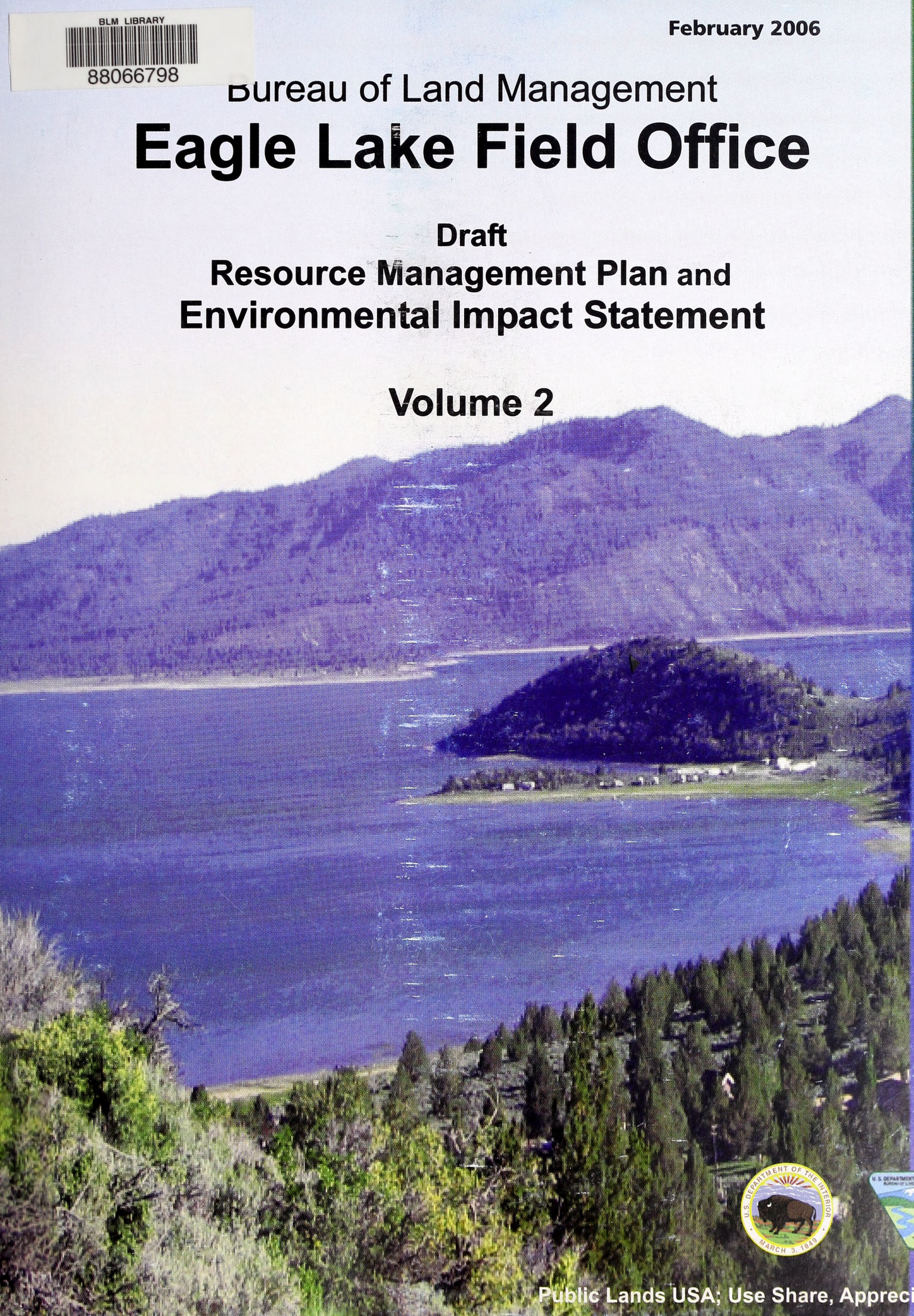
February 2006

Bureau of Land Management

Eagle Lake Field Office

Draft
Resource Management Plan and
Environmental Impact Statement

Volume 2



BLM

The Bureau of Land Management Today

Our Vision

To enhance the quality of life for all citizens through the balanced stewardship of America's public lands and resources.

Our Mission

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Our Values

To serve with honesty, integrity, accountability, respect, courage, and commitment to make a difference.

Our Priorities

To improve the health and productivity of the land to support the BLM multiple-use mission.

To cultivate community-based conservation, citizen-centered stewardship, and partnership through consultation, cooperation, and communication.

To respect, value, and support our employees, giving them resources and opportunities to succeed.

To pursue excellence in business practices, improve accountability to our stakeholders, and deliver better service to our customers.

