harassment from human activities negatively influence peregrine falcon habitat and populations. Development activities, such as road

construction, and disturbance by recreational activities, such as rock climbing, can render nest sites unusable. Development projects such as the draining of wetlands directly adjacent to peregrine nest sites can adversely affect the habitat and availability of prey species such as waterfowl and shorebirds. This directly influences the suitability of an area for peregrine occupancy and reproductive success.

Other raptors: Many other raptors occur within the LRA and are of high public interest. These include, but are not limited to osprey, northern harrier, sharp-shinned hawk, Cooper's hawk, northern goshawk, Swainson's hawk, red-tailed hawk, ferruginous hawk, rough-legged hawk, American kestrel, merlin, prairie falcon, barn owl, great horned owl, western burrowing owl, long-eared owl, short-eared owl, and turkey vulture. Some of these species are provided special management as BLM sensitive species, and three of these—the western burrowing owl, northern goshawk, and ferruginous hawk—are USFWS species of concern. However, they all are protected under the "Migratory Bird Treaty Act" of 1918. The "Migratory Bird Treaty Act" although old, has been amended and updated many times and is still strictly enforced. No systematic surveys have been conducted on the LRA for these species, but records of sightings are maintained.

Nesting habitat for these species ranges from ground nesting species to species that prefer to nest on rock outcrops and cliffs. Nest structures range from ground burrows dug by badgers and ground squirrels to natural cliff ledges and stick-built nests. Many of the larger cliffs have been surveyed and many nest sites are known. The smaller members of this group prey on insects and small mammals. The larger members prey on moderate sized birds, mammals and reptiles. The major impacts to this group include disturbance or damage to nests and nesting structures as well as disturbances near the nest site during the nesting season. Site-specific habitat surveys and inventories are required as part of the NEPA process for all construction and range improvement projects that may affect listed or sensitive species. Nesting seasons vary by species, but most nesting activity generally occurs between February 1 and August 31.

Greater sage-grouse: The western subspecies of the sage grouse was federally listed as a candidate species (Category 2) by the USFWS until candidates were recently dropped from the list. The sage grouse throughout its range is of high public interest and is designated by BLM as a special status species and USFWS species of concern. The greater sage-grouse is currently under consideration for listing as either a threatened or endangered species.

Sage grouse populations have exhibited long-term declines throughout North America, declining by 33 percent over the past 30–40 years. The species has disappeared in five states (Arizona, New Mexico, Oklahoma, Kansas, and Nebraska) and one province (British Columbia) and is "at risk" in six other states (Washington, California, Utah, Colorado, North Dakota, and South Dakota) and two provinces (Alberta, Saskatchewan). Even in states where the species is considered to be "secure" (Oregon, Nevada, Idaho, Wyoming, and Montana), long-term population declines have averaged 30 percent (Connelly and Braun 1997; Crawford and Lutz 1985). Sage grouse population estimates for Lake County are not available. However, the BLM in cooperation with the ODFW has conducted limited nonsystematic lek inventories for greater sage-grouse on the resource area since 1977 and the general trend in decline is indicative of declines observed throughout the west.

The Western States Association of Fish and Wildlife Agency's Sage and Columbian Sharp-tailed Grouse Technical Committee has published guidelines for the maintenance of greater sage-grouse habitats (Braun et al. 1977). The Association has directed the technical committee to revise those guidelines and it is likely that the habitat management guidelines portion of that document will be largely adopted by the Bureau into a new version of the1974 BLM Technical Note, "Habitat Requirements and Management Recommendations for Sage Grouse."

Oregon BLM is committed to the development and implementation of a "Sage Grouse/Sagebrush-Steppe Conservation Assessment and Strategy Plan" that may focus on greater sage-grouse as an icon, but is dedicated to all of the shrub-steppe obligate species that have been the focus of the ICBEMP effort. This plan in essence will step-down the results of the ICBEMP to application at the field level.

Sage grouse depend on sagebrush-grassland communities. Existing habitat is displayed on Map W-1. Big sagebrush, the primary species grouse depend on in Lake County, is usually associated with western juniper, although juniper is not a necessary habitat component. Sage grouse are most frequently found in sagebrush covered flatlands or gently rolling hills. Free water is also a component of greater sage-grouse habitat, but they do not require it for their daily survival. Water is used when available from late spring through late fall, and greater sage-grouse attain their

highest population densities in areas that contain abundant and well distributed surface water. Sage grouse rely on snow and ice during the winter months and moisture from succulent plants when available.

Sage grouse populations that are migratory may travel great distances seasonally. Summer and winter ranges may be as far as 50 or more miles apart. If deep snow covers spring and summer ranges, the birds may migrate to lower elevations to find food and cover. Sage grouse may nest and raise their broods in sage-covered mountain valleys at high elevations. A variety of sagebrush stand conditions are necessary for good grouse habitat. In general, good habitat should contain openings less than 300 yards in circumference, some dense stands, and about equal amounts of tall and short sagebrush plants. There are three habitat types that greater sage-grouse use throughout the year: breeding habitat, brood-rearing habitat, and wintering habitat.

Lek sites or greater sage-grouse strutting and mating grounds, are usually small open areas, from .01 to 10 acres, with low, sparse sagebrush or are denuded of vegetation. Grassy swales, natural and irrigated meadows where grass has been removed, burned areas, cultivated fields adjacent to sagebrush-grass range-lands, and dry lakebeds are often used as leks.

Hens generally nest in short sagebrush of medium density (Call 1974). Optimum greater sage-grouse nesting habitat consists of the following characteristics: sagebrush stands which contain plants 16 to 32 inches in height with a canopy cover which ranges from 15 percent to 25 percent and an herbaceous understory of at least 15 percent cover that is at least 7 inches tall. It is recommended that these conditions should be found on 80 percent of the breeding habitat for any given population of greater sage-grouse (Klebenow 1969; Wallestad and Pyrah 1974). Some studies have shown that nonmigratory hens nest within 1.5 miles of the lek site. However, some migratory birds equipped with radio collars tracked by radio-telemetry have been seen nesting 10 to 30 miles from the lek (Crawford 1998).

Early brood rearing generally occurs relatively close to nest sites, but movements of individual broods may be highly variable (Connelly 1982; Gates 1983). Sage grouse chick diets include forbs and invertebrates (Drut et al.). Insects, especially ants and beetles, are an important component of early brood-rearing habitat. Brood habitats that provide a wide diversity of plant species tend to provide an equivalent diversity of insects which are important chick foods. As sagebrush habitats dry up and herbaceous plants mature, hens move their broods to more moist sites during June and July where more succulent vegetation is available (Klebenow 1969; Gill 1965; Connelly et al. 1988). Optimum brood-rearing habitat consists of sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 percent to 25 percent and an herbaceous under-story of 20 percent (10 percent grasses and 10 percent forbs). This type of habitat should be found on at least 40 percent of the area that is considered brood habitat.

As fall progresses toward winter, greater sage-grouse start to move toward their winter ranges and their diet shifts to primarily sagebrush leaves and buds (Connelly et al. 1988). Timing of movement depends on weather severity and snow depth. Sage grouse winter habitats are relatively similar throughout most of the species range. As their winter diet consists almost exclusively of sagebrush, winter habitats must provide sagebrush that is available above the level of the snow. Sage grouse tend to select areas of both high canopy cover and taller Wyoming big sagebrush and will select the plants which have the highest protein content.

It is critical that sagebrush be exposed at least 10 to 12 inches above snow level (Hupp and Braun 1989). This provides both food and cover for wintering greater sage-grouse. In situations where snow covers the sagebrush the birds will move to areas where sagebrush is exposed. Sagebrush of varying heights should be found on 80 percent of the wintering range of a given greater sage-grouse population to guarantee that they will find exposed sagebrush for winter survival.

The greatest negative impact on greater sage-grouse is the destruction or adverse modification of their habitat. At the present, greater sage-grouse occupy most of their historic range in reduced numbers, but have disappeared from areas on the periphery of former ranges where extensive areas of sagebrush have been removed. During the past 40 years, many sagebrush covered valleys and foothill ranges have been sprayed, plowed, chained, burned, disked, or cut in an attempt to convert these ranges to grasslands. Eradication of large tracts of sagebrush has occurred historically in Lake County, but has recently slowed.

Research data are scant with respect to the impact of fire and plant succession on greater sage-grouse. Recent research conducted on a pair of burned and unburned plots within Wyoming sagebrush types in Idaho revealed that a sub-population of greater sage-grouse was reduced within the burn area compared to the control site (IDFW 1994). Although both the control and burned areas showed a general decline in the greater sage-grouse population during the research period, the reduction was greater in the treatment area

(83 percent) than the control area (55 percent), and the difference was associated with losses in nesting cover. Sage grouse select nest sites near the largest sagebrush plants with a good herbaceous understory, which is precisely where wildfire or prescribed fire tends to travel.

This is a substantial finding worthy of incorporation into a greater sage-grouse conservation strategy in view of documented population declines and the inclination of BLM to want to pursue prescribed fire as an ecosystem management tool. Shrub cover fragmentation throughout the range of the greater sage-grouse makes this an issue of current importance that may not have been quite as significant in the past. Clearly, the conditions and values of rangeland habitats in the Pacific Northwest continue to change due to weeds, fire, and other influences. This indicates a need for BLM to adjust management strategies accordingly.

Anecdotal accounts have often associated greater sage-grouse with burn areas and mosaics of grass/forb and grass/forb/shrub habitats. The concept of habitat edge and the desirability of mosaics has been substantially ingrained and reinforced within the culture of BLM management goals for a long time. However, the analysis of the data from Idaho indicated that at least in the Wyoming sagebrush types where greater sage-grouse nest, the mosaic of habitat that results from burning diminishes their productivity and the consequences of fire cannot be viewed as positive. In addition, Connelley reported the following:

" If Klebenow (1972) and Gates (1983) and Sime (1991) were correct, greater sage-grouse use of the burned area should have been greater than that of the unburned area. However, we found no differences in use of the treatment area compared to the control area. These results suggest that fire does not improve brood rearing habitat in relatively low precipitation zones dominated by Wyoming big sagebrush. Therefore, we caution against using this argument as justification for burning in this type of habitat."

As is typical within the science and research community, there is some dispute regarding prescribed fire and its beneficial or adverse effects. Oregon BLM acknowledges that there are differences in opinion. However, given this debate and the ongoing threats of further habitat losses to wildfire, it will be prudent to avoid prescribed burning in Wyoming sagebrush types because it is likely to exacerbate population viability problems for the species. Moreover, these two recommendations do not prevent the use of prescribed fire. They simply redirect where it is appropriate to do so without jeopardizing an important sagebrush steppe species that may be listed as a T&E species.

Other factors possibly impacting greater sage-grouse habitat and populations include irrigation projects and degradation of riparian areas. The creation of reservoirs and diversion of water for irrigation may eliminate important, high-quality brooding habitat. Conversely, some of these land uses probably benefit greater sage-grouse. Openings in large sagebrush stands can create feeding and brooding areas that may benefit greater sage-grouse if water is nearby. The creation of meadows by seeding and water diversion may add to food supplies, and reservoirs and ponds may provide standing water. In addition, practices that removed stands of large decadent sagebrush have permitted new, young sagebrush stands to develop and provided openings for grasses and forbs to establish.

Columbian sharp-tail grouse: There was one collection of Columbian sharp-tailed grouse at Beatys Butte in the early 1900s; however, no sharp-tailed grouse have been documented since that time. ODFW has no plans to reintroduce the species in Lake or Harney Counties due to lack of adequate habitat.

Waterfowl and shorebirds: Most of the common puddle duck species are known to migrate spring and fall throughout the planning area and many successfully nest in suitable habitats in Warner Valley, Summer Lake Basin, the Chewaucan Marsh, and isolated potholes throughout the resource area. Wood ducks, Eurasian wigeon, ring-necked ducks, tundra swans, trumpeter swans, snow geese, and canvasbacks have occasionally been seen in the planning area; however, no nesting has been observed. The most common nesting ducks in the resource area are gadwalls, northern shovelers, teal, mallards, pintails, American wigeon, American coots, and redheads.

Early nesting species such as pintails and mallards rely on residual cover for nest concealment until the current year's growth is high enough. Without this old growth, an area is not used or nesting success is greatly reduced. Livestock grazing that reduces or eliminates this residual cover is detrimental to these two species and can provide negative impacts. Livestock grazing during the nesting season creates additional conflicts by removing current year's growth around nests, which affects all waterfowl species, creates disturbance to nesting birds, and can cause trampling impacts.

The long-billed curlew is not federally listed. However, it is considered as an Oregon State vulnerable species. Known nesting populations exist at Antelope

Flat, Greaser Lake, Horsehead Lake, Hawks Valley seeding, Guano Lake, and probably several other locations.

Western snowy plover is a USFWS species of concern. It is listed by the State of Oregon as threatened. According to the ONHP database, this species is critically imperiled due to extreme rarity, imminent threats, or biological factors. The only known nesting habitat for western snowy plovers within the planning area is Abert and Summer Lakes.

The greater sandhill crane has no special Federal status, but is considered an Oregon State vulnerable species by the ONHP database. It is an occasional spring/fall migrant throughout the resource area and has been seen nesting in appropriate habitats. The major nesting areas in Lake County are Summer Lake, Chewaucan Marsh, and Camas Valley. Many small isolated nesting populations have been seen in favorable areas throughout the resource area except in the norther portion, which has extensive sagebrush uplands and few irrigated meadows (USFWS 1978).

The white-faced ibis, yellow rail, red-necked grebe, black tern, and western least bittern are not federally listed. However, they are listed by ONHP as vulnerable and by USFSW as species of concern. The ONHP has ranked these bird species (based on worldwide distribution of the species level) to be demonstrably secure, though frequently rare in parts of their range, especially on the periphery. They are ranked in Oregon to be rare or with a very restricted range or otherwise vulnerable. These species have breeding status in Oregon. They are known to nest in Warner Valley and other suitable habitats in Lake County. Studies or monitoring of the species status and the amount of suitable habitat has not been conducted. At this time, it cannot be determined whether the habitat available is essential for species survival or maintenance of species diversity.

Neotropical migrant bird species: Numerous neotropical migrant bird species are found within the planning area; however, no systematic nesting inventories have been conducted. Olive-sided flycatchers, yellow-billed cuckoos, purple martins, black-head woodpeckers, white-headed woodpeckers, and northern and loggerhead shrikes have been documented on the resource area, but no nest sites have been located. Lewis' woodpeckers nest on the forest-fringe, but their abundance and distribution is unknown.

Bats

Pale western big-eared bat: The pale western big-eared bat is a BLM sensitive species that occurs in a wide variation of habitat types. Areas commonly utilized within the planning area are desert scrub communities and pine forests. Perkins stated that caves and cave-like structures are a critical component of this bat's habitat requirements, both as hibernaculum in the winter and as roosts for summer nursery colonies. The species also uses abandoned mine tunnels and buildings. Other special habitat features required by the pale western big-eared bat include wet meadows and riparian areas to forage for aerial insects and arthropods. Habitats free from human disturbance are apparently required by this species.

Bats may use mines in several ways. The most obvious use is as a daytime resting place (roost) for these nocturnally active animals. This occurs during the warm part of the year when they are most active. Another use during this time of year is as a temporary resting place at night between foraging bouts. A given mine may be used for one or the other or both of these activities. Such use may vary seasonally. Sometimes, an infrequently used summer roosting site will be attractive to bats in the fall, especially at night, when they congregate for breeding. Another use of mines is as hibernaculum for dormant bats during the winter. Most species have specific habitat requirements for such use.

Numerous bat surveys have been conducted in the LRA. However, these have been limited to historical sites, mining exploration areas, and museum collection sites. A mist netting survey conducted by Cross (1976) revealed 10 species of bats found on BLM-administered lands: pale western big-eared, big brown, silver-haired, pallid, California myotis, little brown myotis, long-eared myotis, small-footed myotis, long-legged myotis, and the Yuma myotis (the last four species listed are USFWS species of concern). Perkins (1986) surveyed historical hibernacula and roost site locations within the LRA and found some use in the Derrick Cave and the Squaw Butte Lava Beds. However, he found only one or two pale western big-eared bats in each of the five caves he surveyed.

Perkins (1986) pointed out that cave habitats in Oregon have not been managed specifically as habitat for bats and are subject to increasing human disturbance, which could result in a decline of available habitat for bats. Inventories to establish a complete distribution of the pale western big-eared and other bat species on LRA lands are needed before habitat protection can be

provided. No LRA-administered lands have been designated as management areas for this sensitive bat species. All abandoned mines on the resource area are surveyed for bat use before they are permanently closed. Hazardous mines with significant bat use and those containing sensitive species of bats will be properly gated to protect the public and allow free movement of bats.

Big Game Mammals

Rocky Mountain elk: Because the Rocky Mountain elk is a game species in Oregon, there is a high degree of public interest relative to the population levels and habitat condition. The elk is also valued by the public for wildlife viewing.

Based on ODFW estimates, the present population of Rocky Mountain elk on the LRA and adjacent lands administered by the USFS are expanding toward the management objectives or goals of ODFW's 1992 "Oregon's Elk Management Plan." ODFW is managing the area for a herd composition of 20 bulls/100 cows and is already maintaining a 3-year average of 10 bulls/100 cows. The management objectives for the area call for 3,000 elk in the South Central Region (Fort Rock, Silver Lake, and Interstste Units), 500 elk in the Warner Unit, and 1,000 elk in the High Desert Unit (Beatys Butte and Juniper Units and includes the Owyhee, Whitehorse, and Steen's Mountain Units that fall outside lands administered by the LRA). Current populations in the three units are close to 1,500 elk in the South Central Unit, 250 elk in the Warner Unit, and 850 elk in the High Desert Units. The LRA big game populations are managed by ODFW to emphasize mule deer. Elk are managed as a secondary species to provide numbers proposed in their elk management plan designed to minimize competition with mule deer. Approximately 800,000 acres of identified yearlong elk habitat occur in the LRA at this time.

Elk populations respond to the quantity and quality of forage and cover and the distribution of these habitats (Brown 1985). Forage areas are defined as vegetated areas with less than 60 percent combined canopy closure of trees and tall shrubs. This includes grass-forb, shrub, and open sapling phases of the early seral stage stands.

Three types of cover are important to elk: hiding, thermal, and optimal thermal cover. Hiding cover includes any vegetation capable of hiding 90 percent of a standing elk at 200 feet or less. All seral stages except the early seral stage meet hiding cover needs. Thermal cover exists in forest stands that are at least 40 feet in height with tree canopy cover of at least 70 percent. Late, mature, and old growth seral stages qualify as thermal cover. Optimal thermal cover is provided by forest stands with dominant trees averaging 21 inches in diameter at breast height (dbh) or greater and 70 percent or greater crown closure. Such stands have four vegetation layers and an overstory canopy which can intercept snow.

Winter range is an important consideration in managing elk populations (Map W-2). During winter, elk use south-facing slopes and valley bottoms because of warmer temperatures, reduced snow depths, and available forage. During periods of hot weather in the summer, north-facing slopes and high elevation western juniper/shrub sites provide important thermal cover.

The major factors affecting elk use of an area are the interspersion of forage and cover areas in time and space, their relative quality, and the effects of human disturbance from motorized vehicles (Brown 1985). Timber harvest and associated activities, such as road construction, can have the greatest impact. Major impacts on elk habitat may include reduction of optimal thermal cover, creation of large (50+ acres) foraging areas (which receive less use by elk because of greater distance to cover), human disturbance/harassment and poaching, commercial thinning of shelterwood, and firewood cutting that produce less forage than clearcuts while reducing thermal cover.

On the BLM-administered lands in the LRA, habitat is primarily winter range and there is minimal use for summer range. Because little is known about movement and use patterns of this expanding elk population, no emphasis has been placed on habitat monitoring and inventory by the BLM.

Elk numbers in Lake County have been increasing for the last 20 years. Most of the elk found on BLM lands are a result of herds expanding into new habitat from other areas. In cooperation with the BLM and the USFS, the ODFW began a telemetry study in 1988 to monitor elk in southcentral Oregon to determine migration routes, winter and summer ranges, a rough population estimate, and identify use areas so that standard trend information can be gathered. Some local elk were trapped and collared and some were trapped in northeast Oregon and collared and released on or near BLM lands. Monitoring of these elk by ODFW is continuing.

Because of the recent expansion of elk into the planning area, there have been no management activities in relation to elk or their habitat, except for the recent

telemetry study in cooperation with ODFW.

Mule deer: Because the mule deer is a game mammal in Oregon, the public has a high level of interest in this species. In addition to interest in hunting, the public also values opportunities to view deer. However, in some suburban and agricultural areas, the species does become a pest, as it feeds in alfalfa fields, home gardens, and browses residential shrubbery.

Deer are the most numerous, adaptable, and widely distributed big game species on the planning area. The majority of mule deer found on the resource area are part of the migratory Interstate deer herd. This herd migrates seasonally, generally wintering in Modoc County in California, and summering in Lake and Klamath County, Oregon, or migrating from Crater Lake, Oregon, and wintering in Lake County. There are also local herds that reside year-round in Lake County, usually near agricultural areas.

ODFW's 1990 "Mule Deer Plan" set management objectives for the Lake County deer units to manage for post-season buck ratios of 15 to 25 bucks per 100 does and less crowded hunting conditions. The management objectives for the Lake County deer units are as follows: Fort Rock, 1,200; Silver Lake, 10,300; Interstate, 14,800; Warner, 5,500; Wagontire, 1,400; Beaty's Butte, 2,300; and the Juniper Unit, 2,300. Four of the units are at management objective and the others are just slightly below. Production has been good in two of the units and limited antlerless hunts have been offered in the last few years. Approximately 1,000,000 acres of crucial deer winter range exists in the LRA.

Adequate food, water, and cover are essential to the survival of deer. Where food, cover, and water are close together, the range of deer is small. Home ranges of resident mule deer can be large. If snow conditions make higher elevations unsuitable, deer will move to suitable range in lower elevations. In general, higher elevations are used as summer ranges and areas below 4,500 feet are considered winter range. Seasonal movements and routes can be critical to maintaining migratory habitat.

The value of timberland for deer is proportional to the degree that it is broken and interspersed with openings. Deer numbers on forested lands are usually highest where openings that support low-growing palatable shrubs and forbs are scattered through the forest. Some of these openings may be natural meadows, marshes, or areas with soils that favor grasses and shrubs rather than trees. Other openings may be created by timber harvest and wildfire.

Elevations within the Interstate herd boundary vary from 4,400 feet on the southern portion of the winter range in California to over 8,400 feet in the forested mountains within Lake County. The range of the Interstate herd is divided into summer, winter, and transitional seasonal ranges.

The winter range is primarily juniper woodland and sagebrush communities with interspersed grasses (Map W-2). Browse is the major component of the winter diet, primarily antelope bitterbrush, big sagebrush, curl-leaf mountain mahogany, and Western juniper. Summer ranges of the Interstate herd are generally associated with coniferous forest/shrub communities. Transition range can be divided into spring and fall. The vegetation of the spring transition range is similar to winter range—sagebrush and juniper woodland. Grasses and forbs are important on this range. Fall transition ranges are vegetatively similar to summer ranges—coniferous forest/shrub communities. Deer tend to remain at the highest possible elevations until forced onto winter concentration areas by snowfall.

Harassment of deer by humans using motorized vehicles during stress situations, cold winters, and extreme heat has an adverse impact but is difficult to quantify. The Lakeview BLM, USFS, Oregon State Patrol, and ODFW have been participating in a cooperative road closure in the Cabin Lake/Silver Lake Winter Range since 1975 to protect wintering deer from harassment and to protect wildlife habitat by controlling vehicle use. The specific goals of the road closure are to increase deer survival in winter, improve physical condition and productivity, protect and improve rangeland, and reduce harassment and poaching. The road closure is in effect each year from December 1 through March 31 and has been successful in reducing, but not entirely eliminating harassment and poaching.

Habitat conditions on the winter ranges within the resource area vary considerably and are site specific. It is generally recognized by wildlife biologists and range managers that it is extremely difficult to precisely measure habitat condition and productivity and even more difficult to relate these measures to herd parameters (Carpenter and Wallmo 1981). Winter deer habitat in the Warner Mountains is generally improving under current management practices. The Fort Rock/Silver Lake winter range has been intensely grazed by domestic livestock and browsed heavily by deer in the past. Habitat conditions are fair to poor for this area as evidenced by browse (antelope bitterbrush and curl-leaf mountain mahogany) transects initiated in 1964. Little

improvement is evident since 1964. Browse plants are old (40 to 80 years old), decaying or dead, and produce very little viable seed. There is very little reproduction in the stands in the form of seedling establishment and many of the browse plants are growing out of the reach of deer. The stands are still producing some browse for wintering deer and the decaying and dead plants are providing valuable thermal and hiding cover.

The "Warner Lakes and High Desert Management Framework Plans" recommended management techniques for:

- Rejuvenating decadent brush fields by burning, scarification, and top pruning or crushing;
- Acquiring private lands within the critical deer ranges through land exchange;
- Reestablishing perennial grasses and forb communities on deer winter ranges that have been invaded by annuals and weed species, such as cheatgrass and medusahead;
- Designing and implementing grazing management systems on those grazing allotments containing identified deer winter range that will meet the physiological needs of preferred deer forage (forbs, grasses, and shrubs);
- Allocating forage for deer on the crucial deer winter ranges;
- Cooperating in cooperative road closures when problems such as wildlife harassment occur Minimizing the effect of cover removal wherever possible to minimize adverse effects to over wintering deer;
- Protecting identified wet meadows by fencing them from overuse by livestock and OHV's;
- Maintaining a vegetative community to provide escape cover along perennial water courses on winter and summer ranges; and
- Locating and constructing roads away from meadows when possible.

Current management on the resource area has focused on the following:

- Improving and maintaining transition and crucial winter range;
- Developing water resources, primarily spring development and improvement and installation of guzzlers;
- Modifying grazing systems to reduce competition with domestic livestock for winter browse and early green-up grasses;
- Fencing riparian areas;
- Seasonal road closures; and
- Prescribed burning.

Pronghorn: Pronghorn are the second most abundant big game species in North America, occupying a vast area in the western United States. On the LRA, pronghorn habitat consists primarily of Wyoming big sagebrush and low sagebrush brushlands. The planning area contains crucial winter range for pronghorn as well as summer and yearlong habitats. Map W-2 shows the location of pronghorn winter habitat. Water is sparsely distributed and is present primarily in widely scattered springs and waterholes.

Pronghorn are the second most common big game species within the resource area after mule deer. The diet consists primarily of forbs and grasses during the spring and early summer. The rest of the year, pronghorn are dependant upon primarily sagebrush and antelope bitterbrush. Seasonal movements are controlled primarily by the snow depth, with deep snows hindering movement and covering the short brush.

Predation by coyotes of kids appears to be a primary factor limiting pronghorn populations in the planning area at this time. Populations in Oregon have declined 20 to 30 percent since 1991 due to limitations in habitat, weather conditions, poor nutrition, disease, and predation. Approximately 3,000 to 5,000 pronghorn use the LRA on approximately 1,000,000 acres of identified crucial winter habitat.

California bighorn sheep: California bighorn sheep occupy sagebrush-grassland on the resource area. Habitat is characterized as yearlong, and totals about 500,000 acres. Escape areas, lambing areas, thermal protection, rutting areas, and foraging areas are provided by the rugged mountains, canyons, and escarpments. Water in this area is a limiting factor and is supplied by big game guzzlers, natural seeps and springs, and waterholes.

There are approximately 500 to 600 bighorn sheep currently occupying the LRA. Map W-2 shows bighorn

sheep habitat in the planning area. This does not include the 250 to 350 sheep found on Hart Mountain National Wildlife Refuge or the 100 found on Winter Rim. Lake County contains historically suitable bighorn sheep habitat and populations on BLM adminitered lands have been reestablished from transplants from Hart Mountain National Wildlife Refuge over the past several years.

Carnivores: Many species of carnivores are known or suspected to occur on the resource area. Coyote, bobcat and mountain lion occur on every part of the resource area and are very common. Kit fox , a State threatened species, is also known to occur on the resource area, but population and distribution data are unknown. Three other carnivores of concern may occur in LRA. These include lynx, a Federal threatened species, wolverine, a state threatened species, and fisher, a Bureau sensitive species. Although these three species could exist in the LRA, they are primarily forest-dwelling species and do not typically occur in open desert shrub habitats. It is suspected that they may occur as a casual visitors to LRA, but little or no permanent habitat exists within the resource area boundary.

Other mammal species: Pygmy rabbits occur within dense stands of big sagebrush in deep, loose soils within the resource area; however, distribution and abundance is unknown for the species due to the lack of systematic surveys. The species is a USFWS species of concern, so surveys are required for all range improvement projects, including prescribed fire.

Limited small mammal inventories have been conducted by ODFW, and resulted in the occurrence of both white- and black-tailed jackrabbits, cottontail rabbits, deer mice, kangaroo mice, kangaroo rats, northern grasshopper mice, Townsend's ground squirrels, least chipmunks, and sagebrush voles, within the planning area.

Reptiles: Limited reptile surveys have been conducted on the resource area; however, northern sagebrush lizard, western fence lizard, desert horned lizard, short-horned lizard, western rattlesnake, garter snake, and gopher snake appear to be common in appropriate habitat types. Side-blotched lizard, long-nosed leopard lizard, western skink, and striped whipsnake are known to occur on the district, but limited data is available on distribution and abundance of these species.

Appendix I — Areas of Critical Environmental Concern

Introduction

This appendix explains ACEC criteria as described in 43 CFR 16 and describes the existing and proposed ACEC's and their relevant and important values. The appendix also contains a map of each existing and potential ACEC showing proposed boundaries and road designations under each alternative.

BLM regulations (43 CFR part 1610) define an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development 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 safety from natural hazards."

ACEC's differ from other special management designations such as WSA's in that the designation, by itself, does not automatically prohibit or restrict other uses in the area. The one exception is that a mining plan of operation is required for any proposed mining activity within an ACEC. The ACEC designation is an administrative designation and is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The intent of Congress in mandating the designation of ACEC's through FLPMA was to give priority to the designation and protection of areas containing truly unique and significant resource values.

Research Natural Areas

According to Oregon Natural Heritage Program (ONHP) (1993) the purpose for research natural areas (RNA's) are: "to preserve examples of all significant natural ecosystems for comparison with those influenced by man; to provide educational and research areas for ecological and environmental studies; and to preserve gene pools of typical and endangered plants and animals." All BLM RNA's are designated and managed as ACEC's (Oregon Manual Supplement 1623.35 for RNA's only). Therefore, all RNA's must meet both the ACEC criteria, as applied in writing by an interdisciplinary team and approved by the field manager, as well as the need for a RNA cell as defined in the ONHP data base. The ACEC can be larger than the RNA, to encompass other values, which may not be needed for the RNA. RNA management plans are usually more restrictive than ACEC plans.

RNA cells determined by the ONHP are the basic units that are represented in a natural area system. These cells can be an ecosystem, community, habitat, or organism. Cells are artificial constructs used by the ONHP to inventory, classify, and evaluate natural areas in Oregon. Cells contain one or more ecosystem elements. Typically, a RNA aggregates several cells that need representation. The ONHP was created by the Oregon Natural Heritage Advisory Council to the State Land Board in 1993. They are the State counterpart of the Federal program. Of the 16 existing and proposed ACEC's, 12 have ONHP cells within their areas. Within the existing and proposed ACEC's, 10 have existing or proposed RNA's.

Requirements for Designation

To be designated as an ACEC, an area must meet the relevance and importance criteria listed in BLM 1613 Manual (BLM 1988) and require special management. Specific evaluation questions for each of these three elements are listed below.

Relevance Criteria

Does the area contain one or more of the following?

- A significant historic, cultural, or scenic value;
- a fish and wildlife resource;
- a natural process or system; or
- a natural hazard?

Importance Criteria

Does the value, resource, system, process, or hazard described above have substantial significance or value? Does it meet one or more of the following criteria?

- Is it more than locally significant, especially compared to similar resources, systems, processes, or hazards within the region or Nation;

- does it have qualities or circumstances that make it

fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change;

- has it been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA;
- does it have qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare; or
- does it pose a significant threat to human life and safety or property?

Need for Special Management

Does the value, resource, system, process, or hazard require special management to protect (or appropriately manage) the relevant/important value(s)? Special management is defined as or is needed when:

1) Current management activities are not sufficient to protect a given relevant/important resource value and a change in management is needed that is not consistent with the existing land use plan(s).

2) The needed management action is considered unusual or outside of the normal range of management practices typically used.

3) The change in management is difficult to implement without ACEC designation.

Evaluation Process

Regardless of who nominates an area as a potential ACEC, it is the BLM who is responsible for evaluating the area to determine if it meets the relevance/importance criteria and requires special management. The LRA has prepared a report entitled "Areas of Critical Environmental Concern Nomination Analysis Report" (2000) which contains the analysis of each area nominated to be an ACEC. This report is available from the resource area office or on-line at www.or.blm.gov/lakeview/planning.

ACEC Descriptions

Existing Areas of Critical Environmental Concern

Devils Garden ACEC

Description and values: An ACEC totaling 29,640 acres was designated in 1984. The boundary of the ACEC is the same as that of the Devils Garden WSA. The ACEC is located approximately eight miles north of the town of Fort Rock (see Maps SMA-1 and -5). This extensive lava flow also contains spatter cones, lava tubes, and cinder cones. Devils Garden lies within the transition zone between forest and high desert, with plant species from both areas represented. Ponderosa pine, juniper, and quaking aspen are common in the northern portion and grade into bitterbrush, sagebrush, and western wheatgrass to the south. Ferns and mosses are able to exist in this desert environment by growing in the moist microclimates in the large cracks and crevices of the lava. The Devils Garden ACEC is also used by educational groups on a regular basis.

The area has high potential for salable minerals, particularly slab lava. This resource would likely be developed if the area is not designated wilderness. The ACEC is also in an area of moderate geothermal potential. Because of the WSA status, the area is closed to mineral leasing, but should the area not be designated wilderness, it is not likely that the geothermal potential would be developed.

Lake Abert ACEC

Description and values: In 1996, 49,900 acres of public land administered by BLM around Lake Abert was designated as an ACEC. The ACEC includes the BLM-administered portions of the lake, most of the surrounding archeological sites and National Historic Register District (NHRD), part of the Abert Rim WSA, and the playa on the north end of the lake. The boundary of the ACEC is established at the top of Abert Rim on the east, the edge of the boundary of rights-of-way for an existing powerline on the northeast, an existing county road and private property on the northwest, a new 3.5-mile riparian exclosure fence on the west and legal property lines on the southwest (Maps SMA-1 and -6).

Lake Abert and its immediate surroundings met the relevance and importance criteria for the presence of prehistoric cultural values, scenic values, wildlife (both populations and habitat) resources, and natural pro-

cesses (aquatic ecology). BLM also recognized that these resources deserved special management. The natural hazards (landslides, rockslides, cliffs and potential for flash flooding) which are present in the area were found to meet the relevance criteria, but not the importance criteria. (BLM 1993). The presence of a ONHP Basin and Range wetland and aquatic ecosystems cell listed below adds to the relevance and importance criteria; however, no RNA is designated for the area:

(7) Fault Block Lake

Management goals from the existing Lake Abert ACEC management plan:

- Maintain a viable, sustainable ecosystem within the lake and surrounding area (prevent changes that would cause significant, adverse effects on ecological values).
- Maintain or enhance economic conditions consistent with other listed goals and existing laws, regulations, and policies.
- Maintain or enhance existing resource values for future generations (i.e., do not exclude future options by current management actions).
- Continue current, traditional, and historic land and resource uses in the area.
- Maintain or enhance recreational opportunities and wilderness values.
- Maintain the present visual/aesthetic quality.
- Protect and/or interpret, where appropriate, existing cultural resource values, including protecting and respecting Native American traditional uses.
- Maintain or enhance habitat quality and quantity for native plant and animal species, including special status species (such that the latter do not become federally-listed).
- Maintain or enhance public education and scientific research opportunities.
- Maintain exploration and development opportunities for leasable, salable, and locatable minerals to provide needed mineral resources, consistent with other listed goals and existing laws, regulations, and policies

Lost Forest/Sand Dunes/Fossil Lake ACEC

Description and values: The Lost Forest/Sand Dunes/Fossil Lake ACEC/RNA is located in north Lake County approximately 20 miles east of the community of Christmas Valley. The existing ACEC/RNA is made up of the Lost Forest RNA and ISA, the Sand Dunes WSA, and the Fossil Lake paleontological area and totals 30,528 acres (see Maps SMA-1 and -8).

The Lost Forest (8,960 acres) was designated a RNA in 1972 and withdrawn from mineral entry. The Lost Forest consists of a disjunct stand of ponderosa pine occurring in a climate of lower rainfall than that normally associated with this vegetation community. The sand dunes, the sandy soils within the Lost Forest and Fossil lake area, and the associated vegetation represent a complex and unique ecosystem. Two ONHP Basin and Range cells are represented there:

(1) Ponderosa pine, big sagebrush-bitterbrush community (isolated stand within steppe)
(2) Ponderosa pine-western juniper, big sagebrush, needle-and-thread grass communities

The Sand Dunes WSA contains 16,440 acres and includes a small portion of the Lost Forest RNA and most of Fossil Lake. Most of the WSA consists of unstabilized sand dunes up to 60 feet high. Vegetation in the dunes is sparse and localized. The Lost Forest portion of the WSA contain sagebrush, juniper, and ponderosa pine. The Sand Dunes represent the largest inland moving sand dune system in the State and maybe the Pacific Northwest (USDI-BLM 1989a). Researchers believe that this large sand dunes system and the resulting complex soil conditions contribute to the preservation of the Lost Forest. Due to the sand dunes and water retention in the soils, the pine forest survives in this low-rainfall area.

The ACEC/RNA has numerous cultural and paleontological sites, most of which are associated with Fossil Lake. Fossil Lake has been recognized as extremely important for the study of Pleistocene-age fossils. It is one of the few locales where prehistoric human inhabitants can be associated with now extinct animals dating from 8,000 to 11,000 years ago.

The unique botanical, ecological, cultural, and paleontological resources of the area which are of more than local importance serve to meet the relevance and importance criteria for designating the area and ACEC. The scientific value of the area merits designation as a RNA.

Existing management goals for Fossil Lake:

The goals of management are to prevent further disturbances of the area and to preserve the scientific values for educational public enjoyment.

- Develop a public service plan for Fossil Lake to keep the public informed about the importance of the area.
- Reduce user conflicts and involve the local community in the management of the area and encourage scientific use of the area.
- Place interpretive signs at major access points leading to fossil lake.
- Complete a standard barbed wire fence around the area of the closure.
- Place closure notices/warning signs.

Warner Wetlands ACEC

Description and values: The Warner Wetlands ACEC covers 51,533 acres in the north half of Warner Valley. The area was designated in September 1989. Within the ACEC are nearly 19,000 acres of lakes, potholes, sloughs, marshes, and shorelines. Waterfowl and shorebirds by the tens and hundreds of thousands funnel through the area on their semiannual migration along the Pacific Flyway. The wetlands also provide summer nesting and year-round habitat for thousands of other birds.

The Warner Lakes are in a closed basin system with no outflow. Within this system the lakes routinely follow a filling cycle followed by a long period of drying through evaporation and absorption. Historic high levels occurred in 1983 and 1984 followed by a drying cycle through the early 1990s. This was in turn followed by a wet cycle culminating in near historic highs in 1999.

The Warner Wetlands met the relevance and importance criteria in for designation as an ACEC in a number of ways. It provides resting habitat for thousands of waterfowl and shorebirds each year. It also provides nesting and brood-rearing habitat for hundreds of pairs of waterfowl and shorebirds. Special status species inhabit the ACEC including bald eagles, seasonally; white faced ibis; snowy plover; and Warner sucker, a T&E species.

Archaeological research in the past by the University of Nevada–Reno has shown that the area has been occupied for at least 10,000 years. It contains numerous sites spread over a wide variety of ecosystems. Site types include rock art, lithic scatters, small temporary campsites, semi-permanent villages, burials, hunting blinds, stone walls and structures, and plant gathering and processing sites (BLM 1988).

One Bureau sensitive plant species, verrucose sea-purslane (*Sesuvium verrucosum*) is found in the wetlands. The below ONHP cell for Basin and Range wetland and aquatic ecosystems is found in the potholes area, but there is no accompanying RNA.

(9) low elevation alkaline pond with aquatic beds and marshy shore

Management goals from the existing Warner Lakes ACEC Management Plan:

This ACEC area is partitioned into three major areas, (1) core wetland, (2) grazed, and (3) meadows, for management.

- For areas 1, 2, and 3: Emphasize the preservation and protection of unique wildlife, ecological, cultural, and geological values identified within the ACEC.
- For area 1: Improve wildlife resource values, eliminating all conflicting uses, demands, and allocations.
- For area 2: Provide for increased livestock forage production, while improving the composition, vigor, and density of the present range site plant communities.
- For area 3: Place primary emphasis on improving wildlife habitat condition or enhancement while providing opportunities for other uses.

Proposed Areas of Critical Environmental Concern

Abert Rim Addition to Lake Abert ACEC

Description and values: Approximately 18,000 acres is being proposed to be added to the existing Lake Abert ACEC. The area abuts the original ACEC boundary to the east and includes the area immediately from the top of Abert Rim up to 1 mile east (see Map SMA-7). The new area being proposed is to be included in the ACEC but not included in the Lake Abert Archeological

District which is located at the base of the escarpment along Highway 395.

The portion of Abert Rim proposed to be added to the existing ACEC contains significant archaeological sites and several cultural plants and habitats. The area is considered by local Native Americans to be a traditional cultural property used for various purposes.

The proposed addition is within the Abert Rim WSA and managed under the wilderness IMP. The area is locally significant as it is part of the view landscape of the Chewaucan/Lake Abert Watershed and adds to the total picture of the escarpment. This panoramic veiwscape also has cultural significance to local Tribal people.

California bighorn sheep occur in the Abet Rim potential ACEC. This species is listed as a special status species within the Oregon BLM. It meets the relevance criteria for ACEC designation, but does not meet the importance criteria. However, habitats for California bighorn sheep occur in the Abet Rim potential ACEC. The quantity and quality of these habitats have declined over the last century due to expanding western juniper woodlands. This expansion of juniper woodland has decreased the availability of forage for bighorn sheep and has increased cover for large predators. Treatment and manipulation of some juniper within bighorn sheep range would increase the quantity and quality of bighorn sheep habitat.

This additional rim area meets the criteria for relevance and criteria for importance. The scenic and recreational values of this area, by itself, do not meet the relevance and importance criteria. However, when viewed as an extension of the existing ACEC, along with its WSA status, this area's recreational and scenic qualities add to the diversity and natural value of the original ACEC.

Visually, the area is an open bench which slopes away from the rim towards the east, and is characterized by grasslands and shrublands, with small pockets of juniper and quaking aspen. The area was originally inventoried as Visual Resource Management (VRM) Class IV due to its Scenic Quality C, background distance zone, and low visual sensitivity. However, since the area is within the Abert Rim WSA, it is managed as VRM Class I, where the management objective is to preserve the existing character of the landscape.

Black Hills Potential ACEC/RNA

Description and values: The Black Hills are a group of low-lying hills located 4 miles south of the town of Christmas Valley (see Map SMA-11). Average elevation is 4,800 feet. The unique soils of the Black Hills support two BLM Bureau sensitive plants species: snowline cymopterus (*Cymopterus nivalis*) and Cusick's buckwheat (*Eriogonum cusickii*). Total area being proposed is 3,049 acres.

The vegetation of the Black Hills is juniper woodland (including some ancient junipers over 1,000 years old), some isolated shrubs, including sagebrush and gooseberry, and a low growing perennial plant community in the exposed ash soils. The two Bureau sensitive plant species, snowline cymopterus and Cusick's buckwheat, are the primary reason for the concerns for the plants of the area. A conservation agreement is being completed between the Burns and Lakeview BLM Districts and the USFWS for the protection of these two plant species and their habitats.

The Black Hills potential ACEC/RNA fills natural area cell elements for the ONHP Basin and Range Ecosystems (ONHP 1998):

(4) Western juniper/big sagebrush/bluebunch wheatgrass
(11) Wyoming big sagebrush/bluebunch wheatgrass

The Black Hills area meets the relevance criteria as it is one of a suite of unusual ash plant communities found in southeastern Oregon to be important due to the presence of ecological diversity of junipers (many age classes), presence of disjunct ponderosa pine, and special status plant species.

The site meets the importance criteria due to the location of two Bureau sensitive plants within the proposed area. Cusick's buckwheat is limited to four small geographical areas in the Lakeview and Burns Districts of eastern Oregon.

The Black Hills site would make an important addition to the RNA system in Oregon as it contains not only a unique plant community and old growth juniper, but also it contains populations of two rare plant species. Research has been conducted in the area for over 10 years.

The Black Hills show moderate potential for geothermal resources; however, exploration and development is not likely in the short term (10 years). The likelihood of exploration and development in the long term

is not known at this time.

Connley Hills Potential ACEC/RNA

Description and values: The Connley Hills proposed ACEC/RNA is located south of Fort Rock, Oregon, and north of the Paulina Marsh in a low range of mountains called the Connley Hills (see Map SMA-12). Total area being proposed is 3,599 acres. Covering a variety of aspects and slopes and ranging in elevation from 4500 feet to 5500 feet, the hills support plant communities of western juniper, big sagebrush, and understory bunchgrasses.

The Connley Hills have significant cultural sites present which have provided important information on the prehistory of the region. While the area has not had a compete inventory, those sites which have presently been identified are significant. Some of the earliest dated cultural materials from the Great Basin have come from these sites, showing evidence of occupation from as much as 11,000 years ago (Aikens and Jenkins 1994). From a cultural resources standpoint, the age of and information provided by these sites meets the criteria for relevance and importance for the area.

The Connley Hills area fill four natural area cells in the ONHP:

(4) Western juniper/big sagebrush/bluebunch wheatgrass
(7) Western juniper/bluebunch wheatgrass
(8) Western juniper/Idaho fescue
(11) Wyoming big sagebrush/bluebunch wheatgrass

It is unusual for an RNA to fill four natural area elements that are as prominent in a physiographic province as those listed above. This is indicative of the importance of the Connley Hills to be designated as an RNA (Vander Schaff 1992). Eddleman (1999) states,." . .the Connley Hills are important. Every aspect of rangeland health depends on reference points and standards that we must obtain from the best we have. The Connley Hills qualify as an area to use for such reference points. From that standpoint alone, these hills have a high value for research. . . . these areas increase in importance as source areas for native plant genetics needed in restoration efforts. Although this aspect is not readily apparent, it shows every indication of becoming of paramount importance for obtaining genetic materials at the Province level."

This area meets the relevance criteria from a botanical standpoint as habitat essential for maintenance of species diversity and as representative of the botanical communities described by Heritage Cell Designations in Basin and Range Ecosystems (see above). The area meets the importance criteria because cell numbers 4, 8, and 11 plant communities are only represented in Oregon within the Connley Hills proposed ACEC/RNA.

This area meets requirements for a RNA with representation of four distinct ecosystems, is easily accessible for use by researchers and for educational reasons, would make an excellent outdoor laboratory for monitoring and research of native grasslands (auspiciously as seed sources).

The Connley Hills have moderate potential for geothermal resources, however the likelihood of activity in the short term is nil and unlikely in the long term. Locatable mineral potential is low, therefore the likelihood of any activity, both in the short term and long term is low. Potential for occurrence of salable minerals and oil and gas is low.

Fish Creek Rim Potential ACEC/RNA

Description and values: The Fish Creek Rim proposed ACEC and RNA is located on the rim which borders the western edge of the Warner Valley and the plateau to the west (see Map SMA-13). The area lies entirely within the Fish Creek Rim WSA. The elevations of the proposed ACEC/RNA range between 6,013 and 6,900 feet. The general vegetation is low sagebrush, a mosaic of tall sagebrush, scattered juniper, and isolated areas of quaking aspen, and other shrubs.

Fish Creek Rim has been a long standing RNA proposal that has gone through several designs. It was first proposed in 1982, then studied for 5 years. In 1987, boundaries were decided upon in a meeting with allotment users. In 1992, it was evaluated again by the ONHP (Vander Schaff 1992). ONHP recommended RNA status for the area. Total area being proposed is 8,725 acres.

The Fish Creek Rim area is known to contain high concentrations of cultural resource sites. Survey work of a systematic nature has been conducted in some areas while other areas have had site-specific project work surveys and occasional random surveys. However, this body of knowledge is sufficient to indicate the presence of many sites. The sites located here should be able to provide important data on upland site uses and patterns within the Northern Great Basin. Fish Creek Rim meets the criteria for relevance.

The Fish Creek Rim sites are of more than just local

importance. They can provide information on the use of uplands which can be applied to study of sites in other portions of the Great Basin. Work by the University of Nevada-Reno has shown that they have potential for study. Fish Creek Rim meets the criteria for importance.

California bighorn sheep occur in the Fish Creek Rim potential ACEC. This species is listed as a special status species within the Oregon BLM. It meets the relevance criteria for ACEC designation, but does not meet the importance criteria. However, habitats for California bighorn sheep occur in the Fish Creek Rim potential ACEC. The quantity and quality of these habitats have declined over the last century due to expanding western juniper woodlands. This expansion of juniper woodland has decreased the availability of forage for bighorn sheep and has increased cover for large predators. Treatment and manipulation of some juniper within bighorn sheep range would increase the quantity and quality of bighorn sheep habitat.

The proposed ACEC area has been enlarged from what was originally proposed in order to include an area of dense concentration of archaeological sites and cultural plants.

Fish Creek Rim Proposed ACEC/RNA fills a relatively large number of natural area cell elements from the ONHP, Basin and Range Ecosystems (ONHP 1998). These include:

(18) Big sagebrush-bitterbrush/Idaho fescue;
(22) Low sagebrush/Idaho fescue scabland;
(33) Mountain mahogany/ mountain big sagebrush, and where possible, bitterbrush
(35) Snowbrush and bittercherry shrub complex.

Also, present in the area are a number of cultural geophytic plants utilized by Native Americans; examples are *Lomatium* and *Calochortus* species, onions, and bitterroot (*Lewisia rediviva*).

This area meets the relevance criteria as habitat essential for maintenance of species diversity and as representative of the botanical communities described by Heritage Cell Designations in Basin and Range Ecosystems. The area meets the importance criteria as numbers 20, 35, and 41 are only represented in Oregon on Fish Creek Rim. Number 26 is also found at the Sink Lakes proposed ACEC/RNA. Also present in the area are populations of Bureau sensitive plants which add to the importance criteria because of their limited range and fragility—dwarf lousewort and nodding melic grass.

This area has a high potential for a RNA. The terrestrial ecosystem cells are unique and in need of scientific study, as are the Bureau sensitive plant species. The limited distribution and the sensitive plant species gene pools afford good opportunities for research and education. The unusual presence of white fir (disjunct) on the site is an indicator of high biodiversity and uniqueness of the area.

The eastern portion of Fish Creek Rim is within Crump Geyser Known Geothermic Resource Area, therefore, it is high geothermal potential. In reality, geothermal exploitation would most likely occur to the east below the rim and steep slopes which are outside the proposed ACEC. The remainder of the proposed ACEC has moderate potential for geothermal and oil/gas; however the likelihood of exploration and development is nil, both in the short term and the long term. The potential for occurrence of other minerals is low.

Foley Lake Potential ACEC/RNA

Description and values: The Foley Lake area was first nominated as a RNA in 1982 by the ONHP group (665 acres); in 1999, about 2,300 acres were proposed by ONHP. This area is located east of the north end of Abert Rim along the west side of the Hogback Road. The site runs southwest from the Hogback Road to the top of Commodore Ridge, and on to the small basin which contains Foley Lake. Total area being proposed is 2,747 acres. The elevation varies between 4,800 feet and 5,160 feet (see Map SMA-14).

The Foley Lake area contains a high concentration of cultural resources. Research has been completed on some sites by the University of Nevada–Reno. This work has shown that the sites cover an estimated time period from 7,000 years ago to the present (Tipps 1998). These sites are important for the study of upland resource procurement and settlement patterns. The area meets both the relevance and importance criteria in regard to cultural resources.

Foley Lake is a seasonally dry playa that in the past has had use by wild horses, pronghorn, mountain sheep, and cattle. In wet years, this vernal pool usually dries out by August. The playa has had in the past a sizeable population of Columbia cress (*Rorippa columbiae*), a Bureau sensitive species. In 1997, the Lakeview District of the BLM signed a conservation agreement with the USFWS to protect and study the plant species. However, research was started as early as 1992 when an exclosure fence was constructed to enclose part of the playa (USFWS 1996). Columbia cress is on ONHP List 1 (threatened or endangered throughout its range).

The Foley Lake site fills a natural area cell need for the ONHP Basin and Range Ecosystem (ONHP 1998a):

(26) Black sagebrush/bunchgrass community complex

Foley Lake site meets the relevance criteria as habitat essential for maintenance of plant species diversity and as representative of the botanical cell need for the ONHP. The site also meets the importance criteria, especially with the presence of the Bureau sensitive plant species, Columbia cress.

Foley Lake meets the criteria for a RNA. Research has been ongoing for 5 years. It is a unique site for studying sagebrush biodiversity, as four distinctive sagebrush species grow in very close proximity. The site is also easy to access.

Foley Lake has moderate potential for geothermal resources and oil and gas. However, the likelihood of exploration, development, or extraction activity for any of these resources is low. The potential for occurrence of other minerals is low.

Guano Creek/Sink Lakes Potential ACEC/RNA

Description and Values: The Guano Creek/Sink Lakes proposed ACEC/RNA covers 4,936 acres and is located on a high treeless plateau north and west of Guano Creek, just south of Hart Mountain Refuge, and northwest of the Shirk Ranch (Map SMA-16). It includes the canyon from the mouth of Guano Creek where it enters Guano Valley northwest to take in Bill Burr Lake. It is entirely within the boundary of the Guano Creek WSA (except Billy Burr Parcel). The elevation of the site varies between 5,300 and 5,980 feet. The landscape is marked by small areas nearly void of vegetation because of the volcanic ash content of the soils.

The site represents two natural area cell needs from the ONHP for the Basin and Range Ecosystems. These cells are described as:

Terrestrial Ecosystem—
(24) Low sagebrush/Sandbergs bluegrass scabland

Aquatic Ecosystem—
(12) Low elevation vernal pond
(15) Wyoming big sagebrush/needle-and-thread grass

The Sink Lakes area contains three ephemeral lakes (including Billy Burr Lake) which are dry playas in the drought years and pools during wet years. The playas are all ringed by silver sagebrush and surrounded by uplands that are dominated by low sagebrush grasslands. The dry lakebeds differ in their vegetative composition and may be dominated by tansy-leaf evening primrose. The middle lake or playa is best characterized as a silver sagebrush/Nevada bluegrass community.

Of primary significance in the Guano Creek area is the occurrence of the high quality natural community that is characterized by big sagebrush/needle-and-thread grass. This community is uncommon in the Great Basin and is typically found in association with sandy soils.

Also found at the site are two Bureau sensitive plant species, grimy ivesia (*Ivesia rhypara* var. *rhypara*) and Crosby's buckwheat (*Eriogonum crosbyae*). A conservation agreement is being written by the BLM and the USFWS to help preserve and study these species for their entire populations. A conservation agreement already exists in Malheur County for those populations; however, the new agreement will contain all of the other known sites (in Oregon, Nevada, and California). Both Crosby's buckwheat and grimy ivesia are on the ONHP List 1 (threatened or endangered throughout its range) (ONHP 1998).

The proposed ACEC/RNA meets the relevance criteria by providing a high priority cell need for the ONHP Basin and Range Ecosystems: big sagebrush/needle-and-thread grass community. The site meets the importance criteria with the two rare plant occurrences within the proposed ACEC/RNA. The grimy ivesia is the most northern population of this species and one of two locations in Oregon. The importance of the gene pool of those sensitive plants on a unique soil is also a very important consideration for the designation of the area.

This area also meets the relevance criteria as it protects a rare aquatic ONHP Basin and Range plant cell: the low elevation vernal pool, and partially fulfills the cell for low sagebrush/Sandbergs bluegrass scablands. The area meets the importance criteria because it is the only site for both cells in Oregon.

The area warrants designation as a RNA for research and educational studies because it protects a unique aquatic ecosystem and sagebrush scabland. There are few scabland studies in eastern Oregon, even though there are many acres of this plant community which are grazed by livestock. In removing livestock under the jurisdictional exchange between BLM and USFWS,

there is a unique opportunity for baseline successional studies and studies of fluctuations in vegetation related solely to precipitation. Vernal lakes are common, but these circular sink lakes are located only on Steens basalt. The presence to the Guano Creek riparian zone also contributes to the diversity of the site and the need for further research. Although situated in a remote area, Guano Creek meets the criteria for the designation of a RNA.

Guano Creek/Sink Lakes area shows moderate potential for the occurrence of oil and gas; however, the likelihood of activity in both the short term and long term is nil.

Hawksie-Walksie Potential ACEC/RNA

Description and values: Hawksie-Walksie proposed ACEC/RNA includes what was nominated as Hawk Mountain I, Hawk Mountain II, and Hawksie-Walksie lowland area. These areas were originally nominated in 1982. The boundary was refined in 1984 and it was proposed again in 1992 by the ONHP. The boundary at that time included approximately 1,920 acres located on the upper slopes between Acty Mountain and Hawk Mountain in the eastern portion of the Beaty Butte Allotment (Map SMA-15). The proposed ACEC/RNA is entirely within the Hawk Mountain and Sage Hen Hills WSA's and comprises 17,339 acres.

The elevation for the site ranges from 5,900 to 6,500 feet. The most important ecological characteristic about the site is the high quality grasslands. It includes representations of excellent condition big sagebrush grasslands with a mix of grass species. Grazing has been light in the area due to lack of water sources and the general remoteness of Hawk Mountain.

The Hawk Mountain areas have been nominated for their high quality grasslands. Grass species present include Idaho fescue, Thurber's needlegrass, bluebunch wheatgrass prairie junegrass, bottlebrush squirreltail, Sandbergs bluegrass, and Indian ricegrass.

Hawksie-Walksie meets the relevance criteria for creating a RNA as it contains a diversity of bunchgrasses, including the two ONHP cells (ONHP 1998):

(11) big sagebrush/bluebunch wheatgrass
(12) big sagebrush/Idaho wheatgrass

This site also meets the importance criteria as the plant communities represent an example of biodiversity in the high desert grassland steppe. This ecosystem has a variety of seed source potential for collection and replanting in southeastern Oregon. Although these sites are isolated and difficult to reach, the potential for education and research is important. The genetic variability of the grass species and steppe dynamics related to fire and grazing pressures are just a few of the potential research categories. Hawksie-Walksie meets the significance criteria as a RNA.

The Hawksie-Walksie area shows moderate potential for oil/gas and moderate potential in certain areas for base/precious metals and perlite. However, the likelihood of any minerals activity based upon history and current economics is low. The potential for all other minerals is low.

High Lakes Potential ACEC

Description and values: The High Lakes Proposed ACEC is located on a large plateau to the east of the Warner Valley and south of Hart Mountain. It extends from Highway 140 north to a line 3 miles south of the Hart Mountain National Antelope Refuge boundary (Map SMA-16).

This upland area is composed of north-south low trending valleys with intermittent lakes found within them. The elevation varies between 5,800 and 6,314 feet on Little Juniper Mountain. The vegetation is largely low sagebrush, with scattered areas of tall sagebrush and isolated stands of western juniper. A variety of shrubs are found around the lakes and in the cliff and landslide areas.

The High Lakes area contains one of the largest and most densely concentrated number of rock art sites anywhere in North America (Ricks 1995). These sites are often large with over 10,000 individual glyphs present. Extensive inventory and evaluation of the rock art of this region has been conducted (Ricks, M. personal communication). Besides the rock art, the area has extensive indications of occupation sites and the area has value as a possible traditional cultural property.

The sites in the area have the potential to provide information on site settlement patterns and many other facets of study. Evidence exists that some of rock art is more than 7,000 years old. This makes them the oldest dated rock art sites in North America. (Ricks 1995) As such, the area meets the criteria for importance.

The upland, low-sagebrush lithic soil areas contain many species of *Lomatiums* (desert parsley, biscuit root), bitterroot, sego lily, wild onions, balsamroot, big-headed clover, and other edible geophytes. Studies of

the area indicate that plants were collected and processed in the area over several thousand years. Native Americans continue to be interested in the plants of the area.

The Bureau sensitive plant species, *Agastache cusickii* (Cusick's giant-hyssop), a ONHP 2, has recently been located in the northern area of this proposed ACEC.

The High Lakes Proposed ACEC meets the criteria for relevance because of the longevity of the relationship of the Tribal people to the landscape (natural plant communities and ecosystem) they used; and because of the biodiversity of those plants and plant communities. The Native American concept of ecosystem management places the human beings within that landscape and not apart from it; this is a classic example of a remnant of that ancient system.

Two factors of the High Lakes Proposed ACEC meet the importance value: this area is more than locally significant and has qualities that make it fragile and irreplaceable. While many of the plants occur elsewhere, it is the juxtaposition of these plants to the humans (statistical correlation of the plant communities and rock art was demonstrated by Ricks [1995]), and the biodiversity and longevity of use of these plants as resources that make these plant communities significant.

Presence of known critical habitat for greater sage-grouse satisfies the criteria for relevance and importance designation as an ACEC.

The High Lakes area shows moderate potential for the occurrence of oil and gas. However, the likelihood of activity in both the short term and long term is nil. The potential for all other minerals is low.

Juniper Mountain Potential ACEC/RNA

Description and values: Juniper Mountain has been proposed as an ACEC by Dr. Richard Miller (Eastern Oregon Agricultural Research Center, 1999). Juniper Mountain is located in south central Oregon approximately four miles east of Alkali Lake. Total area being proposed is 6,335 acres. This is a relatively isolated mountain rising to over 6,000 feet elevation along the border of Lake and Harney Counties (see Map SMA-17). The area is within the High Desert Ecological Province (Anderson 1996). Most of the mountain is covered with western juniper woodland that is expanding into surrounding sagebrush/grassland steppe of mountain big sagebrush and mixed perennial bunchgrasses. Much of the woodland consists of old growth juniper. The ONHP has also nominated the area to represent a cell for Basin and Range Ecosystems (ONHP 1998):

(5) Western juniper/big sagebrush/Idaho fescue

The northern, eastern, and southern aspects of Juniper Mountain are occupied by a dense old growth juniper woodland. The overstory tree canopy is 400 to 600 years old. A few trees within the stand are estimated to be near 1,000 years old (Miller, R.E., personal communication). Tree canopy cover ranges between 30 percent on the south aspect to 50 percent on the north aspect. This stand is unique in that: (1) it is the only old growth woodland of both its size and tree density within the Klamath, High Desert, and Snake River Ecological Provinces, (2) tree canopy and density are considerably greater than the old growth juniper woodlands occupying the Mazama Province, and (3) the woodland is growing on igneous derived soils rather than the aeolian sands that typify the old growth woodlands of the Mazama Province. Juniper Mountain is an example of what much of the mountain big sagebrush alliance would look like in the absence of fire. Although there is evidence of small fires throughout the woodland, a stand replacement burn has not occurred for a least 600 years.

Juniper Mountain proposed ACEC/RNA meets the relevance criteria in providing a unique and important example of a natural system and processes for a fully mature old growth juniper woodland in the High Desert Ecological Province. It also meets the criteria by providing the ONHP cell need for Basin and Range Ecosystems:

(5) Western juniper/big sagebrush/Idaho fescue

The site also meets the importance criteria. The biological processes and plant communities on Juniper Mountain have special worth and are more than locally significant. Juniper Mountain's primary relevance as an ACEC/RNA would be for the natural processes and systems which are exhibited there.

In consideration for a RNA, Juniper Mountain would make an important addition to the RNA system in Oregon as it contains a natural system and plant community processes that are unique and in good condition. Oregon State University researchers have done a preliminary description of plant community composition, structure, and stand age on Juniper Mountain. Avian populations in both the old growth woodlands and sagebrush steppe communities have also been measured during the past 3 years. In addi-

tion, the University of Arizona and Oregon State University have collected tree ring samples for climate reconstruction. Genetic work is also being conducted on Juniper Mountain by the Intermountain Forest Service Research Laboratory in Reno, Nevada. Juniper Mountain meets the criteria for the designation of a RNA.

Juniper Mountain has moderate potential for oil and gas although the likelihood of exploration and development is nil in the short term and low in the long term. The potential for the occurrence of locatable, salable, or other leasable minerals is low, therefore no activity involving these minerals is expected.

Rahilly-Gravelly Potential ACEC/RNA

Description and values: The Rahilly-Gravelly area is located at the south end of the Warner Valley in the plateau and foothills dominated by western juniper, and tall and low sagebrush. The site runs north and south on the high hills that abut the Oregon-Nevada stateline. The elevations average 6,000 feet in the proposed area (Map SMA-18). The total area proposed is 20,127 acres.

The Rahilly-Gravelly area has been subjected to archaeological surveys more than most areas of the district. It is known to contain a wide variety and a high density of sites. It is also known to be an area which has traditional cultural property values for the plant resources which are found there. The University of Nevada–Reno, has conducted archaeological excavations at several sites within the region. Earlier, the spring sites were the focus of investigations (Fagan 1974). Several large scale archeological surveys in connection with geothermal exploration projects have been completed in the area.

Rahilly-Gravelly has significant prehistoric and historic cultural resources present. The high density of sites, the variety of sites, and the time depth of these sites, make the area important for the study of prehistory in the Northern Great Basin. The area is also known to be a plant source area important to the Northern Paiute. The area meets the criteria for relevance and importance in regard to cultural resources.

The Rahilly-Gravelly site contains scattered western juniper stands, tall sagebrush mosaic, and low sagebrush on the lithic soil flats. Prominent features of the site are the diversity of shrubs and the high quality grasses in the understory. Of particular note is the presence of squaw apple and bitterbrush along with big sagebrush in the shrub layer.

Of primary importance, the site fills the natural area cell, western juniper/big sagebrush-bitterbrush community, in the ONHP Basin and Range Ecosystems (ONHP 1998a):

(6) Western juniper/big sagebrush-bitterbrush

The BLM sensitive plant species, Cooper's goldflower (*Hymenoxys cooperi*. var *canescens= H. lemmonii*), occurs four places in the area; these four locations are the only populations for this plant in Oregon. This variety occurs at the northwestern edge of its range in Oregon, and the total range for Cooper's goldflower is southern Idaho, southward through Nevada to northwestern Arizona, and west to eastern California. The status for ONHP is List 2 (threatened with extirpation in Oregon, may be more common elsewhere) (OHNP 1998b).

From a botanical standpoint, the Rahilly-Gravelly area meets the relevance criteria as habitat essential for maintenance of species diversity and as representative of the botanical cell need for ONHP. The site also meets the importance criteria, especially with the presence of the Bureau sensitive plant species, Cooper's goldflower.

Rahilly-Gravelly meets the criteria for a RNA, and is especially important because it exists in the ecotone where the northern Great Basin meets the sagebrush/bunchgrass steppe. The presence of squaw apple, as well as the other shrubs, opens an opportunity for plant community and ecosystem biodiversity research. The variety and number of cultural sites and the research that has already taken place contributes to the importance of the area as a RNA from a cultural resources standpoint.

The northern two-thirds of the Rahilly-Gravelly proposed ACEC is within a known geothermal resource area and therefore has high potential for geothermal resources. The rest of the area has moderate potential for geothermal. The entire area has moderate potential for oil and gas. The likelihood of geothermal activity in the short term is low, but this is an important area for geothermal resource. It could be developed in the long term. The likelihood of oil and gas activity in both the short and long term is nil. The potential for occurrence of other mineral resources is low.

Presence of known critical habitat for greater sage-grouse satisfies the criteria for relevance and importance designation as an ACEC.

Red Knoll Potential ACEC

Description and Values: The name of the proposed Tucker Hill ACEC was changed to Red Knoll in order to avoid confusion with the Tucker Hill perlite mining area. Red Knoll is a geographic feature that is part of the Tucker Hill formation which is located within the larger Lake Abert/Chewaucan River drainage on the southern edge of the Chewaucan Marsh. The formation trends north and south and can be seen for a long distance (Map SMA-19). The vegetation of the area varies from greasewood/cheatgrass on sandy soil on the lower elevation area bordering Lower Chewaucan Marsh, to big sagebrush/bottlebrush squirreltail on the rocky sandy loam at the top of Red Knoll. Scattered western juniper and shrubs crown the rocky hill tops; elevations vary from 4,300 to 5,600 feet.

The Tucker hill formation has a dense concentration of cultural sites. These sites contains nearly every type of site which is known for the Great Basin region. It is also an area which has been shown to have traditional cultural values making it a potential traditional cultural property site (USDI-BLM 1996e). The density and wide variety of sites makes the area important for research and traditional cultural uses. The formation meets the criteria for relevance.

The south end of the formation is considered to be in good vegetative condition. The soils are thin but support sagebrush and diversity increases in the steep rocky areas near the hill tops where juniper, gooseberry, and long-flowered snowberry can be found. The snowberry (*Symphorocarpos longiflorus*) is a Bureau sensitive plant and requires protection. Recently a low lying prickly pear cactus (*Opuntia fragilis*) was found on the slopes of the formation. This cactus is disjunct from its normal distribution and the plant and habitat warrants study. Native bunchgrasses on the formation are bluebunch wheatgrass (*Agropyron spicatum*), needle-and-thread grass (*Stipa comata*) and Thurber's needlegrass (*Stipa thurberiana*).

A number of cultural plants are also found on the formation: *Lomatium macrocarpum, Lomatium nevadense, Lomatium nudicaule, Lomatium cambyii, Calochortus macrocarpus, Allium parvum, Mentzelia albicaulis, Orobanche fasciculata, Ribes cereum,* and the above mentioned grasses. All contribute to the biodiversity of the plant community and ecosystem structure (USDI-BLM 1996e).

While this area contains no ONHP plant community cells, it does represent a unique plant community found on extremely shallow soils. The composition of the community and the presence of the BLM Bureau sensitive plant, long-flowered snowberry, and the brittle cactus meet the criteria for relevance and importance.

Presence of known critical habitat for greater sage-grouse satisfies the criteria for relevance and importance designation as an ACEC.

The proposed Red Knoll ACEC is south of Cornerstone's Tucker Hill Perlite Mine and all the claims associated with the mine. There are no mining claims within the proposed ACEC. The north end of the proposed ACEC shows moderate potential for perlite, but the likelihood of activity is low because of the poor quality of the material. The proposed ACEC has moderate potential for geothermal and oil and gas. However, the likelihood of any activity is nil. There is moderate potential for the occurrence of base and precious metals in the vicinity of Section 18, T.35S., R.20E. The potential for the occurrence of leasable minerals is low. There are rock and gravel sites along the south perimeter of the area that have a moderate to high likelihood of being developed in the short term.

Spanish Lake Potential ACEC/RNA

Description and values: In 1992, the ONHP (Vander Schaaf 1992) proposed the Spanish Lake site for an ACEC/RNA. This site is located in the south end of the Warner Basin, south of Greaser Reservoir and northeast of Coleman Lake (see Map SMA-20). Spanish Lake is a semi-dry playa/lake that is mostly barren and surrounded by salt desert scrub. The community is much more common to the south in the Great Basin, but in Oregon, this community exists only in a few areas. Total area being proposed is 4,699 acres.

Spanish Lake has several natural plant communities of salt desert scrub and alkali greasewood. Of particular importance is the extensive shadscale-budsage/bunchgrass community that dominates the uplands to the east of the usually dry lake as well as portion of the flats surrounding the playa. ONHP considered this plant community to be in good ecological condition and to meet the requirements to fill a natural area cell need. The ONHP natural area cell need, shadscale-budsage/bunchgrass desert shrub, for Basin and Range Ecosystems is met at the Spanish Lake site(ONHP 1998a)

This community is extensive at the site covering side slopes in two sections. The bunchgrass understory consists of primarily bottlebrush squirreltail. Also present at the site is spiny hopsage, gray rabbitbrush,

and seablite. Partially represented ONHP cell needs are (ONHP 1998a):

Terrestrial ecosystems—
(33) Black greasewood-shadscale/bunchgrass playa margin vegetation

Wetland ecosystems—
(73) Bare playa with poverty weed

The Spanish Lake proposed ACEC/RNA meets the relevance criteria as it contains a diversity of salt desert scrub communities and fulfills ONHP cell needs. The area also meets the importance criteria as these communities are widespread throughout the Great Basin but have not been represented to date in the combination found at Spanish Lake in any existing RNA's. In particular, the shadscale-budsage community is not represented in any existing RNA's and thus the site is important for protecting an example of this community type.

Although found to the south in the Great Basin, this area is one of the few northern-most desert shrub communities found in Oregon, and it provides an excellent laboratory to study the biodiversity and resilience of these plant communities. It is believed that these spiny plant communities arose in the Pleistocene under the foraging pressures of now extinct mammals; the occurrence this far north offers unique possibilities for genetic studies of the individual plant species. The area meets the criteria for establishing a RNA.

Spanish Lake has moderate potential for lakebed evaporites, geothermal, and oil/gas. However, the likelihood of exploration and development of any of these minerals is low, with the possible exception of geothermal resources. The potential for occurrence of all other minerals is low.

Table Rock Potential ACEC

Description and values: Table Rock, formed by steam explosions resulting from rising magma encountering ground or surface water, is one of several basaltic maar volcanoes found in the Silver Lake/Fort Rock area. Table Rock dominates the area east of the town of Silver Lake and southwest of Christmas Valley (see Map SMA-21). It rises to an elevation of 5,621 feet and covers 5,891 acres. The vegetation on the formation is juniper, including some ancient trees, tall sagebrush, and areas of low sagebrush. The volcanic soils support two BLM Bureau sensitive plants: Cusick's buckwheat (*Eriogonum cusickii*) and snowline cymopterus (*Cymopterus nivalis*).

The Table Rock formation has been extensively inventoried for cultural resources as part of BLM project work, power line rights-of-way inventory and archaeological research projects. Excavations have been conducted at several site locations over a 50-year period. The formation is known to have many sites present (Aikens and Jenkins 1995; Paul-Mason 1993 [in Aikens and Jenkins]).

The area has significant cultural values present on the formation. The area has a high density of unique site types such as rock cairns, caves, and rock alignments. The area meets the criteria for relevance.

The sites of the formation are important for the study of the prehistory and ethnography of the region. The area meets the criteria for importance.

The towering basalt column of Table Rock with its surrounding maar is a significant visual feature on the landscape, with dramatic relief in form and color. Vegetation changes between grasses and juniper stands provide added contrast. It is a dominant feature visible from Highway 31, which is a designated state and Federal Oregon outback scenic byway, and to County Road 5-14F, which is part of a national back country byway. The area was inventoried and is managed as VRM Classes III and IV.

Although VRM management classes are low, Table Rock's location adjacent to the Christmas Valley National Back Country Byway and the Oregon Outback State and National Scenic Highway, makes it more than locally significant. Table Rock possesses regionally important scenic value. Therefore, it meets the relevance and importance criteria.

Although the proposed area does not contain any ONHP plant community cells, it does represent a variety of specialized plants communities found on dry rocky volcanic soils. The presence of two BLM Bureau sensitive plants adds to the ecological biodiversity of the area. Cusick's buckwheat (*Eriogonum cusickii*) is on ONHP List 1 (threatened or endangered throughout its range). There are a few isolated Cusick's buckwheat plants located within the ash soils on the north part of the formation. The snowline cymopteris (*Cymopteris nivalis*) is more prevalent and is found along the top of the formation tucked into the protective rocks, under the junipers, and in some places out in the open ash soils. The snowline cymopteris is on ONHP List 2 (threatened with extirpation in Oregon, may be more common elsewhere). The

Lakeview and Burns BLM Districts are in the process of finalizing a conservation agreement with the USFWS to conserve the future of both plant species.

The Table Rock area meets the relevance criteria as habitat essential for maintenance of plant species diversity and meets the importance criteria, especially with the presence of the Bureau sensitive plants species: Cusick's buckwheat and snowline cymopterus. Much more research is needed on the genetics and physiology of these "ash flow plant" communities. The ease of getting to this site is an important factor to encourage future research. The juniper forests combined with the forb communities, including the sensitive plants, meet the criteria for a RNA on Table Rock.

Table Rock has moderate potential for the occurrence of geothermal resources; however, the likelihood of activity is nil. The potential for occurrence of other minerals is low.

Areas Nominated for Designation and Rejected

Table I-1 lists areas that were nominated for designation as ACEC's, but upon evaluation by the resource area staff were found not to meet the relevance and/or importance criteria. These areas were then dropped from further consideration.

Table I-1(A-ACEC).—*ACEC's proposed but found not to meet relevance and importance critera*

Proposed ACEC	Reason not approved
Alkali Lake toxic waste site	Site is not a part of the natural system
Bull Lake	Values are covered in Fish Creek Rim proposed ACEC
Christmas Lake	Values are not significant (lake has been dry since early 1900's)
Coleman Lake	Values are represented by other designations
Crane Mountain Front	Special status plants are not presently threatened (to be covered in USFWS conservation agreement for *Eriogonum prociduum*)
Elymus triticoides site	Cell represented elsewhere in Oregon
Guano Valley	Values are not significant
Plush Road	Foley Lake proposed ACEC represents the black sagebrush community cell
Pot Holes	*Orellana* spp. area values are not significant
Powerline Playa	Values are better represented elsewhere
Pronghorn	See Chapter 3, Overview of the Alternatives section, Alternatives Considered but Eliminated from Detailed Analysis subsection
Silver Lake Wildlife Management Area (BLM/Fremont National Forest)	USFS designated but BLM values were not significant
Silver Lake/Duncan Area	Values are better represented elsewhere and not significant

Appendix J — Wilderness and Wild and Scenic Rivers

J1: Wilderness Study Areas

Devils Garden WSA (OR-1-12)

The Devils Garden Lava Bed WSA is located in Lake County, about 60 miles southeast of Bend, Oregon, and 8 miles north of the small town of Fort Rock. The boundaries are primarily defined on the east by private land, vehicle ways, and low-standard dirt access roads associated with a powering rights-of-way. On the north, west, and south, land ownership and low standard roads define the WSA boundary. Devils Garden WSA encompasses approximately 29,680 acres. Approximately 28,160 acres within this WSA are recommended for wilderness designation and 1,520 acres are recommended to be released for uses other than wilderness.

The Devils Garden WSA has high wilderness values, is generally free of human activity, and appears to have been affected primarily by the forces of nature. The area possesses outstanding opportunities for solitude because of its large size, rugged topographic features, and vegetative screening. Outstanding opportunities for primitive recreation include hiking, hunting, photography, spelunking (cave exploring), sightseeing, and nature study. The extent and diversity of volcanic features, plant communities, ecological interrelationships, and recreation opportunities offer a unique matrix of wilderness values.

Three small parcels make up the 1,520 acres recommended nonsuitable for wilderness designation. One parcel, which is outside the main lava flow, contains vehicle trails, fence lines, and low wilderness values. Topography and the ownership pattern would make controlling access difficult after designation. The second parcel contains crested wheatgrass seeding, which offers no opportunity for solitude. The third parcel presents an awkward ownership configuration and lacks wilderness values such as naturalness and solitude.

Squaw Ridge Lava Bed WSA (OR-1-3)

The Squaw Ridge Lava Bed WSA is located approximately 80 miles southeast of Bend and 26 miles from State Highway 31 in Lake County, Oregon, and approximately 12 miles northeast of the town of Fort Rock. The boundaries are described by high-standard gravel roads on the south, private land and 1.5 miles of low-standard dirt road on the west, a low-standard dirt road on the north, and low- and high-standard dirt roads on the east. Small portions of the east and north boundaries are formed along private land. Squaw Ridge WSA encompasses approximately 28,340 acres. Approximately 21,010 acres within this WSA are recommended for wilderness designation and 7,330 acres are recommended to be released for uses other than wilderness.

Squaw Ridge WSA is roughly circular in shape, is dominated by an extremely rugged basalt flow, which issues from what is now called Lava Butte, and forms a flattened cone covering approximately two-thirds of the study area. Elevation ranges from 4,300 to 5,585 feet at the summit of Lava Butte near the center of the WSA. The WSA appears to be predominantly natural with negligible human imprints. This natural character is emphasized by abundant native vegetation throughout the WSA and by undisturbed lava features. The WSA is located in an ecotone between the sagebrush steppe and ponderosa pine forest and thus contains an assemblage of plants found in both ecosystems. The WSA is known for its variety of volcanic features, including sharp and convoluted "`a`a" lava, flat-featured and smooth-surfaced pahoehoe lava, collapses, tumuli (fractured basaltic domes), cinder cones, squeeze-ups (lava forced through fissures), spires, and ropy lavas.

The opportunities for solitude are outstanding in the entire WSA, which includes the area recommended for wilderness designation. The opportunities for primitive and unconfined recreation such as day hiking, backpacking, tent camping, sightseeing, photography, caving, and exploring the lava features are outstanding throughout the WSA. The areas recommended as nonsuitable for wilderness lie outside the lava flow on all four sides of the WSA. The primary rationale for nonsuitable recommendations was to allow for future livestock development.

Four Craters Lava Bed WSA (OR-1-22)

The Four Craters Lava Bed WSA is located in Lake County, Oregon, approximately 60 miles southeast of Bend, Oregon, and 8 miles north of the small town of Christmas Valley. Roughly oval in shape, the study

area is bounded on the west and north by a low-standard dirt road and on the east and south by private land. A paved county road bounds the WSA on the southeast for approximately 2 miles. Four Craters WSA encompasses approximately 12,600 acres. Approximately 9,100 acres within this WSA are recommended for wilderness designation and 3,500 acres are recommended to be released for uses other than wilderness.

Four Craters WSA is divided into two distinct land types. The first type is the rugged "`a`a" lava flows and cinder cones, and the second type is sagebrush/grassland flats. The WSA contains the Crack-in-the-Ground, a tension fracture in the basalt that is approximately 2-miles long, 10 to 30-feet deep, with a maximum width of about 20 feet.

The suitability recommendation recognizes the high wilderness values of the area, values which are considered to outweigh use of the area for resource development such as cinder pits. The WSA is in a natural condition and is primarily affected by the forces of nature. There are unique natural features in the lava flow evidencing relatively recent volcanism, including the four cinder cones for which the WSA is named (The Four Craters).

Primitive recreation opportunities are outstanding within the WSA. Day hiking opportunities are plentiful and backpacking trips are also available. Hunting occurs as a primitive, nonmotorized opportunity. Wildlife viewing and photographic opportunities are outstanding. Crack-in-the-Ground is a one-of-a-kind feature with cool temperatures, grasses, and ferns inside the crack in dramatic contrast to the desert landscape just above. The WSA offers outstanding opportunities for education, sightseeing, photography, and nature study.

There are two parcels within this WSA which are recommended as nonsuitable for wilderness. The first parcel has a boundary convoluted by private land ownership, which means the area would be heavily influenced by the activities on these private lands. The second parcel lacks any substantial opportunities for solitude or primitive recreation, and natural values are low.

Sand Dunes WSA (OR–1-24)

The Sand Dunes WSA is located in Lake County, 9 miles northeast of the small town of Christmas Valley, Oregon, and about 70 miles southeast of Bend, Oregon. It is approximately 30 miles northeast of Oregon Highway 31, and 30 miles west of U.S. Highway 395. Low-standard roads define the boundaries on the north and east, a 750 kilovolt powering rights-of-way on the west, and legal land subdivisions on the south. Much of the land outside the area is public land managed by the BLM and is used primarily for recreation and grazing. Sand Dunes WSA encompasses approximately 16,040 acres. The recommendation for this WSA is to release the entire area to uses other than wilderness.

The majority of this WSA is characterized by unstable sand dunes, which rise to a maximum height of about 60 feet. The Sand Dunes WSA is the largest inland moving sand dune system in Oregon and possibly the Pacific Northwest. This WSA appears to be in a generally natural condition. This natural appearance is maintained by the shifting sand which quickly alters evidence of human activity. A 960-acre portion of the Lost Forest RNA is within the WSA. The Lost Forest RNA consists of a disjunct stand of ponderosa pine occurring in a climate lower in rainfall than that normally associated with this vegetation community. The opportunity for primitive recreation in the WSA is outstanding. Recreation activities include photography, hiking, camping, and nature study.

Wilderness values within this WSA are limited to the central core of the dunes. The majority of the area lacks the degree of wilderness values necessary for a recommendation to designate the area as wilderness. It is not possible to manage the Sand Dunes WSA to preserve its wilderness characteristics. The open terrain, easy access from existing roads, and the long-standing public acceptance and encouragement of OHV use in the sand dunes would require an extensive range of actions to enforce OHV exclusion.

Diablo Mountain WSA (OR-1-58)

The Diablo Mountain WSA is located in Lake County, Oregon, approximately 110 miles southeast of Bend, Oregon. The south end of the WSA is 5 miles northwest of the small town of Paisley, Oregon. Low-standard BLM dirt roads form the boundaries on the east and south. The boundaries are formed by the medial line of Summer Lake on the west, private lands on part of the south and north, and a high-standard BLM road on a portion of the north boundary. The Summer Lake State Game Management Area forms part of the northwest boundary. The Diablo Mountain WSA encompasses approximately 113,120 acres. Approximately 90,050 acres within this WSA are recommended for wilderness designation, while 23,070 acres are recommended to be released for uses other

than wilderness.

The Diablo Mountain WSA is essentially in a natural condition. It is characterized by several long north-to-south ridges, rising in elevation to the summit ridge of Diablo Mountain on the east side, where the steep scarp of Diablo drops some 1,500 to 2,000 feet. The western half of the WSA has low, rolling terrain and salt flats on the playa adjacent to Summer Lake. The recommendation would provide for the addition of a unique combination of ecosystems (Intermountain Sagebrush Province/Sagebrush Steppe and Saltbrush-greasewood) to the national wilderness preservation system. At present, there are no similar wilderness areas containing both of these ecosystems.

Wilderness values within this WSA include outstanding opportunities for solitude, primitive and unconfined recreation (hiking and wildlife observation), and the preservation of habitat for wildlife. The Diablo Mountain WSA has been selected by ODFW for the reintroduction of California bighorn sheep, a candidate species for Federal listing under the "Endangered Species Act."