BLM/CA/ES-2006-005+ 1790-1600

Appendices

Draft Resource Management Plan and Environmental Impact Statement

Prepared by
Bureau of Land Management
Eagle Lake Field Office
Susanville, California

February 2006

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Appendix A

Applicable Laws and Management Guidance

Appendix A

Applicable Laws and Management Guidance

Appendix A: Applicable Laws and Management Guidance

Decisions contained in this Final EIS and RMP comply with all applicable laws, regulations, and management guidance that direct the BLM in its resource management activities. This appendix lists the major legal authorities relevant to BLM land use planning.

1. The Federal Land Policy and Management Act of 1976 (FLPMA), as amended, 43 U.S.C. 1701 et seq., provides the authority for BLM land use planning.
   a. Sec. 102 (a) (7) and (8) and 103(c) sets the policy of the United States concerning the management of BLM lands.
   b. Sec. 201 requires the Secretary of the Interior (the Secretary) to prepare and maintain an inventory of all BLM lands and their resource and other values; 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.
   c. Sec. 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.
   d. Sec. 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.
   e. Sec. 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.
   f. Sec. 202 (f) and Sec. 309 (e) provide that federal agencies, 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.
   g. Sec. 302 (a) requires the Secretary to manage BLM lands under the principles of multiple use and sustained yield, in accordance with, when available, land use plans developed under Sec. 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.
   h. Sec. 302 (b) recognizes the entry and development rights of mining claimants, while directing the Secretary to prevent unnecessary of undue degradation of the public lands.
   i. Sec. 505(a) requires that "...each right-of-way shall contain terms and conditions which will ... minimize damage to the scenic and esthetic values...".

2. The National Environment Policy Act of 1969 (NEPA), 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.

3. The Clean Air Act 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.

4. The 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.

5. 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 non-governmental entity.

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

7. The Endangered Species Act of 1973 (ESA), as amended, 16 U.S.C. 1531 et seq.:
   a. Provides a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and to provide a program for the conservation of such endangered and threatened species (Sec. 1531 [b], Purposes).
   b. Requires all federal agencies to seek the conservation of endangered and threatened species and utilize applicable authorities in furtherance of the purposes of the Endangered Species Act (Sec. 1531 [c] [1], Policy).
   c. Requires all federal agencies to avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened or endangered or destroying or adversely modifying its designated or proposed critical habitat (Sec. 1536 [a], Interagency Cooperation).
   d. Requires all federal agencies to consult (or confer) in accordance with Sec. 7 of the Endangered Species Act with the Secretary of the Interior, through the Fish and Wildlife Service 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).

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

9. 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.

10. 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.

11. The National Historic Preservation Act (NHPA), 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.

12. 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.

13. Federally Recognized Tribes and Tribal Reserved Rights - Federally recognized tribes are sovereign nations that maintain a unique government to government and trust relationship with the United States (American Indian Resources Institute 1988:26). The trust relationship is essentially one in which Indian tribes trust the federal government to honor the reserved rights made in treaties or other agreements in exchange for Indian lands[1].

    In the past, this relationship has been acknowledged in one of three ways; by treaty ratification, Congressional Act, or executive order[2]. The various treaties, congressional acts, and executive orders that have been crafted during the past 150 years have established a unique legal relationship with the three federally recognized tribes and the United States government. Part of that legal relationship may be found in the tribes' reserved rights and privileges to harvest and utilize traditional resources, to visit and maintain sacred sites, and to participate in ceremonies that preserve the essential elements of their culture. Those resources and sacred sites, located on ancestral lands and ceded to the federal government, now constitute a large part of the public domain.

14. 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.

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

16. 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.

17. The Onshore Oil and Gas Leasing Reform Act of 1987, 30 U.S.C. 181 et seq., stipulates that:
    a. Potential oil and gas resources be adequately addressed in planning documents;
    b. The social, economic, and environmental consequences of exploration and development of oil and gas resources be determined; and
    c. Any stipulations to be applied to oil and gas leases be clearly identified.

18. 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.

19. 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.

20. The Materials Act of 1947, as amended (30 U.S.C. 601–604, et seq.), provides for the sale of common variety materials for personal, commercial, or industrial uses and for free use for local, state, and federal governmental entities. The sales of mineral materials are controlled by the regulations listed in 43 CFR 3600.

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[1] Pevar, S.L. 1992. The Rights of Indians and Tribes: The Basic American Civil Liberties Union Guide to Indian and Tribal Rights. Southern Illinois University Press, Carbondale and Edwardsville.

[2] Zucker, J., K. Hummel, and B. Hogfoss. 1983. Oregon Indians: Culture, History and Current Affairs, an Atlas and Introduction. Western Imprints, the press of the Oregon Historical Society. Portland.

21. 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.

22. The Public Rangelands Improvement Act 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.

23. The Wild Free Roaming Horse and Burro Act of 1971, 43 U.S.C 1331–1340, provides for the management, protection, and control of wild horses and burros on public lands and authorizes "adoption" of wild horses and burros by private individuals. Regulations applicable to wild horse and burro management on BLM-administered lands are provided in 43 CFR 4700.

24. The Archaeological Resources Protection Act of 1979, 16 U.S.C. 470, secures the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data which were obtained before October 31, 1979.