There are three parcels totaling approximately 23,070 which are recommended as nonsuitable for wilderness designation within this WSA. One parcel is considered suitable for exploration and development for oil, gas, and geothermal energy. The second parcel would be available for completing land exchanges for lands which have high wilderness values and are located within the WSA. The final parcel would allow for intensive grazing management.

Orejana Canyon WSA (OR-1-78)

The Orejana Canyon WSA is located in Harney County, Oregon, 30 miles northeast of the small town of Plush, Oregon. U.S. Highway 395 is located 35 miles to the west of the WSA, and Oregon State Highway 140 is approximately 40 miles to the south. The southern, eastern, and northern boundaries of the WSA are defined by low-standard roads and the western boundary is defined by a low-standard road for approximately 5 miles and by a way for approximately 7 miles along the base of Orejana Rim. Approximately 14,800 acres of Orejana Canyon WSA is recommended suitable for wilderness, and a total of 9,800 acres is recommended for release for uses other than wilderness.

The WSA is characterized by the 500-foot high Orejana Rim and the 8.5-mile long Orejana Canyon, which runs most of the length of the WSA from north to south. Five small side canyons run along the length of Orejana Canyon. Overall, the WSA appears to be generally natural, whereas the area within Orejana Canyon and on The Island are predominantly natural. Orejana Rim is an example of the distinctive basin and range topography of southeastern Oregon. It contains exceptional geologic and paleontological features such as unique obsidian flows and fossil remains. The nonsuitable area contains vehicle trails, reservoir mounds, and impacts of man that detract from the natural perspective of the landscape.

There are outstanding opportunities for primitive and unconfined recreation in the area of the WSA recommended suitable for wilderness designation. Opportunities for solitude are available in the Orejana Canyon and on The Island between Orejana Rim and the canyon. The face of Orejana Rim offers several unique opportunities for sightseeing (obsidian flows and paleontological features) and hiking. Primitive recreation including hiking, photography, and nature study is best in the canyon and along the rim.

Abert Rim WSA (OR-1-101)

The Abert Rim WSA is located 26 miles north of Lakeview and 3 miles northeast of Valley Falls, Oregon. The boundaries of the WSA are defined by the rights-of-way of Highway 395 and private land on the west, private land on the south, primarily low-standard dirt roads and some private land on the east, and a powering rights-of-way on the north. The Abert Rim WSA encompasses approximately 23,760 acres. The recommendation is to designate all 23,760 acres as wilderness.

The Abert Rim WSA offers one of the most spectacular geologic sightseeing views in eastern Oregon. It rises 2,000 vertical feet above Lake Abert. It is one of the largest exposed fault scarps in North America and is a major attraction in this region of the State. The study area appears to be in a generally natural condition and is primarily affected by the forces of nature.

Opportunities for solitude are outstanding in the WSA, especially in the southern half, both on the rim and along portions of the scarp. There are excellent opportunities for primitive and unconfined recreation including hiking, backpacking, hunting, camping, sightseeing, photography, wildlife observation, and horseback riding. In combination, the exhilarating scenic views, the variety of topography and wildlife, and the wooded areas and springs offer outstanding recreational opportunities.

Fish Creek Rim WSA (OR-1-117)

The Fish Creek Rim WSA is located immediately north of Adel, Oregon, and approximately 30 miles east of Lakeview, Oregon. The boundaries of the WSA are defined by state and private lands on the north and east, mostly by a low-standard dirt road on the west, and by powering and highway rights-of-way adjacent to Highway 140 on the south. The Fish Creek Rim WSA encompasses approximately 16,070 acres. Approximately 11,920 acres are recommended for wilderness designation and 4,770 acres are recommended to be released for uses other than wilderness.

The Fish Creek Rim WSA is in an essentially natural condition and has been primarily influenced by the forces of nature. The primary feature of the WSA is the east-facing scarp of Fish Creek Rim, which rises 1,500 to 2,000 feet above the Warner Valley. Fish Creek Rim is part of a series of steep fault-block scarps which form the basin and range topography of much of southeastern Oregon. Approximately 1,000 acres of a proposed 1,280-acre RNA lies within this WSA.

Opportunities for solitude are outstanding within most of the WSA, particularly in the wooded areas containing mountain mahogany or juniper below the rim. Primitive recreational opportunities are outstanding. Hiking terrain varies from easy to extremely rugged on the east-facing scarp, and there are many good camping areas located above the rim. There are excellent opportunities for pronghorn and mule deer hunting, or observation and photography of mammals, birds, plants, geologic formations, and rock art. Sightseeing from the rim is spectacular.

There are three areas within the WSA not recommended for wilderness designation. These areas are recommended nonsuitable because of the presence of television repeater and microwave tower sites, several powering rights-of-way, livestock water holes, and the exposure to high volumes of traffic on Highway 140.

Guano Creek WSA (OR-1-132)

The Guano Creek WSA is located approximately 67 miles northeast of Lakeview, Oregon, in southern Lake County. Oregon State Highway 140 passes 12 miles south of the WSA. The boundaries are defined by low-standard dirt or gravel roads with the exception of approximately 1.5 miles along the eastern edge following the boundary of the USFWS Shirk Ranch (fence line) and an indentation of private land in the north. The WSA encompasses approximately 10,350 acres. The recommendation is to designate all 10,350 acres within this WSA as wilderness.

The study area is characterized by open and gently rolling sagebrush-covered terrain which is broken by shallow and intermittent drainages, rims, and the canyon of Guano Creek. The WSA is in a natural condition and has been primarily affected by the forces of nature. Designation as wilderness would preserve significant natural values such as the presence of rare plants and native plant communities, paleontological resources, and habitat for the Sheldon tui chub and the greater sage-grouse. The Sheldon tui chub and the greater sage-grouse are candidate species for listing under the “Endangered Species Act.”

There are outstanding opportunities for solitude in Guano Creek Canyon along broken rims and in the vicinity of the tufaceous cliffs in the eastern portion of the WSA. Primitive recreation opportunities such as hiking, camping, horseback riding, wildlife observation, and plant studies exist throughout the WSA. Antelope hunting is good in the area.

Spaulding WSA (OR-1-139)

The Spaulding WSA is located 18 miles east of Adel, Oregon, in both Lake and Harney Counties. The boundaries are defined by the rights-of-way of Oregon State Highway 140 for approximately 3 miles on the southwest, a high-standard dirt road on the west, and low-standard dirt roads on the north, east, and south. The WSA boundary extends up the deadend road to Spaulding Reservoir and around a 320-acre parcel of private land adjacent to this road. The WSA contains approximately 69,530 acres. The recommendation for this WSA is to release all of it to uses other than for wilderness designation.

The WSA is in a predominately natural condition and primarily affected by the forces of nature. Evidence of recent human activity is extremely isolated and unobtrusive when considering the area as a whole. Because of the large size and remote location of the Spaulding WSA, outstanding opportunities for solitude exist over most of the area. Primitive recreation opportunities are outstanding for day hiking, backpacking, camping, nature study, photography, hunting, horseback riding, and general sightseeing in most of the WSA. Primitive hunting and backpacking opportunities are excellent.

Although the WSA has outstanding wilderness values (such as limited human activity and outstanding opportunities for solitude and primitive recreation), the recommendation to release all of the WSA to uses other than wilderness recognizes that the benefits of retaining

options to increase livestock forage production, improve deer and pronghorn habitat, and develop mineral resources outweigh the benefits of preserving the area's wilderness values.

Hawk Mountain WSA (OR-1-146A)

The Hawk Mountain WSA is located in southern Harney County, approximately 73 miles east of Lakeview, Oregon. U.S. Highway 140 passes 5 miles southwest of the WSA. The boundaries are described by a high-standard gravel road on the northwest, private land and a fence line on the north, low-standard dirt roads on the northeast and southwest, and the Charles Sheldon National Wildlife Refuge on the south. Approximately two-thirds of the study area is in the BLM's Lakeview District and approximately one-third is in the Burns District. The WSA contains approximately 69,640 acres, of which 45,604 acres are within the LRA. The recommendation for the Hawk Mountain WSA is to designate all 69,640 acres as wilderness.

The WSA is in a very natural condition and appears primarily affected by the forces of nature. Approximately 300 acres of the 440-acre Long Draw RNA lie within the WSA. The Long Draw area contains a number of special features such as the scenic contrast in color of exposed soils and the various types of vegetation on the hills flanking the draw. The Hawk Mountain WSA is within an ecosystem type (intermountain sagebrush/sagebrush-steppe) which is represented in the national wilderness preservation system in only three areas.

Opportunities for solitude are outstanding throughout the study area. The north, northeast, and eastern portions of the WSA have mountainous terrain with draws, valleys, ridges, and canyons among which a person can easily find isolation. There are outstanding opportunities for a wide range of primitive recreation activities including day hiking, backpacking, horseback riding, hunting, and camping. The eastern half of the WSA offers the more rugged and challenging hiking terrain, while the central and western portions offer the most opportunities for wildlife observation.

Wilderness designation would help to preserve the very natural condition of Hawk Mountain WSA. The wilderness values would outweigh the benefits that would be foregone from any energy and mineral development or livestock developments.

Sage Hen Hills WSA (OR-1-146B)

The Sage Hen Hills WSA is located in southwestern Harney County, Oregon, approximately 73 miles east of Lakeview, Oregon. State Highway 140 is adjacent to the southwest corner of the WSA. The study area is bounded by a high-standard gravel road on the west and by a low-standard dirt road on the northeast. The southern boundary is adjacent to the Sheldon National Wildlife Refuge. The adjacent areas on the north, east, and west are also public lands. The WSA contains approximately 8,520 acres. The recommendation is to release all 8,520 acres to uses other than wilderness.

The WSA is in a natural condition and is primarily affected by the forces of nature. There is one unnatural feature, a small reservoir near the northeast boundary road. The WSA is characterized by low, rolling sagebrush hills with moderate topographic relief.

Opportunities for solitude within the WSA are not considered outstanding because of the moderate topographic relief and low vegetative cover of most of the area. Outstanding primitive recreation opportunities for backpacking, day hiking, horseback riding, camping, and wildlife observation exist only if the 8,520-acre WSA is considered in conjunction with the adjacent refuge land.

The benefits derived from 900 acres of burn and seed range developments for livestock and wildlife and projected mineral development are judged to outweigh the limited wilderness values found on the BLM portion of Sage Hen Hills.

J2: Wild and Scenic River Suitability Determinations

Guano Creek

Characteristics which do or do not make the area a worthy addition to the national system

Guano Creek is relatively remote and is characterized by open and gently rolling terrain broken up by shallow intermittent drainages, rims, and canyon landscapes. The upper portion of the creekbed is broad and open where the creek flows between sagebrush benches; the last several miles are located in a more deeply incised, curving canyon with large, dark boulders strewn along the bottom.

Guano Creek is an intermittent stream which typically

flows from March or April until July or August. During the wet period, the water is used for irrigation downstream near the historic Shirk Ranch. The Beaty Butte Grazing Association has responsibility for release of the water from Jacob's Reservoir for irrigation, and controls flows during June and July when the overflow usually has ceased. The Guano Creek study corridor covers the portion of the stream which is located below Jacob's Reservoir and continues downstream for approximately 10.6 miles. Jacob's Reservoir is the upper limit of the free-flowing stretch of the stream. The study corridor does not include the portion of the stream adjacent to the Shirk Ranch because of the presence of several water diversion structures.

Guano Creek acts as a biological corridor between the highlands of Hart Mountain and the valley floor of Shirk Lake/Guano Lake. The vegetative communities of Guano Creek are unique in Oregon and represent a desert intermittent stream system between lower and higher elevations. The BLM segment of Guano Creek is a typical, intermittent Great Basin desert stream with little willow or no shrub development in the riparian zone. However, two BLM sensitive plant species occur within the river corridor—Crosby's buckwheat and grimy ivesia. The occurrence of these sensitive plant species within the stream corridor are a botanical outstandingly remarkable value. While they do not occur within the riparian zone, their proximity to the stream corridor and possible dependence on the mitigating climate of the river creates unique plant communities of national and regional significance. The area of the study corridor where these plants are located is also part of the proposed Sinks Lake/Guano Creek ACEC. Cultural plants found within the stream corridor include Great Basin wildrye, Indian ricegrass, yampa, and blue camas.

The current status of land ownership and use in the area

a. There are approximately 2,734 acres within the 0.5-mile wide and 10.6-mile long stream corridor on BLM-administered land. The upper reaches of Guano Creek are located on lands administered by the USFWS. Jacob's Reservoir is located on USFWS lands and the BLM administers the lands downstream from the reservoir.

b. Associated or conflicting uses:

1. *Current management:* Guano Creek is located within the Guano Creek WSA and management of the area is under the wilderness IMP. Visual resources were originally assigned as VRM (visual resource management) Class III and IV. However, because Guano Creek area is designated a WSA, the visual resources are managed as VRM Class I. If Guano Creek WSA is not congressionally designated a wilderness area the VRM class would revert back to VRM Class III and IV, unless changed through the land management planning process.

2. *Energy and minerals:* No mining claims or oil and gas leases are located near Guano Creek. The potential for locatable minerals is very low. There is a medium potential for the existence for oil and gas with a B level of certainty. The geothermal potential is low with a B level of certainty. The lakebed evaporite potential is low to medium with a C level of certainty.

3. *Water resource development:* There are currently no applications for additional development for storage, irrigation, or power production. There is the potential for development of power but the physical suitability is unknown. A small hydropower or storage system could be built, but there are no applications at this time nor have there been any in the past. The potential for power development is considered very low. There are no existing water resource developments within the study corridor, but there are dams and diversion ditches above and below the study area.

4. *Transportation, facilities, and developments:* Access to Guano Creek is via 15 miles on an unmaintained BLM road. Along the stream corridor there is a way which parallels the upper 1.5 mile of the corridor and then crosses the creek. Along the last mile there is a way which also parallels the creek. There are no developed roads or trails along the corridor.

5. *Recreation:* Opportunities exist along the corridor for hiking, camping, sightseeing, photography, and hunting. Overall, recreation use appears to be very low and is associated mainly with hunting for deer, pronghorn, and upland game birds. Fishing is usually restricted to Guano Creek above Jacob's Reservoir. Water levels are consistently too low for any boating activities. The recreation uses along the corridor are fairly typical for the surrounding area and it is anticipated that recreational use would not increase significantly over time.

6. *Wildlife and fisheries:* (Fisheries) Because Guano Creek is an intermittent stream, it does not

contain significant populations of fish. There have been releases of cutthroat (about 1957) and rainbow trout (about 1963) in the upper perennial reaches (portion administered by USFWS) of the stream where these fish persist. On very high water years these fish may be washed downstream from the perennial habitats into the corridor where there is no permanent habitat for them. Sheldon tui chub, a Federal species of concern, Bureau sensitive and ODFW sensitive-critical species is found the Shirk Ranch in very high water years when they are washed down from their habitats on the Sheldon Refuge to the south. They may move into the lower portion of the study reach, but there is no permanent habitat for this species within the corridor.

(Wildlife) A moderate number of mule deer and pronghorn reside within the corridor. Although the corridor lies outside of crucial winter range for pronghorn it is considered crucial kidding habitat. Greater sage-grouse have been observed within the corridor. There are 24 known strutting grounds located within 1 to 10 miles of the stream corridor. However, no crucial nesting or wintering habitat is known to occur within the corridor.

Other terrestrial animals common to the High Desert region reside within the stream corridor, including bobcats, rabbits, porcupines, red-tailed hawks, golden eagles, American kestrels, great horned owls, amphibians, reptiles, squirrels, and a large variety of birds including cavity nesters.

7. *Streamflow:* The Guano Creek watershed is typical of streams in the northern Great Basin. It has a snowmelt dominated streamflow regime. The amount and timing of streamflow is dependent on the climate and fluctuates yearly and seasonally. Guano Creek Watershed drains an area of approximately 62 square miles. There are no formal gaging stations in the watershed, but a water availability study was completed in 1993. The "Guano Creek Water Availability Study" (Division of Engineering, Region One, Fish and Wildlife Service, April 1993) determined through modeling that Guano Creek would have, 80 percent of the time, 2,898 acre-feet annually. A BLM review of this report found this amount to be an overestimation of annual water production but did not estimate the amount of water production.

8. *Geology:* Guano Creek is located in the northwestern corner of the Basin and Range Physiographic Province, just south of the High Lava Plains. The area is characterized by a broad, uneven plateau, 4,000–5,000 feet above sea level. The upper reaches of Guano Creek primarily consist of Tertiary-age basalt flows dissected by a northwest-trending zone of en echelon faults. The lower reaches of Guano Creek cut through Tertiary-age tuffaceous and pumiceous sedimentary rock and locally-welded tuffs. The course of Guano Creek is largely controlled by the faulting in the area.

9. *Cultural resources:* (Prehistoric) The general vicinity of Guano Creek is within an area which contains numerous archaeological sites, several of which occur within the stream corridor. Site types known to exist in the Guano Creek area include rock art, stone rings, lithic scatters, and temporary campsites. The ethnographic information available indicates that the area could have been used by either the Burns Paiute Band or the Fort Bidwell Band or both. The settlement/subsistence pattern of these groups is described as following the seasonal round.

(Historic) Historic use of the region began with the military in the 1860s. Occupation of the area by ranchers began at this time with livestock grazing the primary use. The Shirk Ranch, which is located at the south end of the stream corridor, is representative of the early settlement in the area. Although located along the stream corridor, this portion of Guano Creek was dropped from consideration as eligible for classification within the national wild and scenic river system because of the presence of several water diversion structures.

10. *Vegetation:* Guano Creek is an important and unique river; it is considered a biological corridor between the highlands of Hart Mountain and the valley floor of Shirk Lake/Guano Lake. The portion of Guano Creek on BLM-administered lands is a typical, intermittent Great Basin desert stream with little willow or shrub development in the riparian zone. The corridor is a green braid of sedges, grasses, and forbs within the gray of the sagebrush shrub steppe. Occasional junipers fringe the stream corridor.

Two BLM sensitive plant species occur within the stream corridor. Crosby's buckwheat and grimy ivesia grow on the ashy soils bordering the stream (outside of the riparian area). Both of these plant species are species of concern for the Federal government, appear on List 1 for the ONHP Data Base, and are considered endangered by the State

of Oregon.

Both aquatic buttercup and fringed water-plantain have also been found within the stream corridor. The riparian zone contains small stands of Great Basin wildrye interspersed with sedges and forbs. Cultural plants within the stream corridor include Great Basin wildrye, Indian ricegrass, yampa, and blue camas. American Natives from local Tribes are currently not using the area. However, this could change in the future.

11. *Grazing:* Per the Hart Mountain Jurisdictional Transfer, dated October 30, 1998, Congress directed management of lands within the Guano Creek WSA be managed so as not to impair the suitability of the area for designation as wilderness, in accordance with current and future management plans and agreements (including the agreement known as the "Shirk Ranch Agreement," dated September 30, 1997), until such date as Congress enacts a law directing otherwise. Under this agreement grazing is excluded from the Guano Creek WSA which includes the study area for Guano Creek.

12. *Other:* (Wilderness) The stream corridor is within the Guano Creek WSA and contains many features which give the study area its wilderness character. Wilderness designation would preserve significant natural values and resources in the existing Guano Creek WSA such as sensitive plant species and other native plant communities, some of which are found along the Guano Creek corridor. Opportunities for solitude are excellent along the canyon and broken rims of the stream corridor.

Affected potential uses if designated or not designated

a. Reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the national system.

1. Enhanced: Because the Guano Creek study corridor is located within the Guano Creek WSA, there would be minimal additional protection by inclusion of Guano Creek in the national system. Grazing is excluded from the study corridor.

2. Foreclosed: Hydroelectric power development would be foreclosed under a wild designation. Under wilderness designation hydroelectric development would be possible, but not probable.

3. Diminished: Because Guano Creek is located in the WSA, inclusion in the national wild and scenic river system would not diminish potential uses above and beyond what is restricted under the existing WSA designation or possible congressional designation as wilderness in the future.

b. The values which could be foreclosed or diminished if the area is not protected as part of the national system.

1. Foreclosed: Expansion of the national wild and scenic river system.

2. Diminished: No values would be diminished because of the existing WSA designation and possible congressional designation as wilderness in the future. The botanical outstandingly remarkable values would also receive protection through the possible designation of the Sinks Lake/Guano Creek ACEC which covers the portion of the study corridor where two sensitive plant species are found.

The Federal agency that will administer the area should it be added to the national system

The BLM would be the sole agency responsible for administration of the area if it where added to the national system.

The extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state and local agencies

It is anticipated that costs associated with the administration of the river would be the sole responsibility of the BLM. Local public interest in designation is thought to be low to moderate.

Estimated costs of administering the area if it is added to the national system

a. The following are expected funding requirements for the Guano Creek if designated:

General administration: (recurring activities such as patrols, monitoring, cleanup, etc.); no change in annual costs from current administration because of existing WSA status of the area, and possible designation of an ACEC where rare plants occur within the study corridor.

Costs of implementation: (one time costs such as

boundary posting, map development, includes printing costs and district work month costs)— $10,000–$15,000.

Development of management plan: (District and state office work month costs, document printing)— work month costs = $15,000–$20,000; document production = $2,000.

Development costs: (capital investment costs for facilities etc.)— none.

Operation and maintenance costs: (recurring costs associated with maintenance of facilities)—none.

A determination of the degree to which the state or its political subdivisions might participate in the preservation and administration of the river should it be proposed for inclusion in the national system

It is not anticipated that any state or local governmental entities would participate in the administration or preservation of Guano Creek if it is proposed for inclusion in the national wild and scenic river system.

Ability of the agency to manage the river area (segment) as a wild and scenic river

The LRA would have the ability to manage the river segment as part of the national system. Recreational use is limited. The river does not offer water-related activities such as boating, canoeing, or kayaking. The main recreational activities are hunting, fishing (on high water years), photography, hiking, camping, and sightseeing. These recreation activities are not intensive and there are no developed recreation opportunities planned. Development relating to fisheries is not anticipated. Overall management of the stream corridor would be consistent with the current management under the wilderness IMP.

Other issues and concerns identified in the land use planning process

Provide for an appropriate management response of initial attack and full suppression on all wildland fires threatening other Federal, state, and private property, commodity areas, or other sensitive areas such as T&E species and habitat, and cultural sites. However, where the fire can achieve resource benefits, consider confining wildland fire spread by employing direct and indirect actions and use of natural topographic features, human-created barriers (i.e., roads), fuel, and weather factors. Use of heavy equipment in WSA's would be avoided and require line officer approval. Use of retardant would not be limited within these areas for initial attack. Use of retardant during extended attack would be considered as a part of the wildland fire situation analysis, considering the resource values at risk.

Finding and Rationale

The Guano Creek study corridor is located within the boundaries of the Guano Creek WSA and management of this area is under wilderness IMP. Present management of the area under the wilderness IMP provides the necessary level of protection for the natural values and the botanical outstandingly remarkable values found within the Guano Creek study corridor. Potential congressional designation of the Guano Creek WSA as wilderness would enhance the protection of the outstandingly remarkable values in the long term. Additionally, the proposed designation of the Guano Creek/ Sink Lakes ACEC along the segment of the Guano Creek which contain the sensitive plant species would provide an added level of protection for the botanical resources which are considered an outstandingly remarkable value.

Motorized access to Guano Creek is currently limited to existing roads and trails. Congressional designation of the Guano Creek WSA as wilderness would most likely change the OHV designation to closed, thereby limiting access to the Guano Creek area. Roads and ways within the area may also be closed through the land management planning process of which this suitability determination is part.

Grazing is excluded within the Guano Creek study corridor. The exclusion of grazing was addressed in the "Hart Mountain Jurisdictional Transfer," dated October 30, 1998. Under this jurisdictional transfer, Congress directed that lands within the Guano Creek WSA be management so as not to impair the suitability of the area for designation as wilderness, in accordance with current and future management plans and agreements (including the agreement known as the "Shirk Ranch Agreement," dated September 30, 1997), until such date as Congress enacts a law directing otherwise. Under this agreement, grazing is excluded from the Guano Creek WSA which includes the study area for Guano Creek.

The existing WSA status and possible congressional designation as wilderness, and the possible ACEC designation on a segment of the study corridor provide the necessary protection for the botanical outstandingly remarkable values which determined the eligibility of

Guano Creek for possible inclusion in the national wild and scenic river system. Restrictions on developments within the Guano Creek WSA provides the same level of protection that designation as a wild, scenic, or recreational river in the national system would provide except for development of hydroelectric facilities which could occur through Presidential proclamation (has never been done in any wilderness area) whereas designation within the national wild and scenic river system would preclude any hydro development. The potential for hydroelectric development on Guano Creek is considered to be very low, and WSA status (and possible wilderness designation by Congress), provides the necessary level of protection.

Because of the existing protections afforded the botanical outstandingly remarkable values under the wilderness IMP, and the proposed Guano Creek/Sink Lakes ACEC, designation of Guano Creek as part of the national wild and scenic river system would not provided any additional protection over and above which is currently in place or proposed. On this basis, Guano Creek is recommended administratively nonsuitable for inclusion in the national wild and scenic river system at any classification level. If Congress should elect to release the Guano Creek WSA from wilderness designation the inclusion of Guano Creek as part of the national wild and scenic river system would be revisited at that time.

Honey Creek

Characteristics which do or do not make the area a worthy addition to the national system

The eligibility determination for Honey Creek was a coordinated effort between the LRA and the Fremont National Forest. The portion of Honey Creek under USFS administration was found ineligible for inclusion in the national wild and scenic river system. There are no diversions structures or impoundments on the portion of Honey Creek administered by the BLM and the stream meets the requirements as free flowing. Honey Creek is eligible for inclusion in the national wild and scenic river system because of the existence of fisheries and cultural (prehistoric) outstandingly remarkable values. The BLM's segment of the creek was tentatively classified as a scenic river. Only the BLM-administered portion of Honey Creek will be addressed under this suitability study.

Honey Creek is located in the Warner Basin, approximately 15 air-miles northeast of the community of Lakeview, Oregon. The segment of Honey Creek evaluated by the BLM runs approximately17 miles east from the Fremont National Forest boundary to Hart Lake (the study portion of the creek terminates at a point approximately 3 miles west of Hart Lake). Throughout this 17-mile segment there is a checkerboard pattern of private and BLM-administered land. Approximately 75 percent of the creek in the study segment crosses private land. A total of 5.6 miles (approximately 1,243 acres within the 0.5-mile wide study corridor) of Honey Creek is within BLM-administered land.

Honey Creek contains viable populations of Warner suckers, a Federally listed T&E species, in the section of the creek downstream from the SW¼ of Section 23, T.36S., R.22E. Warner suckers are only found in the Warner Basin. Because of the potential to regain connectivity with the lake systems, this section of Honey Creek is judged to be one of the better Warner sucker habitats within the basin. Warner suckers are prevented from going above this section because of the high gradient in the upper reaches. Honey Creek also provides habitat for other resident fish species, including speckled dace, Warner tui chub, and Warner Basin redband trout (a Federal species of concern, Bureau sensitive and ODFW sensitive-vulnerable species). However, these species in Honey Creek are not considered regionally significant, including redband trout. As a result of the presence of the Warner sucker, and the quality habitat found along this segment of Honey Creek, the fisheries are considered to be an outstandingly remarkable value.

Seasonal movements by aboriginal peoples were likely made from the lowlands of the basin (Warner Valley area) up the Honey Creek drainage and other drainages to upland summer hunting and plant collecting locations. Rock shelters and caves provided both shelter and storage sites along these travel routes. Complete surveys have not been conducted in the study corridor, but surveys in the Warner Valley and casual aerial survey, have shown that archaeological sites exist in abundance. Honey Creek is known to have rock art sites, shelters, caves, rock cairns, lithic scatters, and campsites along the bottom canyon walls and rims of the main drainage. Rock rims were used for the creation of rock art which served an unknown purpose for the society which created it. Rock cairns which are found in the region may have marked trails or sites, or may have been related to religious activities. The chronology of the sites located in the area cover the entire period of occupation of the Warner Valley region. This would include sites from the stemmed point period through the archaic period (8,000–500 B.C.), and through the Paiute period during European-

contact times. None of the known sites have been evaluated for NRHP significance. However, the apparent abundance of sites, their size, and diverse nature would indicate that once a full survey of the area and evaluation of the sites is completed, they will be found to be significant. The potentially high archaeological resource values within the Honey Creek basin are judged to be an outstandingly remarkable value.

The current status of land ownership and use in the area

a. From the Fremont National Forest boundary, Honey Creek flows eastward for approximately 17 miles to Hart Lake. The BLM-administered segments along this 17-mile portion of Honey Creek account for only 25 percent of the ownership within the study corridor. There are approximately 1,243 acres within the 0.5-mile wide and 5.6-mile long stream corridor segments on BLM-administered lands. The primary use of the private lands within the corridor is agricultural.

b. Associated or conflicting uses:

1. *Current management:* Honey Creek is within an area assigned a VRM Class II. Although Honey Creek is a scenic canyon, no notable or exemplary visual features are present. Human activities are not strongly evident.

2. *Energy and minerals:* No mining claims or oil and gas leases are located near Honey Creek. The potential for locatable minerals is low. There is a medium potential for the existence for oil and gas with a B level of certainty. The geothermal potential is medium with a B level of certainty. The lakebed evaporite potential is low to medium with a C level of certainty.

3. *Water resource development:* There are several diversions for irrigation on private lands, both above and below the 17-mile segment of the stream which makes up the study corridor. Upstream from the BLM-administered stream segments there are several small reservoirs (combined capacity of 870 acre feet). There are currently no applications for additional development for storage, irrigation, or power production. There is the potential for development of power, but the physical suitability is unknown. A small hydropower or storage system could be built, but there are no applications at this time and there has not been any in the past. Because of the rural and arid nature of the area the potential for hydropower development is low. There is a need to maintain the current structures.

4. *Transportation, facilities, and developments:* A water gauging station is located within the lower reach of the stream. Access to the canyon is poor. There are no developed roads within the study corridor.

5. *Recreation:* Opportunities exist along the corridor for hiking, camping, sightseeing, photography, bird watching, wildlife observation, fishing, and hunting. Overall, recreation use appears to very low—there is minimal evidence of human use. Water levels are generally too low for any boating activities. The recreation uses along the corridor are fairly typical for the surrounding area and it is anticipated that recreational use would not increase significantly over time.

6. *Wildlife and fisheries:* (Wildlife) Peregrine falcons (*Falco perrigrinus*), a Federal endangered species, have been observed in the area, but no nests have been detected in the study area for Honey Creek. Greater sage-grouse (a Federal candidate category 2 species) have been seen near the study corridor on Fish Creek Rim; however, Honey Creek is not considered critical habitat. No other T&E or candidate terrestrial species are known to occur as residents or breeders within the study corridor. A moderate number of mule deer winter within the study corridor and pronghorn frequent the flats above the creek. Other animals which are common to the High Desert environment are found within the Honey Creek area also. They include bobcats, rabbits, porcupines, red-tailed hawks, golden eagles, American kestrels, great horned owls, amphibians, reptiles, and squirrels.

(Fisheries) Honey Creek contains viable populations of Warner suckers, a Federally listed T&E species, in the section of the creek downstream from the SW¼ of Section 23, T.36S., R.22E. Warner suckers are only found in the Warner Basin. Because of the potential to regain connectivity with the lake systems, this section of Honey Creek is judged to be one of the better Warner sucker habitats within the basin. Warner suckers are prevented from going above this section because of the high gradient in the upper reaches. Honey Creek also provides habitat for other resident fish species, including speckled dace, Warner tui chub, and Warner Basin redband trout (a Federal species of concern, Bureau sensitive and ODFW sensitive-vulnerable species). However, these species in Honey Creek are not considered regionally significant, including redband trout. As a result of the presence of the Warner sucker, and the quality

habitat found along this segment of Honey Creek, the fisheries are considered to be an outstandingly remarkable value.

7. *Streamflow:* The Honey Creek watershed is typical of streams on the east side of the Warner Mountains. It has a snowmelt dominated streamflow regime. The amount and timing of streamflow is dependent on the climate and fluctuates yearly and seasonally. Honey Creek watershed drains an area of approximately 170 square miles, with an average water yield of 2.5 inches per square mile or 22,460 acre feet per year. The average discharge of Honey Creek is 31 cubic feet per second (cfs), with recorded extremes of 11,000 cfs and zero flow (USGS 1990). Low flows (9 cfs or less) occur from July through November.

8. *Geology:* Honey Creek is located in the northwestern corner of the Great Basin and Range Physiographic Province, just south of the High Lava Plains Physiographic Province. The geology of the area is dominated by faulted and jointed volcanic and volcanic-derived sedimentary rocks (2 to 24 million years old). The portion of Honey Creek flowing across BLM-administered land is in a moderately deep, dark, basalt-rimmed canyon. The creek has cut a deep gorge through lava flows and partially welded volcanic derived sedimentary rocks. The walls of Honey Creek are extremely steep and rocky and have little to no soil. The creek bed is characterized by younger fluvial sediments of predominately gravel, sand, and silt and contains boulders of wall rock.

9. *Cultural resources:* (Prehistoric) Honey Creek is known to have rock art sites, shelters, caves, rock cairns, lithic scatters, and campsites along the bottom canyon walls and rims of the main drainage. Rock rims were used for the creation of rock art which served an unknown purpose for the society which created it. Rock cairns which are found in the region may have marked trails or sites, or may have been related to religious activities. The potential prehistoric archaeological resource values within the Honey Creek basin are judged to be an outstandingly remarkable value.

(Historic) There are no known historical values along Honey Creek on land in public ownership.

(Traditional uses) No current Native American use of resources within the Honey Creek study corridor are known to occur.

10. *Vegetation:* Vegetation on the canyon walls ranges from cheatgrass and sagebrush on the lower reaches to stands of bluebunch wheatgrass in the upper reaches. Juniper is scattered all along the corridor. Some of the lower benches along the stream have stands of basin wildrye, sandy pockets contain needle-and-thread grass and Indian ricegrass. There is a narrow riparian zone along the stream which contains willow, dogwood, mountain alder, and a scattering of quaking aspens. Herbaceous species include Kentucky bluegrass, glyceria, sedge, rush, and various forbs. There are noxious weeds infestations of Canada thistle, Mediterranean sage, and in one location, Klamath weed is found.

11. *Grazing:* Grazing is excluded within the BLM-administered lands within the study corridor except for a water gap located in the extreme southwest corner of Section 22, T.36S., R.22E. This water gap borders the stream for approximately 100 to 150 feet. This water gap is used because there are limited water sources for agricultural purposes within the vicinity of the study corridor area. Cattle are excluded from the study corridor area through a combination of fencing and topography (i.e., canyon rims).

Affected potential uses if designated or not designated

a. Reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the national system.

1. *Enhanced:* Because the suckers in this stream are protected under the "Endangered Species Act," minimal additional protection would be provided by inclusion of this habitat under the national system. Habitat protection through foreclosure of potential hydroelectric power and water resource developments would occur, but neither over nor above what would be accomplished under "Endangered Species Act." Protection of cultural resource sites is managed through the "Antiquities Act" of 1906, FLPMA, the "Archaeological Resources Protection Act," and the "Historic Preservation Act," and through law enforcement patrols, site monitoring, and site stewardship programs. Nonmotorized recreation opportunities would be enhanced.

2. *Foreclosed:* Potential hydroelectric power and water resource developments, e.g., flood control dams, levees, water supply dams, etc. Hydroelec-

tric potential on Honey Creek is low.

3. *Diminished:* Public use and access could be diminished, such as possible road closures to the area, rights-of-ways for transmission lines, natural gas lines, water lines would be discouraged and would be allowed only if no other alternative existed.

b. The values which could be foreclosed or diminished if the area is not protected as part of the national system.

1. *Foreclosed:* Expansion of the national wild and scenic river system.

2. *Diminished:* The effects on the fisheries and cultural resource outstandingly remarkable values would be negligible.

The federal agency that will administer the area should it be added to the national system

The BLM would be the sole agency responsible for administration of the area if it where added to the national system.

The extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state and local agencies

It is anticipated that costs associated with the administration of the river would be the sole responsibility of the BLM. Local public interest in designation is thought to be low.

Estimated costs of administering the area if it is added to the national system

a. The following are expected funding requirements for Honey Creek if designated:

General administration: (recurring activities such as patrols, monitoring, and cleanup); there would be a moderate increase in administration costs because of increased monitoring and patrols—approximately $5,000 annually.

Costs of implementation: (one time costs such as boundary posting, map development, includes printing costs and district work month costs.)—$10,000–$15,000.

Development of management plan: (District and state office work month costs, document printing)— work month costs = $15,000–$20,000; document production = $2,000.

Development costs: (capital investment costs for facilities etc.)—none.

Operation and maintenance costs: (recurring costs associated with maintenance of facilities)—none.

b. The estimated cost to the United States of acquiring necessary lands and interests in lands within the study corridor.

There are approximately 2,530 acres of private lands located within the Honey Creek study corridor (checkerboard of public and private lands). The estimated cost of acquiring these private parcels from willing sellers would be approximately $1,265,000 (based on an estimated cost of $500/acre). This amount could potentially be higher if parcels of private land adjacent to the study corridor had to be acquired in combination with the private lands within the study corridor.

A determination of the degree to which the state or its political subdivisions might participate in the preservation and administration of the river should it be proposed for inclusion in the national system

It is not anticipated that state and/or local governmental entities would participate in the administration or preservation of Honey Creek if proposed for inclusion in the national wild and scenic river system.

Ability of the agency to manage the river area (segment) as a wild and scenic river

The LRA would have the ability to manage the publicly owned portions of Honey Creek as part of the national system. However, the checkerboard pattern of land ownership (interspersed public and private land) along the 17-mile stretch of the stream would hinder overall management efforts. Recreational use is limited and levels of use are not anticipated to increase significantly overtime. The creek does not offer water-related activities such as boating, canoeing, or kayaking. The main recreational activities are hunting, fishing, photography, hiking, camping, sightseeing, birdwatching, and wildlife observation. These recreation activities are limited and there are no existing or planned developed recreation opportunities.

Other issues and concerns identified in the land use

planning process

a. *Fire management:* An appropriate management response on all wildland fires within the stream corridor would be provided with an emphasis on firefighter and public safety. The appropriate management response would provide initial attack and full suppression on wildland fires which may threaten the outstandingly remarkable values within the stream corridor, i.e., T&E species (Warner sucker) and its habitat. The use of surface-disturbing equipment and fire retardant would be avoided, when practical.

Finding and Rationale

Based on the eligibility assessment completed in May, 1995, it was determined that the criteria for fish habitat/populations and the potentially high prehistoric archaeological resource values within the Honey Creek basin met the criteria as outstandingly remarkable values. The fisheries outstandingly remarkable values determination was made because Honey Creek contains a self-sustaining population of the Warner sucker, a Federally listed T&E species. The archaeological outstandingly remarkable values determination was made because of the potential abundance of sites, their size, and diverse nature.

In regards to the fisheries outstandingly remarkable values, the potential inclusion of Honey Creek as part of the national wild and scenic river system would add a minimal amount of protection because the Warner sucker is protected under the "Endangered Species Act." Protection of cultural resources within the study corridor would be accomplished under the "Antiquities Act" of 1906, FLPMA, the "Archaeological Resources Protection Act," the "Historic Preservation Act," and through law enforcement patrols, site monitoring, and site stewardship programs.

The potential for hydropower development within the Honey Creek study corridor is low. There are no planned recreational developments for the Honey Creek area and existing recreational use is considered to be low, and future use is not anticipated to increase significantly. Grazing is excluded from the study corridor on BLM-administered lands, but it does occur on the privately owned lands along the stream corridor.

The total extent and/or presence of archaeological resources within the Honey Creek has not been ascertained. Complete surveys have not been conducted within the study corridor. The archaeological outstandingly remarkable values which determined eligibility for inclusion in the national wild and scenic river system was based on casual aerial surveys and surveys within the Warner Valley which indicate that archaeological resources within Honey Creek could be potentially high. Honey Creek is known to have rock art sites, shelters, caves, rock cairns, lithic scatters, and campsites along bottom walls and rims of the drainage. Existing laws, regulations, and policies related to the protection and management of archaeological resources would provide the necessary protection for known and yet-to-be discovered resources regardless of Honey Creek's inclusion in the national wild and scenic river system.

The checkerboard land ownership (only 25 percent public land and 75 percent private) would impede the overall management of the resources within the Honey Creek corridor. Given the limited amount of public land, the inclusion of Honey Creek as part of the national wild and scenic river system would not improve manageability. Existing laws (e.g., "Endangered Species Act"), laws pertaining to cultural resources, regulations, and project specific environmental analyses would provide adequate protection of the fisheries and cultural resource values which are present within the Honey Creek study corridor.

Because of the existing protections through various laws, regulations, and policies, and the limited public land ownership within the study corridor, inclusion in the national wild and scenic river system would not provide any significant additional protection for the fisheries and archaeological outstandingly remarkable values. On this basis, Honey Creek is recommended administratively nonsuitable for inclusion in the national wild and scenic river system at any classification level.

Twelvemile Creek

Characteristics which do or do not make the area a worthy addition to the national system

The 6.6 mile segment of the Twelvemile Creek determined to be eligible for classification within the national wild and scenic river system goes from the California/Oregon border to the confluence with Twentymile Creek. It drains the volcanic uplands of northern California and southern Oregon, just south of Adel, Oregon. In the lower reaches it has cut through volcanic rocks to form a deep, steep-sided gorge. The canyon slopes are dotted with pinyon, juniper, ponderosa pine, cottonwood, and bitterbrush. There are also periodic stands of quaking aspen along the stream and on north facing slopes. The creek alternately flows and

pools along the boulder-strewn bottom.

Twelvemile Creek is one of two creeks with public ownership which contain a viable, self-sustaining population of Warner suckers, a Federally listed T&E species. It also contains populations of the Warner red-band trout which is a Bureau sensitive species and ODFW sensitive-vulnerable species. Twelvemile also contains speckled dace, a regionally an important habitat for these species. Because of the Warner suckers, Twelvemile Creek meets the criteria for fish habitat and fish populations outstandingly remarkable value.

The current status of land ownership and use in the area

a. There are approximately 2,206 acres within the 0.5-mile wide and 6.6-mile long stream corridor segment. With the exception of a 90-acre block of private land, the entire corridor is in public ownership and managed by the BLM. In past discussions, the private land-owner has expressed a willingness to deal with the BLM regarding purchase or exchange of this parcel.

b. Associated or conflicting uses:

1. *Current management:* Visual resources along the Twelvemile Creek are currently assigned VRM Class II and IV. Active management of the area is low because of the remoteness of Twelvemile Creek and it receives little recreation use.

2. *Energy and Minerals:* There are no mining claims or salable mineral potential within the Twelvemile Creek study corridor. Leasable mineral potentials include; a medium geothermal potential with a C level of certainty; and, no lakebed evaporite potential. Locatable minerals include a low base and precious metal potential, and pearlite potential with a B level of certainty.

3. *Water resource development:* There are diversions for irrigation on private lands. These diversion structures are located on the upper and lower reaches of the study corridor. These structures do not effect the free-flowing nature of the stream within the study corridor. There are currently no applications for additional development for storage, irrigation, or power production. There is a potential for development of power but the physical suitability is unknown. A small hydropower or storage system could be built but there are no applications at this time and there has not been any in the past. Because of the rural and arid nature of the area the potential for hydropower development is low. There is a need to maintain the current irrigation structures.

4. *Transportation, facilities, and developments:* Access to Twelvemile Creek is limited to three rough, steep jeep trails that descend from the rim to the bottom of the canyon. One of these roads crosses private lands. A power line road runs parallel to the canyon, but stops at the edge of the rim. The power line crosses the stream and continues on into Nevada. There is a county-maintained road which crosses the stream near the Oregon/California state line. There are no developments along or within the study corridor. Signs of human use in the area is minimal.

5. *Recreation:* Opportunities exist along the corridor for hiking, camping, sightseeing, photography, bird watching, wildlife observation, fishing, and hunting. Overall, recreation use appears to very low—there is minimal evidence of human use. Water levels are generally too low for any boating activities. The recreation uses along the corridor are fairly typical for the surrounding area and it is anticipated that recreational use would not increase significantly over time.

6. *Wildlife and fisheries:* (Fisheries) Twelvemile Creek contains a viable, self-sustaining population of Warner suckers, Warner red-band trout, and speckled dace. Warner suckers are a Federally listed T&E species and the Warner red-band trout are a Federal species of concern, Bureau sensitive and ODFW sensitive-vulnerable species. Twelvemile Creek is important to the management of these species because it contains adequate habitat on public lands. The fisheries outstandingly remarkable values are associated with the population of Warner suckers and the stream habitat.

(Wildlife) Greater sage-grouse, which are listed as a BLM sensitive species, have been observed within the Twelvemile Creek study corridor. However, no crucial nesting or wintering habitat is found along the creek. Small populations of mule deer and pronghorn can be found in the study area. The Twelvemile Creek is within a mule deer winter range area and is used by mule deer during periods of extreme weather. The area provides habitat for kidding habitat for pronghorn and fawning habitat for mule deer. There is an expanding population of Rocky Mountain elk within this area, but it is not known whether the study corridor contains crucial

wintering or calving areas. Other animals which are common to the high desert environment are found the Twelvemile Creek area also. They include bobcats, rabbits, porcupines, red-tailed hawks, golden eagles, American kestrels, great horned owls, amphibians, reptiles, and squirrels.

7. *Streamflow:* Twelvemile Creek drains the volcanic uplands of northern California and area of southern Oregon, to the south of Adel, Oregon. The Twelvemile Creek watershed is typical of streams on the east side of the Warner Mountains. It has a snowmelt dominated streamflow regime. The amount and timing of streamflow is dependent on the climate and fluctuates yearly and seasonally. Twelvemile Creek watershed drains an area of approximately 163 square miles. There is no gaging station on Twelvemile Creek. The closest is on Twentymile Creek of which Twelvemile is a tributary. The gage on Twentymile Creek adds about 31 more square miles to the watershed. The average discharge of Twentymile Creek is approximately 46.4 cfs, with recorded extremes of 10,400 cfs and zero flow (USGS 1990). Low flows (3 cfs or less) occur from July through September.

8. *Geology:* Twelvemile Creek is located in the northwestern corner of the Basin and Range Physiographic Province, just south of the High Lava Plains. The Basin and Range Province in this area is characterized by a broad, uneven plateau, 4,000–5,000 feet above sea level, broken up by late Tertiary- to Holocene-age block faulting. The creek has cut through massive basalt flows and interbeds of tuffaceous sedimentary rocks of Tertiary age, and Pliocene- to Pleistocene-age flows and breccias of rhyodacitic composition. The creek has cut a deep, steep-sided gorge through volcanic rock. This area also is fed by hot springs, which affirms the presence of geothermal activity in the area.

9. *Cultural resources:* (Prehistoric) Several known prehistoric cultural sites, including rock art, lithic scatters, obsidian quarry/work sites, stone rings, and campsites, exist in the Twelvemile Creek area. The prehistory of the area goes back approximately 10,000 years. Lithic quarry and stone tool manufacture sites are common in the area. Ethnographic work indicates that the Fort Bidwell Band of the Northern Piaute Indians used the area during warm weather months as part of a seasonal round. They are thought to have used the area because of the availability of fish, game, and plants.

(Historic) The Warner Valley to the north of Twelvemile Creek was settled by Euroamericans in the 1860s. The Twelvemile Creek area was used by these settlers for livestock grazing.

(Traditional uses) No evidence exists for current Native American use of fish, wildlife, or plant materials. Nor are there special features, places, or structures relating to religious use within the area.

10. Vegetation: For most of its course on public lands, Twelvemile Creek is in a relatively narrow canyon with ponderosa pine, juniper, quaking aspen, and cottonwood growing on the slopes and down to the riparian zone. Within the riparian zone there are plants such as sedges, rushes, and grasses. In areas where hot springs occur there are lush areas of riparian vegetation. Cultural plants found along the banks include chokecherry, gooseberry, Indian plum, serviceberry, and red-osier dogwood.

11. Grazing: Grazing is not authorized within the Twelvemile Creek corridor. Livestock are excluded by both fencing and topography (i.e., canyon rims).

Affected potential uses if designated or not designated

a. Reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the national system.

1. *Enhanced:* Because the suckers in this stream are protected under the "Endangered Species Act," minimal additional protection would be provided by inclusion of this habitat under the national system. Habitat protection through foreclosure of potential hydroelectric power and water resource developments would occur, but neither over nor above what would be accomplished under "Endangered Species Act." Nonmotorized recreation opportunities would be enhanced.

2. *Foreclosed:* Potential hydroelectric power and water resource developments, e.g., flood control dams, levees, water supply dams, etc.

3. *Diminished:* Some watershed enhancement projects could be limited to protect the scenic, natural aspect of the corridor. For example, juniper are invading the quaking aspen stands and springs of the north facing slopes in the corridor, clear cutting these stands to maximize watershed health could be precluded. Public use and access

could be diminished, e.g., rights-of-way for transmission lines, natural gas lines, water lines would be discouraged and would be allowed only if no other alternative existed.

b. The values which could be foreclosed or diminished if the area is not protected as part of the national system.

1. *Foreclosed:* Expansion of the national wild and scenic river system.

2. *Diminished:* No effect on fish because they are currently protected under the "Endangered Species Act."

The federal agency that will administer the area should it be added to the national system

The BLM would be the sole agency responsible for administration of the area if it where added to the national system.

The extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state and local agencies

It is anticipated that costs associated with the administration of the river would be the sole responsibility of the BLM. Local public interest in designation is thought to be low to moderate.

Estimated costs of administering the area if it is added to the national system

a. The following are expected funding requirements for the Twelvemile Creek if designated:

General administration: (recurring activities such as patrols, monitoring, and cleanup); there would be a moderate increase in administration costs because of increased monitoring and patrols—approximately $5,000 annually.

Costs of implementation: (one time costs such as boundary posting, map development, includes printing costs and district work month costs)—$10,000–$15,000.

Development of management plan: (District and State Office work month costs, document printing)—work month costs = $15,000–$20,000, document production = $2,000.

Development costs: (capital investment costs for facilities, etc.)—none.

Operation and maintenance costs: (recurring costs associated with maintenance of facilities)—none.

b. The estimated cost to the United States of acquiring necessary lands and interests in lands within the study corridor. There are approximately 90 acres of private land located within the Twelvemile Creek study corridor. The estimated cost of acquiring these private parcels from willing sellers would be approximately $45,000 (current estimate of fair market value for land within the study corridor is $500.00 per acre).

A determination of the degree to which the state or its political subdivisions might participate in the preservation and administration of the river should it be proposed for inclusion in the national system

It is not anticipated that state and/or local governmental entities would participate in the administration or preservation of Twelvemile Creek if proposed for inclusion in the national wild and scenic river system.

Ability of the agency to manage the river area (segment) as a wild and scenic river

The LRA would have the ability to manage the Twelvemile Creek segment as part of the national wild and scenic river system. Recreational use in the study corridor is limited. The river does not offer recreational activities such as boating, canoeing, or kayaking. The main recreational activities are hunting, fishing, photography, hiking, camping, sightseeing, birdwatching, and wildlife observation. These recreation activities are not intensive and there are no existing or planned developed recreation opportunities. Fisheries enhancement projects would occur on an as needed basis.

Other issues and concerns identified in the land use planning process

a. *Fire management:* An appropriate management response on all wildland fires within the stream corridor would be provided with an emphasis on firefighter and public safety. The appropriate management response would provide initial attack and full suppression on wildland fires which may threaten the outstandingly remarkable values within the stream corridor, i.e., T&E species (Warner sucker) and its habitat. The use of surface-disturbing equipment and fire retardant would be avoided, when practical.

Finding and Rationale

Based on the eligibility assessment completed in July, 1999, it was determined that Twelvemile Creek met the criteria for fish habitat/populations as outstandingly remarkable values. Specifically, Twelvemile Creek contains a self-sustaining population of the Warner sucker, a Federally listed T&E species (and a population of Warner redband trout which is a Bureau sensitive species). Twelvemile Creek is important to the management of this species because it contains adequate habitat on public lands. A tentative recommendation based on the eligibility assessment was for classification as a scenic designation in the national wild and scenic river system.

The majority of the 6.6 mile-long study corridor is publicly owned—only one 90-acre parcel is in private ownership. There are no mining claims or salable potential within the corridor, while there is a medium potential for geothermal. There is a potential, albeit low, for hydropower or storage system to be built there. However, there are no applications or interest at the present time, nor has there been in the past. Recreation opportunities exist, but current use is very low. Water levels do not promote any boating activities. Grazing is excluded within the study corridor.

The potential inclusion of Twelvemile Creek as part of the national wild and scenic river system would add a minimal amount of protection to the outstandingly remarkable values because the Warner sucker is protected under the "Endangered Species Act." Hydropower potential on Twelvemile Creek is low and very likely not probable. Potential designation and inclusion in the national wild and scenic river system would foreclose this opportunity and any other water development such as flood control, and water supply dams, etc. Under the "Endangered Species Act" the potential for these developments would be foreclosed, also. However, should the Warner sucker be removed from the "Endangered Species Act" list, the protection afforded through the "Endangered Species Act" would no longer play a key role in the protection of the species or habitat. The potential designation of Twelvemile Creek as part of the national wild and scenic river system would ensure an adequate and long-term level of protection relating to the outstandingly remarkable values for which it was found eligible. Although tentatively classified as scenic under the eligibility assessment, the recreational classification would provide the needed level of protection of the outstandingly remarkable values, while allowing a greater level of flexibility in the management of the fish populations and habitat through a variety of watershed enhancement projects.

The 6.6 mile study corridor on Twelvemile Creek is administratively recommended suitable for potential designation by Congress as a national wild and scenic river system, with a tentative classification as recreational.

J3: Management Guidelines and Standards for National Wild and Scenic Rivers, Oregon/Washington

The "Wild and Scenic Rivers Act" (Public Law 90-542 as amended) established a method for providing Federal protection for certain of our remaining free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. Rivers are included in the system so that they may benefit from the protective management and control of development for which the Act provides. The following guidelines and standards are summarized from the February 3, 1970 and August 26, 1982, joint Department of the Interior and Department of Agriculture guidelines. They are intended to apply to formally designated rivers through incorporation in formal management plans which are normally developed within 3 years of designation. The guidelines also apply on an interim basis on designated rivers prior to management plan approval and to rivers or river segments which have been found to be eligible for consideration as additions to the national system through the BLM's land use planning process. The guidelines have been presented for each classification to enhance clarity. Section 10(a) of the Act states that:

> "Each component of the national wild and scenic rivers system shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development on the special attributes of the area."

This section is interpreted by the Secretaries of Interior and Agriculture as stating a nondegradation and

enhancement policy for all designated river areas, regardless of classification.

Wild Rivers

Wild rivers are defined by the Act to be "Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America."

Management Objective for Wild Rivers

Management of wild river areas should give primary emphasis to protecting the values which make it outstandingly remarkable while providing river-related outdoor recreation opportunities in a primitive setting.

Management Standards for Wild Rivers

Allowable management practices might include construction of minor structures for such purposes as improvement of fish and game habitat; grazing; protection from fire, insects or disease; and rehabilitation or stabilization of damaged resources—provided the area will remain natural appearing and the practices of structures will harmonize with the environment. Such things as trail bridges, an occasional fence, natural-appearing water diversions, ditches, flow measurement or other water management devices, and similar facilities may be permitted if they are unobtrusive and do not have a significant direct adverse effect on the natural character of the area. The following program management standards apply:

a. *Forest practices:* Cutting of trees will not be permitted except when needed in association with a primitive recreation experience (such as clearing for trails and protection of users) or to protect the environment (such as control of fire). Timber outside the boundary, but within the visual corridors, should, where feasible, be managed and harvested in a manner to provide special emphasis to visual quality.

b. *Water quality:* Water quality will be maintained or improved to meet Federal criteria or federally approved state standards.

c. *Hydroelectric power and water resource development:* No development of hydroelectric power facilities would be permitted. No flood control dams, levees, or other works are allowed in the channel or river corridor. The natural appearance and essentially primitive character of the river area must be maintained. All water supply dams and major diversions are prohibited.

d. *Mining:* New mining claims and mineral leases are prohibited within 0.25-mile of the river. Valid existing claims would not be abrogated and, subject to existing regulations (e.g., 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect the rivers included in the national system, existing mining activity would be allowed to continue. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment. Reasonable access will be permitted.

e. *Road construction:* No new roads or other provisions for overland motorized travel would be permitted within a narrow incised river valley, or if the river valley is broad, within 0.25-mile of the river bank. A few inconspicuous roads leading to the boundary of the river area may be permitted.

f. *Agriculture and livestock grazing:* Agricultural use is restricted to a limited amount of domestic livestock grazing and hay production to the extent currently being practiced. Row crops are prohibited.

g. *Recreation facilities:* Major public-use areas, such as campgrounds, interpretive centers, or administrative headquarters are located outside wild river areas. Simple comfort and convenience facilities, such as fireplaces or shelters, may be provided as necessary within the river area. These should harmonize with the surroundings. Unobtrusive hiking and horseback riding trail bridges could be allowed on tributaries, but would not normally cross the designated river.

h. *Public use and access:* Recreation use, including but not limited to, hiking, fishing, hunting, and boating is encouraged in wild river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance wild river values.

i. *Rights-of-way:* New transmission lines, natural gas lines, water lines, etc., are discouraged unless prohibited by other plans, orders, or laws. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are indicated, wild

river values must be fully evaluated in the selection of the site.

j. *Motorized travel:* Motorized travel on land or water could be permitted, but is generally not compatible with this classification.

Scenic Rivers

Scenic rivers are defined by the Act to be "Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads."

Management Objective for Scenic Rivers

Management of scenic river areas should maintain and provide outdoor recreation opportunities in a near natural setting. The basic distinctions between a wild and a scenic river area are the degree of development, type of land use, and road accessibility. In general, a wide range of agricultural, water management, silvicultural, and other practices could be compatible with scenic river values, providing such practices are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment.

Management Standards for Scenic Rivers

The same considerations enumerated for wild river areas should be considered, except that motorized vehicle use may, in some cases, be appropriate and that development of large scale public-use facilities within the river area, such as moderate size campgrounds, public information centers, and administrative headquarters, would be compatible if such structures were screened from the river. The following program management standards apply:

a. *Forest practices:* A wide range of silvicultural practices could be allowed provided that such practices are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment. The river area should be maintained in its near natural environment. Timber outside the boundary but within the visual scene area should be managed and harvested in a manner which provides special emphasis on visual quality.

b. *Water quality:* Water quality will be maintained or improved to meet Federal criteria or federally approved state standards.

c. *Hydroelectric power and water resource development:* No development of hydroelectric power facilities would be allowed. Flood control dams and levees would be prohibited. All water supply dams and major diversions are prohibited. Maintenance of existing facilities and construction of some new structures would be permitted provided that the area remains natural in appearance and the practices or the structures harmonize with the surrounding environment.

d. *Mining:* Subject to existing regulations (e.g., 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect the values of rivers included in the national system, new mining claims and mineral leases could be allowed. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution and visual impairment. Reasonable access will be permitted.

e. *Road construction:* Existing roads may occasionally bridge the river area and short stretches of conspicuous or long stretches of inconspicuous and well-screened roads or screened railroads could be allowed. Maintenance of existing roads and any new roads will be based on the type of use for which roads are constructed and the type of use that will occur in the river area.

f. *Agriculture and livestock grazing:* In comparison to wild river areas, a wider range of agricultural and livestock grazing uses is permitted to the extent currently practiced. Row crops are not considered as an intrusion of the "largely primitive" nature of scenic corridors as long as there is not a substantial adverse effect on the natural-like appearance of the river area.

g. *Recreation facilities:* Larger scale public use facilities, such as moderate size campgrounds, public information centers, and administrative headquarters are allowed if such structures are screened from the river.

h. *Public use and access:* Recreation use, including but not limited to hiking, fishing, hunting and boating, is encouraged in scenic river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance scenic river values.

i. *Rights-of-way:* New transmission lines, natural gas lines, water lines, etc., are discouraged unless

prohibited by other plans, orders or laws. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are indicated, scenic river values must be fully evaluated in the selection of the site.

j. *Motorized travel:* Motorized travel on land or water may be permitted, prohibited, or restricted to protect the river values.

Recreation Rivers

Recreational rivers are defined by the "Wild and Scenic Rivers Act" to be "Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Management Objective for Recreation Rivers

Management of recreational river areas should be designed to protect and enhance existing recreational values. The primary objective will be to provide opportunities for engaging in recreation activities dependent on or enhanced by the largely free-flowing nature of the river.

Standards for Recreation Rivers

Recreation facilities may be established in close proximity to the river, although recreation river classification does not require extensive recreation developments. Recreational facilities may still be kept to a minimum, with visitor services provided outside the river area. Future construction of impoundments, diversions, straightening, riprapping, and other modification of the water-way or adjacent lands would not be permitted except in instances where such developments would not have a direct and adverse effect on the river and its immediate environment. The following program management standards apply:

a. *Forest practices:* Timber harvesting would be allowed under standard restrictions to protect the immediate river environment, water quality, scenic, fish and wildlife, and other values.

b. *Water quality:* Water quality will be maintained or improved to meet Federal criteria or federally approved state standards.

c. *Hydroelectric power and water resource development:* No development of hydroelectric power facilities would be allowed. Existing low dams, diversion works, riprap and other minor structures may be maintained provided the waterway remains generally natural In appearance. New structures may be allowed provided that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

d. *Mining:* Subject to existing regulations (e.g:, 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect values of rivers included in the national system, new mining claims and mineral leases are allowed and existing operations are allowed to continue. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment. Reasonable access will be permitted.

e. *Road construction:* Existing parallel roads or railroads can be maintained on one or both river banks. There can be several bridge crossings and numerous river access points.

f. *Agriculture and livestock grazing:* In comparison to scenic river areas, lands may be managed for a full range of agriculture and livestock grazing uses, consistent with current practices.

g. *Recreation facilities:* Interpretive centers, administrative headquarters, campgrounds, and picnic areas may be established in close proximity to the river. However, recreational classification does not require extensive recreation development.

h. *Public use and access:* Recreation use, including but not limited to hiking, fishing, hunting and boating, is encouraged in recreation river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance recreation river values.

i. *Rights-of-way:* New transmission lines, natural gas lines, water lines, etc., are discouraged unless prohibited by other plans, orders or laws. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are indicated, recreation river values must be fully evaluated in the selection of the site.

j. *Motorized travel:* Motorized travel on land or water will generally be permitted on existing roads.

Controls will usually be similar to surrounding lands and waters.

J4: Wilderness Review

Under FLPMA, wilderness preservation is part of BLM's multiple use mandate, and wilderness is recognized as part of the spectrum of resource values considered in the land use planning process. The initial task of identifying areas suitable for wilderness preservation was completed as mandated in FLPMA section 603, and is documented in Oregon BLM's 1989 "Final Wilderness EIS" and 1991 "Wilderness Study Report for Oregon."

Lands acquired by the BLM since that time that were adjacent to WSA's (3,043 acres via donation, exchange, or purchase) were not included in the initial inventory for wilderness suitability. Sections 201 and 202 of FLPMA provide for ongoing inventories of public land resources and identification of significant areas through the RMP process. If acquired parcels of land adjacent to WSA's are found recommended as suitable for wilderness designation, these areas would be included in the appropriate WSA and managed under authority of FLPMA sections 202 and 302. The wilderness IMP would apply to these areas while under wilderness consideration by Congress.

For an area to possess wilderness characteristics, it must meet certain criteria found in section 2(c) of the "Wilderness Act" of 1964, and as further defined in BLM's manual on Wilderness Inventory and Study Procedures. These criteria include size, naturalness, solitude or opportunities for primitive and unconfined recreation, and any supplemental values.

In the LRA, tracts of acquired lands that were smaller than 5,000 acres and isolated from existing WSA's were not considered practicable for wilderness designation. Eight tracts of acquired land totalling 3,043 acres are adjacent to existing WSA's. Through a wilderness inventory and review, 1,194 acres were found suitable for wilderness designation, as additions to three existing WSA's.

Lynchs Rim (Fish Creek Rim WSA)

Four parcels are located adjacent to the north and west boundaries of the current Fish Creek Rim WSA (16,690 acres). At the time of the original wilderness inventory, these parcels (a total of 607 acres) were private land, and so were not included in the inventory. All four parcels were acquired in an exchange in 1995, and are now public land. Another two parcels of public land (8.5 and 0.1 acres) are included in the acreage total with Parcel C. These parcels were originally "cut off" from the WSA by the private lands, and so are now included in this inventory.

Parcel A (158 acres) is located adjacent to the north boundary of the WSA, which follows section lines. Topography of this parcel is relatively open and flat with small pockets of junipers. There are two springs and a small drainage, and a rough, two-track jeep trail bisects the parcel, with a short spur running to a spring development and associated water troughs, fencing, and bermed pond at Lynch Spring. A wire fence runs through the northern portion of the parcel. Human use of this parcel is primarily associated with livestock grazing and hunting activities.

Parcel B (40 acres) is located along and inside the north boundary, surrounded on the west, south, and east sides by the existing WSA. Typography of the parcel is an open sagebrush bench which rises slightly in elevation heading southeast towards the rim. The two-track jeep trail that bisects Parcel A becomes more faint as it approaches Parcel B, and ends before reaching it. Human use of this parcel is primarily associated with livestock grazing and hunting activities.

Parcel C (369 acres) straddles the west boundary road of the Fish Creek Rim WSA. The parcel is mostly within the existing WSA (364 acres); the boundary road runs through the western corner of this parcel. The western half of Parcel C is primarily juniper and mountain mahogany, while the eastern half is more open sagebrush. Cox Spring is located in the west portion of this parcel adjacent to the road, and is signed and used as a hunting camp. A short two-track leads approximately 150 yards east to a small intermittent creek, the fenced spring, and its associated water tanks, a sign, and a style over the fence. A small wire corral and wooden loading chute is on the west side of the boundary road, across from where the two-track leaves the road. Human use of this parcel is primarily associated with hunting and livestock grazing activities.

Parcel D (40 acres) is located further south along the western boundary road of the existing WSA; the road bisects the parcel. Approximately 32 acres lie west of the road, and 8 acres lie to the east of the road. It is primarily an open, rolling sagebrush flat with an ephemeral stream and pockets of juniper along its north and west edge. Human use of this parcel is primarily associated with hunting and livestock grazing activities.

Size: The parcels by themselves are not of sufficient size for practicable preservation as wilderness. However, when considered with the adjacent WSA, all or portions of Parcels B, C, and D enhance it by forming a more definable and manageable WSA boundary. The portions of Parcels C and D which are west of the road are essentially cut off from the existing WSA, and are not of sufficient size for practicable preservation as wilderness.

Naturalness: All four parcels appear generally natural. However, portions of Parcels A, C, and D contain developments that are in contrast to the rest of the adjacent WSA's naturalness, or the parcels are split in two by the boundary road.

Parcel A contains approximately 0.5 mile of wire fence in the northern portion, 0.5 mile of two-track road through the center of the parcel, and two spring/water hole developments with bermed ponds, water troughs, wire fencing and rock cribs in the southern portion. The Lynch Spring development is easily discernable from the two-track road. Because of the number of human imprints, none of this parcel meets the naturalness criteria.

Parcel C is primarily natural except for the developments associated with Cox Spring, in the western portion of the parcel near the boundary road, and the boundary road itself. Approximately 15 acres in this area is affected by human impacts due to the presence of a corral, loading chute, 150 yards of two-track vehicle trail, wire fencing, water tanks, signs, and a style over the fence. These developments are very noticeable from the west boundary road, but are not visible from the east due to vegetation screening and topography. The area east of the Cox Spring development area meets the naturalness criteria (approximately 349 acres), but the area around Cox Spring and west of the road does not (20 acres). Parcel D is bisected by the current WSA's western boundary road, splitting the parcel in two, and isolating the western portion from the remainder of the WSA.

Outstanding opportunities for solitude or primitive and unconfined recreation: All four of the parcels offer outstanding opportunities for solitude when considered in conjunction with the adjacent WSA, particularly in the wooded areas containing mountain mahogany or juniper. The low sagebrush flat areas contain less vegetative or topographic screening, but offer ample opportunities for solitude. Visitation to the are is low, and occurs primarily during fall hunting season. Solitude may be compromised in Parcel C during hunting season, due to the hunting camp located at Cox Spring. Primitive recreation opportunities are outstanding in the parcels when considered in conjunction with the adjacent WSA. Hiking terrain is very easy, and offers excellent deer and pronghorn hunting opportunities. Opportunities for the observation and photography of mammals, birds, plants, geologic features and rock are outstanding. All four parcels offer scenic views of Hart Mountain and the plateaus and desert to the north and south, as well as Drakes Peak and the Fremont National Forest to the west.

Supplemental values: Since all of the parcels are adjacent to the existing WSA, they have similar supplemental values found in the original wilderness inventory for Fish Creek Rim WSA. These include: numerous cultural resources (including rock art sites), the presence of dwarf lousewort in a proposed RNA, crucial deer winter range, California bighorn sheep, and greater sage-grouse habitat.

Conclusion: A total of 397 acres in Parcels B, C, and D have wilderness character, and should be included in the Fish Creek Rim WSA. A total of 210 acres in Parcels A, B, and C do not have wilderness character.

Abert Rim (Abert Rim WSA)

The inventory unit is located adjacent to the west boundary of the current Abert Rim WSA (23,760 acres). At the time of the original wilderness inventory, this 193-acre parcel was State land, and so was not included in the inventory. Since that time, the parcel has been acquired by BLM and the materials site right-of-way associated with it dropped. Another 94-acre parcel to the north was also acquired by BLM, but is still under a State materials site right-of-way, so is not being considered in this inventory.

The inventory unit is located along the west boundary of the WSA, approximately 8 miles north of Valley Falls. Vegetation consists of sagebrush, greasewood, native bunchgrasses, and cheatgrass. Some mediterranean sage is present. Topography of the parcel is quite steep at the north end, rising in elevation from 4,300 feet to 5,100 feet in less than 0.5 mile. The southern end of the parcel is more gently sloping near the highway with a small bench located part way up the slope. A State of Oregon geology sign and vehicle pull-off is located at the northwestern edge of the parcel along Highway 395, within the highway rights-of-way. A gravelled vehicle pull-off, about 150 feet in diameter, is located partially within both the highway rights-of-way and in the inventory unit. A two-track vehicle route leaves the highway at the pull-off and climbs approximately 300 yards up to the bench.

Size: The parcel, by itself, is not of sufficient size for practicable preservation as wilderness. However, when considered with the adjacent WSA, all of the unit enhances the existing WSA by forming a more definable and manageable WSA boundary.

Naturalness: The unit appears to be generally natural. The only man-made features are the vehicle pull-off located at the edge of the unit, and 200 yards of two-track vehicle trail leading up to the bench. Although these features are visible from almost anywhere within the unit, they are insignificant when considered with the adjacent WSA.

Outstanding opportunity for solitude or primitive and unconfined recreation: Opportunities for solitude are limited on the parcel, due to the presence of State Highway 395 along its western edge. The highway is within sight and sound of the entire unit. By itself, the unit does not provide opportunities for primitive and unconfined recreation, due to its small size and location next to a state highway. However, when considered in conjunction with the adjacent WSA, it supplements these qualities already found in the WSA. In addition, the location and topography of this unit provides alternative hiking access to Poison Creek, which is blocked by private land along the highway, and is used by a small number of hikers to reach the top of Abert Rim.

Supplemental values: Since all of the unit is adjacent to the existing WSA, it has similar supplemental values found in the original wilderness inventory of Abert Rim WSA. These include: outstanding scenic and geologic qualities of the Abert Rim fault scarp, high archeological values, and the presence of California bighorn sheep.

Conclusion: All of the area, 193 acres, has wilderness character and should be in included in the Abert Rim WSA.

Billy Burr (Guano Creek WSA)

The Billy Burr unit (545 acres) is located along the north edge of the Guano Creek WSA (10,350 acres). At the time of the original wilderness inventory, this parcel was private land and was not included in the WSA. In 2000, it was donated to the BLM by The Nature Conservancy and is now public land.

Elevation ranges from 5,770 feet at Billy Burr Lake at the north end to a 5,940 feet narrow bench overlooking Clover Swale within the adjacent WSA to the south. The area contains Billy Burr Lake, an ephemeral sink lake, while the remainder of the area is mainly covered with low sagebrush and bunchgrasses, and other shrub species along the rim south of the lake. Present human use of the area is extremely low due to the poor condition of the access road from either direction, and consists mainly of pronghorn hunters during the fall. This road, BLM Road 6106D, runs across the full length of the unit, parallel to its northern edge. This same road also serves as the boundary road for the existing WSA. Remnants of a homestead are north of the road, and consist of a wood shack, outhouse, fencing, and a well. The area north of the road is managed by USFWS, as part of the Hart Mountain National Antelope Refuge.

Size: The unit, by itself, is not of sufficient size for practicable preservation as wilderness. However, when considered with the adjacent WSA, the area south of the road (505 acres) would enhance it by forming a more definable and manageable WSA boundary. The remaining 40 acre parcel on the north side of the WSA's boundary road is not of sufficient size.

Naturalness: The area is in a natural condition. It is characterized by undisturbed uplands and rims with one unaltered sink lake. The presence of native plant communities and rare plant and animal species indicates significant natural values are present. There are a few unnatural features in the parcel located north of the road, but they are small and visible only from the immediate area. These features include a broken down wood shack and outhouse, wire fencing, and a well. Approximately 1.5 miles of BLM Road 6106D runs across the northern edge, separating the parcel into two areas.

Outstanding opportunity for solitude or primitive and unconfined recreation: Opportunities for solitude exist throughout the unit, when considered in conjunction with the adjacent WSA. The sink lake, a bowl-like depression in the basalt upland, offers isolation in spite of the low vegetation. The remoteness of the unit elicits a feeling of solitude even on the open sagebrush flats. Opportunities for primitive and unconfined types of recreation are outstanding, when considered in conjunction with the adjacent WSA. Day hiking, wildlife observation, photography, and hunting are all good within the unit.

Supplemental values: Billy Burr Lake is a geological feature which is unique to the basalt flows of southeastern Oregon. The significance of this lake is that it is undisturbed by water projects; few such unaltered lakes remain. This lake is within a proposed RNA and

ACEC. Wintering concentrations of greater sage-grouse are also high within the unit and the adjacent WSA.

Conclusion: The 505 acres located south of the road have wilderness character and should be included in the Guano Creek WSA. The 40 acres north of the road do not have wilderness character.

Hart Mountain Exchange (Guano Creek WSA)

The Hart Mountain Exchange parcels (1,698 acres total) are located along the east edge of the Guano Creek WSA (10,350 acres). At the time of the original wilderness inventory, these parcels were managed by USFWS as part of the Hart Mountain National Antelope Refuge, and were not included in the WSA. In 1999, they were transferred to the BLM as part of a jurisdictional transfer, and are now public land.

Parcel A (282 acres) is located along the northeast edge of the existing WSA, and is bisected by BLM Road 6106C. The area is relatively flat, with an elevation of approximately 5,200 feet. Guano Creek flows intermittently through the unit to the north. Vegetation consists of sagebrush and native bunchgrasses. Present human use of the area is fairly low due to the poor condition of the access road from Highway 140, and consists mainly of pronghorn hunters during the fall months.

Parcel B (1416 acres) is located 1.5 miles south of Parcel A, along the southeast edge of the existing WSA. BLM Road 6106C runs inside the west edge of the unit for approximately 1.5 miles. Guano Creek and several of its diversions run through the north portion of the unit and into Shirk Lake. Vegetation is similar to Parcel A, with some riparian vegetation associated with Guano Creek and its diversions. Shirk Lake, an ephemeral desert lake, is located along the eastern portion of the unit. This unit is located on the western edge of Guano Valley and is fairly flat, except for the northwest corner, which rises 200 feet above the valley floor.

Size: The units, by themselves, are not of sufficient size for practicable preservation as wilderness. However, when considered with the adjacent WSA, the areas west of the road (64 acres in Parcel A, and 40 acres in Parcel B; total 104 acres) would enhance it by forming a more definable and manageable WSA boundary. The remaining 1,594 acres on the east side of the WSA's boundary road is not of sufficient size.

Naturalness: The two areas west of the boundary road are in a mostly natural condition. They are characterized by undisturbed uplands and rims. There are a few unnatural features in the northwest corner of Parcel B, affecting approximately 5 acres. They include a metal culvert and dirt diversion structure, a manmade canal diverting Guano Creek, 0.75 mile of fence line, and 100 feet of vehicle trail leading to the diversion. Although they are small and visible only from the immediate area, these features are regularly used and maintained for watering cattle at the Shirk Ranch. The fence line runs parallel to the road, and separates the grazed area with the diversions and culverts, from the ungrazed WSA. Another vehicle route, which was previously identified in the original wilderness inventory as a "way," crosses the northwest corner of Parcel B before entering the WSA; it is approximately 1/8 mile in length.

BLM Road 6106C runs through both parcels, and is an unnatural feature in both parcels. The area east of this road in Parcel B contains numerous manmade features. These consist of structures associated with the Shirk Ranch: the main house and 10 out buildings, a pond, diversion ditches, wire fencing, wood corrals, wire corrals, and numerous vehicle routes crisscrossing the parcel. Although the Shirk Ranch is of important historic value and is listed on the State historic register, its location on the east side of the existing WSA boundary road would be unmanageable as wilderness.

Outstanding opportunity for solitude or primitive and unconfined recreation: Opportunities for solitude are limited in both parcels, due to their location along the road and the openness of the terrain and low vegetation. The remoteness of the unit somewhat offsets this, but outstanding opportunities for solitude do not exist. Opportunities for primitive and unconfined types of recreation are outstanding, when considered in conjunction with the adjacent WSA. Day hiking, wildlife observation, photography, and hunting are all good within the unit.

Supplemental values: Since the parcels are adjacent to the existing WSA, they contain similar supplemental values found in the original wilderness inventory. These include the presence of late Miocene vertebrate fossils in tertiary tuffaceous sedimentary rocks, and greater sage-grouse habitat.

Conclusion: A portion of the area, approximately 99 acres west of the grazing fence in Parcel B and west of the road in Parcel A, has wilderness character and should be included in the Guano Creek WSA. The remaining 1,595 acres east of the fence and/or the road does not have wilderness character.

Appendix K — Interim Management Policy for Caves

General

The "Federal Cave Resources Protection Act" of 1988 (16 USC 4306) states that significant caves on Federal lands are an invaluable and irreplaceable part of the Nation's natural heritage and, in some instances, these significant caves are threatened due to improper use, increased recreational demands, urban spread, and lack of specific statutory protection. As provided by the Act, it is also the policy of the United States that Federal lands be managed in a manner which protect and maintain, to the extent practical, significant caves. Cave management regulations define the process and criteria for determining cave significance (43 CFR Part 37, published in the *Federal Register*, Volume 58, No. 189, October 1, 1993, pages 51550–51555). In accordance with the Act, Federal agencies are required to prescribe policy or regulation which includes management measures to insure that caves under consideration for listing of significance be protected during the period of consideration. The Act further provides for agencies to regulate or restrict use, as appropriate for caves determined to be significant.

Recreational or other human activities are allowed in caves when consistent with protecting other cave resource values. Foot access and exploration in caves is permissible, unless otherwise limited.

Until caves are determined significant and management plans are prepared which provide specific management prescriptions, the following interim restrictions will insure the protection of significant and potentially significant caves on Federal lands administered by the BLM in Oregon and Washington.

Interim Cave Management Restrictions

1) Where known or potential adverse impacts from human use to threatened, endangered, and/or sensitive plants or animals, cultural resources, biological deposits (i.e., middens, skeletal remains, etc.), or geologic/paleontologic/mineral features are present, the responsible authorized officer shall act to protect these resources. Such actions could include information/education, closures (seasonally or yearlong), written authorization for activities, or other appropriate measures.

2) Written authorization will be required from the responsible authorized officer for any activity or installation that could destroy, disturb, deface, mar, alter, harm, remove cave resources, or alter the free movement of life into or out of any significant or potentially significant cave. This could include recreational, scientific, educational, commercial, or competitive uses. Written authorization can be in the form of an approved management plan, use permit, or authorizing letter.

3) The BLM retains the authority to limit or terminate uses and/or require the restoration of cave resources if it is determined that unacceptable resource damage is occurring.

4) The BLM will consider proposals for special activities, including placing fixed anchors in a cave, establishing a trail to a cave, and research, etc. For existing uses or activity proposals where it is determined that a management plan is required, priority will be given to caves where extensive recreational uses are occurring or significant resource conflicts may be at issue.

5) Authorized activities or installations are subject to the agency's NEPA process and shall be consistent with the intent of the "Federal Cave Resources Protection Act" of 1988 and any conditions of existing policy and/or management decisions for the affected cave(s). Written authorization would require the applicant to provide the time, scope, location, and specific purpose of the proposed activity and the manner in which the activity is to be performed.

6) Unless otherwise authorized, the following acts are prohibited in all caves on BLM-administered lands. The responsible authorized officer will take appropriate action needed to reduce or eliminate the occurrence of the acts.

- Willfully defacing, removing or destroying plants or their parts, soil, rocks or minerals, or cave resources;
- Building, maintaining, attending or using any fire, campfire or stove;
- Smoking;
- Camping;
- Possessing, discharging or using any kind of fireworks or other pyrotechnic device;

- Discharging a firearm, air rifle, gas gun or paint gun;
- Possessing a domestic animal;
- Depositing or disposing of human waste;
- Digging, excavation, or displacement of natural and/or cultural features;
- Entering into a cave which requires written authorization; or engaging in any activities for which a written authorization requirement has been established, without having obtained in advance and having in possession such written authorization;
- The use of hand drying agents for climbing which are not natural appearing;
- New surface disturbing activities within a 350-foot radius of a cave opening or any known cave passages which may adversely impact any significant or potentially significant cave resource value.

7) Existing installations (e.g., stairs, ladders, and fixed anchors) will be evaluated for retention or removal. Retained and future installations designed and authorized to be left in place should normally be camouflaged to minimize visual impacts. Method of removal or future placement will be preapproved by the authorized officer and a condition of written authorization. Any nonpermanent apparatus or equipment used must be removed immediately after its use.

8) The use of hand drying agents for climbing requires mitigation measures (chalk balls, pigmented chalk, etc.) to avoid creating a visual impact from residue. If needed, periodic cleaning of drying agents by cave users to the satisfaction of the authorized officer can be required.

Penalties

Any person who violates this closure and restriction notice may be subject to a maximum fine not to exceed $1,000 and/or imprisonment not to exceed 12 months under authority of 43 CFR 8360.0-7.

Appendix L — Fire Rehabilitation

L1: Lakeview Resource Area Normal Fire Rehabilitation Plan

Introduction

The purpose and need of a normal fire rehabilitation plan is to streamline the emergency fire rehabilitation process to enable on-the-ground treatments to be completed within time frames consistent with the urgent nature of fire rehabilitation. The normal fire rehabilitation plan facilitates the orderly and timely rehabilitation of burned lands by delineating the procedures to be followed and treatments to be used after wildland fires that occur on the LRA.

Appropriate use of emergency fire rehabilitation funds includes implementing the following practices to:

- Protect life, property, and soil, water and/or vegetative resources.
- Prevent unacceptable onsite or offsite damage.
- Facilitate meeting land use plan objectives and other Federal laws.
- Reduce the invasion and establishment of undesirable or invasive species of vegetation.

Emergency fire rehabilitation funds are not used for rehabilitation of wildland fire suppression efforts; this includes rehabilitating firelines, helispots, fire camp, etc. Costs for rehabilitating wildland fire suppression efforts will be funded by the wildland fire project code.

The terms *rehabilitation* and *restoration* are often used synonymously, especially in relationship to the use of native species to revegetate burned areas. Rehabilitation is the "repair" of a wildland fire area utilizing native and/or nonnative plant species to obtain a stable plant community that will protect the burned area from erosion and invasion of weeds. Restoration is the use of a diverse mixture of only native species to obtain a plant community that is similar in appearance and function to the historic vegetation.

Total restoration of a burned area is not within the scope of the emergency fire rehabilitation program, although the use of native plants to rehabilitate burned areas is strongly encouraged. Native plants are to be used on those soils and ecological sites where they are, (1) adapted, (2) able to establish and survive with weed competition and periodic drought, (3) compatible with other land uses, and (4) reasonably priced relative to the land use and emergency fire rehabilitation plan objectives. The application of emergency fire rehabilitation practices should be consistent with the S&G's in as much as the constraints of emergency fire rehabilitation policy will allow.

This plan guides emergency wildland fire rehabilitation efforts in areas of the LRA that meet one or more of the following criteria:

- Areas that are highly susceptible to accelerated soil erosion, either because of soil characteristics, steep topography, or recurrent high winds.
- Areas where native grasses and forbs cannot reasonably be expected to provide soil and watershed protection within 2 years following fire.
- Areas where unacceptable vegetation, such as noxious weeds or invasive annuals, may readily invade and become established following fire.
- Areas where shrubs are a crucial wildlife habitat component for greater sage-grouse, mule deer and/or pronghorn. Map V-1 delineates these areas.

The process for implementing emergency fire rehabilitation activities through a site-specific plan development process is described as follows:

1) Following a wildland fire, the area manager, consulting with resource specialists, will decide if fire rehabilitation is needed. If fire rehabilitation is needed, an interdisciplinary team reviews the burn and selects the proper rehabilitation prescription from this plan. (If the proper prescription does not fall under the scope of this plan, refer to the "Emergency Fire Rehabilitation Handbook" [H-1742-1] for guidance. Generally, rehabilitation efforts not covered in this plan would require an environmental assessment and approval by the State Director.)

2) The prescription identifies the appropriate seed mixture, application rates, planting methods, and costs. The prescription also describes any additional treatments that may be necessary including shrub planting, erosion control structures, protection fencing, and grazing adjustments beyond the normally prescribed minimum two growing

seasons rest period.

3) A budget is created that summarizes the rehabilitation costs by fiscal year. This budget is sent to the State Director for funding approval.

4) For all rehabilitation projects covered by this plan, a site-specific rehabilitation plan will be prepared that is tiered to this plan. Additionally, each rehabilitation project requires a normal fire rehabilitation plan treatment form.