25. The Native American Graves Protection and Repatriation Act of 1990, 25 U.S.C. 3001, addresses the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. It requires federal agencies and museums to provide information about Native American cultural items to parties with standing and, upon presentation of a valid request, dispose of or repatriate these objects to them.

26. The Migratory Bird Conservation Act of 1979, as amended, 16 U.S.C. 715 et seq., establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

27. The Bald Eagle Protection Act of 1973, 16 U.S.C. 668, establishes the eagle as a protected species.

28. The Energy Policy and Conservation Act Reauthorization of 2000, as amended, Public Law 106–469. For more information, please visit: http://www.doi.gov/epca/.

29. The National Trails System Act of 1968, as amended (16 U.S.C. 1241–1249), establishes a national trails system and requires that federal rights in abandoned railroads be retained for trail or recreation purposes, or sold with the receipts to be deposited in the Land and Water Conservation Fund.

30. Executive Order 11644 as amended by Executive Order 11989 (Off-Road Vehicles on Public Lands) established policies and procedures for controlling the use of off-road vehicles on public lands.

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

32. Executive Order 13007 (Indian Sacred Sites), 61 Fed. Reg. 26771, requires federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions to:
    a. Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners; and
    b. Avoid adversely affecting the physical integrity of such sacred sites.

33. 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.

34. 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.

35. Executive Order 11990 (Protection of Wetlands) requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

36. Executive Order 11988 (Floodplain Management) provides for the restoration and preservation of national and beneficial floodplain values, and enhancement of the natural and beneficial values of wetlands in carrying out programs affecting land use.

37. Executive Order 13186 (Migratory Birds) establishes the responsibilities of federal agencies to protect migratory birds.

38. Secretarial Order 3175 (incorporated into the Departmental Manual at 512 DM 2) requires that if Department of the Interior 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.

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

40. Executive Order 12548 provides for establishment of appropriate fees for the grazing of domestic livestock on public rangelands and directs that the fee shall not be less than $1.35 per animal unit month.

Appendix B

Record of Decision Northeastern California and Northwestern Nevada

STANDARDS for Rangeland Health

and

GUIDELINES for Livestock Grazing Management

Prepared by the Bureau of Land Management
California State Office
June 1999

Appendix B

Record of Decision
Northeastern California
and
Northwestern Nevada

STANDARDS
for Rangeland Health
and
GUIDELINES
for Livestock Grazing
Management

Prepared by the Bureau of Land Management
California State Office
June 1997

ABSTRACT

NE California and NW Nevada

Standards for Rangeland Health and Guidelines for Livestock Grazing Management

Draft ( ) Final( ) Record of Decision (X)

United States Department of the Interior, Bureau of Land Management (BLM)

1 Type of Action: Administrative (X) Legislative ( )

2 Abstract: This is the Record of Decision for the environmental impact statement (EIS) documenting the effects of adopting regional standards for rangeland health and guidelines for livestock grazing management on BLM-administered lands in parts of California and NW Nevada. This Record of Decision covers that part of California and Nevada formerly known as the Susanville District.

The Preferred Alternative described in the final EIS (Alternative 5), with modifications for clarification, has been chosen as the Standards and Guidelines for California. The changes reflected in this Decision are within the scope and analysis of the EIS.
There Standards and Guidelines will be recommended to the Secretary of the Interior for final approval. They will take effect immediately upon that approval.

This document contains the actual Decision establishing Rangeland Health Standards and Guidelines for California and NW Nevada. It includes the following:

-Decision on Plan Amendments
-Standards and Guidelines for NE California and NW Nevada (formerly the Susanville District)
-Implementation
-Assessments and Monitoring

Al Wright 6.14.99

Al Wright, Acting State Director Date Bureau of Land Management California State Office

SUMMARY

This is the Record of Decision (Decision) recommending Rangeland Health Standards and Livestock Grazing Management Guidelines for NE California and NW Nevada. These recommendations will be submitted to the Secretary of the Interior (Secretary) for his approval, and will become effective immediately upon that approval.

The Decision amends BLM land use plans in NE California and NW Nevada to include the Standards and Guidelines and directs evaluation of existing, and development of new, Desired Plant Community (DPC) standards to ensure conformance of the DPCs with the Standards.

The Decision selects the Preferred Alternative described in the final EIS (Alternative 5), with minor changes for clarification, as the Rangeland Health Standards and Guidelines to be submitted to the Secretary for his approval.

The Decision describes how the Standards and Guidelines will be implemented and how rangeland health conditions will be monitored to assure achieving the Standards.