5) Cultural and T&E species clearances will be completed prior to project implementation. Known populations of T&E plants will be marked and that area restricted from heavy equipment use. Cultural sites discovered during clearances or previously known sites will be marked and avoided by ground disturbing equipment.

Due to the broad spectrum of situations encountered in emergency fire rehabilitation, several options of possible treatments, either separately or in combination, must be considered. The list of activities that may be considered are outlined below.

Natural Revegetation

In many cases, successful reestablishment of native species occurs if the perennial plant species are not killed as a result of the fire, or if viable and desirable seed or root mass is present. Generally, in these areas it would be necessary to rest the burned area from livestock grazing for at least two growing seasons. In some situations, the area may be closed to vehicles by issuing a temporary emergency closure. The only rehabilitation that may be necessary is repairing damaged fencing and/or construction of temporary fencing around the burned area until the native vegetation is successfully reestablished.

Seeding with Rangeland Drills or Aerial Seeding

Seeding of burned areas would only be considered if the emergency fire rehabilitation team determines that the burned area would not successfully reestablish to a native perennial plant community in a reasonable amount of time (generally two growing seasons under normal precipitation).

Seed mixtures have been formulated that are designed for specific soil types (see Appendix G). These seed mixtures are intended only as a guide and may be modified as each fire rehabilitation project requires. Parameters such as soil properties, erosion potential, aspect, elevation, intended use, potential plant community, threat to existing watershed, and seed cost and availability would be evaluated in selecting seed mixtures.

The use of native plants for rehabilitation is strongly encouraged and is both BLM emergency fire rehabilitation policy and a standard for meeting rangeland health objectives. That policy is tempered, however, by the availability of native seed at a reasonable cost, its adaptation to the area proposed for treatment, impacts of competition on seeding establishment, and land use plan requirements. There are many areas where one or more of these criteria cannot be met, and the only choice is between seeding nonnatives, such as crested wheatgrass and noxious weeds becoming established in the disturbed areas. Given these situations, the use of nonnatives is allowed to biologically and physically stabilize the burned area until the earliest possible time when the introduced grass seedlings can be restored (converted) to a more diverse native plant community. Where available, native seed should be used in combination with nonnatives to complete a diverse mix of species to meet particular land use objectives for the site.

Seeding guidelines:

- Native species will be utilized over nonnative species as appropriate and based on seed availability.
- A project inspector will monitor all phases implementation.
- The area to be seeded will be rested from grazing for at least two growing seasons or until vegetation is successfully established. Livestock will be excluded by using fencing, closing specific pastures, or closing entire allotments.
- Only native species will be seeded in WSA's. See Appendix L2 for additional guidance regarding emergency fire rehabilitation activities in WSA's.
- Monitoring will determine the effectiveness of seeding and to indicate when grazing will resume.
- Use only certified weed-free sources and collect seed samples for an All States Noxious Weed Test.
- Seed nonnatives only in areas of the burn where high erosion or unacceptable vegetation is expected to occur. This may include, but not be limited to, roads, gullies, noxious weed areas, or cheatgrass sites. This will allow refugia for native species where they can reestablish without competition from nonnative species.
- If nonnative species are used, a preference should

be given to species that are not invasive and can be replaced naturally by native shrubs and grasses. If this is inappropriate or is ineffective, a commitment should be made for long-term secondary restoration of a site following planting of nonnatives.

Construction of Erosion and Sediment Control Structures

Where the possibility of damage is great, structures, such as retention dams, or land treatments, such as contour furrowing, may be needed to control erosion, sediment yield, and flood waters. In most cases, these treatments would be used in combination with seeding. Gully checkdams or plugs may be required where head-cutting erosion is occurring. Gully treatment may also include broadcast seeding and chaining to establish perennial vegetation on the channel sides and bottom. Planning, design, and construction of erosion and sediment control structures and flood water retarding structures will be implemented in accordance with BLM Manual 1972, Water Control Structures.

Any erosion and sediment control structures proposed within a WSA must comply with wilderness IMP (see Appendix J1.

Construction of Support Facilities

Fences, gates, cattle guards, and other control features will be constructed or repaired as needed to further natural revegetation, and to protect seedings or other improvements created for rehabilitation. Follow BLM Manual Handbook H-1741-1 for fencing specifications.

Any construction of support facilities proposed within a WSA must comply with wilderness IMP (see Appendix J1).

L2: Normal Emergency Fire Rehabilitation Guidelines for Wilderness Study Areas

Rehabilitation following wildland fire in a WSA will comply with wilderness IMP (H-8550-1). When a proposed rehabilitation project addresses an area coving land both within and outside a WSA, it will be treated as two separate projects. The area outside the WSA will be treated in accordance with this guide. The area inside the WSA will be treated in accordance with the wilderness IMP referenced above.

Interested parties will be allowed a 30-day comment period on the proposed treatment in WSA's, unless it is not possible to do so because of emergency conditions (i.e., the 30-day comment period would result in missing the optimum period for treatment). If a full 30-day period would result in missing the optimum period for rehabilitation, key contacts would be notified for immediate comment, and a followup copy of the treatment prescription would be forwarded.

Disturbance caused by fire suppression actions will be evaluated in WSA's. If it is determined that wilderness suitability is affected by the fire suppression disturbance, mitigation of the disturbance will occur prior to release of suppression resources. Costs associated with mitigating suppression actions will be covered by wildland fire suppression funds, not emergency fire rehabilitation funds.

The "minimum tool" will be applied to all fire rehabilitation projects within WSA's. Any rehabilitation actions must maintain an area's suitability for preservation as wilderness. Fire rehabilitation should be accomplished using methods and equipment that causes the least damage to wilderness resources. The use of motorized vehicles and mechanical equipment will be minimized to the extent possible.

The appropriate species and methods for seeding will be considered on a case-by-case basis to determine if the proposed method meets the policy and guidelines for WSA's. Seed and planting will utilize native species, and will minimize cross-country use of motorized equipment. Seedings and plantings will be staggered or irregular so as to avoid a straight-line plantation appearance. Seed will be applied aerially unless the area to be rehabilitated is small, or ground application will not impair wilderness characteristics. Because the covering of seed greatly affects its successful germination, mechanized equipment may be considered to cover the seed after aerial application. If the burned area is determined to be crucial wildlife habitat, and shrub seed is not applied aerially, then seedlings may be hand planted.

Map R-1 shows the twelve WSA's in the LRA.

Table L2-1.—*Emergency fire rehabilitation native seed mixtures*

Native seed	Scientific name
Sandy soils	
Indian rice grass	*Oryzopsis hymenoides*
needle & thread	*Stipa comata, S. thurberiana*
running rye	*Elymus triticoides*
bottlebrush squirelltail	*Sitanion hystrix*
dropseed	*Sporobolus cryptandrus*
rabbitbrush	*Chrysothamnus nauseosus, C. viscidiflorus*
Rocky, thin lithic soils	
bluegrass	*Poa secunda, P. sandbergii*
Idaho fescue	*Festuca idahoensis*
big-headed clover	*Trifolium macrochephalum*
Purshi's milkvetch	*Astragalous purshii*
low sagebrush	*Artemisia arbuscula*
winterfat	*Ceratoides lanata*
Medium depth soils	
bluebunch wheat grass	*Agropyron spicatum* and other *Agropyyron* species
Great Basin rye	*Elymus cinereus*
needlegrass	*Stipa comata, S. thurberiana, S. occidentalis*
prairie clover	*Petalostemon purpureum*
lupine	*Lupinus lepidus*
saltbush	*Atriplex confertifolia, A. canescens*
penstemon	*Penstemon humilis, P. strictus, P. linarioides*
sagebrush	*Artemisia tridentata*
Alkaline playas and bottom lands	
bottlebrush squirrel-tail	*Sitanion hystrix*
silver sagebrush	*Artemisia cana*
muhly grass	*Muhlenbergia asperifolia, M. richardsonis, M. filiformis*
blue flax	*Linum lewisii*
dropseed	*Sporobolus airoides*
saltgrass	*Distichlis spicata* var. *stricta*
Wetlands (meadows/ stream banks)	
meadow barley	*Hordeum brachyantherum*
bentgrass	*Agrostis scabra*
foxtail	*Alopecurus alpinus*
hairgrass	*Deschampsia elongata*
Junegrass	*Koeleria nitida* (syn *K. cristata*)

Native seed	Scientific name
oatgrass	*Danthonia californica, D. unispicata*
Forbs for greater sage-grouse areas	
false dandelion	*Agoserus heterophylla, A. glauca, A. grandiflora*
everlasting	*Antennaria dimorpha, A.microphylla*
rock cress	*Arabis* spp.
milkvetch	*Astragalus purshii* [1], *A. obscurus* , *A. lentiginosus* [1], *A. filipes, A. curvicarpus*
blue-eyed Mary	*Collinsia parviflora*
hawksbeard	*Crepis acuminata* [1], *C. modocensis*
buckwheat	*Eriogonum corymbosus, E. umbellatum*
biscuitroot	*Lomatium nevadense* [1], other *Lomatium* spp.
bluebells	*Mertensia ciliata*
nodding microseris	*Microseris nutans,*
phlox	*Phlox longifolia* [1], *P. diffusa*
microsteris	*Phlox gracilis* [1] (syn. *Microsteris gracilis*)
buttercup	*Ranunculus glaberrimus*
salsify	*Tragopogon dubius*
clover	*Trifolium macrocephalum, T. longipes*
yarrow [2]	*Achillea millifolium*
common dandelion [2]	*Taraxacum officinale*

[1] Recommended most important forb food by Mike Dunbar, USDI-USFWS, Sheldon-Hart Mountain Refuges, Lakeview, Oregon, September 1, 2000, personal communication.
[2] Important food for greater sage-grouse—introduced, but nonnoxious.
References: (Crawford et al. 2000; Barnett and Crawford 1994; Pyle 1992; Redente 1977; and UDSA-FS 1997).

Appendix M — Recreation

M1: Off-Highway Vehicle Use

Off-Highway Vehicle Terms And Definitions

OHV designations are determined through a comprehensive land use planning process which serves as an adaptive and flexible approach to the management of all activities on the public lands. As circumstances and conditions have changed over the past several decades, BLM has made a concerted effort to focus the agency's resources in the development of land-use plans by seeking additional funding and staff to address issues associated with the increased population growth near the public lands. OHV designations are a major component of all future planning efforts.

In 1972, the President issued Executive Order 11644 requiring each Federal agency to designate "areas and trails" for off-road vehicle use or restriction and to develop regulations implementing this Executive order. The BLM's regulations (43 CFR 8340) established management areas as either open, limited, or closed to off-road vehicle use. The BLM's OHV designations are listed with the following terms which are defined as stated in 43 CFR 8340.0-5.

Off-highway vehicle (OHV) ~ 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; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies. OHV use is subject to operating regulations and vehicle standards set forth in 43 CFR 8341 and 8342.

Open area designation ~ any area where all types of vehicle use are permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in 43 CFR 8341 and 8342.

Closed area designation ~ an area where OHV use is prohibited. Use of OHV's in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer.

Limited area designation ~ an area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following categories: number of vehicles, types of vehicles, time or season of vehicle use, permitted or licensed use only, use on existing roads and trails, use on designated roads and trails, and other restrictions.

For clarification of terms (as applied in this RMP) for types of motorized vehicle travel within certain areas, the following definitions and conditions apply.

Seasonal motorized vehicle use limitation ~ to meet management objectives on certain described public land areas, motorized vehicle travel is limited to certain and/or all designated and/or existing motorized vehicle routes during a certain period of the year. Seasonal restrictions can apply within areas designated as OHV limited and OHV open.

Limited to designated routes ~ a described area of public land where motorized vehicle travel is restricted to specific roads (and ways in WSA's). Any specific motorized route within the described area not documented as a designated route is closed to motorize vehicle travel, and may be reclaimed if determined needed to meet management objectives. Designated routes are documented in the Lakeview District Office.

Limited to existing routes ~ a defined public land area where motorized vehicle travel is restricted to those approved roads in existence at the time of RMP record of decision. Cross-country vehicle use off of existing roads is prohibited. Establishment of any additional (new or extension of existing) motorized vehicle routes requires prior BLM approval. Unapproved routes are subject to closure and reclamation.

M2: Recreational Opportunity Spectrum Definitions and Classifications by Alternative

Definitions

The recreation opportunity spectrum provides the conceptual framework for inventory, planning, and management of the recreation resource. The recreation opportunity spectrum recognizes that people differ in their needs and in the experience they desire. Also, the

resource base is not uniform; it varies in its potential for providing recreation experiences. The recreation opportunity spectrum provides a way to characterize either the capability of a resource to provide an experience or the demand for an experience in terms of the activity opportunity and setting opportunity provided or demanded. Therefore, recreation opportunities can be expressed in terms of three components: (1) the activities, (2) the setting, and (3) the experience. The possible combinations of these three components are arranged along a continuum, or spectrum. The recreation opportunity spectrum is divided into six classes, with each class defined in terms of its combination of activity, setting, and experience opportunities. The six classes are primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. As conceived, the spectrum has application to all land, regardless of ownership or jurisdiction. Classes are described as follows.

Primitive

This is essentially an unmodified natural environment of fairly large size. Use of motorized vehicles is prohibited. There is an extremely high probability of experiencing isolation, closeness to nature, and self-reliance on outdoor skills. Activities may include hiking, nature study, fishing, cross-country skiing, and floatboating.

Semiprimitive Nonmotorized

This is a predominantly natural or natural-appearing environment of moderate to large size. Minimum onsite controls and restrictions may be present. Use of motorized vehicles is prohibited. There is a high probability of experiencing isolation, closeness to nature, and self-reliance in outdoor skills. Activities may include camping, hunting, snowshoeing, and floatboating.

Semiprimitive Motorized

This is a predominantly natural or natural-appearing environment of moderate to large size. User interaction is low, but there is evidence of other users. Minimum onsite controls and restrictions may be present. Use of motorized vehicles is permitted. There is a moderate probability of experiencing isolation, closeness to nature, and self-reliance in outdoor skills. Activities may include boating, motor biking, specialized landcraft use, mountain climbing, driving for pleasure, camping, and picnicking.

Roaded Natural

This is a predominantly natural-appearing environment with moderate evidence of humans. Evidence usually harmonizes with the natural environment. Management provides for the use of conventional motorized vehicles. There is an equal probability to experience affiliation with other user groups and for isolation and interaction with the natural environment. Challenge and risk opportunities are not very important, although testing of outdoor skills may be. Opportunities for both motorized and nonmotorized recreation are available. Activities may include bus touring, water skiing, walking, canoeing, sledding, and driving for pleasure.

Rural

This is a substantially modified environment. Resource modifications and utilization practices are to enhance specific recreation activities. Facilities are designed for use by a large number of people. Motorized use and parking opportunities are available. The probability of user interaction is moderate to high, as is the convenience of sites and opportunities. These factors are generally more important than the physical setting. Wildland challenges and testing of outdoor skills are generally unimportant. Activities may include interpretive services, swimming, bicycling, recreation cabin use, and skiing.

Urban

This is a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modernization and urbanization practices are to enhance specific recreation opportunities. Vegetative cover is often exotic and manicured. Large numbers of users can be expected onsite and in nearby areas. Facilities for highly intensified motor-vehicle use and parking are available. The probability of user interaction is high, as is the convenience of sites and opportunities. Experiencing natural environments and uses of outdoor skills are relatively unimportant. Opportunities for competitive and spectator sports and for passive uses are common. Activities may include resort lodging, ice skating, team sports participation, tour boat use, and picnicking.

Classifications by Alternative

Alternative A

Warner Wetlands Special Recreation Management Area: *Targeted activities:* Hunting, fishing,

sightseeing, birdwatching, water-related activities (such as boating and canoeing). *Recreation opportunity spectrum classes:* The majority of the Warner Wetlands Special Recreation Management Area is classified semiprimitive motorized BLM-administered lands adjacent to County Roads 3-10, 3-11, and 3-12 (within 0.5 miles on either side of the road) are classified as roaded natural.

Wilderness study areas: *Targeted activities:* Hunting, fishing, sightseeing, birdwatching, hiking, camping, backpacking, etc. *Recreation opportunity spectrum classes:* All WSA's are classified semiprimitive motorized with the following exceptions: The lava beds portion of Devils Garden WSA is classified semiprimitive nonmotorized; the lava bed portion of Squaw Ridge WSA is classified semiprimitive nonmotorized; the lava bed potion of Four Craters Lava Bed WSA is classified semiprimitive nonmotorized; an area of Spaulding WSA is classified semiprimitive nonmotorized; and an area of Hawk Mountain WSA is classified semiprimitive nonmotorized.

Remainder of LRA (extensive recreation management area): *Targeted activities:* Hunting, fishing, sightseeing, birdwatching, hiking, camping, backpacking, interpretation, wildlife viewing, etc. *Recreation opportunity spectrum classes:* Fossil Lake (6,560 acres), Buck Creek (590 acres), Cougar Mountain (40 acres), Crane Mountain (1,090 acres), South Green Mountain (480 acres), and Table Rock (56 acres) classified as semiprimitive nonmotorized. The remainder of the LRA is classified as semiprimitive motorized with the following exceptions: Lands adjacent (0.5 mile either side of roadway) to paved highways, county roads, etc., are classified as rural. Lands adjacent to the following roads are classified as roaded natural: BLM Roads 6126A, 6176D, 6159, 6179, 6165, 6197, 6176, 6152, 6115, 6155, 6109, 6109C, and County Roads 2-10, 2-10A, 3-10, 3-11, 3-12, 5-11, 5-10, 5-12, 5-12B, 5-13, and 4-14.

Alternative B

Warner Wetlands Special Recreation Management Area: Same as under Alternative A.

North Lake Special Recreation Management Area: *Recreation opportunity spectrum classes:* Fossil Lake (6,560 acres), Buck Creek (590 acres), Cougar Mountain (40 acres), South Green Mountain (480 acres), and Table Rock (56 acres) would be classified semiprimitive nonmotorized. Lands adjacent to BLM Roads 6151 and 6141A (0.5 miles on either side of roads) within the Lost Forest/Sand Dunes/Fossil Lake ACEC would be classified as roaded natural. The Green Mountain and Duncan Reservoir campgrounds would be classified as rural. All other areas within the special recreation management area would be classified semiprimitive motorized, except for lands adjacent to highways, county roads, and BLM roads classified as roaded natural and rural (as listed under Alternative A).

Wilderness study areas: Same as listed under Alternative A.

Remainder of LRA (extensive recreation management area): Same as listed under Alternative A.

Alternative C

Warner Wetlands Special Recreation Management Area: Same as under Alternative A.

North Lake Special Recreation Management Area: *Targeted activities:* Hunting, fishing, sightseeing, birdwatching, hiking, camping, backpacking, interpretation, wildlife viewing, etc. *Recreation opportunity spectrum classes:* The following areas would be classified as semiprimitive nonmotorized: Lost Forest/Sand Dunes/Fossil Lake ACEC (35,575 acres), Black Hills ACEC (3,048 acres), Buck Creek (590 acres), Cougar Mountain (40 acres), South Green Mountain (480 acres), and Table Rock (56 acres). Green Mountain and Duncan Reservoir campgrounds would be classified as rural. The remainder of the special recreation management area would be classified as semiprimitive motorized, except for any highway, county, and/or BLM roads specifically classified as roaded natural or rural (as listed under Alternative A).

Wilderness study areas: Same as listed under Alternative A with the exception of Devils Garden Lava Bed WSA. An additional 28,241 acres would be classified as semiprimitive nonmotorized in comparison to Alternative A.

Remainder of LRA (extensive recreation management area): Same as listed under Alternative A.

Alternative D

Warner Wetlands Special Recreation Management Area: Same as under Alternative A.

North Lake Special Recreation Management Area: *Targeted activities:* Hunting, fishing, sightseeing, birdwatching, hiking, camping, backpacking, interpretation, wildlife viewing, etc. *Recreation opportunity*

spectrum classes: Fossil Lake (6,560 acres), Buck Creek (590 acres), Cougar Mountain (40 acres), Crane Mountain (1,090 acres), South Green Mountain (480 acres), and Table Rock (56 acres) would be classified as semiprimitive nonmotorized. Green Mountain and Duncan Reservoir campgrounds would be classified as rural. Lands adjacent to BLM Roads 6151 and 6141A (0.5 miles on either side of roads) within the Lost Forest/Sand Dunes/Fossil Lake ACEC would be classified as roaded natural. The remainder of the special recreation management area would be classified as semiprimitive motorized, except for any highway, county, and/or BLM roads specifically classified as roaded natural or rural (as listed under Alternative A).

Wilderness study areas: Same as listed under Alternative A with the exception of Devils Garden Lava Bed WSA. An additional 28,241 acres would be classified as semiprimitive nonmotorized in comparison to Alternative A.

Remainder of LRA (extensive recreation management area): With the exception of the Sunstone Collection Area which would be classified as rural, the recreation opportunity spectrum classifications for the remainder of the LRA would be the same as listed under Alternative B.

Alternative E

Entire LRA: There would be no recreation opportunity spectrum classifications under this alternative.

M3: Visual Resource Management Class Objectives

FLPMA requires the BLM to consider the effects of management actions on the visual quality of the landscape. To protect visual resources, all public land is inventoried to determine its VRM classification. The VRM objectives for each of four possible classifications are described below.

Class I—The objective of this classification is to preserve the existing character of the landscape. This class provides for natural ecological changes and allows limited management activity. The level of change should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made to preserve a natural landscape. This includes areas such as wilderness, WSA's, the wild sections of WSR's, and other congressionally and administratively designated areas.

Class II—The objective of this classification is to retain the existing character of the landscape. The level of change to landscape characteristics should be low. Management activities may be seen but should not attract the attention of a casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III—The objective of Class III is to partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention but should not dominate the view of a casual observer. Changes should conform to the basic elements of the predominant natural features of the characteristic landscape.

Class IV—The objective of Class IV is to provide for management activities that require major modification of the landscape. These management activities may dominate the view and become the focus of viewer attention. However, every effort should be made to minimize the impact of these projects by carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

Table M2-1.—*Recreation opportunity spectrum setting criteria*

Criteria	Primitive	Semi-primitive nonmotorized	Semi-primitive motorized	Roaded natural	Rural	Modern urban
Remoteness	At least 3 miles from all roads.	At least 0.5 mile from all roads.	Within 0.5 mile of primitive roads and at least 0.5 mile from better than primitive roads.	Within 0.5 mile of better than primitive roads.	No distance criteria.	No distance criteria
Size (acres)	5,000	2,500	2,500	No criteria	No criteria	No criteria
Evidence of human use	Unmodified natural environment; surface disturbance rare and small; trails okay, but no roads; structures small and rare.	Setting may have subtle modifications; surface disturbance limited and small; little or no evidence of primitive roads or motorized use; small, isolated structures may be present.	Setting may have subtle modification; surface disturbance limited and small, primitive roads and motorized use are present; small isolated structures may be present.	Moderate evidence of human modification harmonious with landscape; surface modification common; roads and highways present; structures scattered and visually subordinate; recreation facilities small and rustic.	Setting substantially modified; surface modifications typical; roads and highways present; cultivated lands common; structures readily apparent in small, dominant clusters; developed recreation facilities.	Natural setting subordinate to culturally modified landscape.
Social setting	Fewer than six parties encountered on trail per day; fewer than three parties visible at campsite; little evidence of previous recreation use.	Six to 10 parties encountered on trail per day; fewer than 6 parties visible at campsite; limited evidence of previous recreation use.	Low to moderate contact frequency.	Moderate contact frequency in developed sites and on roads; low to moderate elsewhere.	Moderate to high contact frequency in developed sites and on roads and trails; moderate elsewhere.	Large numbers of users onsite and in nearby areas.
Managerial setting	Offsite controls only, onsite facilities for resource protection only; no facilities for user convenience or safety.	Offsite controls preferred, onsite controls subtle; facilities are avoided but may be provided for resource protection or user safety.	Onsite controls present but subtle; facilities for resource protection and user safety and law enforcement occasionally visible.	Onsite controls noticeable, but harmonious with natural environment; rustic facilities for user convenience, resource protection, and law enforcement occasionally visible.	Onsite controls obvious and numerous; facilities widely available for user convenience, safety, special activities and resource protection; law enforcement moderately visible.	Onsite controls are numerous; facilities for intensive use are provided; law enforcement is highly visible.

Appendix N — Minerals

N1: Historic Mineral Activity and Mineral Potential

Historic Mineral Activity in the Lakeview Resource Area

Locatable Minerals

Locatable minerals are those minerals for which mining claims can be located, such as precious and base metals, and some nonmetallic minerals that possess unique properties (uncommon variety minerals) (Map M-4). Except for sunstones, exploration activity for locatable minerals in the LRA has been sporadic. Of the 165 notices submitted under the BLM's Surface Management Regulations (43 CFR 3809), about 80 percent have involved activities in the Rabbit Basin sunstone area. The remaining 20 percent have covered perlite exploration at Tucker Hill, exploration in Christmas Valley for diatomite, and gold exploration in the Coyote Hills, Fir Timber Butte, Summer Lake, Horsehead Mountain, and Dry Valley areas. Four plans of operation have been submitted over the years. Two have involved perlite exploration and mining at Tucker Hill, and two have involved diatomite mining at Christmas Valley.

Coyote Hills: This area is known as the Lost Cabin Mining District, Coyote Hills Mining District, Camp Loftus, or Windy Hollow Mining District. Gold was reportedly discovered by the Loftus brothers in 1906, followed by a small gold rush to the area. The gold rush was short-lived as available records indicate an absence of gold production. In 1934, cinnabar, an ore of mercury, was discovered and some prospecting took place. However, production did not begin until about 1941. Three to seven flasks were reportedly produced from 1941 to 1943 (Brooks 1963). Little if any activity occurred between the mid-1940s and the late 1970s. From the late 1970s through the mid- to late 1980s, three large mining companies and a few individuals conducted exploration programs that included drilling, mapping, and sampling. Since then, the only known activity has been sporadic field reconnaissance and hand sampling.

Fir Timber Butte: This area is known as the Brattain Mining District and Paisley Mountains. Gold was discovered in this area in 1875 by a member of an army patrol (Hammitt 1976). About 1900, an adit was driven and several shafts were sunk in areas of vein-type lead, zinc, and copper mineralization near the head of Brattain Canyon. While some lead and zinc were reportedly produced, there are no records on amounts. Since the turn of the century, there was no recorded activity until 1965, when numerous trenches were excavated in mineralized areas. Since then, several mining companies have examined the area, including drilling programs in the 1980s.

Horsehead Mountain/Cox Butte: Not much information is available on the historical activity of Horsehead Mountain. It appears that this cinnabar mine was probably worked in the 1940s and 1950s. A few mining companies examined and staked the area in the early 1980s. The mining claims were dropped in the mid-1980s. Although most of a retort and an open adit remain at the Horsehead site, there is no record of any production. A few prospects and an open shaft apparently related to cinnabar exploration dating back to the 1950s are present on the north side of Cox Butte.

Tucker Hill: This deposit has also been known as the Eagle's Nest perlite, or Paisley perlite. In 1949, a group of prospectors discovered perlite on the south side of Tucker Hill. Mining claims were staked, and shortly afterwards a 1- to 2-ton perlite sample was sent to the Bureau of Mines in Tucson, Arizona, where it was tested (Wilson and Emmons 1985). Tucker Hill underwent a brief period of mining, but a high percentage of obsidian impurities in the perlite rendered the operation uneconomic. In 1980, a massive perlite deposit was discovered north of the old workings. Throughout the 1980s and early 1990s, drilling and bulk sampling and testing of the perlite took place. In late 1996, Atlas Perlite began construction and development activities and mining commenced in 1997.

Christmas Valley Diatomite: The earliest records on the Christmas Valley diatomite operation dates back to 1954 when mining claims were located and recorded. The earliest production appears to have commenced sometime in the early 1960s. Since then, operators have changed, but exploration and mining, both on private and public lands, have continued.

Rabbit Basin Sunstone Area: Because sunstones, identical to those found in the Rabbit Basin, were found in the Rogue Valley by early residents, it is thought that the first collectors of Rabbit Basin sunstones may have been the Indians who traveled through this area (Peterson 1972). In 1908, a deposit of sunstones ranging from "colorless to a dark variety,"

Table N1-1.—*Acreage for all locatable mineral potential*

Mineral and potential for occurrence	Acres
Base and precious metals	
High	3,512
Medium	186,026
Low or unknown	3,049,272
Diatomite	
High	31,377
Medium	269,522
Low or unknown	2,937,911
Dolomitic limestone	
High	784
Uranium	
Low	7,087
Unknown	3,231,723
Sunstones	
High	6,252
Perlite	
High	1,367
Medium	3,345
Low or unknown	3,234,098

and displaying red, salmon, and green tints, was reportedly discovered in southern Oregon. Through the years, rockhounds and gemstone collectors have collected sunstones in this area. Around 1970, several mining claims were staked, and conflicts between mining claimants and organized rockhound groups and individuals ensued. In 1970, to protect the rights of the miners and to provide the public with a lasting opportunity to collect sunstones, the BLM closed four square miles to mining claim location. In 1987, the Oregon sunstone was made the official state gemstone. Since then, the number of mining claims in Rabbit Basin has increased to almost 300.

Summer Lake (Winter Rim): Mining claims dating back to 1943 were located on public land on the west side of Summer Lake. These claims were most likely staked for mercury and/or gold. More claims were located in the mid- to late 1950s and mid- to late 1960s. Several prospects and shallow adit starts can still be seen. In 1988 and 1989, two companies engaged in exploration drilling in the area. There is no record of any production from these lands.

Coleman Hills: Several diggings dating back at least to the mid-1950s are present in the Coleman Hills. Based on the mineralization, it appears that the prospectors were looking for mercury and/or gold. In the late 1970s and early to mid-1980s, several individuals located gold claims and sampled the area. The claims were subsequently dropped. There is no evidence of any production from this area.

Elk Butte: A number of prospects and at least two adits are present in the Elk Butte area. The age of these diggings is not known, but based on the mineralization, it is assumed that the prospectors were looking for gold. There is no record of production from this area.

Tenmile Dolomitic Limestone: Mining claims dating back to the late 1940s and early 1950s were located, apparently for the dolomitic limestone that crops out in several places in the area. Mining claims were also staked on these outcrops in the mid-1970s and early 1980s. All claims were dropped. There is no record or evidence of production in this area.

There are scattered prospects throughout the LRA where very little work has occurred. With the exception of the diatomite prospects in the Diatomite Reservoir area of the Paisley Desert, most prospects are presumed to be associated with the pursuit of uranium, gold, or mercury. Known areas include Coglan Hills, Clover Flat/south Tucker Hill area, Chimney Rock,

Foley Creek, Sagehen Butte, Blizzard Gap, Spaulding Reservoir, and Coleman Valley/Coleman Rim area.

Leasable Minerals

Leasable minerals are those minerals for which a person must obtain a lease from the Federal government in order to produce the mineral. Generally, leasable minerals include deposits that occur over large areas, such as the energy minerals—oil and gas, coal, and geothermal resources (Map M-5). Lake bed evaporite minerals such as sodium and potassium are also leasable.

Oil and gas exploration has been minimal in the LRA. Eleven exploratory wells were drilled on private land between 1915 and 1961 (Newton 1965). No oil was reported in any of the wells, while five reported minimal gas shows. During the leasing boom, from the 1970s to to mid-1980s, approximately 100 leases totaling about 250,000 acres, were issued on public land in the LRA. No recorded exploration activity occurred on these leases, and they were eventually relinquished or terminated.

There are three known geothermal resource areas in the LRA: Crump Geyser, Summer Lake, and Lakeview. Of the 85,668 acres in the Crump Geyser Known Geothermal Resource Area, 40,245 are Federal. Competitive lease sales were offered for public bidding from 1975 to 1982. A total of 25,025 acres was sold for $88,100. The Summer Lake Known Geothermal Resource Area contains 13,633 acres of which 10,118 are Federal. Three lease sales were held from 1976 to 1982. A total of 7,520 acres was sold for $20,000. Of the 12,165 acres in the Lakeview Known Geothermal Resource Area, only 20 acres are Federal. No Federal lease sales have ever been held in this known geothermal resource area. Approximately 30 geothermal exploration notices were filed in the LRA in the late 1970s and early 1980s. Most of these notices were for drilling and for geophysical surveys in the Crump Geyser Known Geothermal Resource Area area. The remaining notices were for similar exploration in the Summer Lake area. During this same period of time, approximately 80 geothermal leases were issued, again, most in the Crump Geyser Known Geothermal Resource Area area, and a few in the Summer Lake area. By the mid- to late 1980s, all of the geothermal leases were relinquished or terminated. The only geothermal resource production (use) has been on private lands in the Lakeview Known Geothermal Resource Area area, where the resource has been used for heating a motel, greenhouses, and a few homes.

A few of the saline lakebeds within the LRA have been prospected for evaporite minerals. Several claims were first filed on Alkali Lake in the late 1800s by a Portland firm interested in boron (Newton and Briggs 1971). Later tests showed little boron. Some sodium carbonate was produced from private land on Alkali Lake in the 1920s. Studies of the evaporite deposits were done in 1947 and 1952, but there is no record of any production since then. In 1967, the property was purchased for the purpose of storing and treating chemical wastes. In 1901, a large prospecting group located a block of 326 placer claims on Summer Lake and the surrounding playa (Diggles et al. 1990). The claims were for "...the valuable metals, sodium, potassium, and their compounds of bicarbonate of soda, carbonate of soda, and potassium sulfate, in paying quantities held in solution and in deposit . . ." With the outbreak of World War I, foreign potash supplies were cut off, and prices rose. In December 1914, the State of Oregon leased the mineral rights to soda salts in Abert and Summer Lakes. Some work was done on a water retention levee and evaporation pond on the southeast side of Summer Lake. After the armistice, potash prices dropped. Work at the prospect never continued, perhaps as a result of the lower prices.

Around the turn of the century, several borax claims were located in the Alkali-Christmas Lake area. Some work on evaporating ponds was done, but there was no apparent production. In the early 1990s, a Canadian company applied for, and received, sodium prospecting permits for Abert Lake. While conducting an exploration program, they applied for preference-right leases. The prospecting permits expired, and the company eventually withdrew their lease applications.

Salable Minerals

Salable minerals are common variety minerals such as sand, gravel, rock, and cinders that generally are purchased from the Federal government. Over the past 10 years, nearly 1,000,000 cubic yards of sand, gravel, and rock have been produced from LRA quarries and pits for construction and maintenance of county roads and state highways (Map M-3). Sales of sand and gravel to individuals have averaged about 2,500 cubic yards per year. During the same period of time, cinder production has varied from about 200 to1,000 cubic yards per year (mostly for use on county roads). Theft of slab lava (a decorative stone) has been a problem in the Devils Garden Lava Flow for many years. Over the past 5–8 years, the demand for decorative stone has gone from a few to several hundred tons per a year.

Mineral Potential

Mineral Potential Classification

The mineral potential classification system, as described in BLM Manual 3031, Illustration 3, is used to evaluate the potential for locatable, leasable, and salable minerals in the resource area. Potential refers to the potential for occurrence of specific mineral resources rather than their economic viability. A discussion of some of the special management categories listed in Tables M2 through M5 is found in the section titled Restrictions to Mineral Exploration, Development, and Production following Table M-5.

Level of Potential

O. ~ The geologic environment, the inferred geologic processes, and the lack of mineral occurrences do not indicate potential for accumulation of mineral resources.

L. ~ The geologic environment and the inferred geologic processes indicate low potential for accumulation of mineral resources.

M. ~ The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochemical/geophysical anomaly indicate moderate potential for accumulation of mineral resources.

H. ~ The geologic environment, the inferred geologic processes, the reported mineral occurrences and/or valid geochemical/geophysical anomaly, and the known mines or deposits indicate high potential for accumulation of mineral resources. The "known mines and deposits" do not have to be within the area that is being classified but have to be within the same type of geologic environment.

ND. ~ Mineral(s) potential not determined due to lack of useful data. This notation does not require a level-of-certainty qualifier.

Level of Certainty

A. ~ The available data are insufficient and/or cannot be considered as direct or indirect evidence to support or refute the possible existence of mineral resources within the respective area.

B. ~ The available data provide indirect evidence to support or refute the possible existence of mineral resources.

C. ~ The available data provide direct evidence but are quantitatively minimal to support or refute the possible existence of mineral resources.

D. ~ The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

Mineral Potential in the Planning Area

No areas of critical mineral potential exist in the LRA. The potential for energy derived from the burning of biomass generated by juniper treatments is covered in the Forest and Woodlands sections.

Locatable Minerals

Map M-4 displays areas of varying potential for locatable minerals. Table 2-54 shows acreage for all locatable mineral potential. The mineral potential areas were developed from known geologic settings, inferred geologic processes (mineralization models), current mining activity, and extrapolation of known mineralization into areas of inferred similar geologic setting.

Base and Precious Metals

There is high potential (H-D) for the occurrence of base and precious metals in portions of the Coyote Hills, Paisley Hills, and Horsehead Mountain areas. This classification is assigned to these areas based upon known mines, known mineral occurrences, and inferred geologic processes. The surrounding areas have been classified as having moderate potential (M-C). Other areas having moderate potential for the occurrence of base and precious metals include:

M-C
Coleman Hills
Cox Butte
Coglan Hills (west)
Tucker Hill(south)/Clover Flat (west)
Summer Lake
Hawk/Lone Mountain
Sage Hen Butte

M-B
Elk Butte
Spaulding
Coleman Valley (southeast)
Orejana Rim
Tenmile Ridge

There are several volcanic centers of silicic to intermediate composition scattered throughout the resource area that could have associated epithermal mineralization. These areas are considered to have low (L-B) potential for the occurrence of base and precious metals.

Uranium

Based upon the proximity of several radioactive prospects in the Virgin Valley area, anomalous radiometric data, and the presence of tuffaceous sedimentary rock (rich in volcanic ash), part of the Hawk Mountain /Halksie Walksie area is considered to have low (L-C) potential for the occurrence of uranium.

Perlite

Perlite is a volcanic glass of rhyolitic or dacitic composition with a higher water content than obsidian. When perlite is ground and heated, the water turns to steam that expands the thermally-softened glass and produces a frothy mass resembling pumice. Because of its hardness, low density, and porous nature, perlite is used in lightweight aggregates, lightweight and fire-resistant building materials, loose-fill insulation, filter aids, fillers, abrasives, and for horticultural purposes. Perlite is associated with some rhyolite and dacite intrusive and extrusive rocks in the area. The area around the Tucker Hill perlite mine is rated high potential (H-D). Several rhyodacitic volcanic areas scattered throughout the LRA are considered to have low (L-B) potential for perlite.

Diatomite

Diatomite is an accumulation of microscopic siliceous skeletons of aquatic plants (diatoms) that proliferate in shallow, silica-rich lake water. In the resource area, diatomite occurs in Pliocene and Pleistocene-Holocene lake beds. Diatomite has a low density, and is porous, hard, and fairly inert. These qualities make it suitable for filtering, fillers, insulating materials, absorbents, abrasives, and lightweight cement aggregates. The largest deposits of diatomite in the LRA are in the Fort Rock/Christmas Valley basin. Two areas within the basin considered as having high (H-D) potential are in the Thorne Lake-Sevenmile Ridge area and just east of the town of Fort Rock. Most of the rest of the basin is considered as having moderate (M-C) potential.

Dolomitic limestone

High potential for dolomitic limestone (calcium magnesium carbonate) is evidenced by outcrops of lacustrine marlaceous deposits in the Tenmile Butte area.

Leasable Minerals

Oil and Gas

The LRA contains two hydrocarbon plays (prospects for significant hydrocarbon accumulations) identified by the USGS (Tennyson and Parrish 1987). These areas are considered to have moderate (M-B) potential for the occurrence of hydrocarbons (Map M-5). The southeastern Oregon play covers most of the southern half of the resource area. The southwest portion of the Ochoco-Mitchell play covers the extreme northwest corner of the LRA. The remaining portions of the LRA are considered to have low (L-B) potential for hydrocarbons. A recent study by the Bonnieville Power Administration (BPA) states that there could be an electricity shortage in the Northwest in the coming decade unless new sources of power can be found. It remains to be seen whether oil and gas exploration increases in the area as a result of this prediction.

Geothermal Energy

Based primarily on geology and surface evidence of geothermal energy, and to a lesser extent, competitive interest, three known geothermal resource areas were designated in the LRA. These areas, Crump Geyser, Summer Lake, and Lakeview, are considered to have high (H-C) potential for geothermal resources. Based on heat flow, the remainder of the LRA has either moderate (M-C) or low (L-B) potential for geothermal resources. Areas of potential for geothermal resources are displayed on Map M-5. The recent study done by the BPA that forecasts a possible electricity shortage in the Northwest in the next decade could spur geothermal exploration.

Coal

The Tertiary and Quaternary lake sediments in the LRA are not considered prospectively valuable for coal. Coal may be present in marine sediments deeply buried under thousands of feet of volcanic and sedimentary cover. Therefore all lands are rated as having low potential based upon indirect evidence (L-B).

Non-Energy Minerals (Sodium/Potassium and Associated Lakebed Evaporite-type Minerals)

The potential for these types of minerals is high (H-D)

in the Summer, Abert, Christmas (Alkali Lake), and Alkali Lake areas. This is based on known deposits and much direct evidence. Other lakebeds in the LRA are considered to have moderate (M-C) potential. The remaining portions of the area are considered to have low (L-C) potential.

Salable Minerals

Most of the LRA has moderate (M-B) potential for the occurrence of salable minerals. The high potential areas are near known developed deposits and are rated H-D. Salable mineral sources are usually developed as close to the intended use area as possible in order to minimize haul costs. Most of the potential is in hard-rock outcrops, cinder cones, alluvial fans, and ancient beach terraces. Map M-3 displays areas of salable mineral potential. Decorative stone, a salable mineral, is in many different areas. The most notable area with the highest potential is the Devils Garden Lava Flow, where premium deposits of slab lava exist.

N2: Mineral Development Scenarios

Introduction

This appendix describes the reasonable foreseeable development scenarios for development of leasable, locatable, and salable mineral commodities. The purpose of the reasonable foreseeable development scenario is to provide a model that predicts the level and type of future mineral activity in the planning area, and will serve as a basis for cumulative impact analysis. The reasonable foreseeable development first describes the steps involved in developing a mineral deposit, with presentation of hypothetical exploration and mining operations. The current activity levels are discussed in Chapter 2 of this document. Future trends and assumptions affecting mineral activity are discussed here, followed by the prediction and identification of anticipated mineral exploration and development.

Scope

The development scenarios are limited in scope to BLM-administered lands within the planning area. The reasonable foreseeable development is based on the known or inferred mineral resource capabilities of the lands involved, and applies the conditions and assumptions discussed under Future Trends and Assumptions. Changes in available geologic data and/or economic conditions would alter the reasonable foreseeable development, and some deviation is to be expected over time.

Leasable Mineral Resources

Reasonably Foreseeable Development of Oil and Gas (Common to all Alternatives Except Alternative E)

Future Trends and Assumptions

Based on the history of past drilling and foreseeable development potential in the LRA, activity over the next 15–20 years would continue to be sporadic. It is anticipated that oil and gas activity would consist of the issuance of a few leases, a few geophysical surveys, and perhaps the drilling of one or two exploratory holes. This could occur almost anywhere in the district, but more likely would occur in Fort Rock/ Christmas Valley, and/or Goose Lake, Warner, or Guano Valleys.

Because of the low potential for development of hydrocarbons, (even though the potential for occurrence is moderate in some areas), we do not anticipate the discovery of a producible oil and gas field during the period covered by this plan; however, to comply with the Supplemental Program Guidance for Fluid Minerals (Manual Section 1624.2), the potential surface impacts associated with the discovery and development of a small oil/gas field are given in the following sections.

Geophysical Exploration

Geophysical exploration is conducted to determine the subsurface structure of an area. Three geophysical survey techniques are generally used to define subsurface characteristics through measurements of the gravitational field, magnetic field, and seismic reflections.

Gravity and magnetic field surveys involve small portable measuring units which are easily transported via light off-road vehicles, such as four-wheel drive pickups and jeeps, or aircraft. Both off-road and on-road travel may be necessary in these two types of surveys. Usually a three-man crew transported by one or two vehicles is required. Sometimes small holes (approximately 1 inch by 2 inches by 2 inches) are hand dug for instrument placement at the survey measurement points. These two survey methods can make measurements along defined lines, but it is more common to have a grid of discrete measurement stations.

Seismic reflection surveys are the most common of the geophysical methods, and they produce the most detailed subsurface information. Seismic surveys are conducted by sending shock waves, generated by a small explosion or through mechanically beating the ground surface with a thumping or vibrating platform, through the earth's surface. The thumper and vibrator methods pound or vibrate the ground surface to create a shock wave. Usually four large trucks are used, each equipped with pads about 4-foot square. The pads are lowered to the ground, and the vibrators are electronically triggered from the recording truck. Once information is recorded, the trucks move forward a short distance and the process is repeated. Less than 50 square feet of surface area is required to operate the equipment at each recording site.

The small explosive method requires that charges be detonated on the surface or in a drill hole. Holes for the charges are drilled utilizing truck-mounted or portable air drills to drill small-diameter (2–6 inches) holes to depths of 100–200 feet. Generally 4–12 holes are drilled per mile of line and a 5–50-pound charge of explosives is placed in the hole, covered, and detonated. The created shock wave is recorded by geophones placed in a linear fashion on the surface. In rugged terrain, a portable drill carried by helicopter can sometimes be used. A typical drilling seismic operation may utilize 10–15 men operating 5–7 trucks. Under normal conditions, 3–5 miles of line can be surveyed daily using this method. The vehicles used for a drilling program may include heavy truck-mounted drill rigs, track-mounted air rigs, water trucks, a computer recording truck, and several light pickups for the surveyors, shot hole crew, geophone crew, permit man, and party chief.

Public and private roads and trails are used where possible. However, off-road cross-country travel is also necessary in some cases. Graders and dozers may be required to provide access to remote areas. Several trips a day are made along a seismograph line, usually resulting in a well defined 2-track trail. Drilling water, when needed, is usually obtained from private landowners.

The surface charge method utilizes 1–5-pound charges attached to wooden laths 3–8 feet above the ground. Placing the charges lower than 6 feet usually results in the destruction of vegetation, while placing the charges higher, or on the surface of deep snow, results in little visible surface disturbance.

It is anticipated that 4 notices of intent involving seismic reflection and gravity/magnetic field surveys would be filed under all alternatives except Alternative E, during the life of this plan.

Drilling Phase

Once the application for a permit to drill is approved, the operator may begin construction activities in accordance with stipulations and conditions. When a site is chosen that necessitates the construction of an access road, the length of road may vary, but usually the shortest feasible route is selected to reduce the haul distance and construction costs. Environmental factors or a landowner's wishes may dictate a longer route in some cases. Drilling activity in the planning area is predicted to be done using existing roads and constructing short (approximately 0.25 mile) roads to access drill site locations.

Based on past oil and gas drilling in Oregon, it is projected that 1 to 3 exploratory "wildcat" well(s) would be drilled on BLM-administered land in the planning area. The estimated success rate of finding hydrocarbons is predicted to be no greater than 10 percent, based on the average U.S. wildcat well success rate. Drilling is expected to be in an area of "moderate" oil and gas potential. This is the highest level of potential for the occurrence of oil and gas in the planning area. There is approximately a 1 in 50 chance of new field discovery during the life of the plan.

During the first phase of drilling, the operator would move construction equipment over existing maintained roads to the point where the access road begins. No more than 0.25 mile of moderate duty access road with a cinder or gravel surface 18 to 20 feet wide is anticipated to be constructed. The total surface disturbance width would average 40 feet with ditches, cuts, and fill. The second part of the drilling phase is the construction of the drilling pad or platform. The likely duration of well development, testing, and abandonment is predicted to be less than 12 months per drill site. The total disturbance for each exploratory well and any new road constructed to that drill site is expected to be no more than 6 acres. The total surface disturbance caused by exploratory drilling over the life of the plan is expected to be no more than 12 acres.

Field Development and Production

No field development is expected to occur during the life of the plan. However, the following scenario describes operations and impacts associated with field development and production.

Small deposits of oil or gas discovered in the planning area will not be economic to develop. The minimum size that would be economic would be a field containing reserves of 50–60 billion cubic feet of gas over a productive lifespan of 10 years. The total area of such a field would be 200 acres with a likely well spacing of 160 acres. The field would require four development wells in addition to the discovery well. Each development would require 0.25 mile of road. Development well access roads would be cinder or gravel surfaced and would have a width of about 20 feet. The width of the surface disturbance associated with roads would average 40 feet. Produced gas would be carried by pipelines. Average pipeline length is estimated at 30 to 60 miles. The width of surface disturbance for pipelines would average 30 feet. Any produced oil would be trucked to refineries outside of Oregon. Well servicing requirements would be provided by established service companies.

The total surface disturbance for well pads would be 8 acres; for roads, 5 acres; field development, 13 acres; and pipelines, 600 acres. The total surface disturbance caused by exploration and development over the life of the plan would be 670 acres.

Plugging and Abandonment

Wells that are completed as dry holes are plugged according to a plan designed specifically for the down hole conditions of each well. Plugging is accomplished by the placing of cement plugs at strategic locations downhole and up to the surface. Drilling mud is used as a spacer between plugs to prevent communication between fluid bearing zones. The casing is cut off at least 3 feet below ground level and capped by welding a steel plate on the casing stub. After plugging, all equipment and debris would be removed and the site would be restored as near as reasonably possible to its original condition. It is predicted that the one exploratory well drilled would be plugged and abandoned.

Reasonably Foreseeable Exploration and Development of Geothermal Resources (Common to all Alternatives Except Alternative E)

Future Trends and Assumptions

With environmental protection and enhancement being a major consideration in the Pacific Northwest, clean, low-impacting energy sources are becoming more important. The abundant geothermal resources thought to be present in the Northwest are essentially undeveloped. As the demand for environmentally-friendly energy sources increases, the three known geothermal resource areas located in the planning area would attract renewed attention.

Geophysical/Geochemical Exploration

As with oil and gas, geothermal geophysical operations can take place on leased or unleased public land. Depending upon the status of the land (leased/unleased), the status of the applicant (lessee/nonlessee), and the type of geophysical operation proposed, (drilling/nondrilling), several types of authorizations can be used if the proposed exploration exceeds "casual use," as defined in 43 CFR 3200.1. In all cases, the authorizations require compliance with NEPA and approval by the authorized officer. As with oil and gas, the operator is required to comply with all terms and conditions of the permits, regulations, and other requirements, including reclamation, prescribed by the authorized officer. Monitoring for compliance with these requirements would be done during the execution of the operations and upon completion.

In addition to the geophysical methods discussed in the Oil and Gas section, the following exploration techniques are often employed in geothermal prospecting:

Microseismic: Small seismometers are buried at a shallow depth (hand-dug holes) and transmit signals from naturally-occurring, extremely minor seismic activity (micro-earthquakes) to an amplifier on the surface. Stations are located away from roads to avoid traffic "noise." These units are often backpacked into areas inaccessible to vehicles.

Resistivity: Induced polarization techniques are used to measure the resistance of subsurface rocks to the passage of an electric current. A vehicle-mounted transmitter sends pulses of electrical current into the ground through two widely spaced electrodes (usually about two miles apart). The behavior of these electrical pulses as they travel through underlying rocks is recorded by "pots" (potential electrodes), small ceramic devices that receive the current at different locations. The electrodes are either short (2–3 feet) rods driven into the ground, or aluminum foil shallowly buried over an area of several square feet. Two or three small trucks transport the crew of 3–5 people to transmitting and receiving sites.

Telluric: A string of "pots" record the variations in the natural electrical currents in the earth. No transmitter is required. Small trucks are used to transport the crew and equipment.

Radiometric: Radioactive emissions (generally radon gas) associated with geothermal resources are usually measured using a hand-held scintillometer, often at hot spring locations. Another method used involves placing plastic cups containing small detector strips sensitive to alpha radiation either on the surface or in shallow hand-dug holes. If holes are dug, they are covered, and the cups left in place for 3–4 weeks. At the end of the sampling period, the cups are retrieved and all holes are backfilled. These surveys can be conducted on-foot or with the aid of light vehicles.

Geochemical Surveys: Geochemical surveys are usually conducted at hot springs by taking water samples directly from the spring. Sampling for mercury associated with geothermal resources is often done by taking soil samples using hand tools. These surveys can be conducted on-foot or with the aid of light vehicles.

Temperature Gradient Drill Hole Surveys: Temperature gradient holes are used to determine the rate of change of temperature with respect to depth. Temperature gradient holes usually vary in diameter from about 3.5 to 4.5 inches, and from a few hundred feet to about 5,000 feet in depth. They are drilled using rotary or coring methods. Approximately 0.1 to 0.25 acre per drill hole would be disturbed. A typical drill site could contain the drill rig, most likely truck-mounted, water tank(s), fuel tank, supply trailer, and a small trailer for the workers. Drilling mud and fluids would be contained in earthen pits or steel tanks. Water for drilling would be hauled in water trucks, or if suitable water sources are close, could be piped directly to the site. Water consumption could range from about 2,000 to 6,000 gallons per day, with as much as 20,000 gallons per day under extreme lost circulation conditions.

Other equipment that would be utilized includes large flatbed trucks to haul drill rod, casing, and other drilling supplies, and in some cases, special cementing and bulk cement trucks. Two or three small vehicles would be used for transporting workers. In most cases, existing roads would be used. It is estimated that short spur trails (usually less than a few hundred yards long) would be bladed for less than 10 percent of these holes. All holes would be plugged and abandoned to protect both surface and subsurface resources, including aquifers, and reclamation of disturbed areas would be required, unless some benefit to the public could be gained—for example, a water well or camping area.

Depending upon the location and proposed depth of the drill hole, detailed plans of operation that cover drilling methods, casing and cementing programs, well control, and plugging and abandonment may be required.

Based upon past geothermal exploration in Oregon, and a projected increase in power demand in the Northwest by the end of the decade, it is anticipated that during the life of this plan, 15 notices of intent for surface geophysical surveys, and 15 notices of intent to drill 40 temperature gradient holes, would be filed under all alternatives, except Alternative E. These notices of intent would most likely be filed within the Crump Geyser and Summer Lake Known Geothermal Resource Areas.

Drilling and Testing

Drilling to determine the presence of, test, develop, produce, or inject geothermal resources can be done only on land covered by a geothermal resources lease.

A typical geothermal well drilling operation would require 2–4 acres for a well pad, including reserve pit, and 0.5 mile of moderate duty access road with a surface 18–20 feet wide, totalling up to 40 feet wide with ditches, cuts, and fills. Existing roads would be used whenever possible. Total surface disturbance for each well, and any new road is expected to be no more than 6 acres. In some cases, more than one production well could be drilled from one pad. Well spacing would be determined by the authorized officer after considering topography, reservoir characteristics, optimum number of wells for proposed use, protection of correlative rights, potential for well interference, interference with multiple use of lands, and protection of the surface and subsurface environment. Close coordination with the State would take place. It is anticipated that the duration of well development, testing, and if dry, abandonment, would be 4 months. Prior to abandonment, the operator would be required to plug the hole to prevent contamination of aquifers and any impacts to subsurface and surface resources. Plugging is accomplished by the placing of cement plugs at strategic locations downhole and up to the surface. Depending upon the formations encountered, drilling mud could be used as a spacer between plugs to prevent communication between fluid bearing zones. The casing is cut off at least 6 feet below ground level and capped by welding a steel plate on the casing stub. After plugging, all equipment and debris would be removed, and the site would be restored as near as reasonably possible to its original condition. A dry hole marker is often placed at the surface to identify the well location. If the surface owner prefers, the marker may be buried. Any new roads not needed for other purposes would be reclaimed.

It is estimated that 4–6 exploratory wells would be drilled under all alternatives, except Alternative E, during the life of this plan.

Geothermal Power Plant Development

It is projected that one power plant generating 24 megawatts of electricity (gross), would be constructed within the Crump Geyser Known Geothermal Resource Area under all alternatives, except Alternative E, during the life of this plan. It is anticipated that the developed geothermal resource would be water-dominated and that the geothermal power conversion system would be either single or double flash, or binary cycle. Before geothermal development could occur, site-specific baseline studies and environmental analyses, with public involvement, would be done. The scenario below describes the level of disturbance that would likely occur from the development of a 24 megawatt power plant:

Five to seven production wells and one or two injection wells would be drilled. It is anticipated that access would be provided by existing roads, and the construction of short (0.5 to 1-mile long) roads with a surface of 18 to 20 feet wide, totalling up to 40 feet wide with ditches, cuts, and fills. Surface disturbance from well pad and road construction would probably range from 2 to 6 acres per well. The power plant facility, including separators, energy converters, turbines, generators, condensers, cooling towers, and switchyard, would involve an estimated 10 to 5 acres. Pipelines and powerlines would disturb an additional 3 to 6 acres. If a water cooling system is employed, one to three water wells, requiring about 0.25 acre per well, would be drilled, unless the cooling water was obtained from the geothermal steam condensate. Depending upon location, terrain, geothermal reservoir characteristics, and type of generating facility, total surface disturbance for a 24 megawatt (gross) geothermal power plant, and ancillary structures, would probably range from about 26 to 76 acres, or about 1 to 3 acres per megawatt. After construction, approximately one-third to one-half of the disturbed area would be revegetated. Prior to abandonment, 30–50 years later, the remaining disturbed area would be reclaimed.

Direct Use of Geothermal Energy

Low- and moderate-temperature (50–300 degrees F) geothermal resources have many direct use applications. Direct applications, and potential development scenarios, include space heating and cooling of residences and businesses, applications in agriculture, aquaculture, and industry, and recreational and therapeutical bathing. Depending upon the type of use and magnitude of operation, surface disturbance could range from a few acres for a well and greenhouses, or food processing facility, to tens of acres for larger agricultural or aquacultural developments. It is anticipated that two wells would be drilled to support one geothermally-heated greenhouse operation within the Summer Lake Known Geothermal Resource Area under all alternatives, except Alternative E, during the plan period.

Reasonably Foreseeable Exploration and Development of Sodium Compounds and Associated Minerals (Common to all Alternataives Except Alternative E)

Future Trends and Assumptions

The demand for soda ash (sodium carbonate) and caustic soda (sodium hydroxide) is increasing, especially in the Pacific Northwest and the Pacific Rim countries. Because acid-based chemicals used in the bleaching of paper pulp produce dioxins, alkali bleaching is ecologically preferable. Besides its use in the pulp and paper industry, sodium carbonate is used extensively in making glass, caustic soda, soaps, and detergents, and for flue gas desulfurization. All current soda ash production in the United States is from Wyoming and southern California. As soda ash and caustic soda prices increase and overland transportation costs rise, Oregon deposits, such as the one at Lake Abert, may have commercial significance because of their proximity to the pulp markets in the Pacific Northwest, glass container plants in northern California, Portland port facilities that handle about 60 percent of the U.S. soda ash export business, and the port of Coos Bay. Considering past interest in Lake Abert's sodium potential, and its proximity to use areas and shipping ports, it is projected that there will be renewed interest.

Sodium Exploration

Sampling of lake water is done using a small row/motor boat or floating platform and hand-operated PVC or stainless steel bailer. Shallow (tens of feet) sediment core samples can be taken from a boat or platform, or land, using piston or thin-wall sediment samplers. Hand or hand-held power augers or truck-mounted power augers are also used when taking shallow samples on land.

Deeper subsurface exploration involves the drilling of core holes using a truck-mounted drilling rig, or if done over water, a raft or platform-mounted rig. Drilling

along the edges of the lake or on the playa using truck-mounted drilling rigs could be done using existing roads and trails, or might necessitate the construction of short spur roads from the existing access to the drill sites. If drilling were to occur in these areas during wet periods, temporary roads and drill pads would have to be built to support the weight of the drilling rig and supply trucks.

It is projected over the life of the plan that 2–4 prospecting permit applications would be filed to perform lake water and shallow sediment sampling and drill a total of 2–10, 100–1,000 foot-deep exploratory holes. If allowed,this could involve the construction of 0.25 to 1 mile of spur road (10–12 feet wide) construction, and a total of less than 2 acres for drill pad construction.

Sodium Development

Presently, U.S. soda ash production comes from the Green River Basin in Wyoming, and Searles and Owens Lakes in California. In Wyoming, trona, the principal ore from which the soda ash is made, occurs in several beds of varying thickness and covers an area of over 1,000 square miles. The deposit is buried, and extends from 800 to over 2,000 feet in depth. Most of it is mined using room and pillar underground methods, while solution mining is used to recover deeply buried trona. Using an array of injection and recovery wells, dilute sodium hydroxide solvent is introduced under pressure to dissolve the underlying trona. At Searles Lake, a dry lakebed, subterranean brines between 50 and 350 feet below the surface are extracted using an array of injection and recovery wells (numbering in the hundreds), pumps, and pipelines located in several areas on the lakebed. At Owens Lake, soda ash has been mined by digging perimeter channels that allow the interstitial fluids to drain, and harvesting the soda ash with front-end loaders (Kostick 1989).

Because the Lake Abert Basin is younger, and the lake and its drainage system are less extensive than the Green River Basin in Wyoming, deep, thick deposits are not anticipated. One hole 30 feet deep was bored and sampled in the middle of the playa at the north end of the lake. While thin surface encrustations contained 39 percent soluble salts (on an anhydrous basis), the salt content of the subsurface muds was found to decrease rapidly from 8 percent in the first foot to 4 percent at a depth of 12 feet, and to only 1 percent at 30 feet (Allison and Mason 1947). However, no deep exploration holes have been drilled in the area, and the potential for the occurrence of economic deposits of soda ash at depth is unknown. Geologically, Lake Abert is very similar to the Pleistocene-age Searles and Owens Lakes. Whether or not there are extensive subterranean brines, as there are with Searles Lake, is also unknown.

It is known that the waters of Lake Abert contain large quantities of sodium salts. The salts in the playas are redissolved during periods of high water and recharge the lake waters. Salts in the saturated lake-bottom sediments also diffuse into the waters above. In addition, salts are introduced into the system by springs and inflow from the Chewaucan River, and possibly transported in from the Summer Lake Basin by the prevailing northwesterly summer winds. While future exploration could discover deposits similar to those described in Wyoming and California, the following reasonably foreseeable development scenario is based upon the currently known mode of occurrence of sodium compounds in Lake Abert:

> One or more pumping inlet stations would be constructed, probably in the deeper parts of the lake. Submerged pipelines would transport lake water to one or more large, shallow evaporation ponds where the salts would be concentrated. The total area of the pond(s) would range from 2 to 4 square miles. They would be located within the lakebed itself and/or on the adjacent playa. The concentrated solution would be piped into secondary/tertiary evaporation ponds where the concentrate/precipitate would be loaded and transported offsite for processing. Alternatively, the concentrate/precipitate could be processed onsite, which would necessitate the construction of a processing plant. The area required for an onsite processing facility, including evaporation pond, pumping facilities and pipelines, roads, powerlines, the plant itself, and loading facilities, would range from 1 to 3 square miles. If the processing plant were not constructed, the total area necessary for the secondary/tertiary ponds and appurtenances would be somewhat less.
>
> Depending upon the locations of the various aspects of an operation, new road and pipeline construction could vary from 5 to 15 miles in length, with the widths of disturbed areas ranging up to 40 feet. New powerline construction also would range from 5 to 15 miles. In some areas, roads, pipelines, and powerlines would occupy the same corridor.
>
> Unused brine from the concentrating process would be pumped back onto the playa to dissolve more salts, evaporated in waste ponds ranging in size from 0.25 to 0.5 square mile, or pumped

directly back into the lake.

An additional 5 to 20 acres would be needed for a water well, rock source for road and facilities construction, and other miscellaneous purposes.

The product would be shipped by truck or rail. Shipping by rail would necessitate the construction of a rail spur from the Lake Abert area south to Lakeview, with as little as less than a mile, to up to about 20 miles constructed on public land; the remainder would be constructed on private lands.

Before any development could take place, a lessee would have to submit a detailed, site-specific mining/processing/reclamation plan, including access, power, and water requirements, and an environmental review would be conducted. Lease stipulations, and conditions of approval developed in part from mitigation measures identified in the environmental review, would be imposed to prevent unnecessary and undue environmental degradation.

It is projected that one proposal to mine sodium salts from Lake Abert will be received during the life of the plan.

Locatable Mineral Resources

Reasonably Foreseeable Exploration and Development Scenarios (Common to all Alternatives Except Alternative E)

Future Trends and Assumptions

The major commodities of interest would continue to be the precious metals gold and silver, and the State gemstone, Oregon sunstone. This is based on a combination of price and the favorable geology for mineral occurrences. Perlite mining at Tucker Hill is expected to continue, while diatomite mining on public land in Christmas Valley would be sporadic. Reclamation science would continue to advance due to experience and research. More detailed design effort would be placed on the reclamation of mined lands in the future. This would result in an overall increase in reclamation costs but those costs would pay dividends in the long-term with increased reclamation success.

The economics of mining in the planning area would be driven by the relationship between production costs and the market price of the commodity. While production costs can be controlled or anticipated through management and technology, the price of mineral commodities (especially of gold) could vary widely. The overall profitability of an operation, and hence the level of activity at the prospecting, exploration, and mining phases, for development of ore bodies would be closely related to the price of the mineral commodity.

No chemical heap-leaching operations are forecasted during the plan period. If such an operation is proposed during the life of the plan, it would be subjected to environmental review under a plan of operations pursuant to regulations found in 43 CFR 3809.

Casual Use, Notices, Plans of Operations, Use and Occupancy

There are 3 levels of use defined by the 43 CFR 3809 regulations—casual, notice, and plan of operations. Generally, casual use means activities resulting in negligible, if any, disturbance of public lands or resources. Mechanized earth-moving equipment or truck-mounted drills are not allowed under casual use. Notice-level operations involve surface-disturbing exploration operations of 5 acres or less. Casual use and notice-level operations do not involve Federal actions that require compliance with NEPA. A plan of operations is required for all mining activity that is not casual use, regardless of the number of acres disturbed. A plan is also required for all exploration activities that disturb over 5 acres, bulk sampling which will remove 1,000 tons or more of presumed ore for testing, or for any surface-disturbing operations greater than casual use in certain SMA's and lands/waters that contain federally-proposed or listed T&E species or their proposed or designated critical habitat. The approval of plans of operations is a Federal action that requires NEPA compliance. Mining claim occupancy associated with notice- or plan-level operations, also requires compliance with NEPA.

Details of plan of operations filing and processing requirements can be found in 43 CFR 3809.400. Generally, plans must include a detailed description of all operations, including a map showing all areas to be disturbed by mining, processing, and access, all equipment that would be used, periods of use, and any necessary buildings or structures. A detailed reclamation plan to meet the standards found in 43 CFR 3809.420, and a monitoring plan to monitor the effect of operations are also required. An interim management plan showing how the project area would be managed during periods of temporary closure to prevent unnecessary and undue degradation must also be submitted. The operator also must submit a reclamation cost estimate. The BLM may require opera-

tional and baseline environmental information, and any other information, needed to ensure that operations will not cause unnecessary and undue degradation.

When a plan of operations is received, BLM would review it to make sure that it is complete. Where necessary, the BLM would consult with the State to ensure operations would be consistent with State water quality requirements. In addition, the BLM would conduct any consultation required under the "National Historic Preservation Act" or "Endangered Species Act." Onsite visits would be scheduled when necessary. BLM could require changes to the plan of operations to ensure that the performance standards found in 43 CFR 3809.420 would be met, and that no unnecessary or undue degradation of lands or resources would occur. Plans of operations would be approved subject to the Locatable Minerals Surface Management Standards for Exploration, Mining, and Reclamation on the Lakeview District, found in Stipulations and Guidelines for Mineral Operations in Appendix N3, and the CWA BMP's in Appendix D. In addition, site-specific mitigating measures would be imposed when necessary. A financial guarantee covering the estimated cost of reclamation, as if BLM were to contract with a third-party, would have to be provided before operations could begin. The financial guarantee would have to be sufficient not only to cover costs of reclamation, but also costs associated with interim stabilization and compliance with Federal, state, and local environmental requirements while third-party contracts would be developed and executed.

BLM approval is necessary to occupy public land for more than 14 calendar days in any 90-day period within a 25-mile radius of the initially occupied site. Details for the submittal and approval of use and occupancy are contained in 43 CFR 3710. As defined in these regulations, occupancy means full or part-time residence on the public lands. It also means activities that involve residence; the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; or the use of a watchman or caretaker for the purpose of monitoring activities. Residence or structures include, but are not limited to, tents, motorhomes, trailers, campers, cabins, houses, buildings, and storage of equipment or supplies. Also included are barriers to access, fences, gates, and signs intended to restrict public access.

Permanent structure means a structure fixed to the ground by any of the various types of foundations, slabs, piers, or poles, or other means allowed by building codes. The term also includes a structure placed on the ground that lacks foundations, slabs, piers, or poles, and that can only be moved through disassembly into its component parts or by techniques commonly used in house moving. The term does not apply to tents or lean-tos.

The disposal of sewage and gray-water would be subject to the rules and regulations of the ODEQ. The disposal of garbage and other debris would be subject to all appropriate local, state, and Federal rules and regulations. Likewise, the drilling of any water wells would be subject to all ODWR requirements. Permanent structures would be subject to all state and county permitting. Copies of all required local and state approvals and permits would be filed with the BLM prior to allowing any occupancy.

Background on the Development of a Locatable Minerals Mine

The development of a mine from exploration to production can be divided into four stages. Each stage requires the application of more discriminating (and more expensive) techniques over a successively smaller land area to identify, develop, and produce an economic mineral deposit. A full sequence of developing a mineral project involves reconnaissance, prospecting, exploration, and mine development.

Reconnaissance: Reconnaissance-level activity is the first stage in exploring for a mineral deposit. This activity involves initial literature search of an area of interest, using available references such as publications, reports, maps, aerial photos, etc. The area of study can vary from hundreds to thousands of square miles. Activity that would normally take place includes large scale mapping, regional geochemical and geophysical studies, and remote sensing with aerial photography or satellite imagery. These studies are usually undertaken by academic or government entities, or major corporations. The type of surface-disturbing activity associated with reconnaissance-level mineral inventory is usually no more than occasional stream sediment, or soil and rock, sampling. Minor off-road vehicle use could be required.

Prospecting: As the result of anomalous geochemical or geophysical readings, unique geologic structure or feature, occurrence of typical mineral bearing formations, or a historical reference to past mineral occurrence, the prospecting area of interest is identified through reconnaissance. This area could range from a single square mile to an entire mountain range of several hundred square miles.

Activity that would take place in an effort to locate a mineral prospect includes more detailed mapping, sampling, geochemical and geophysical study programs. Also, this is the time when property acquisition efforts usually begin and most mining claims are located in order to secure ground while trying to make a mineral discovery. Prospecting on an annual basis is considered a minimum requirement, under the mining laws, to secure a claim.

Types of surface disturbing activity associated with prospecting would involve more intense soil and rock chip sampling using mostly hand tools, frequent off-road vehicle use, and placement and maintenance of mining claim monuments. This activity is normally considered "casual use" (43 CFR 3809.5) and does not require BLM notification or approval.

Exploration: Upon location of a sufficiently anomalous mineral occurrence, or favorable occurrence indicator, a mineral prospect is established and is subjected to more intense evaluation through exploration techniques. Activities that take place during exploration include those utilized during prospecting but at a more intense level in a smaller area. In addition, activities such as road building, trenching, and drilling are conducted. In later stages of exploration, an exploratory adit or shaft may be driven. If the prospect already has underground workings these may be sampled, drilled, or extended. Exploration activities utilize mechanized earth-moving equipment, drill rigs, etc., and may involve the use of explosives.

Typical exploration projects in the planning area could include: in-stream dredging with portable suction dredges, exploratory drilling which could include construction of new roads, use of explosives to sample rock outcroppings, and excavation of test pits. If the exploration project disturbs 5 acres or less, it is conducted under a notice (43 CFR 3809.301) which requires the operator to notify BLM 15 days before beginning the activity. A copy of each notice received is sent to the Oregon Department of Geology and Mineral Industries (DOGAMI) for their review. If the project disturbs more than 5 acres, it is conducted under a plan of operations (43 CFR 3809.401) and requires NEPA compliance before approval.

Mine Development: If exploration results show that an economically viable mineral deposit is present, activity would intensify to obtain detailed knowledge regarding reserves, possible mining methods, and mineral processing requirements. This would involve applying all the previously utilized exploration tools in a more intense effort. Once enough information is acquired, a feasibility study would be made to decide whether to proceed with mine development and what mining and ore processing methods would be utilized.

Once the decision to develop the property is made, the mine permitting process begins. Upon approval, work begins on development of the mine infrastructure. This includes construction of the mill, offices, and laboratory; driving of development workings if the property is to be underground mined, or prestripping if it is to be open pit mined; and building of access roads or haulage routes, and placement of utility services. During this time additional refinement of ore reserves is made.

Once enough facilities are in place, actual mine production begins. Concurrent with production there often are "satellite" exploration efforts to expand the mine's reserve base and extend the project life. Reclamation of the property is conducted concurrently with, or upon completion of, the mining operation. Often subeconomic resources remain unmined and the property is dormant, waiting for changes in commodity price or production technology that would make these resources economic.

Activities that occur on these lands include: actual mining, ore processing, tailings disposal, waste rock placement, solution processing, metal refining, and placement of support facilities such as repair shops, labs, and offices. Such activities involve the use of heavy earthmoving equipment and explosives for mining and materials handling, exploration equipment for refinement of the ore reserve base, hazardous or dangerous reagents for processing requirements, and general construction activities.

The size of mines varies greatly and not all mines would require all the previously mentioned facilities and equipment. Acreage involved can range from less than 5 acres to several hundred. Most mining operations in the sunstone area are under 5 acres. Any mining that involves greater than casual use, regardless of the number of acres, requires the submittal of a plan of operations, and appropriate NEPA analysis, under 43 CFR 3809.401 and .411.

Gold

Based on the mineral exploration activity of the last planning period, and recent discoveries of Tertiary epithermal disseminated gold deposits in the Basin and Range Physiographic Province, it is anticipated that 10 to 15 notices for disseminated gold exploration would be submitted under all alternatives, except Alternative E, over the life of this plan. These notices could be

located anywhere, but likely areas include the Coyote Hills, Horsehead Mountain, and Paisley Hills. It is predicted that approximately 10 holes would be drilled utilizing truck mounted drill rigs for each notice. Drill sites would disturb less than 0.1 acre. Temporary access roads, 10–12 feet wide, would be constructed for about one-third of the drill holes, but in most cases the existing roads would be utilized. Drill holes would be plugged in accordance with state and Federal regulations, and reclamation, including rehabilitation of drill pads and access roads, would be conducted at the conclusion of the exploration program.

In addition to the gold exploration mentioned above, it is anticipated that four notices for in-stream suction dredging would be filed during the life of the plan. In-stream dredging is usually a one to two person operation using a floating suction dredge with a 5 to 7 horsepower engine. The dredge pulls up all the gravel in the stream down to bedrock. The gravels are passed over a sluice box and are returned to the stream without the gold. This process does not require any chemicals. Most of the dredges have an intake nozzle opening of less than 5 inches diameter. Other activities associated with dredging include temporary occupancy and minor road and trail construction. These operations would be monitored pursuant to the regulations found in 43 CFR 3809.

Sunstones

Sunstones are feldspar crystals that formed in a basaltic lava flow. They vary from colorless to straw-colored pink, and occur in varying shades of red and green. They are considered a semiprecious gemstone. Oregon sunstones are uncommon in their composition, clarity, range of colors, and abundance. There are three areas in Oregon where sunstones are known to occur. The Lake County occurrence is the largest, covering over 10 square miles. The two other areas cover approximately one square mile each. Transparent feldspar occurrences have been reported from Arizona, California, New Mexico, and Utah, but few gems have been produced from those states. Since the designation of the Oregon sunstone as the State's official gemstone in August of 1987, exploration and mining has steadily increased, and is expected to continue to increase over the life of this plan. The exploration and mining of sunstones are regulated by 43 CFR 3809. Mining claim use and occupancy are regulated by 43 CFR 3710.

Sunstone exploration is usually done by hand-digging, or excavating backhoe or bulldozer trenches. Power or hand augers and truck-mounted drill rigs are sometimes used. Some operators employ blasting, but if not done carefully, fractured stones result. The sunstones are mined from the soil, sediments, and the decomposed rock that result from the weathering of the lava flow. Sunstones can be mined casually by hand, using a pick and shovel and sieving through a 0.25 inch screen. The stones are separated from the rock fragments by hand. Larger operations use backhoes, bulldozers, conveyors, and automated shakers and screens to increase production. Most of the time, the tailings are deposited directly back into the mining excavation immediately after retrieving the stones. Sometimes the tailings are stockpiled, and returned to the pit after mining ceases.

To date, all operations in the sunstone area have been casual use or notice-level operations as defined in the pre-January 20, 2001, 43 CFR 3809 regulations. The amended regulations, effective January 20, 2001, require the submittal of a plan of operations for all mining operations that exceed casual use, regardless of acres disturbed, and for exploration operations disturbing 5 acres or more. Regardless of the level of operation, reclamation is required, and consists of backfilling, contouring, spreading stockpiled topsoil over the disturbed areas, and, when necessary, reseeding. Over the past 20 years, the Rabbit Basin area has received 146 notices, (about 7 per year), mostly for mining. There are currently 67 active notices. There never have been any plans of operation filed in this area. The average surface disturbance per notice has been about 1 acre, including occupancy. The largest operations have not exceeded 4 acres, including occupancy. Because the amended 3809 regulations now require a plan for any mining, regardless of acres disturbed, notices for mining will no longer suffice. It is anticipated that this area will receive about 7 plans of operations each year during the life of this plan. The level of disturbance per plan is expected to be about what it has been in the past for notices. However, assuming the average numbers of acres disturbed per plan increase to 4, over a 20-year period, up to 560 acres would be disturbed. Notice-level exploration would probably disturb less than a total of 5 acres per year, so in 20 years, total disturbance, including disturbance caused from occupancy, exploration, and mining, could reach 660 acres. Because reclamation must follow mining as soon as practicable, as it has in the past, it is estimated that a maximum of 160 acres would be disturbed and unreclaimed at any one time.

Since the 3715 regulations went into effect in August, 1996, 32 occupancy notices have been received (about 6 per year). Currently, there are 18 active occupancies in the Rabbit Basin sunstone area.

Prior to any ground clearing or excavation, site specific cultural resource and sensitive, T&E species inventories would be done where deemed necessary by a BLM archeologist, botanist, and wildlife biologist, respectively. If any critical values were identified, the proposed occupancy would be relocated to avoid conflict. Where excavation in excess of 100 square feet would occur, all topsoil and/or growth medium would be removed, stockpiled, windrowed, or otherwise conserved, and if necessary, seeded. Upon termination of occupancy, all structures, foundations, piers, poles, slabs, equipment, materials and debris would be removed from public land. All fences, barriers, and signs would also be removed. The area would be graded to conform with the surrounding topography, scarified if necessary, and the stockpiled topsoil/growth medium would be spread over the disturbance, and revegetated as directed by BLM. Small quantities of native seed mixes would be made available for purchase from BLM for use in reclaiming these sites, and disturbance from exploration and mining.

To minimize disturbance, BLM would encourage the use of temporary structures, such as tents, campers and trailers, over the use of permanent structures such as buildings, homes, or cabins. Occupancy that was not reasonably incident to mining would be eliminated from the public lands.

BLM would attempt to keep the public lands open to public entry at all times. However, where public health and safety are a primary concern, or if it is essential that access be limited to protect valuable mining equipment or supplies from theft or loss, BLM will authorize the placing of fences, gates, barriers, and signs on public land to limit public access.

Perlite and Diatomite

The perlite and diatomite mining operations currently taking place in the LRA, and anticipated in the future, involve similar open-pit mining techniques. The perlite operations differ in that the rock is harder and requires drilling, blasting, and more crushing.

It is anticipated that the Tucker Hill perlite mine would continue to operate throughout the life of this plan. For a description of typical mining operations, and an analysis of impacts, see the "Amended Plan of Operations and Reclamation Plan for the Tucker Hill Perlite Mine," and "Final Environmental Impact Statement, Atlas Perlite, Inc., Tucker Hill Perlite Project" (BLM, 1996), on file in the Lakeview District Office. For the purpose of this land use plan, it is anticipated that the existing mine would expand beyond the scope of the current plan of operations, and that a second mine would be developed somewhere else within the claim block. This would require the filing and approval of new plans of operation and compliance with the NEPA.

Currently, Oil Dri Corporation is performing reclamation on public lands in Christmas Valley. No mining is currently taking place on public lands, though mining is occurring on adjacent private lands. It is anticipated that Oil Dri would initiate an exploration program consisting of 20 to 50 drill holes and 10–30 backhoe trenches on public land during the life of this plan. It is also anticipated that one new open-pit diatomite mine would be located on public land in the Christmas Valley area. This would require a plan of operations and compliance with NEPA.

Salable Mineral Resources

Reasonably Forseeable Exploration and Development Scenarios (Common to all Alternatives Except Alternative E)

Future Trends and Assumptions

The major use of salable minerals (primarily sand, gravel, cinders, and rock) would continue to be in support of the State and County highway and road system, BLM roads, and, to a lesser extent, for private purposes. Decorative rock sales to individuals is expected to increase. It is anticipated that rock and sand and gravel will be needed in about the same quantities as in the past for maintenance and construction of County and State roads and highways.

Existing quarries and pits would most likely would be used for obtaining sand, gravel, cinders and rock, but new site development in not precluded in this plan. Decorative rock sales could be made anywhere throughout the planning area where not precluded by law or policy.

The development and reclamation of mineral material sites would be subject to the Guidelines for Development of Salable Mineral Resources in the Lakeview District, found in Stipulations and Guidelines for Mineral Operations (Appendix N3).

Rock Quarry, Sand/Gravel/Cinder Pit Development

Existing material sites disturb approximately 15–20 acres of land each. This acreage is necessary for the

mine itself, rock crushing operations, truck-turn around areas, access trails for bulldozers and drills, overburden stockpile sites, and aggregate stockpile areas. For access to a new quarry site, approximately 0.5 acre of land would be disturbed by new road construction.

It is expected that the existing mineral materials sites in this area would be utilized intermittently throughout the planning period, and that 15 to 30 new sites would be opened up. Any existing pit expansion that causes surface disturbance beyond previously inventoried limits, or the development of any new site, would require resource inventories, site-specific NEPA compliance, and development and reclamation plans.

It is expected that at least 20 depleted mineral material sites would be reclaimed during the life of the plan. After all useable material is removed, reclamation work would be conducted according to an approved interdisciplinary plan. Upon depletion, reclamation work would be conducted on the material sites as well as on all unneeded access roads and trails. Oversize rock would be put back into the quarries or pits, and, where possible, cutslopes would be graded to conform with the existing topography. Stockpiled topsoil would be spread over sideslopes and floors, and seeded as directed by BLM. Access roads and trails would be graded for proper drainage, scarified and seeded.

Decorative Stone

It is anticipated that the district office would receive 4 to 10 sale requests per year for decorative stone. In most cases, existing roads would provide access to areas where the stone is scattered on the surface. In these areas, the rock would be hand-picked and loaded directly onto pick-ups or flatbed trucks, or onto pallets and then loaded onto trucks. There would be both on- and off-road vehicle travel. There is a possibility that temporary road or trail construction could be necessary to gain access in some areas. Prior to designating an area as a decorative rock gathering area, and prior to any road or trail construction, appropriate inventories and NEPA compliance would be conducted to prevent unnecessary and undue degradation. Reclamation plans would be developed for any designated collecting areas and their access roads and trails.

N3: Stipulations and Guidelines for Mineral Operations

The following are mineral leasing stipulations, and guidelines for locatable and salable mineral operations. The special stipulations may be used on a site-specific basis. Their use, and details such as dates and buffer sizes, may vary through the alternatives. The locatable mineral surface management guidelines and the salable mineral guidelines would apply throughout the alternatives.

Leasing Stipulations

Standard Leasing Terms

Standard leasing terms for oil and gas are listed in Section 6 of Offer to Lease and Lease for Oil and Gas Form 3100-11. They are:

> Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air and water, to cultural, biological, visual and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.
>
> Prior to disturbing the surface of the leased lands, lessee shall contact BLM to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short-term special studies under guidelines provided by lessor. If in the conduct of operations, T&E species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects until appropriate steps have been taken to protect the site or recover the resources as determined by BLM in consultation with other appropriate agencies.

Standard terms for geothermal leasing can be found on Offer to Lease and Lease for Geothermal Resources (Form 3200-24), Section 6, and are very similar to those described above for oil and gas leasing.

Powersite Stipulation (Form No. 3730-1) is to be used on all lands within powersite reservations.

Special Leasing Stipulations

The following special stipulations are to be utilized on specifically designated tracts of land as described under the various alternatives.

Recreation, OHV's, and Visual Resources

A 30-day public notice period may be required prior to exception, modification, or waiver of this stipulation.

Resource—Developed recreation sites (including, but not limited to campgrounds, watchable wildlife sites, and hang-gliding launch sites)

Stipulation: Surface occupancy and use is prohibited within developed recreation sites.

Objective: To protect developed recreation sites.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: The boundaries of the stipulated area may be modified by the authorized officer if the recreation site boundaries are changed.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains developed recreation areas.

Resource—OHV restrictions

Stipulation: Access, travel, and drill site construction will be limited in areas where OHV use is restricted. Areas classified as limited to existing roads and trails or designated roads and trails will limit access for mining activities to just those roads that are open under the designation. Access will not be allowed in areas closed to OHV use.

Objective: To protect important scenic and wildlife resources, and to enhance primitive recreational opportunities.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting the resource values.

Waiver: This stipulation may be waived if the off-road vehicle closure is lifted.

A 30-day public notice period will be required prior to exception, modification, or waiver of this stipulation.

Resource—VRM Class I

Stipulation: Surface occupancy and use is prohibited in VRM Class I areas.

Objective: To preserve the existing character of thelandscape.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: The boundaries of the stipulated area may be modified by the authorized officer if the boundaries of the VRM Class I area are changed.