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DECISION

1. INTRODUCTION

There were five alternatives considered and analyzed in the EIS. Alternative 1 consisted of the standards and guidelines developed by the three Resource Advisory Councils (RACs) for their representative areas. Alternative 2 consisted of the state-wide standards developed by BLM, in consultation with representatives from each of the RACs, but without concurrence by the entire RAC membership. The guidelines for Alternative 2 were essentially the same as those for Alternative 1. Alternative 3 was adoption of the national "fall-back" standards and guidelines listed in the regulations. Alternative 4 (the environmentally preferred alternative) was a rapid improvement or rapid recovery alternative developed by BLM, with suggestions from several interest groups. The Standards in Alternative 4 were the same as those in Alternative 2, except for Water Quality; however, the implementation would have occurred much faster than under other alternatives. Alternative 5 was a modified version of Alternative 1, with changes based upon suggestions and new information from the public, the RACs, and BLM.

The Decision is to select Alternative 5, with some minor changes and clarifications, all of which are within the scope of the analysis. This decision will become effective immediately upon approval by the Secretary of the Interior.

This Alternative was selected for a number of reasons, including (1) it meets the requirements of the regulations at 43 CFR 4180.1 and 4180.2 to address the principles of rangeland health; (2) it was based upon and incorporates a large portion of the regional standards and guidelines recommended by the Resource Advisory Council; (3) it incorporates some good suggestions by other agencies and the public; (4) it is based upon sound science as requested repeatedly by the different parties who commented on the process; and (5) it can be implemented within BLM's existing budgets without undue economic impacts to the grazing operators and the surrounding communities.

2. PLAN AMENDMENTS

In accordance with the grazing administration regulations at 43 CFR 4100, existing land use plans (Resource Management Plans and Management Framework Plans) have been examined to determine their compliance with the new regulations and the principles of rangeland health. In most cases, these plans do comply.

The land use plans identified below, as well as allotment management and other activity level plans, are hereby amended to include the standards and guidelines as adopted in this decision. The standards and guidelines will become effective immediately upon approval by the Secretary of the Interior and will be incorporated into the Plans at that time. Where there are plan decisions that are contrary to the new regulations, the principles of rangeland health, and the standards and guidelines, those decisions will be deleted from the plans or amended to comply.

Where "desired plant community" (DPC) objectives have been determined through the BLM planning and NEPA processes, the DPCs will be evaluated to ensure they meet the standards of rangeland health. Where DPCs have not yet been determined for a pasture or allotment, they will be developed through the BLM planning and NEPA processes to meet local and regional management objectives, and the standards of rangeland health.

Each Field Office will make the physical changes to their land use plans prior to the next grazing season. As this is merely plan maintenance, further NEPA analysis will not be necessary to complete this administrative action.

LAND USE PLAN	PLAN DATE	FIELD OFFICE
Tuledad / Home Camp Management Framework Plan (MFP)	1978	Surprise -- south part
Cowhead / Massacre MFP	1980	Surprise -- north part
CAL / NEVA MFP	1982	Eagle Lake -- NE part
Willow Creek MFP	1983	Eagle Lake -- NW part
Honey Lake MFP	1983	Eagle Lake -- south part
Eagle Lake MFP Amendment	1990	Eagle Lake -- Eagle Lake area
Alturas Resource Management Plan	1983	Alturas -- most of area
Ash Valley Amendment		Alturas -- part only
Mount Dome MFP	1981	Alturas -- part only
Redding (old) MFP	1983	Alturas -- part only

3. STANDARDS AND GUIDELINES for RANGELAND HEALTH in NORTHEASTERN CALIFORNIA and NORTHWESTERN NEVADA

The Preferred Alternative described in the final EIS (Alternative 5), with minor changes for clarification, has been chosen as the Standards and Guidelines for Northeastern California and Northwestern Nevada. The changes reflected in this Decision are within the scope and analysis of the EIS. These Standards and Guidelines will take effect immediately upon their approval by the Secretary of the Interior.
These standards and guidelines were developed for, and are hereby adopted for, that part of northeastern California and northwestern Nevada formerly known as the Susanville District.

Preamble

Healthy rangelands contribute to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada, and they provide, over the long term, the most reliable harvest of rangeland resources. The objective of rangeland resource planning is to integrate BLM resources with other resources to achieve the mandate of multiple-use and sustained yield management of renewable resources in an environmentally sound and cost-effective manner.

The **Standards** of rangeland health are expressions of physical and biological condition or degree of function required for healthy, sustainable rangelands. The Standards are applied on a landscape scale. Some standards may not apply to all acres. For example, a mosaic of vegetation types and age classes may produce the diversity associated with healthy rangelands; however, some individual vegetation communities within the mosaic may lack diversity.

The Standards always relate to the capability or potential of a specific site. The land will not be expected to produce vegetation or support habitats not attainable due to climate, soils, or other limiting attributes. In instances where site capability or potential has changed due to human-caused or natural disturbance, recognition will be given to the modified capability when setting or assigning a standard to (for) the site. The Standards are designed to establish the threshold for healthy rangelands. In some

circumstances, an exception to the Standards or Guidelines may be necessary or unavoidable; however, **these instances should be under extreme conditions only** and fully justified (documented) in order to be acceptable.