Waiver: This stipulation may be waived by the authorized officer if all VRM Class I areas within the leasehold are reduced to a lower VRM class. Areas reduced to a VRM Class II will be subject to the controlled-surface-use stipulation for visual resources, and areas reduced to VRM Class III will be subject to standard stipulations.

Resource—VRM Class II

Stipulation: All surface-disturbing activities, semipermanent and permanent facilities in VRM Class II areas may require special design including location, painting and camouflage to blend with the natural surroundings and meet the visual quality objectives for the area.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None.

Modification: None.

Waiver: This stipulation may be waived if the authorized officer determines that there are no longer VRM Class II areas in the leasehold.

Archeology

Resource—Native American religious sites

Stipulation: Surface occupancy and use is prohibited within areas identified by Native Americans/ Tribes as religious sites.

Objective: To protect important Native American religious sites.

Exception: An exception to this stipulation may be granted by the authorized officer if, after consultation with the appropriate Tribe(s), it has been determined that the proposed action is compatible with the religious use of the site.

Modification: The boundaries of the stipulated area may be modified by the authorized officer if the religious site boundaries are changed by the appropriate Tribe(s).

Waiver: This stipulation may be waived if the religious sites are abandoned and if, after consultation with the appropriate Tribe(s), it is determined that impacts from subsequent surface occupancy are acceptable or can be mitigated adequately.

Wildlife

Resource—Bald eagle nest sites and nesting habitat

Stipulation: Surface occupancy and use is prohibited from March 1 to July 30, within 0.25 mile of known bald eagle nest sites and nesting habitat.

Objective: To protect bald eagle nesting sites and nesting habitat.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be mitigated adequately. This plan must be approved by BLM in consultation with the USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that portion of the area can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat, or if the bald eagle is declared recovered and is no longer protected. Consultation with the ODFW will be required prior to exception, modification, or waiver of this stipulation.

Resource—Other raptor nest sites

Stipulation: Surface occupancy and use is prohibited from February 1 to July 30, within 0.25 mile of known raptor nest sites (other than bald eagle).

Objective: To protect raptor nest sites.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bird or its nest site.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that a portion of the area can be occupied without adversely affecting the species or its nest site.

Waiver: This stipulation may be waived if the authorized officer determines that there is no longer raptor nesting habitat on the leasehold. Consultation with the ODFW will be required prior to exception, modification, or waiver of this stipulation.

Resource—Crucial deer and pronghorn winter range

Stipulation: Surface use is prohibited from November 20 to April 15 within crucial deer and pronghorn winter range. This stipulation does not apply to the operation or maintenance of production facilities.

Objective: To protect crucial deer and pronghorn winter range from disturbance during the winter use season, and to facilitate long-term maintenance of deer/pronghorn populations.

Exception: An exception to this stipulation may be

granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable of can be mitigated adequately.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain crucial winter range. This stipulation can be expanded to cover additional portions of the lease if additional crucial habitat areas are identified, or if habitat use areas change. The dates for the timing restriction may be modified if new wildlife use information indicates that the November 20 to April 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains crucial winter range. Consultation with the ODFW will be required prior to exception, modification, or waiver of this stipulation.

Resource—Greater sage-grouse lek sites (Alternatives A and B)

Stipulation: Surface occupancy and use is prohibited within 2 miles of known greater sage-grouse lek sites.

Objective: To protect greater sage-grouse lek sites.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the greater sage-grouse or its lek site.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that a portion of the area can be occupied without adversely affecting the greater sage-grouse or its lek site.

Waiver: This stipulation may be waived if the authorized officer determines that there is no longer a lek site on the leasehold.

Resource—Greater sage-grouse habitat (Alternatives C and D)

Stipulation: Surface occupancy and use is prohibited within 0.6 miles of all known or occupied greater sage-grouse habitat under Alternative C and within 0.6 miles of known or occupied breeding habitat under Alternative D.

Objective: To protect greater sage-grouse habitat.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the greater sage-grouse or its habitat.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that a portion of the area can be occupied without adversely affecting the greater sage-grouse or its habitat.

Waiver: This stipulation may be waived if the authorized officer determines that there is no longer habitat on the leasehold.

Soil/Water/Wetlands/Riparian

Resource—Soil and water

Stipulation: Prior to disturbance of slopes over 60 percent, an engineering/reclamation plan must be approved by the authorized officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated erosion, such as rilling, gullying, piping, and mass wasting.
- Water quality and quantity will be in conformance with state and federal water quality laws.
- Surface-disturbing activities will not be conducted during extended wet periods.
- Construction will not be allowed when soils are frozen.

Objective: To maintain soil productivity, provide necessary protection to prevent excessive soil erosion on steep slopes, and to avoid areas having excessive reclamation problems.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that the impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: The area affected by this stipulation may be modified by the authorized officer if it is determined that slopes over 60 percent in the area are not subject to excessive erosion and do not have excessive reclamation problems.

Waiver: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold does not include slopes over 60 percent.

Resource—Wetlands (areas which Federal agencies define as "innundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevelance of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas").

Stipulation: Surface occupancy and use is prohibited from November 1 to July 15 on wetlands.

Objective: To protect wetland vegetation and wildlife habitat.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: This stipulation may be modified if the authorized officers determines, on a site-specific basis, that a shorter time limitation will adequately protect the wetland values.

Waiver: This stipulation may be waived if it is determined that the leasehold no longer contains wetland values.

A 30-day public notice period will be required prior to exception, modification, or waiver of this stipulation. *Note:* Additional requirements for complying with Sections 401 and 404 of the CWA must be met before surface occupancy in wetlands is authorized.

Resource—Riparian conservation areas

Stipulation: Unless otherwise authorized, drill site construction and access through riparian conservation areas within this leasehold will be limited to established roadways.

Objective: To protect riparian vegetation and reduce erosion adjacent to water courses.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification/Waiver: This stipulation may be modified or waived if it is determined by the authorized officer that there is no threat to riparian values.

Areas of Critical Environmental Concern/Special Management Areas

Resource—ACEC's

Stipulation: Surface occupancy and use is prohibited within an ACEC.

Objective: To protect natural processes, historic, cultural, scenic, fisheries, and wildlife resources.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be mitigated adequately.

Modification: The boundaries of the stipulated area may be modified if the ACEC boundaries are modified.

Waiver: This stipulation may be waived if the ACEC designation is lifted.

A 30-day public notice period will be required prior to exception, modification, or waiver of this stipulation.

Resource—Areas recommended suitable as wild rivers under the "Wild and Scenic Rivers Act."

Stipulation: Areas within 0.25 mile of the river with existing mineral leasing activity occurring at the time of congressional designation would be allowed to continue, but must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impacts.

Objective: To protect the outstandingly remarkable values for which the river was designated as wild.

Exception: No exception to this stipulation may be granted by the authorized officer.

Modification: This stipulation may be modified only if the boundaries of the WSR corridor change.

Waiver: This stipulation may be waived if it is determined that the leasehold no longer contains land that meets wild river criteria.

Resource—Areas recommended suitable as scenic or recreational rivers under the "Wild and Scenic Rivers Act."

Stipulation: Existing mineral leasing activity occurring at the time of congressional designation and new mineral leasing proposals would be allowed, but must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impacts.

Objective: To protect the outstandingly remarkable values for which the river was designated as scenic or recreational.

Exception: No exception to this stipulation may be granted by the authorized officer.

Modification: This stipulation may be modified only if the boundaries of the wild and scenic river corridor change.

Waiver: This stipulation may be waived if it is determined that the leasehold no longer contains land that meets scenic or recreational river criteria.

Appendix Attachment—Locatable Minerals Surface Management

43 CFR 3809—Standards for Exploration, Mining, and Reclamation on the Lakeview District

The following operational guidelines for mining activities have been compiled to assist the miner in complying with the 43 CFR 3809 regulations, which apply to all mining operations on BLM-administered lands. The manner in which the necessary work is to be done will be site specific and all of the following standards may not apply to each mining operation. It is the mining claimant's and operator's responsibility to avoid "unnecessary or undue degradation" and they must perform all necessary reclamation work. Refer to 43 CFR 3809 regulations for general requirements and performance standards. The BLM will provide site-specific guidelines for some mining proposals.

Operations in WSA's are regulated under 43 CFR 3802 and the wilderness IMP. WSA's are technically open to mineral location, but are severely restricted by the wilderness IMP's "no reclamation" standard.

Construction and Mining

Vegetation removal: Remove only that vegetation which is in the way of mining activities. Merchantable timber must be marked by BLM prior to cutting, and may not be used for firewood. It is recommended that small trees (less than 6 inches diameter at breast height [dbh]) and shrubs are to be lopped and scattered, or shredded for use as mulch. Trees over 12 inches dbh should be bucked and stacked in an accessible location unless they are needed for the mining operation.

Firewood: Firewood may not be cut and sold, or used off of the mining claims.

Topsoil: All excavations should have all productive topsoil (usually the top 6 to 18 inches) first stripped, stockpiled, and protected from erosion for use in future reclamation. This also includes removal of topsoil before the establishment of mining waste dumps and tailings ponds if the waste material will be left in place during reclamation.

Roads: Existing roads and trails should be used as much as possible. Temporary roads are to be constructed to a minimum width and with minimum cuts and fills. All roads shall be constructed so as not to negatively impact slope stability. Access may be limited in some areas by off-highway vehicle restrictions (Maps R-2, -5, -6, and -7).

Water quality: When mining will be in or near bodies of water, or sediment will be discharged, contact the ODEQ and U.S. Army Corps of Engineers. It is the operator's responsibility to obtain any needed suction dredging, streambed alteration, or water discharge permits required by Federal or state agencies. Copies of such permits shall be provided to the resource area manager if a notice or plan of operations is filed.

Claim monuments: Due to the history of small wildlife deaths, plastic pipe is no longer allowed for claim staking pursuant to state law. It is recommended that existing plastic pipe monuments have all openings permanently closed. Upon loss or abandonment of the claim, all plastic pipe must be removed from the public lands, and when old markers are replaced during normal claim maintenance, they are to be either wood posts or stone or earth mounds, consistent with state law.

Drill sites: Exploratory drill sites should be located next to or on existing roads when possible without blocking public access. When drill sites must be constructed, the size of the disturbance shall be as small as possible in order to conduct drilling operations.

Dust and erosion control: While in operation, and during periods of temporary shut-down, exposed ground surfaces susceptible to erosion will need to be protected. This can be accomplished with seeding, mulching, installation of water diversions, and routine watering of dust producing surfaces.

Fire safety: All State fire regulations must be followed, including obtaining a campfire permit or blasting permit if needed. All internal combustion engines must be equipped with approved spark arresters.

Safety and public exclusion: The general public may not be excluded from the mining claim. In the interest of safety, the general public can be restricted only from specific dangerous areas (underground mines, open pits, or heavy equipment) by erecting fences, gates and warning signs. It is the operator's responsibility to protect the public from mining hazards. Gates or road blocks may be installed on existing or proposed roads only with the approval of the resource area manager.

Occupancy: All structures/trailers on mining claims must be used for mining purposes (must be reasonably incident to mining) and should be covered by a notice or plan of operation. Use of such a structure for residential purposes not related to mining or for recreation is not authorized.

Suction dredging: Filing either notice or plan of operations is required on all suction dredge operations. The operator must have the applicable ODEQ suction dredge permit prior to starting work, and a copy should be submitted to the resource area manager.

Tailings ponds: Settling ponds must be used to contain fines and any discharge into creeks must meet the ODEQ standards.

Trash and garbage: Trash, garbage, used oil, etc. must be removed from public land and disposed of properly. Do not bury any trash, garbage, or hazardous wastes on public lands. Accumulations of trash, debris, or inoperable equipment on public lands is viewed as unnecessary degradation and will not be tolerated.

Cultural and paleontological resources: Operators shall not knowingly alter, injure, or destroy any scientifically important paleontological (fossil) remains or any historical or archaeological site, structure, or object on Federal lands. The operator shall immediately bring to the attention of the resource area manager, any paleontological (fossil) remains or any historical or archaeological site, structure, or object that might be altered or destroyed by exploration or mining operations, and shall leave such discovery intact until told to proceed by the resource area manager. The resource area manager shall evaluate the discovery, take action to protect or remove the resource, and allow operations to proceed within 10 working days.

Threatened and endangered species of plants/ animals: Operators shall take such action as may be needed to prevent adverse impacts to T&E species of plants and animals and their habitat which may be affected by operations. Special status species (Federal candidate/Bureau sensitive) of plants and animals, and their habitat, will be identified by the resource area manager, and shall be avoided wherever possible.

Areas of Critical Environmental Concern: Operators are required to prepare and have the BLM approve a plan of operations prior to conducting mining activities within ACEC's. The plan of operations would specifically need to address methods to mitigate impacts to those relevant and important resource values for which the ACEC was designated.

Suitable Wild and Scenic Rivers: Areas within 0.25 mile of rivers recommended suitable as a wild river under the "Wild and Scenic Rivers Act," are closed to new mineral location. Mining activity occurring at the time of congressional designation would be allowed to continue, but must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impacts.

Areas recommended as either scenic or recreational under the "Wild and Scenic Rivers Act" would allow new and existing mineral location to occur, but it must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impacts.

Reclamation

Reclamation of all disturbed areas must be performed concurrently with mining, or as soon as possible after mining permanently ceases. Reclamation shall include, but shall not be limited to: (1) saving of topsoil for final application after reshaping of disturbed areas has been completed; (2) measures to control erosion,

landslides, and water runoff; (3) measures to isolate, remove, or control toxic materials; (4) reshaping the area disturbed, application of topsoil, and revegetation of disturbed areas, where reasonably practicable; and (5) rehabilitation of fisheries and wildlife habitat. When reclamation of the disturbed area has been completed, except to the extent necessary to preserve evidence of mineralization, the resource area manager must be notified so that inspection of the area can be made.

Equipment and debris: All mining equipment, vehicles, structures, debris, and trash must be removed from the public lands during periods of nonoperation and/or at the conclusion of mining, unless authorization from the resource area manager is given to the operator or claimant in writing.

Backfilling & recontouring: The first steps in reclaiming a disturbed site are backfilling excavations and reducing high walls. Coarse rock material should be replaced first, followed by medium sized material, with fine materials to be placed on top. Recontouring means shaping the disturbed area so that it will blend in with the surrounding lands and minimize the possibility of erosion.

Seedbed preparation: Recontouring should include preparation of an adequate seedbed. This is accomplished by ripping or disking compacted soils to a depth of at least 6 inches in rocky areas and at least 12 inches in less rocky areas. This should be done following the contour of the land to limit erosion. All stockpiled settling pond fines, and then topsoil, are spread evenly over the disturbed areas.

Fertilizer: The resource area manager must be contacted to determine if fertilization will be necessary, and if so, the type and rate of application.

Revegetation: An resource area manager-approved revegetation prescription must be used to provide adequate revegetation for erosion control, wildlife habitat, and productive secondary uses of public lands.

Mulch: As directed by the resource area manager, during review of the notice or plan of operations, the disturbed area may require mulching during interim or final reclamation procedures. Depending on site conditions, the mulch may need to be punched, netted, or blown on with a tackifier to hold it in place. In some cases, erosion control blankets may be cost effective for use.

Roads: After mining is completed, all new roads shall be reclaimed, unless otherwise specified by the resource area manager. High wall and cutbanks are to be knocked down or backfilled to blend with the surrounding landscape. Remove all culverts from drainage crossings and cut back the fill to the original channel. The roadbed should be ripped to a minimum depth of 12 inches to reduce compaction and provide a good seedbed. The road must then be fertilized and seeded if necessary. When necessary, waterbars are to be used to block access and provide drainage.

Tailings ponds: The ponds should be allowed to dry out and the fines removed and spread with the topsoil, unless the fines contain toxic materials. If the ponds contain toxic materials, a plan will be developed to identify, dispose, and mitigate effects of the toxic materials. If necessary, a monitoring plan will also be implemented. The ponds should then be backfilled and reclaimed.

Appendix Attachment—Guidelines for Development of Salable Mineral Resources in the Lakeview District

Proposed Operations

All proposed pits and quarries, and any exploration that involves surface disturbance, are required to have operating and reclamation plans that must be approved by the resource area manager. All proposals will undergo the appropriate level of review and compliance with NEPA.

Operating Procedures

Where practicable, the following requirements should be made a part of every contract or permit providing for the use of mineral material sites on the district:

- Oversized boulders shall not be wasted but shall be broken and utilized concurrently with the excavated material.
- The operator shall comply with local and state safety codes covering quarry operations, warning signs, and traffic control. All necessary permits must be obtained from state and county agencies.
- Use of the site for equipment storage and stockpiling rock material is allowed for the duration of the

contract or permit. Use of the site beyond that time would be authorized under a special use permit.

- All topsoil shall be stockpiled or windrowed, as appropriate, for use in reclamation.

- Prior to abandonment, all material sites will be graded to conform with the surrounding topography. Oversize material that is not usable, and reject, will be placed in the bottom of the pit, graded, and the pit floor and cutslopes covered with topsoil. Reseeding, if necessary, will be done as prescribed by the resource area manager. Access roads no longer needed by the BLM will be abandoned and reclaimed as directed by the resource area manager.

Quarry Design

Where in steep terrain in the operating area, quarry developments will require a series of benches to effectively maximize the amount of mineral materials to be removed in a safe manner. In most cases, bench height should not exceed 40 feet, and if the bench will be used by bulldozers to access other parts of the quarry, the width of the bench should be at least 25 feet. If the bench is not used by equipment, then this width can be reduced to approximately 10 feet.

Clearing of timber and brush should be planned at least 10 feet beyond the edge of the excavation limit. Most often the brush will be piled and burned at the site, or scattered nearby.

If at all possible, all topsoil and overburden should be stockpiled and saved for eventual quarry site reclamation. These piles may need to be stabilized by seeding in order to minimize erosion during the winter months.

As a standard procedure, the excavation of the quarry floor should be designed with an outslope of approximately 3 percent in order to provide for adequate drainage of the floor. Compliance with this design should be made a requirement of all operators at the site.

Appendix O — Lands

O1: Land Tenure Adjustment Criteria and Legal Requirements

Maps L-1, -3, -4, -5 depict three zones, by alternative, that identify public land with potential for land tenure adjustments (e.g., acquisition or disposal), consistent with existing regulations and BLM policy. Section 102(a)(1) of FLPMA provides that ". . . the public lands be retained in Federal ownership unless as a result of the land use planning procedure provided for in this Act, it is determined that disposal of a particular parcel will serve the national interest . . ."

Management guidelines specific to each zone are described below.

Zone 1: Retention/Acquisition

Zone 1 land has been generally identified for retention in public ownership. These are also areas where emphasis will be placed on acquisition of land containing high resource values through such methods as exchange, purchase, donation, or public agency jurisdictional transfers. Zone 1 land may contain significant visual, wildlife, watershed, vegetative, cultural, and other resource values and are generally well blocked. Land within Zone 1 with public resource values may be exchanged for other Zone 1 land with high resource values (see Glossary for definitions of high resource values and public resource values).

The following management criteria would be applied to land tenure adjustments involving Zone l land within the planning area:

- Land within SMA's such as wilderness areas, WSA's, ACEC's, and RNA's would be retained in public ownership. Private land within these designated areas represents potential acquisition priorities.

- Land sale exception in Zone 1 — under certain circumstances, small parcels of public land adjacent to private land holdings in a retention-Zone 1 area which are difficult or uneconomical to manage may be considered for exchange or sale under disposal-Zone 3 criteria. Also, parcels of land identified by state, local, or other Federal entities for public purpose or community needs may be considered for exchange or sale under disposal Zone 3 criteria.

Zone 2: Retention/Acquisition (Land Exchange)

Zone 2 land has been identified generally for retention and consolidation of ownership. Public land within this zone may be exchanged for Zone 1 or 2 non-Federal land with high resource values. Zone 2 public land generally include those well-blocked BLM-administered lands outside of Zone 1. Zone 2 lands also include some fragmented landownership patterns such as isolated parcels contiguous with the Fremont National Forest boundary. Generally, Zone 2 lands possess relatively lower resource values than are present in Zone 1. These are areas where emphasis will be placed on acquisition of land containing high resource values through such methods as exchange, purchase, donation or public agency jurisdictional transfers and disposal by exchange to create consolidated public land areas. Zone 2 land will not be sold except as stated under management criteria listed below.

The following management criteria would be applied to land tenure adjustments involving Zone 2 land within the planning area:

- Zone 2 lands could be exchanged to acquire private land with high resource value throughout the resource area and within designated SMA's such as WSA's and ACEC's.

- Land sale exception in Zone 2 — under certain circumstances, public land in Zone 2 may be considered for sale under disposal-Zone 3 criteria.

- Public purpose land sale exception in Zone 2 — parcels of public land may be sold to meet public and community needs.

Zone 3: Disposal

Zone 3 land generally has low or unknown resource values and meet the disposal criteria of Section 203 of FLPMA. This land is potentially suitable for disposal by such methods as public agency jurisdictional transfers, or state indemnity selection (state in lieu election), or "Recreation and Public Purpose Act" lease or patent, exchange or sale unless significant recreation, wildlife, watershed, special status species, cultural resources or other significant resource values

are identified as a result of site-specific analysis. This zone may include land needed for community expansion, small parcels located adjacent to private inholdings within and/or adjacent to large blocks of public land being retained by BLM, parcels on which unauthorized use exists, and land included within survey hiatus. Zone 3 land may be exchanged for land with greater resource values in Zones 1 and 2. Legal descriptions of Zone 3, by alternative, are presented in Table O2-1.

The following management criteria would be applied to land tenure adjustments involving Zone 3 land within the planning area:

- If acquisition interest is shown, in writing, for Zone 3 land by local, county, or state governments, BLM would consider their needs to accommodate community expansion or other public purposes.
- If Zone 3 parcels are found unsuitable for disposal because of currently unknown resource values, they will be retained and included under the Zone 1 or 2 designation.

General Management Criteria

Land Exchanges

The following general management criteria would be applied when considering land exchanges within the planning area. To be considered to be in the public interest, exchanges must:

- facilitate access to public land and resources, or
- maintain or enhance important public values and uses, or
- maintain or enhance local social and economic conditions; and
- facilitate implementation of other goals and objectives of the RMP.

It is important to minimize the impact to the local tax base by emphasizing exchanges rather than direct purchases.

Direct Purchases

Direct purchases of non-Federal lands may occur when the same public interest general management criteria apply as described under Land Exchanges above.

Disposal of Land by Sale

Current BLM Washington Office policy prohibits the disposal of land acquired with Land and Water Conservation Funds.

Public land or tracts to be sold must meet at least one of the following disposal criteria stated in section 203 of the FLPMA:

- "Such tract because of its location or other characteristics is difficult and uneconomic to manage as part of the public lands, and is not suitable for management by another Federal department or agency; or
- Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or
- Disposal of such tract will serve important public objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasiblely on land other than public land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which would be served by maintaining such tract in Federal ownership."

Generally, exchanges are the preferred method of disposal but sales will be utilized when:

- It is required by national policy; or
- It is required to achieve disposal objectives on a timely basis, and where disposal through exchange would cause unacceptable delays; or
- Disposal through exchange is not feasible.

The preferred method of selling public land will be by competitive bidding at public auction to qualifying purchasers. However, modified competitive bidding procedures may be used when there is no legal public access to a tract, when necessary to avoid jeopardizing an existing use on adjacent land, or to avoid dislocation of existing public land users.

- Public land may be sold by direct sale at fair market value when:
- such land is needed by state or local governments; or
- direct sale is needed to protect equities arising from authorized use; or

- direct sale is needed to protect equities resulting from inadvertent unauthorized use that was caused by survey errors or title defects; or

- there is only one adjacent landowner.

Methods of Disposal

Methods of disposal for implementing land disposal actions include the following: (a) BLM and other Federal jurisdictional transfers; (b) transfers to state and local agencies (e.g., "Recreation and Public Purpose Act" patents, in-lieu selections, airport patents); (c) State exchanges; (d) private exchanges; (e) sales; (f) Indian allotments; and (g) desert land entries.

Public Parcels Within Privately-Owned Land

Scattered parcels of public land located within consolidated private areas could be exchanged or sold. Land exchanges would be the preferred method of disposal because this would maintain the current public and private land bases. Parcels of public land may be exchanged for land with greater resource values within BLM retention areas.

Subsurface Mineral Interests

Section 209(b) of FLPMA allows for the disposal of public mineral estate to the surface owners. Section 205 allows for the acquisition of land on interests consistent with the mission of the department.

Appropriate Environmental Review

Site-specific environmental analysis and documentation in conformance with NEPA, including completion of categorical exclusion check lists and plan conformance determinations where appropriate, will be accomplished for each proposed land program action. Interdisciplinary impact analysis will be tiered within the framework of this and other applicable environmental documents.

O2: Public Lands Available for Disposal

Table O2-1 lists public lands available for disposal.

Table 02-1.—*Public lands available for disposal*

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
Group 1: Bankhead/Jones					
Fort Rock/Christmas Valley		*Fort Rock/Christmas Valley*		*Fort Rock/Christmas Valley*	
T.25S., R.14E., W.M., Oregon		T.24S., R.13E., W.M., Oregon		T.25S., R.14E., W.M., Oregon	
Section		Section		Section	
13: NE¼;	160	35: E½NE¼, SW¼SW¼, SE¼;	280	32: N½SE¼, N½SW¼SE¼, SW¼SW¼SE¼, N½SE¼SW¼SE¼, SW¼SE¼SW¼SE¼. [1]	117.50
14: N½NE¼, SW¼NE¼,W½;	440	36: N½, SW¼, SE¼SE¼.	520		
15: E½;	320			T.26S., R.14E., W.M., Oregon	
22: E½, SW¼;	480	T.24S., R.14E., W.M., Oregon		Section	
23: W½;	320	Section		4: Lots 13, 15. [1]	80.25
26: NE¼, W½;	480	1: S½;	320		
27: NW¼, S½;	480	11: All;	640		
35: E½;	320	12: N½NE¼, SW¼NE¼, W½, SW¼SE¼;	480		
36: SE¼.	160	13: W½E½, W½;	480		
		14: All;	640		
T.25S., R.15E., W.M., Oregon		15: SW¼;	160		
Section		16: NE¼NW¼, S½;	360		
26: W½NW¼, SW¼;	240	20: E½NE¼, S½;	400		
27: E½E½;	160	21: N½, SW¼, N½SE¼, SE¼SE¼;	480		
28: SW¼;	160	22: W½, W½SE¼;	400		
29: S½NW¼, SW¼;	240	23: N½SE¼, E½SW¼;	160		
30: SE¼;	160	27: W½NW¼;	80		
31: NE¼;	160	28: E½NE¼, SW¼NE¼, W½;	440		
32: N½NW¼;	80	29: All;	640		
33: NW¼, S½;	480	30: Lots 1, 2, 3, 4, E½, E½NW¼, NE¼SW¼;	591.58		
34: NE¼, S½;	480	31: Lots 1, 2, 3, 4, E½, SE¼NW¼, E½SW¼;	592.12		
35: SW¼.	160	32: E½, E½NW¼, SW¼NW¼, N½SW¼;	520		
		33: E½, E½NW¼, SW¼NW¼, N½SW¼;	520		
T.26S., R.14E., W.M., Oregon		34: S½NW¼, NW¼NW¼, SW¼.	280		
Section					
1: Lots 3,4,5,6,11,12, SW¼;	430.21	T.25S., R.13E., W.M., Oregon			
2: Lots 1,2,7,8,9,10, SE¼;	428.40	Section			
11: S½NW¼.	80.00	1: Lots 1, 2, 3, 4, S½N½, S½;	639.62		
		2: Lots 1, 2, 3, 4, S½N½, S½;	640.10		
T.26S., R.15E., W.M., Oregon		3: Lots 1, 3, 4, SE¼NE¼, S½NW¼, S½;	561.30		
Section		9: E½;	320		
1: Lots 1 thru 12;	510.36	10: All;	640		
2: Lots 1 thru 6, 11, 12;	351.44	11: All;	640		
3: Lots 1, 8, 9;	128.08	12: E½NE¼, W½, N½SE¼, SE¼SE¼;	520		
4: S½;	320	13: All	640		
5: Lots 5, 6, 11, 12, SW¼;	320	14: E½, NW¼, N½SW¼, SW¼SW¼;	600		
6: SE¼;	160	15: E½, SW¼SW¼;	360		
7: NE¼, W½SE¼;	240	16: W½NE¼, NW¼;	240		
8: NW¼, E½SW¼, SE¼;	400	17: SE¼;	160		
9: N½, SW¼, N½SE¼;	560				
10: NW¼;	160				

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
12: SE¼SE¼;	40	20: E½;	320		
13: NE¼;	160	21: All;	640		
17: W½;	320	22: W½NW¼, SE¼NW¼, S½;	440		
18: E½E½;	160	23: All;	640		
20: N½, N½SW¼, SW¼SW¼.	440	24: E½NE¼, W½;	400		
		28: All;	640		
T.26S., R.16E., W.M., Oregon		29: E½, SW¼;	480		
Section		32: N½, N½SW¼, SW¼SW¼,			
7: Lot 4, E½SW¼	120	N½SE¼SW¼, SW¼SE¼; SW¼, E½SE¼,			
		NW¼SE¼;	600		
		33: All;	640		
		34: W½, SE¼.	480		
		T.25S., R.14E., W.M., Oregon			
		Section			
		3: Lots 3, 4, S½NW¼;	158.41		
		4: Lot 2, S½NE¼;	119.27		
		5: S½;	320		
		6: Lots 1, 2, 3, 4, 5, 6, 7, S½NE¼,			
		SE¼NW¼, E½SW¼; N½SE¼;	550.32		
		7: Lots 1, 2, 3, 4, NE¼, E½NW¼,			
		E½SW¼, SE¼;	633.70		
		8: All;	640		
		13: NE¼;	160		
		14: N½NE¼, SW¼NE¼,W½;	440		
		15: E½;	320		
		17: All;	640		
		18: All;	634.51		
		19: Lots 1, 2, NE¼, E½NW¼;	317.92		
		20: N½;	320		
		22: E½, SW¼;	480		
		23: W½;	320		
		26: NE¼, W½;	480		
		27: NW¼, S½;	480		
		31: Lots 1, 2, 3, 4, E½W½;	319.54		
		32: N½SE¼, N½SW¼SE¼,			
		SW¼SW¼SE¼, N½SE¼SW¼SE¼,			
		SW¼SE¼SW¼SE¼ [1];	117.50		
		35: E½;	320		
		36: SE¼.	160		
		T.25S., R.15E., W.M., Oregon			
		Section			
		26: W½NW¼, SW¼;	240		
		27: E½E½;	160		
		28: SW¼;	160		
		29: S½NW¼, SW¼;	240		

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
		30: SE¼;	160		
		31: NE¼;	160		
		32: N½NW¼;	80		
		33: NW¼, S½;	480		
		34: NE¼, S½;	480		
		35: SW¼.	160		
		T.26S., R.14E., W.M., Oregon			
		Section			
		1: Lots 3,4,5,6,11,12, SW¼;	430.21		
		2: Lots 1,2,7,8,9,10, SE¼;	428.40		
		4: Lots 13, 15 [1];	80.25		
		11: S½NW¼.	80		
		T.26S., R.15E., W.M., Oregon			
		Section			
		1: Lots 1 thru 12;	510.36		
		2: Lots 1 thru 6, 11, 12;	351.44		
		3: Lots 1, 8, 9;	128.08		
		4: S½;	320		
		5: Lots 5, 6, 11, 12, SW¼;	320		
		6: SE¼;	160		
		7: NE¼, W½SE¼;	240		
		8: NW¼, E½SW¼, SE¼;	400		
		9: N½, SW¼, N½SE¼;	560		
		10: NW¼;	160		
		12: SE¼SE¼;	40		
		13: NE¼.	160		
		17: W½;	320		
		18: E½E½;	160		
		20: N½, N½SW¼, SW¼SW¼.	440		
		T.26S., R.16E., W.M., Oregon			
		Section			
		7: Lot 4, E½SW¼.	122.66		
Group 1 Total	10,808.49		35,887.29		197.75
Group 2: Public domain					
Fort Rock/Christmas Valley		*Fort Rock/Christmas Valley*		*Fort Rock/Christmas Valley*	
T.24S., R.18E., W.M., Oregon		T.24S., R.13E., W.M., Oregon		T.24S., R.18E., W.M., Oregon	
Section		Section		Section	
31: Lot 3, NE¼SW¼;	75.42	35: SE¼SW¼;	40	31: Lot 3, NE¼SW¼.	75.42
32: E½NW¼.	80	36: N½SE¼, SW¼SE¼.	120	32: E½NW¼.	80

Alternative A	
Legal description	Acres
T.25S., R.17E., W.M., Oregon	
Section	40
11: SE¼NW¼.	
T.25S., R.18E., W.M., Oregon	
Section	180
11: E½E½, S½SW¼SE¼;	240.87
18: Lots 2, 3, 4, SE¼NW¼, E½SW¼;	240
23: E½NE¼, N½S½;	320
24: N½;	160
35: NE¼.	
T.25S., R.19E., W.M., Oregon	
Section	158.82
19: Lots 1, 2, 3, & 4;	40
20: NE¼NE¼.	
T.26S., R.16E., W.M., Oregon	
Section	40
33: SW¼NE¼;	120
34: N½NW¼, SE¼NW¼.	
T.26S., R.18E., W.M., Oregon	
Section	80
3: SE¼NE¼, SW¼NW¼;	40
9: NE¼NW¼;	320
10: S½;	320
11: S½;	
T.26S., R.19E., W.M., Oregon	
Section	160
29: SE¼;	320
33: S½.	
T.27S., R.13E., W.M., Oregon	
Section	80
34: SW¼NE¼, NW¼SE¼.	
T.27S., R.16E., W.M., Oregon	
Section	80
28: W½SW¼.	
T.27S., R.17E., W.M., Oregon	
Section	40
23: SE¼SE¼;	320
25: NE¼NE¼, S½NE¼, SE¼NW¼, N½S½;	40
26: NE¼NE¼;	400

Alternative B	
Legal description	Acres
T.24S., R.14E., W.M., Oregon	
Section	
15: SE¼;	160
20: W½NE¼, NW¼;	240
21: SW¼SE¼;	40
22: NE¼, E½SE¼;	240
23: N½, W½SW¼;	400
27: E½NW¼, SW¼;	240
28: NW¼NE¼, SE¼;	200
30: SE¼SW¼;	40
31: NE¼NW¼;	40
32: NW¼NW¼, S½SW¼;	120
33: NW¼NW¼, S½SW¼;	120
34: NE¼NW¼.	40
T.24S., R.18E., W.M., Oregon	
Section	
31: Lot 3, NE¼SW¼;	75.42
32: E½NW¼.	80
T.25S., R.13E., W.M., Oregon	
Section	
3: Lot 2, SW¼NE¼;	80.37
12: W½NE¼, SW¼SE¼;	120
14: SE¼SW¼;	40
15: NW¼;	160
16: E½NE¼, S½;	400
22: NE¼;	160
24: W½NE¼.	80
T.25S., R.14E., W.M., Oregon	
Section	
4: Lots 1, 3, 4, S½NW¼;	197.75
5: Lots 1, 2, 3, 4, S½N½;	316
6: S½SE¼;	80
13: N½NW¼;	80
26: SE¼;	160
36: W½NE¼, NW¼, N½NW¼SW¼.	140
T.25S., R.15E., W.M., Oregon	
Section	
20: NW¼SE¼;	40
26: E½NW¼;	80
28: SE¼;	160
29: E½NE¼, SW¼NE¼, SE¼;	280
32: E½NE¼, NW¼NE¼, NE¼SE¼;	160
35: N½, W½SE¼;	400

Alternatives C and D	
Legal description	Acres
T.25S., R.15E., W.M., Oregon	
Section	
20: NW¼SE¼.	40
T.25S., R.16E., W.M., Oregon	
Section	
17: E½SW¼.	80
T.25S., R.18E., W.M., Oregon	
Section	
23: E½NE¼, N½S½;	240
24: NW¼;	160
35: NE¼.	160
T.25S., R.19E., W.M., Oregon	
Section	
19: Lots 3, & 4.	78.91
T.26S., R.16E., W.M., Oregon	
Section	
9: W½;	320
33: SW¼NE¼;	40
34: N½NW¼, SE¼NW¼.	120
T.26S., R.18E., W.M., Oregon	
Section	
3: SE¼NE¼, SW¼NW¼;	80
9: NE¼NW¼;	40
10: S½;	320
11: S½.	320
T.26S., R.19E., W.M., Oregon	
Section	
29: SE¼.	160
T.27S., R.13E., W.M., Oregon	
Section	
34: SW¼NE¼, NW¼SE¼.	80
T.27S., R.15E., W.M., Oregon	
Section	
11: N½SW¼.	80
T.27S., R.16E., W.M., Oregon	
Section	
28: W½SW¼.	80

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
34: W½NW¼, S½;	80	36: All.	640	T.27S., R.17E., W.M., Oregon	
35: W½SW¼.				Section	
		T.25S., R.16E., W.M., Oregon		23: SE¼SE¼;	40
T.27S., R.18E., W.M., Oregon		Section		26: NE¼NE¼.	320
Section	160	17: E½SW¼.	40		
3: N½SW¼, E½SE¼;	80			T.27S., R.18E., W.M., Oregon	
4: N½SE¼;	40	T.25S., R.17E., W.M., Oregon		Section	
8: SE¼NW¼;	160	Section		8: SE¼NW¼;	40
9: SW¼NW¼, W½SW¼, SE¼SW¼;	120	11: SE¼NW¼.	40	9: SW¼NW¼, W½SW¼, SE¼SW¼;	160
11: N½SW¼, SW¼SW¼;	80			11: N½SW¼, SW¼SW¼.	120
13: W½SW¼;	160	T.25S., R.18E., W.M., Oregon			
22: N½NE¼, NE¼NW¼,NW¼SW¼;	80	Section		T.27S., R.19E., W.M., Oregon	
28: S½NE¼;		23: E½NE¼, N½S½;	240	Section	
30: Lots 1, 2, 3, NE¼, E½NW¼,	482.79	24: NW¼;	160	7: Lot 3, E½SW¼.	120.76
NE¼SW¼, N½SE¼.		35: NE¼.	160		
				T.28S., R.13E., W.M., Oregon	
T.27S., R.19E., W.M., Oregon		T.25S., R.19E., W.M., Oregon		Section	
Section	120.76	Section		23: SW¼NW¼, North of County Road #4-	
7: Lot 3, E½SW¼;	40	19: Lots 3, & 4.	78.91	10.	20
29: SW¼SW¼;					
30: SW¼NE¼, SE¼NW¼, E½SW¼,	280	T.26S., R.15E., W.M., Oregon		T.28S., R.15E., W.M., Oregon	
W½SE¼, SE¼SE¼;	160	Section		Section	
31: NE¼;	360	1: S½;	320	14: NW¼NE¼, S½NW¼;	120
32: E½E½, W½W½, SE¼SW¼;	200	2: Lots 7, 8, 9;	120	15: NE¼SE¼;	40
33: W½W½, SE¼SW¼.		3: SW¼;	160	22: SE¼NW¼.	40
		4: Lots 3, 4, 5, 6;	179.53		
T.28S., R.14E., W.M., Oregon		5: Lots 7, 8, 9, 10, SE¼;	320	T.28S., R.16E., W.M., Oregon	
Section	40.25	7: Lot 4, E½SW¼, E½SE¼;	181.90	Section	
3: Lot 4;	40.26	8: W½SW¼;	80	5: SE¼SE¼;	40
4: Lot 1.		10: E½, E½SW¼;	400	15: W½SW¼.	80
		11: N½;	320		
T.28S., R.15E., W.M., Oregon		12: N½, SW¼, N½SE¼, SW¼SE¼;	600		
Section	40	13: NW¼;	160		
11: NW¼SE¼;	80	15: NE¼, N½SE¼, SE¼SE¼;	280		
12: NW¼SW¼, SW¼SE¼;	120	18: Lots 1, 2, 3, 4, W½E½, E½W½.	409.68		
14: NW¼NE¼, S½NW¼;	40				
15: NE¼SE¼;	40	T.26S., R.16E., W.M., Oregon			
17: SW¼NE¼.		Section			
		7: Lot 3, E½NW¼;	122.53		
T.28S., R.16E., W.M., Oregon		9: W½;	320		
Section	40	33: SW¼NE¼;	40		
5: SE¼SE¼;	80	34: N½NW¼, SE¼NW¼.	120		
11: S½SE¼;	80				
15: W½SW¼;	40	T.26S., R.18E., W.M., Oregon			
21: NW¼NW¼.		Section			
		3: SE¼NE¼, SW¼NW¼;	80		
T.28S., R.17E., W.M., Oregon		9: NE¼NW¼;	40		

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
Section	40	10: S½;	320		
6: SE¼NW¼.		11: S½.	320		
T.28S., R.19E., W.M., Oregon		T.26S., R.19E., W.M., Oregon			
Section	40	Section			
4: SE¼SE¼;	40	29: SE¼.	160		
9: NE¼NE¼.					
		T.27S., R.13E., W.M., Oregon			
		Section			
		34: SW¼NE¼, NW¼SE¼.	80		
		T.27S., R.15E., W.M., Oregon			
		Section			
		11: N½SW¼.	80		
		T.27S., R.16E., W.M., Oregon			
		Section			
		28: W½SW¼.	80		
		T.27S., R.17E., W.M., Oregon			
		Section			
		23: SE¼SE¼;	40		
		26: NE¼NE¼.	320		
		T.27S., R.18E., W.M., Oregon			
		Section			
		8: SE¼NW¼;	40		
		9: SW¼NW¼, W½SW¼, SE¼SW¼;	160		
		11: N½SW¼, SW¼SW¼.	120		
		T.27S., R.19E., W.M., Oregon			
		Section			
		7: Lot 3, E½SW¼.	120.76		
		T.28S., R.13E., W.M., Oregon			
		Section			
		23: SW¼NW¼, North of County Road #4-10.	20		
		T.28S., R.14E., W.M., Oregon			
		Section			
		7: NE¼NW¼SE¼ that portion east of Hwy. 31. [2]	4		
		T.28S., R.15E., W.M., Oregon			
		Section			
		14: NW¼NE¼, S½NW¼;	120		