The **Guidelines** for grazing management are the types of grazing management methods and practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and terms and conditions for grazing permits. The Bureau of Land Management (BLM) must operate within the constraints of other regulatory requirements that may affect how standards and guidelines are applied for livestock grazing, for example the Wild Free-Roaming Horse and Burro Act (1971).

STANDARD 1: UPLAND SOILS

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform, and exhibit functional biological, chemical and physical characteristics.

Meaning that:

Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate, and landform; the soil is adequately protected against human-caused wind or water erosion; and the soil fertility is maintained at, or improved to, the appropriate level.

Criteria to Meet Standard:

* Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion.
* Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, and deposition of dunes is either absent or, if present, does not exceed what is natural for the site.
* Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site.

STANDARD 2: STREAMS

Stream channel form and function are characteristic for the soil type, climate, and landform.

Meaning that:

Channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and sediment transport are able to function naturally and are characteristic of the soil type, climate, and landform.

Criteria to Meet Standard:

* Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species.
* Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events.
* The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.
* Portions of the primary floodplain are frequently flooded (inundated every 1-5 years).

STANDARD 3: WATER QUALITY

Water will have characteristics suitable for existing or potential beneficial uses. Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada State standards, excepting approved variances.

Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water protect them where they are threatened, and restore them where they are currently degraded. This objective is of even higher priority in the following situations:

a. where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;

b. where aquatic habitat is present, has been present, or is potentially present for Federal threatened or endangered, candidate, and other special status species dependent on water resources; and

c. in designated water resource sensitive areas such as riparian and wetland areas.

Meaning That:

BLM will:

Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it administers.

Protect the integrity of these waters where it is currently threatened.

Insofar as is feasible, restore the integrity of these waters where it is currently impaired.

Not contribute to pollution and take action to remedy any pollution resulting from its actions that violates California and Nevada water quality standards, Tribal water quality standards, or other applicable water quality requirements (e.g., requirements adopted by SWRCB or RWQCB in California, or U.S. EPA pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act). Where action related to grazing management is required, such action will be taken as soon as practicable but not later than the start of the next grazing year (in accordance with 43 CFR 4180.1).

Be consistent with the non-degradation policies as identified by the States.

Develop and execute a Management Agency Agreement with the States of California and Nevada for the efficient protection of water quality associated with BLM's management.

Work with the States' water quality administrative agencies and U.S. EPA to establish appropriate beneficial uses for public waters, establish appropriate numeric targets for 303(d) listed water bodies, and implement the applicable requirements to ensure that water quality on public lands meets the objectives for the designated beneficial uses of the water.

Develop and implement Best Management Practices (BMPs) approved by the States to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs. These BMPs will be developed in full consultation, coordination, and cooperation with permittees and other interests.

State or Tribal approved variances or exceptions to water quality standards may be applicable within their Basin Plans for specific types of activities or actions. BLM will follow State or Tribal administrative procedures associated with variances.

As Indicated By:

* The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., indicator macroinvertebrates, fish, algae, and plants).
* Achievement of the standards for riparian, wetlands, and water bodies.
* Monitoring results or other data that show water quality is meeting the standard.

STANDARD 4: RIPARIAN and WETLAND SITES

Riparian and Wetland areas are in properly functioning condition and are meeting regional and local management objectives.

Meaning that:

The riparian and wetland vegetation is controlling erosion, stabilizing stream banks, shading water areas to reduce water temperature, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater and increasing recharge of ground water that is characteristic for these sites. Vegetation surrounding seeps and springs is controlling erosion and reflects the potential natural vegetation for the site.

Criteria to Meet Standard:

Riparian vegetation is vigorous and mostly perennial, and diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines.
Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events.
Negligible accelerated erosion as a result of human related activities is evident.
Age class and structure of woody riparian and wetland vegetation are appropriate for the site.

Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable)

- Structural facilities constructed for livestock/wildlife water or other purposes are not natural wetland and/or riparian areas. Examples are: water troughs, stock ponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD 5: BIODIVERSITY

Viable, healthy, productive and diverse populations of native and desired plant and animal species, including special status species, are maintained.

Meaning that:

Native and other desirable plant and animal populations are diverse, vigorous, and able to reproduce, and support nutrient cycles and energy flows.

Criteria to Meet Standard:

* Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.
* A variety of age classes is present for most species.
* Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur.
* Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.
* Natural disturbances such as fire are evident, but not catastrophic.
* Non-native plant and animal species are present at acceptable levels.
* Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas.
* Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health.

GUIDELINES FOR LIVESTOCK GRAZING

The following guidelines are meant to apply to one or more of the standards for rangeland health.

Guideline 1: Adequate stubble will be present on all stream-side areas at the end of the growing season, or at the end of the grazing season if grazing occurs after fall dormancy. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirement of plant vigor maintenance, bank protection, and sediment entrapment. Stubble height thresholds will be set on a site-specific basis, except for those allotments to which Guideline 16 applies (see Guideline 16 for an explanation of when Guideline 16 applies).