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
		15: NE¼SE¼;	40		
		22: SE¼NW¼.	40		
		T.28S., R.16E., W.M., Oregon			
		Section			
		5: SE¼SE¼;	40		
		15: W½SW¼.	80		
Group 2 Total	7,259.17		13,126.85		3,695.09
Group 3: Public Domain					
Paisley Flat		*Summer Lake/Paisley/Valley Falls*		*Summer Lake/Paisley/Valley Falls*	
T.32S., R.18E., W.M., Oregon		T.29S., R.17E., W.M., Oregon		T.29S., R.17E., W.M., Oregon	
Section		Section		Section	
34: Portions of Lot 1, Lots 2, 3 & Portions of the N½;	477.40	24: NW¼NE¼, NW¼NW¼;	80	24: NW¼NE¼, NW¼NW¼;	80
35: Lots 1, 2, 3 & Portions of the NW¼.	278.02	27: NE¼SE¼, S½SE¼;	120	27: NE¼SE¼, S½SE¼;	120
		34: NE¼NE¼.	40	34: NE¼NE¼.	40
T.32S., R.19E., W.M., Oregon		T.30S., R.18E., W.M., Oregon		T.30S., R.18E., W.M., Oregon	
Section		Section		Section	
33: NE¼, E½NW¼, SW¼NW¼;	280	5: SE¼NW¼.	40	5: SE¼NW¼.	40
34: W½NE¼, SE¼NE¼, NW¼, S½;	600				
35: S½.	320	T.33S., R.18E., W.M., Oregon		T.33S., R.18E., W.M., Oregon	
		Section		Section	
T.33S., R.18E., W.M.., Oregon		7: Lot 1.	40.24	7: Lot 1.	40.24
Section					
1: Lot 4, SW¼NW¼, SW¼;	239.85	T.35S., R.20E., W.M., Oregon		T.35S., R.20E., W.M., Oregon	
2: All;	640.40	Section		Section	
3: Lot 1, Portions of Lots 2, 3, 4 &W¼NW¼, the S½NE¼, SE¼NW¼, SW¼, N½SE¼, N½S½SE¼;	601.28	35: SE¼NE¼, NE¼SE¼.	80	35: SE¼NE¼, NE¼SE¼.	80
4: Portions of Lots 1, 2, 3, 4 and Lots 5 thru 12;	348.98	T.35S., R.21E., W.M., Oregon			
9: Lots 1 thru 7, north of Hwy. 31;	217	Section			
10: NW¼, N½SW¼, SW¼SW¼ north of Hwy. 31, N½SE¼SW¼, SW¼SE¼SW¼ north of Hwy. 31, N½SW¼SE¼, SE¼SW¼SE¼, SE¼SE¼;	350	28: That portion of the SE¼NW¼ west of Hwy. 395. [3]	5		
11: NE¼, NE¼NW¼, E½NW¼NW¼, NW¼NW¼NW¼, E½SE¼NW¼, NW¼SE¼NW¼, NE¼NE¼SW¼, SW¼NW¼SW¼, W½SW¼SW¼, E¼SW¼SW¼, NW¼SE¼, N½SW¼SE¼, SE¼SW¼SE¼;	370				

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
12: W½NE¼, SE¼NE¼, W½, N½SE¼;	520				
13: S½NE¼, NW¼, N½S½, NE¼SW¼SW¼;	410				
14: NE¼NE¼, E½SE¼NE¼, W½NE¼NW¼, NW¼NW¼ and Portions of S½NW¼ north of Hwy. 31;	200				
15: NE¼NE¼, NE¼NW¼NE¼ north of IIwy. 31.	45				
T.33S., R.19E., W.M., Oregon					
Section					
1: All;	640.68				
2: All;	641.76				
3: Lots 1, 2, S½NE¼, S½;	480.67				
4: Lots 1, 2, S½NE¼, S½;	479.72				
5: Lots 6, 13, SE¼NE¼, NE¼SE¼;	143.94				
9: Lots 7, 8, NE¼, E½NW¼;	267.70				
10: N½;	320				
11: N½, NE¼SW¼, N½SE¼, E¼SE¼;	480				
12: All;	640				
13: NE¼, E½NW¼, NW¼NW¼, E½SE¼.	360				
Group 3 Total	10,352.40		405.24		400.24
Group 4: Public Domain					
South Butte Valley		*Adel/Plush*		*Adel/Plush*	
T.27S., R.22E., W.M., Oregon		T.36S., R.22E., W.M., Oregon		T.36S., R.22E., W.M., Oregon	
Section		Section		Section	
26: N½ southwest of county road 5-14, S½ southwest of county road 5-14;	395	24: SE¼SW¼, SE¼;	200	24: SE¼SW¼, SE¼;	200
27: All southwest of county road 5-14;	660.99	34: SE¼SW¼, SW¼SE¼.	80	34: SE¼SW¼, SW¼SE¼.	80
34: All;	671.94	T.36S., R.28E., W.M., Oregon		T.36S., R.28E., W.M., Oregon	
35: All.	662.16	Section		Section	
T.27S., R.23E., W.M., Oregon		8: SE¼NE¼, SE¼SW¼, SW¼SE¼, E½SE¼.	200	8: SE¼NE¼, SE¼SW¼, SW¼SE¼, E½SE¼.	200
Section		T.37S., R.22E., W.M., Oregon		T.37S., R.22E., W.M., Oregon	
31: All southwest of county road 5-14;	320	Section		Section	
32: SW¼SW¼ southwest of county road 5-14.	10	2: Lots 1, 2, 3, 4, S½N½, N½S½;	480.48	2: Lots 1, 2, 3, 4, S½N½, N½S½;	480.48
T.28S., R.22E., W.M., Oregon		12: N½NW¼, SW¼NW¼.	120	12: N½NW¼, SW¼NW¼.	120
Section		T.37S., R.23E., W.M., Oregon		T.37S., R.23E., W.M., Oregon	
1: All;	703.49	Section		Section	
12: NE¼.	160	18: Lots 1, 2, 3, 4, N½NE¼, SW¼NE¼,		18: Lots 1, 2, 3, 4, N½NE¼, SW¼NE¼,	

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
T.28S., R.23E., W.M., Oregon		E½W½, S½SE¼;	521.21	E½W½, S½SE¼;	521.21
Section		20: W½W½;	160	20: W½W½;	160
2: SW¼SW¼ southwest of county road 5-14;	25	30: Lots 1, 2, 3, NE¼, E½NW¼, NE¼SW¼.	399.52	30: Lots 1, 2, 3, NE¼, E½NW¼, NE¼SW¼.	399.52
3: All southwest of county road 5-14;	455				
4: All;	699.12	T.38S., R.22E., W.M., Oregon		T.38S., R.22E., W.M., Oregon	
5: All;	698.80	Section		Section	
6: All;	676.01	2: SE¼NW¼;	40	2: SE¼NW¼;	40
7: All;	618.68	12: N½NE¼, NE¼NW¼;	120	12: N½NE¼, NE¼NW¼;	120
8: All;	640	22: E½E½.	160	22: E½E½.	160
9: All;	640				
10: All	640	T.38S., R.23E., W.M., Oregon		T.38S., R.23E., W.M., Oregon	
11: All southwest of county road 5-14 & west of US Hwy. 395;	480	Section		Section	
14: All west of US Hwy. 395;	400	18: Lots 2, 3, 4, SE¼NW¼, E½SW¼, W½SE¼.	358.92	18: Lots 2, 3, 4, SE¼NW¼, E½SW¼, W½SE¼.	358.92
15: All;	640				
16: All;	640	T.39S., R.22E., W.M., Oregon		T.39S., R.22E., W.M., Oregon	
17: All;	640	Section		Section	
18: All.	620.12	10: Lots 1 thru 8;	307.27	10: Lots 1 thru 8;	307.27
		11: Lot 1;	37.91	11: Lot 1;	37.91
		14: NE¼NE¼, SE¼NW¼;	40	14: NE¼NE¼, SE¼NW¼;	80
		15: SE¼SE¼.	40	15: SE¼SE¼.	40
		T.39S., R.24E., W.M., Oregon		T.39S., R.24E., W.M., Oregon	
		Section		Section	
		20: S½SE¼. [4]	80	20: S½SE¼. [5]	80
		T.41S., R.25E., W.M., Oregon		T.41S., R.25E., W.M., Oregon	
		Section		Section	
		8: SW¼SE¼.	40	8: SW¼SE¼.	40
Group 4 Total	12,096.31		3,385.31		3,425.31

Group 5: Public Domain

Lakeview area *Lakeview area* *Lakeview area*

Alternative A		Alternative B		Alternatives C and D	
Legal description	Acres	Legal description	Acres	Legal description	Acres
T.39S., R.18E., W.M., Oregon		T.37S., R.21E., W.M., Oregon		T.37S., R.21E., W.M., Oregon	
Section		Section		Section	
31: Lots 3,4, E½SW¼.	160.05	18: SE¼SE¼;	40	18: SE¼SE¼;	40
		19: SW¼NE¼, NW¼SE¼;	80	19: SW¼NE¼, NW¼SE¼;	80
T.40S., R.18E., W.M., Oregon		20: S½NW¼.	80	20: S½NW¼.	80
Section					
5: W½SW¼;	80	T.39S., R.20E., W.M.,Oregon		T.40S., R.18E., W.M., Oregon	
6: Lots 2,3,10, S½NE¼, NE¼SE¼.	234.94	Section		Section	
		24: W½SW¼, SE¼SW¼.	120	24: SW¼NW¼, W½SW¼. [5]	120
T.40S., R.20E., W.M., Oregon					
Section		T.40S., R.18E., W.M., Oregon			
12: S½NE¼, E½SE¼;	160	Section			
13: E½NE¼, SE¼.	240	24: SW¼NW¼, W½SW¼. [4]	120		
T.40S., R.21E., W.M., Oregon		T.40S., R.20E., W.M., Oregon			
Section		Section			
7: Lots 2,3,4, SE¼NW¼, NE¼SW¼;	190.49	12: S½NE¼, E½SE¼;	160		
18: Lots 1,2,3,4, SE¼SW¼, S½SE¼;	269.98	13: E½NE¼, SE¼.	240		
19: Lot 1, NE¼, E½NW¼, NE¼SW¼, W½SE¼;	398.23	T.40S., R.21E., W.M., Oregon			
30: NW¼NE¼, SE¼SE¼;	80	Section			
31: NE¼NE¼, S½NE¼.	120	7: Lots 2,3,4, SE¼NW¼, NE¼SW¼;	190.49		
		18: Lots 1,2,3,4, SE¼SW¼, S½SE¼;	269.98		
T.41S., R.21E., W.M., Oregon		19: Lot 1, NE¼, E½NW¼, NE¼SW¼, W½SE¼;	398.23		
Section		30: NW¼NE¼, SE¼SE¼;	80		
6: N½NE¼.	8	31: NE¼NE¼, S½NE¼.	120		
		T.41S., R.21E., W.M., Oregon			
		Section			
		6: N½NE¼.	80		
Group 5 Total	2,013.69		1,978.70		320

[1] Land would be sold by direct sale to Lake County or other civic related entity(s) with county approval for Fort Rock community expansion purposes only.
[2] Land would be sold by direct sale to the current owners of the Old Schumacher Ranch.
[3] Land would be sold by direct sale to either the current owners of the River's End Ranch or to American Tribal entity(s).
[4] Land would be sold by direct sale to Native American Tribal entity(s) for reinterment purposes only. At the discretion of the Lakeview Resource Area Field Manager, any portion of the land not sold to the Tribe(s) may be offered for sale to the general public.

Appendix P — Common and Scientific Names for Plants and Animals

Table P-1.—*Common and scientific names for plants and animals mentioned in this plan*

Common name	Scientific name
PLANT SPECIES [1]	
Forbs	
Arrowleaf balsamroot	*Balsamorhiza sagittata*
Bastard kentrophyta	*Astragalus tegetariodes*
Big-headed clover	*Trifolium macrocephalum*
Biscuitroot	*Lomatium* spp.
Bistort	*Polygonum bistortoides*
Bitterroot	*Lewisis rediviva*
Blue camas	*Camassia quamash*
Blue flax	*Linum lewisii*
Bluebells	*Mertensia* spp.
Blue-eyed Mary	*Collinsia parviflora*
Bogg's Lake hedgenettle	*Gratiola heterosepala*
Buckwheat	*Eriogonum* spp.
Bull thistle	*Cirsium vulgare*
Burreed	*Sparganium* spp.
Canada thistle	*Cirsium arvense*
Cattail	*Typha latifolia*
Columbia cress	*Rorippa columbiae*
Common cocklebur	*Xanthium strumarium*
Common dandelion	*Taraxacum officinale*
Cooper's goldflower	*Hymenoxys cooperi* var. *canescens*
Cow parsnip	*Heracleum lanatum*
Cranesbill	*Geranium maculatum*
Crosby's buckwheat	*Eriogonum crosbyae*
Cusick's buckwheat	*Eriogonum cusickii*
Cusick's giant-hyssop	*Agastache cusickii*
Dalmation toadflax	*Linaria dalmatica*
Desert allocarya	*Plagiobothrys salsus*
Desert chaenactis	*Chaenactis xantiana*
Desert parsley	*Lomatium* spp
Diffuse knapweed	*Centaurea diffusa*
Disappearing monkeyflower	*Mimulus evanescens*
Dogbane	*Apocynum cannabinum*
Dwarf lousewort	*Pedicularis centrantera*
Dwarf mistletoe	*Arceuthobium* spp.
Dyer's woad	*Isatis tinctoria*
Epos/Ipos	*Perideridia* spp.
Everlasting/low pussytoes	*Antennaria dimorpha*
False dandelion	*Agoseris heterophylla*
Field bindweed	*Convolvulus arvensis*
Four-winged milkvetch	*Astragalus tetrapterus*
Geum	*Geum* spp.
Grimy ivesia	*Ivesia rhypara* var. *rhypara*
Halogeton	*Halogeton glomeratus*
Hawksbeard	*Crepis acuminata*
Hoary cress	*Cardaria* spp.
Horned buttercup	*Ranunculus testiculatus*
Hyacinth	*Brodiaea hyacinthina*
Knapweed	*Centaurea* spp.
Leafy spurge	*Euphorbia esula*
Lemmon's onion	*Allium lemmonii*
Lomatium	*Lomatium* spp.
Lupine	*Lupinus* spp.
Meditteranean sage	*Salvia aethiopis*
Medusahead	*Taeniatherum caput-medusae*
Milkvetch	*Astragalus* spp.
Monkey flower	*Mimulus latidens*
Mullein	*Verbascum thapsus*
Musk thistle	*Carduus nutans*
Mustard	*Brassica* spp.
Nodding microseris	*Microseris nutans*
Paintbrush	*Castilleja* spp.
Patis onion	*Allium bisceptrum*
Penstemon	*Penstemon humilis*, *P.* spp.
Perennial pepperweed	*Lepidium latifolium*
Pink microsteris	*Phlox gracilis* (*Microsteris gracilis*)
Poison hemlock	*Conium maculatum*
Potentilla	*Potentilla* spp.
Prickly pear cactus	*Opuntia fragilis*
Prairie clover	*Petalostemon purpureum*
Prostrate buckwheat	*Eriogonum prociduum*
Purple loosestrife	*Lythrum salicaria*
Purshi's milkvetch	*Astragalus purshii*
Rose	*Rosa* spp.
Russian knapweed	*Acroptilon repens*
Salsify	*Tragopogon* spp.
Scotch thistle	*Onopordum acanthium*
Seablite	*Suaeda nigra*
Sego lily	*Calochortus macrocarpus*
Shelly's ivesia	*Ivesia rhyparia* var. *shellyi*
Snowline cymopterus	*Cymopterus nivalis (C. bipinnatus)*
Spreading phlox	*Phlox diffusa*
Spiny cocklebur	*Xanthium spinosa*
Spotted knapweed	*Centaurea biebersteinni*
St. Johnswort	*Hypericum perforatum*
Stinging nettle	*Urtica dioica*
Tansy leaf evening primrose	*Camissonia tenacetifolia*
Thickstemmed wild cabbage	*Caulanthus crassicaulis*
Thistle	*Cirsium* spp.
Three color monkeyflower	*Mimulus tricolor*
Tobacco root	*Valeriana edulis*
Verrucose sea-purslane	*Sesuvium verrucosum*
Wapato	*Sagittaria latifolia*
Warner Mountain bedstraw	*Galium serpenticum* var. *warnerens*
Water lily	*Nuphar polysepalum*
Western spring beauty	*Claytonia lanceolata*
Western waterhemlock	*Circuta douglasii*

Common name	Scientific name
Whitetop	*Cardaria* spp.
Wild onion	*Allium* spp.
Yampa	*Perideridia gairdneri* (*P. oregana*)
Yellow bell	*Fritillaria pudica*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*
Grasses and grasslikes	
Alkali grass	*Distichlis stricta*
Bentgrass	*Agrostis scabra*
Bluebunch wheatgrass	*Agropyron spicatum (Pseudoroegneria spicata)*
Bottlebrush squirreltail	*Sitanion hystrix (Elymus elymoides)*
Cattail	*Typha latifolia*
Cheatgrass	*Bromus tectorum*
Creeping wildrye	*Elymus triticoides (Leymus triticoides)*
Crested wheatgrass	*Agropyron cristatum*
Foxtail	*Alopecurus* sp.
Great Basin wildrye	*Elymus cinereus* (*Leymus cinereus*)
Hairgrass	*Elocharis acicularis*
Hardstem bullrush	*Scirpus acutus*
Idaho fescue	*Festuca idahoensis*
Indian ricegrass	*Oryzopsis hymenoides* (*Achnatherum hymenoides*)
Junegrass	*Koeleria macrantha*, *K. cristata* or *K. nitida*
Kentucky bluegrass	*Poa pratensis*
Mat muhly	*Muhlenbergia richardsonis*
Meadow barley	*Hordeum brachyantherum*
Needle-and-thread grass	*Stipa comata* (*Hesperostipa comata*)
Needlegrass	*Stipa* spp. (*Achnatherum* spp.)
Nevada bluegrass	*Poa nevadensis (Poa secunda* spp. *Nevadensis)*
Nodding melic grass	*Melica stricta*
Oatgrass	*Danthonia californica*
Oregon semaphore grass	*Pleuropogon oregonus*
Rough fescue	*Festuca scabrella*
Saltgrass	*Distichlis spicata*
Sand dropseed	*Sporobolus cryptandrus*
Sandberg bluegrass	*Poa secunda*
Spike rush	*Eleocharis palustris*
Thickspike wheatgrass	*Agropyron dasystachyum* (*Elymus lanceolatus* spp. *lanceolatus*)
Thurber's needlegrass	*Stipa thruberiana* (*Achnatherum thurberianum*)
Tufted hairgrass	*Deschampsia caespitosa*
Western needlegrass	*Stipa occidentalis (Achnatherum occidentalis* spp. *occidentalis)*
Shrubs	
Alkali or black greasewood	*Sarcobatus vermiculatus*
Antelope bitterbrush	*Purshia tridentata*
Basin big sagebrush	*Artemisia tridentata* ssp. *tridentata*
Big sagebrush	*Artemisia tridentata*
Buckthorn	*Rhamnaceae* spp.
Bud sagebrush	*Artemisia spinescens*
Chokecherry	*Prunus virginiana* var. *demissa*
Currant	*Ribes cereum; R. aureum*
Desert-sweet	*Chamaebatiaria millefolium*
Elderberry	*Sambucus* spp.
Gooseberry	See current above
Gray rabbitbrush	*Chrysothamnus nauseosus*
Green rabbitbrush	*Chrysothamnus vicidiflorus*
Huckleberry	*Vaccinium* spp.
Long-flowered snowberry	*Symphoricarpos longiflorus*
Low sagebrush	*Artemisia arbuscula*
Manzanita	*Arctostaphylos manzanita*
Mountain big sagebrush	*Artemisia tridentata* ssp. *vaseyana*
Mountain mahogany	*Cercocarpus ledifolius*
Purple sage	*Salvia dorii*
Serviceberry	*Amelanchier alnifolia*
Shadscale	*Artiplex confertifolia*
Silver sagebrush	*Artemisia cana*
Snowberry	*Symphoricarpus oerophilus*
Spiny hopsage	*Grayia spinosa* (*Atriplex spinosa*)
Squaw apple	*Peraphyllum ramosissimum*
Tamarisk	*Tamarix* spp.
Truckee green rabbitbrush	*Chrysothamnus vicidiflorus* ssp. *humils*
Tumbleweed	*Salsola kali (S. tragus)*
Winterfat	*Ceratoides lanata (Krascheninnikovia lanata)*
Wormwood	*Artemisia* spp.
Wyoming big sagebrush	*Artemisia tridentata* ssp. *wyomingensis*
Trees	
Alder	*Alnus* spp.
Alpine larch	*Larix lyallii*
Ash	*Fraxinus* spp.
Black cottonwood	*Populus trichocarpa*
Cottonwood	*Populus fremontii*
Douglas fir	*Pseudotsuga menziesii*
Engelmann spruce	*Picea engelmannii*
Grand fir	*Abies grandis*
Lodgepole pine	*Pinus contorta*
Ponderosa pine	*Pinus ponderosa*
Quaking aspen	*Populus tremuloides*
Red-osier dogwood	*Cornus stolonifera*
Sandbar willow	*Salix exigua*
Scouler willow	*Salix scoulerana*
Subalpine fir	*Abies lasiocarpa*

Common name	Scientific name
Western juniper	*Juniperus occidentalis*
Western larch	*Larix occidentalis*
Western white pine	*Pinus monticola*
White fir	*Abies concolor*
Whitebark pine	*Pinus albicaulis*
Willow	*Salix* spp.
ANIMAL SPECIES	
Amphibians	
Columbia spotted frog	*Rana luteiventris*
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Black tern	*Chlidonias niger*
Canvasback	*Aythya valisineria*
Clark's grebe	*Aechmophorus clarkii*
Common snipe	*Gallinago gallinago*
Coot	*Fulica americana*
Eared grebe	*Podiceps nigricollis*
Gadwall	*Anas strepera*
Golden eagle	*Aquila chrysaetos*
Great Basin Canada goose	*Branta canadensis*
Greater sage-grouse	*Centrocercus urophasianus*
Greater sandhill crane	*Grus canadensis*
Green-winged teal	*Anas crecca*
Least bittern	*Ixobrychus exilis*
Lesser scaup	*Aythya affinis*
Long-billed curlew	*Numenius americanus*
Mallard	*Anas platyrhynchos*
Northern shoveler	*Anas clypeata*
Osprey	*Pandion haliaetus*
Peregrine falcon	*Falco peregrinus anatum*
Pied-billed grebe	*Podilymbus podiceps*
Redhead	*Aythya americana*
Ruddy duck	*Oxyura jamaicensis*
Sora rail	*Porzana carolina*
Virginia rail	*Rallus limicola*
Western snowy plover	*Charadrius alexandrinus nivosus*
White-faced ibis	*Plegadis chihi*
Willet	*Cataptrophorus semipalmatus*
Wilson's phalarope	*Phalaropus tricolor*
Fish	
Black crappie	*Pomoxis nigromaculatus*
Brook trout	*Salvelinus fontinalis*
Brown bullhead	*Ictalurus nebulosis*
Cowhead tui chub	*Gila bicolor* spp.
Cutthroat trout	*Oncorhynchus clarki* spp.
Foskett speckled dace	*Rhinichthys osculus* spp.
Goose Lake lamprey	*Lampetra tridentata* ssp.
Goose Lake sucker	*Catastomus occidentalis lacusanserinus*
Hutton tui chub	*Gila bicolor* spp.
Largemouth bass	*Micropterus salmoides*
Modoc sucker	*Catastomus microps*
Pit-Klamath brook lamprey	*Lampetra ayresi*
Rainbow trout	*Oncorhynchus mykiss*
Redband trout	*Oncorhynchus mykiss* spp.
Sheldon tui chub	*Gila bicolor eurysoma*
Summer Basin tui chub	*Gila bicolor* spp.
Warner sucker	*Catstomus warnerensis*
White crappie	*Pomoxis annularis*
XL tui chub	*Gila bicolor* spp.
Invertebrates	
Fir engraver	*Scolytus ventralis*
Mountain pine beetle	*Dendroctonus ponderosa*
Spring snail	*Pyrgulopsis* sp. nov.
Western pine beetle	*Dendroctonus brevicomis*
Mammals	
Pygmy rabbit	*Brachylagus idahoensis*
California bighorn sheep	*Ovis canadensis californiana*
Mule deer	*Odocoileus hemionus*
Pacific Townsend's big-eared bat	*Corynorhinus townsendii* spp.
Pronghorn	*Antilocapra americana*
Rocky Mountain elk	*Cervus canadensis*

[1] Sources for plant names in order of preferred nomenclature:

(1) Hitchcock, C.L.; Cronquist, A. 1973. Flora of Pacific Northwest. University of Washington Press, Seattle, WA.

(2) Chambers, K.L.; Sundberg, S. 2000. Oregon Vascular Plant Checklist: Asteraceae. Oregon Flora Project, Oregon State University, Corvallis, OR.

(3) Hickman, J.C.; *Editor.* 1993. The Jepson Manual, Higher Plants of California. University of California Press, Berkeley, CA.

Appendix Q — Forest Health Considerations Within the Summer Lake, Lake Abert, Warner Lake, and Guano Subbasins

This appendix is from "Forest Insect and Disease Considerations for the Forested Areas of the Summer Lake, Lake Abert, Warner Lake, and Guano Subbasins" by Andris Eglitis and Helen Maffei, Central Oregon Insect and Disease Service Center (2000).

Introduction

This appendix includes a general description of how major insects and pathogens directly affect the growth and health of trees and thereby influence how forested stands develop in the subbasins within the planning area. Also discussed is specific information on the extent, distribution, severity, and projected 15-year impact of forest pathogens.

The insects and pathogens described here are native organisms that have coevolved with the vegetation that they utilize. Forest insect populations (and to a lesser extent diseases) fluctuate widely in response to changes in weather, biotic factors, and other disturbances. These disturbance agents can exert a profound effect on the ability of the forest to meet the expectations of its many users. All resources, including timber, water, wildlife, or recreation, can be strongly affected by the actions of these disturbance agents that occur in the forest. In some cases, the activity of these organisms interferes with our management objectives, while in other cases the organisms alter the forest in a way that provides certain benefits (e.g., gap formation, snags, and specialized habitats, etc.). Many of these organisms are ephemeral and are only noticeable under certain conditions; others are persistent across a wide variety of conditions.

In some cases there is little difference between the historic and current roles of certain organisms. In other cases, the departures from the historic forest have affected how insects and diseases express themselves and their current roles are radically different from their historic ones. Some of these insects and pathogens are easily regulated by specific management actions while others are not. As with any organism, the insects and pathogens of the forest are most strongly influenced by their host or food source. For example, bark beetles benefit from any factor that reduces the vigor of its host trees. Some opportunistic fungi such as *Armillaria ostoyae* take advantage of weakened hosts and high densities of susceptible hosts. Many of these organisms are fairly specific in their host preferences and are only associated with certain vegetative types; others are less discriminating and may occur in several types of stands or conditions.

Overview of Major Diseases

Three forest diseases are wide spread and consistently have a significant effect on forest structure and productivity within the subbasin: (1) dwarf mistletoe, (2) annosus root disease, and (3) *Armillaria* root disease. Based on analysis of the Fremont continuous vegetation survey plots within the subbasin , about 208,862 acres (38 percent), 8,816 acres (15 percent) and 35,467 (6 percent) of the forested acres are infected with some level of these diseases, respectively.

The effect of these pathogens tend to be relatively slow, progressive, and relatively small on a yearly basis, when compared with insect outbreaks or wildland fire. Over time, however, the influence they exert is considerable. For example, 15-year basal area mortality (based on forest vegetation simulator projections [Stage 1973] using Fremont National Forest continuous vegetation survey plot information) is predicted to exceed 15 percent on 17 percent of the forested area and 25 percent on 5 percent of the forested area as a result of the combined effects of dwarf mistletoe, root disease and inter-tree competition.

Insects and Diseases by Vegetation Series

The major insects and diseases occurring in this subbasin are discussed in the context of the vegetative series within which they occur.

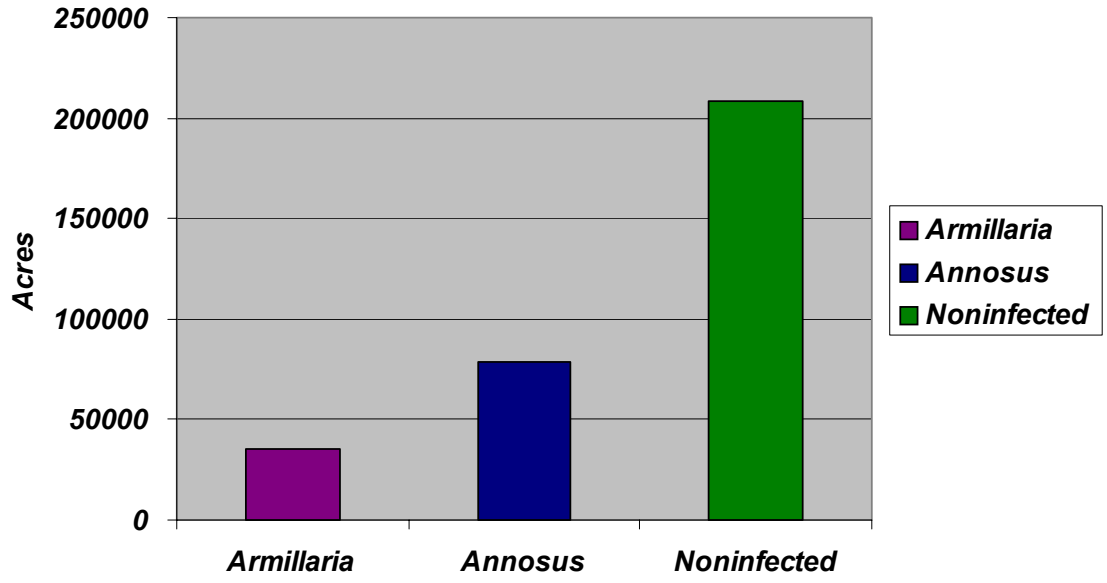

Figure 1.— ***Estimated forested acres infested by Armillaria and Annosus root disease***

Lodgepole Pine

Insects

The mountain pine beetle (*Dendroctonus ponderosae*) is by far the most important insect associated with lodgepole pine forests. The beetles infest mature stands and can kill the majority of the largest trees within 3 to 4 years. Within the course of a single outbreak, it is not unusual to experience a loss of 80 percent of the basal area from a stand under attack. Stands are usually considered susceptible when the dominant trees are around 100-years old and when there are about 80 trees per acre that are greater than 9 inches dbh (diameter at breast height). Following an outbreak of the mountain pine beetle, the residual stand is immune from further infestation until the advanced regeneration reaches the 9 inch diameter, usually in about 70 years. Currently, there is an active mountain pine beetle infestation in the Winter Rim area near Paisley. The northern subwatersheds near Silver Lake experienced widespread outbreaks of mountain pine beetle in the 1970s and 1980s. Similar outbreaks occurred in the early 1900s in parts of the Fremont National Forest where lodgepole stands were densely stocked and over 80 years of age. This pattern of periodic widespread infestation is not the result of management practices; rather, it appears to be a function of the natural stand development process for lodgepole pine.

The most significant defoliating insect in this vegetative type is the pandora moth (*Coloradia pandora*). The larval stage consumes the needles from host trees and leaves them completely bare until the new needles develop in late summer. Defoliation does not occur in successive years because the insect spends the second year of its life cycle in the soil in the pupal stage. The pandora moth is not a direct mortality agent, but may weaken trees to make them more susceptible to bark beetles. Although outbreaks are generally more common in ponderosa pine, there have been recent episodes involving lodgepole pine. Within this subbasin, the pandora moth was only noted in the Lower Crooked Watershed during the last population cycle in the early 1990s.

Diseases

Dwarf mistletoe (*Arceuthobium americanum)* is the most important disease agent in the lodgepole pine, both in the subbasin and throughout its range (Figure 1). Heavy dwarf mistletoe infections cause dramatic reductions in growth and survival. Spread and damage from dwarf mistletoe is greatest in single species stands with more than one canopy layer. Dwarf mistletoe has proliferated over historic levels in stands where harvest (e.g. shelterwood cuts or salvage after a bark beetle outbreak) has occurred and an infected overstory remains. In situations like these, productivity of the young replacement stand is dramatically reduced. Reductions in volume can be as much as 80 percent over 70 years (Hawksworth and Hinds 1964)

White Fir

This vegetative series has experienced the most radical changes due to past management practices (primarily selective harvesting and fire exclusion) and represents the greatest departure from the historic condition. In the past, these stands were composed almost entirely of early-seral ponderosa pines that were maintained at a fairly low density by frequently recurring low-intensity ground fires. Currently, the climax species (*Abies concolor*) is much more prevalent across the landscape and occurs in the understory and midstory in dense stands of complex structure. These stands also contain a component of ponderosa pine, generally in the overstory. In their present condition, these highly complex and diverse stands are desirable for many features such as microhabitats for specialized organisms, hiding cover for big game and other features not provided by simpler stands. However, these stands represent some very difficult challenges for the resource manager. Not only is the ponderosa pine component of these stands being lost without replacement, but the white fir component is also proving to be very unstable. Although white fir grows very rapidly when conditions are good, the species is poorly adapted to drought and experiences very high levels of mortality when dry conditions prevail. This vulnerability of white fir was very evident during the early 1990s when the fir engraver killed thousands of trees across the landscape, requiring the Fremont National Forest to engage in numerous salvage sales. Even in times of normal or above-average precipitation, the vulnerability of white fir to numerous other insects and diseases is very evident. Hence, it is proving difficult if not impossible to manage or sustain dry-site stands that are largely composed of white fir.

Insects

The fir engraver (*Scolytus ventralis*) has been the most significant insect associated with white fir in this area. Normally, the fir engraver is found in root disease centers and kills trees infected by the pathogens *Armillaria ostoyae* and *Heterobasidion annosum*. However, during drought periods, fir engravers have killed trees in dense stands that are not necessarily associated with root diseases. Significant outbreaks occurred throughout the subbasin during the early 1990s, particularly in the drier fir type. Trees of all sizes were infested by the engraver and in some instances, well over 60 percent of the standing volume was killed within a 4-year period. The most susceptible stands appeared to be those growing on the driest sites (20 to 30 inches of annual precipitation). During this recent drought episode, the fir engraver even caused significant mortality in many stands that had been thinned prior to the drought.

There is little doubt that fir engraver populations have recently been higher in this area than they were historically, due in large part to the fact that their host material is far more abundant now than in the past.

The Modoc budworm (*Choristoneura viridis*) is a common and widespread defoliator of white fir throughout this subbasin. The insect is closely related to the western spruce budworm (*C. occidentalis*) but is less damaging than the spruce budworm. Damage occurs when the larvae consume the new growth of host trees. Feeding is generally much heavier in the tops of trees than in the lower crown. The Modoc budworm feeds on the buds and newly emerging needles of host trees throughout the spring and early summer. When the new foliage has been depleted, the budworm will consume older foliage as well, producing bare tops in the affected trees. The Modoc budworm has caused extensive top-kill in white firs throughout the Fremont National Forest. The earliest report of this insect was in the 1920s, and numerous infestations have occurred since that time. Interestingly, many older white firs show evidence of as many as four separate incidents of top-kill in the course of their lives (Cochran, P.H. 1997, personal communication). Stands that receive the greatest level of budworm feeding are those with high proportions of host material, high densities, a multi-storied character, and growing on drier sites. The areas of greatest concentration of this defoliator have been the North and South Warner Mountains and the Gearhart Mountain Wilderness, with lesser concentrations elsewhere in the region.

Due to fire exclusion, there is considerably more budworm habitat in the current forest than in historic times. Many areas are now occupied by shade-tolerant white fir and defoliator infestations now occur on sites previously devoid of host material. In areas where fir has always existed, the stands have become denser through the exclusion of natural fires and current stands densities often exceed the carrying capacity of the site, leading to tree stress and greater susceptibility to defoliators such as the Modoc budworm.

Another common defoliator of white fir in this subbasin has been the Douglas-fir tussock moth (*Orgyia pseudotsugata*). Even though they are more damaging when they occur, tussock moth outbreaks have been less widespread than infestations of the Modoc budworm. The most recent outbreak of the tussock moth occurred west of this subbasin around

Dog Lake and from the Drews Valley to California in the 1960s. Tussock moth populations tend to rise and collapse very rapidly, with all of the visible defoliation being produced over a 2 to 3 year period. Outbreaks appear to be on a 9-year cycle, and we are currently entering one of those cycles (1999–2000). This subbasin, however, would have a considerably lower hazard rating for tussock moth than some areas in the state (e.g., Blue Mountains).

The western pine beetle (*Dendroctonus brevicomis*) has become an important disturbance agent in the mixed-species stands where white fir occupies the understory and midstory and the overstory contains severely crowded ponderosa pines. The western pine beetle is causing the loss of large ponderosa pines from these stands. Effects have been most pronounced during the drought periods such as the early 1990s when thousands of large pines were killed on the Fremont National Forest. Many of these affected stands are much denser than they would have been in the historic forest that was maintained by frequent low-intensity fires.

Diseases

Annosus root disease caused by the pathogen (*Heterobasidion annosum,* S-strain) is the most important root disease in the white fir series. The abundance, spread, and impact of this disease agent has been significantly increased over historic levels as a result of management practices which have created extensive suitable habitat. This strain of *H. annosum* affects true firs and can spread either by windblown spores which land and germinate on freshly exposed wood (stumps or wounds), or, by the contact of healthy roots with infected roots. The evidence suggests that infection levels and associated damage from annosus root disease has significantly increased over areas in the subbasin with multiple entries; especially those where large stumps have been created (Schmitt et al. 1984; Hopkins et al. 1988). For example, Schmitt et al. found 21 percent of the true fir on the Fremont were infected and killed by *H. annosum* in stands with multiple entries, while only 0.04 percent and 2 percent were infected and killed in unaltered- and stands which were entered once, respectively. Once *H. annosum* has become established, its spread and ability to kill trees is facilitated by the dense stands of susceptible host that has resulted from the suppression of low intensity ground fires. Dense stands dominated by fir provide ideal habitat for S-strain annosus root disease.

Armillaria root disease is caused by the fungus, *Armillaria ostoyae*. Throughout its distribution, this fungus is extremely variable in terms of its virulence. In this subbasin, *A . ostoyae* seems of comparatively low virulence. Infection centers are primarily in the white fir series. Although white and red firs are usually the preferred host, all conifers may become infected if the fungus is present and if there is favorable habitat for spread of the fungus. Armillaria can infect and kill trees most easily under conditions of stress, especially where there is dense stocking of the preferred host type. While *A . ostoyae* mostly confines itself to root-to-root spread and rarely spreads via spore dispersal (unlike *H. annosum*), the creation of numerous large stumps or dead trees (of any species) usually results in much higher inoculum levels and facilitates root-to-root spread.

Spread and damage from *Armillaria* root disease is probably greater today than it was historically. The predominantly pine-dominated and relatively open characteristics of the historic forest was not as conducive as many of the dense, white fir dominated structures of many contemporary stands.

Western dwarf mistletoe caused by the pathogen (*Arceuthobium campylopodum*) is the most significant pathogen of ponderosa pine in the white fir series. Spread and damage from dwarf mistletoe is greatest when infected large pines are within 30 feet of smaller pines. Heavy infections lead to significant loss in growth, decreased survival, and can significantly accelerate the conversion from a pine-dominated stand to one dominated by white fir.

Ponderosa Pine

Insects

Within the ponderosa pine type, the mountain pine beetle (*D. ponderosae*) is typically associated with second-growth stands. The effects of an outbreak are rarely as dramatic as they are in lodgepole pine, in terms of the total mortality that occurs, but nonetheless can be very significant. Bark beetle populations fluctuate greatly and are regulated by many factors. The most important of these factors is a suitable food source in the form of susceptible stands. The stand condition that leads to outbreaks is when trees are not growing vigorously (less than 1 inch of radial growth per decade). In the ponderosa pine host, unmanaged stands tend to become susceptible to the mountain pine beetle at age 50–75 on high-quality sites, and at age 75–100 on poor sites. The mountain pine beetle became important in the 1950s as second-growth pine stands came of susceptible age in those areas cut during the settlement of southcentral Oregon in the 1870s. Mountain pine beetle heavily affected young ponderosa

pine stands in the foothills near Lakeview, Oregon, during the 1960s and the drought years of the 1970s. Current infestations can be seen where stand densities are above the long-term carrying capacity of the site.

The western pine beetle (*Dendroctonus brevicomis*) is most commonly associated with large-diameter ponderosa pines. The beetle attacks and kills older overmature pines, especially if these trees are stressed by competition for moisture. The tree-killing pattern is normally for one or two trees to be killed at a time, but occasionally the western pine beetle will attack and kill several adjoining trees in the same year. Many trees throughout the subbasin were killed shortly after World War I. Extensive "risk-cutting" was done during the 1930s and 1940s in an effort to remove susceptible old growth trees, but the western pine beetle continued to be important because stand structures remained unaltered. Over the years of aggressive risk-cutting which continued for a number of decades, the removal of many large-diameter pines reduced the importance of this bark beetle throughout the forest. Recently, however, the western pine beetle has become more common in dense second-growth stands and can now be found in the same types of stands affected by the mountain pine beetle. Since stocking densities in most ponderosa pine stands are higher than they were at historic levels, the western pine beetle is once again becoming an important component in these stands, with particularly high importance as a mortality agent for the large-tree stand component.

The pine engraver (*Ips pini*) has occurred sporadically along the eastern edge of the Fremont National Forest. These beetles generally infest small-diameter trees (4–5 inches dbh) and occasionally the tops of large trees. There has been a strong correlation between moisture levels and the occurrence of this bark beetle. The insect is more important on dry sites during dry years. During these periods of limited moisture it is common for engravers to infest host material on the ground, either as logging residuals or windthrow, and then attack nearby standing trees in subsequent generations. As with most bark beetles, the pine engravers are affected by host vigor, and stands and trees need to be managed to minimize stresses on the trees in order to limit pine engraver populations. This subbasin is in a lower hazard zone than some areas of Oregon including the Blue Mountains, hence, management concerns are usually limited to the dry sites during dry years.

The pandora moth *(Coloradia pandora*) is probably more important in this host than in lodgepole pine, although both species of pines have been infested. The most recent infestation was confined to the northern portion of this subbasin, within the Lower Crooked Watershed. Pines were completely defoliated by two to three successive generations of the pandora moth, but there appeared to be few long-term effects from that infestation. The pandora moth is rather infrequent in southcentral Oregon. Dendrochronological studies have registered 32 localized outbreaks in the past 500 years in central Oregon.

Diseases

Western dwarf mistletoe caused by the pathogen (*Arceuthobium campylopodum*) is the most significant pathogen in the ponderosa pine series (Figure 1). Spread and damage from dwarf mistletoe is greatest in pine stands with more than canopy layer and an infected overstory. It takes relatively few well-distributed infected overstory trees to have a significant effect on the productivity of the understory. Heavy infections lead to significant loss in growth and decreased survival. Mistletoe is most abundant and its effects are most severe in situations that favor its rapid dispersal in relation to tree growth. Dwarf mistletoe infested stands are generally more flammable than healthy stands due to the large amounts of fuels arising from the accumulation of dead witch's brooms, fallen trees, and live brooms in the lower crowns. Because of these fuels, normally nondestructive fires can become stand-replacing fires in stands with dwarf mistletoe.

Annosus root disease, caused by the pathogen (*Heterobasidion annosum*, P-strain), is significant on the drier pine sites and desert fringe areas of the subbasin. As with the S-strain, infection levels and associated damage has been found to increase relatively quickly in areas with multiple entries and harvest treatments that result in large numbers of fresh-cut stumps. There also appears to be a strong association between heavy damage from P-strain *H. annosum* and soil compaction (Hopkins et al. 1988).

Juniper Woodlands

Insects

The cedar bark beetle (*Phloeosinus* spp.) is one of the few insects associated with western juniper. These bark beetles are not particularly aggressive, hence, require their host trees to be highly debilitated before they can be successfully colonized. Their incidence is fairly low.