Utilization of stream-side herbaceous and woody plants should be limited to a specified amount of the current growth, and/or livestock should be removed to allow sufficient time for plant regrowth.

a. Late season use (summer or fall grazed pastures) requires more restrictive utilization based on site specific situations.

b. Special situations such as fragile fisheries habitats or easily eroded stream banks may require more restrictive utilization thresholds.

c. Hoof action impacts or chiseling on stream banks will not exceed specified thresholds so that stream bank stability is maintained or improved.

Guideline 2: Desired seral states will be determined through the Allotment Management Plan development process; generally the goal will be to achieve advanced ecological status in the riparian zone, except where site-specific objectives call for lower ecological status (such as meadows in important sage grouse habitat, where the objective might call for a pattern of meadows in different seral stages from mid-seral to the potential natural community). These site-specific objectives will be determined through allotment management plans or other plans and analyzed through the NEPA process.

Guideline 3: Periods of rest from livestock grazing or other avoidable disturbances must be provided during/after periods of stress on the land (e.g.: fire, flood, drought) and during critical times of plant growth.

Guideline 4: Plans for grazing on any allotment must consider other uses (recreation, archaeological sites, wildlife, horses and burros, mineral resource extraction, etc.) and be coordinated with the other users of public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 5: Intensity, frequency, season-of-use, and distribution of grazing shall provide for growth and reproduction of desired plant species and the achievement of the potential natural vegetation or desired plant community.

Guideline 6: Grazing permits will include site-specific, measurable terms and conditions.

Guideline 7: Design and work towards implementation of a grazing management strategy for livestock for each grazing unit (pasture) within I (Improvement) and M (Maintenance) category allotments, to maintain or improve rangeland health. This may consist of, but not be limited to, season-of-use, rotation, or by setting utilization levels for desirable plants. Each management plan implemented will incorporate the factors necessary to maintain the health of desirable plants.

Guideline 8: Determination of grazing use by livestock must provide for the habitat requirements of fish and wildlife.

Guideline 9: Grazing management practices must sustain biological diversity across the landscape. A mosaic of seral stages, vegetation corridors, and minimal habitat fragmentation must be maintained.

Guideline 10: Take aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities. The spread of noxious weeds will be controlled through appropriate methods such as grazing management, fire management, and other management practices.

Guideline 11: Prescribed fire and (natural) prescribed fire will be utilized to promote a mosaic of healthy plant communities and vegetative diversity.

Guideline 12: Grazing and other management practices shall take advantage of transitional opportunities (e.g., drought, flood, fire) to enhance or establish populations of desirable tree, shrub, herbaceous and grass species. Utilization levels will be established for desired seedlings, saplings, and/or mature plants to promote their presence in the plant community.

Guideline 13: Development of springs, seeps, and other water related projects shall be designed to promote rangeland health. Wherever possible, water sources shall be available year long for use by wildlife.

Guideline 14: Apply the management practices recognized and approved by the States of California and Nevada as Best Management Practices (BMPs) for grazing related activities to protect and maintain water quality.

Guideline 15: In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where grazing activities may contribute to the pollutants eausing such impairment, the management objective is to fully protect, enhance, and restore the beneficial uses of the water.

Guideline 16: Utilization Levels to be Applied to those Allotments Not Meeting or Making Significant Progress Toward Meeting the Standards

If monitoring or documented observation indicates that one of more of the standards is not being met, and if significant progress is not being made toward meeting all of those standards that are not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then the following utilization levels will be applied.

Utilization of key upland herbaceous species

UTILIZATION GUIDELINES (adapted from Holechek 1988 and Holechek et al. 1998)	
Community Type	Percent of Use of Key Herbaceous Species
Salt desert shrubland	25-35
Semi-desert grass and shrubland	30-40
Sagebrush grassland	30-40
California annual grassland	50-60*
Perennial grass communities within the California annual grassland vegetation type	30-40
Coniferous forest	30-40
Mountain shrubland	30-40
Oak woodland	30-40
Pinyon-juniper woodland	30-40
Alpine tundra	20-30

* Residual dry matter (RDM) guidelines will be used instead of these utilization levels for management of annual species in the California annual grassland. These RDM levels correspond approximately with these utilization levels. The RDM levels given in the table in the Final EIS under Alternative 5, Ukiah RAC Recommended Standards and Guidelines (Section 2.92), will be used for those few annual allotments within the area covered by this ROD.

Utilization of key upland browse species

There will be no more than 20 percent utilization of annual growth on key browse species prior to October 1 within identified deer concentration areas. These concentration areas are those areas within mule deer habitat where mule deer numbers are most likely to be concentrated during the winter season (winter season normally occurs from December 16 through March 31). These areas have been identified through State Fish and Game Agency fall and spring counts over a period of several years. Maps of these deer concentration areas are on file at the BLM Eagle Lake Field Office.

Utilization of key riparian species

A 4-6 inch minimum stubble height will remain at the end of the growing season in most riparian areas.

There should be no more than 20% utilization on key riparian trees and shrub species in those areas where the presence of woody riparian species is necessary to meet standards.

Application of the above utilization levels

These utilization guidelines will be applied to those areas of the allotment responsible for the determination that the allotment is not meeting the standards. For example, an allotment has 10 riparian areas, of which 6 have been determined to be in proper functioning condition and 4 have been determined to be functional–at risk. The utilization guidelines for riparian species given above would be applied to the 4 riparian areas that are functional–at risk, not to the 6 that are in proper functioning condition (although *all* of the riparian areas will be managed to meet the standards). Also, only those guidelines that are applicable to making progress toward meeting the standards that are not being met would be applied. For example, if only riparian standards are not being met, then only the guidelines applicable to utilization and stubble height of riparian vegetation would be applied.

These utilization levels will be implemented unless and until a current site-specific analysis is completed and new utilization levels are developed for specific allotments and documented in allotment management plans, other management plans, and/or in terms and conditions of grazing permits/leases. New site-specific utilization levels that are developed may be more restrictive than the guidelines presented above, consistent with achieving the desired resource conditions (as prescribed in land use plans and activity plans) and progress toward meeting the standards.

Implementation of this guideline

1. Uplands (including perennial grass and browse communities).

Guideline 16 will be implemented only on those upland areas that are responsible for the determination that the allotment is not meeting one or more of the standards and for which lighter utilization would be expected to move these areas toward meeting the standard(s).

Management changes (such as changes in season of use, timing, duration, and/or intensity; rotational grazing; fencing; herding; and/or adjustments in stocking rates) will be implemented if utilization guidelines on the average of the upland key areas across the pasture (or allotment if there is only one pasture) are exceeded for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of upland key areas on the pasture (or allotment) are not to exceed maximum utilization guidelines in most years. Because of the potential long-term damage to perennial grass species associated with severe grazing, severe grazing use (>70% utilization) in any upland key area in any year will result in a management change the following year. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. The average (mean) utilization on key species will be estimated at each key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 of the Final EIS for further discussion on this issue.

The management options to be implemented to meet this guideline will be determined in full consultation, cooperation, and coordination with affected permittees and other interests.

For allotments not meeting or making significant progress toward meeting the standards (and for which lower utilization levels of perennial upland species would be expected to help move these allotments toward the standards), utilization data already in hand will be used to determine whether a management change is necessary. Thus, for example, if utilization on a particular key area has exceeded the thresholds for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval.

In addition to implementing management changes that are expected to bring utilization levels within threshold values, close monitoring will follow to ensure that the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

2. Riparian areas (including herbaceous and woody plant communities).

Guideline 16 will be implemented only on those riparian areas that are nonfunctional or functional--at risk and lighter utilization levels would be expected to move these areas toward meeting the standards. The guideline will apply where the riparian area in a healthy state has the capability to produce vegetation of the prescribed height. The stubble heights will be measured at the end of the growing season to determine if the guideline has been met. Management changes (such as changes in season of use, timing, duration, and/or intensity; rotational grazing; fencing; herding; and/or adjustments in stocking rates) will be implemented if stubble heights on the average of the key riparian areas across the pasture (or allotment if there is only one pasture) fall below the guidelines for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70% of riparian key areas on the allotment are to exceed minimum stubble heights in most years. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents.

Because stream banks may be inadequately protected by heavy use in any one year and because stubble heights below 3 inches result in cattle shifting their preference to shrubs, stubble heights below 2 inches in any one year will require a management change in the following year.

The mean stubble height on key riparian species will be estimated at each riparian key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 of the Final EIS for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which higher stubble would be expected to help move these allotments toward the standards), stubble height data already in hand will be used to determine whether a management change is necessary. Thus, for example, if stubble heights on a particular key area have fallen below the thresholds for the two years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring stubble heights within threshold values, close monitoring will follow to ensure that the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

The management options to be implemented to meet this guideline will be determined in full consultation, coordination, and cooperation with affected permittees and other interests.

If reductions in permitted use are required: Any reductions in permitted use required as a result of implementing this guideline will be held in suspension and apportioned back to the permittee(s) or lessee(s) authorized to graze in the affected allotment if rangeland health improves to the extent that the authorized officer determines additional forage to be available (see Implementation, Appendix 1, for more information on this).

Guideline 17: Rangeland monitoring to determine utilization of forage resources and trend of rangeland health will be conducted in each allotment based on current accepted practices and techniques as directed in the Interagency Technical References: *Utilization Studies and Residual Measurements* (BLM et al. 1996b) and *Sampling Vegetation Attributes* (BLM et al. 1996a). Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees and interested publics.

To the extent possible, monitoring methods will be simple and easily accomplished. BLM, permittees, or others will do the monitoring. BLM will be responsible for ensuring that the monitoring is conducted in accordance with currently accepted practices and techniques, for analyzing and interpreting the data collected (in consultation, coordination, and cooperation with affected permittees and other interests), and for the accuracy of the data.

Existing key areas will be used where they exist. New key areas will be selected in full consultation, coordination, and cooperation with affected permittees and other interests. BLM will periodically review established key areas to determine if they continue to be appropriate to management. This review will be done in full consultation, coordination, and cooperation with affected permittees and other interests. If there is disagreement between BLM, permittees, and other interests over the location of key areas, the RAC will be asked for ideas on resolution. The final decision on the placement of key areas, however, rests with BLM.

BLM, in cooperation with other agencies, including Cooperative Extension, the Natural Resources Conservation Service, and the Forest Service, will provide training for permittees and other interested parties on rangeland monitoring methods.

4. IMPLEMENTATION

BLM will fully implement the grazing standards and guidelines as directed in the rulemaking. The rule states that, "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 grazing practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform to the guidelines...."(43 CFR 4180.2(c)).

Determination of the "appropriate action," and the actual scheduling of the implementation, will be the responsibility of the local Field Managers. However, it will be done using the priority system described in Appendix 1.

5. ASSESSMENTS and MONITORING

Field Offices will conduct assessments of all allotments according to the priority described in Appendix

1. These assessments will be done using an interdisciplinary approach and the findings and reasons for the findings will be documented. The format and content of this documentation will be left to the discretion of the individual Field Manager. (Examples are in the Final EIS.)

Field Offices will monitor allotments according to the priority described in Appendix 1. The monitoring will be done using an interdisciplinary approach, using methods described in Appendix 2. Also see Guideline 17. Both assessments and monitoring will be done in consultation, coordination, and cooperation with permittees and other interests.

Rangeland health conditions will be reported annually for each grazing allotment. This information will include the determinations of rangeland health conditions through assessments and monitoring and the progress made towards meeting rangeland health standards. Specifically, for each allotment an identification will be made of what standards, if any, are not met or where significant progress is not being made toward meeting the standard; what progress has been made regarding determining and implementing needed management changes; and the results of making the management changes as determined from monitoring information. Additionally, any changes in the management categories of the allotments will be identified and an explanation of the reasons for the change will be made.

The above information will be gathered at the Field Office which administers the respective allotment(s). A summary of this information will be consolidated for all of the allotments in the state (exclusive of the California Desert District) and made available to the public annually.

6. PUBLIC INVOLVEMENT and RESPONSE to PROTESTS

BLM has had extensive public involvement throughout the process of developing the Standards and Guidelines. Early phases of this involvement were described in the Draft EIS, and in Chapter 5 of the Final EIS. Further, we have consulted extensively with the three Resource Advisory Councils (RAC) on content and wording of the Standards and Guidelines.

As stated in the Final EIS, "following the comment period on the draft EIS, the RAC members were sent copies of all of the comment letters. The RACs discussed the comments and the draft EIS in their meetings. Representatives of the three RACs then met with BLM staff in a workshop setting and made recommendations for modification of their original proposals."

Comments made by the public following the Draft EIS were individually analyzed by BLM, and responded to in the Final EIS. The Proposed Action (Alternative 5) in the Final EIS was based upon the original RAC proposals, with changes suggested by the RACs and by BLM, based upon analysis of the public comments. There were several meetings with the Susanville RAC and other interested parties prior to issuing the Final EIS because there were items in the Standards and Guidelines that caused concern to RAC members and ranchers in NE California and NW Nevada.

Following release of the Final EIS, BLM received 5 protests, all of which applied to Northeastern California and Northwestern Nevada (3 of these applied only to this area, while the other 2 applied to this area and to the rest of the EIS area). The major concerns were that there were changes made in the Final EIS that the public had not been allowed to review in the Draft; that the water quality guidelines were inappropriate; that utilization guidelines should not be imposed throughout the region; that there was no "no grazing" alternative; and that the Bureau does not have enough staff to implement the Standards and Guidelines.

As a result of these protests, BLM has added some language to this ROD to clarify how the standards and guidelines will be implemented. However, no substantive changes have been made to the Northeastern California and Northwestern Nevada Standards and Guidelines from that contained in the Final EIS. Based on the clarification language, three of the protestors subsequently withdrew their protests. The remaining two protests were dismissed by the Director of BLM, who sent letters to the two protestors explaining the reasons for the dismissals.

APPENDIX 1: IMPLEMENTATION

The fallback standards (43 CFR 4180.2(f)(1)) have been in effect in since August 12, 1997. An initial screening of allotments was made, based on existing information, to determine the status of each allotment with respect to meeting the fallback standards. Each allotment was placed into one of four categories as follows:

Category 1: Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standards(s), and livestock grazing is a significant contributor to the problem.

Category 2: Areas where all standards are being met or significant progress is being made toward meeting the standard(s).

Category 3: Areas where the status for one or more standards is not known, or the cause of the failure to not meet the standard(s) is not known.

Category 4: Allotments where one or more of the standards are not being met or significant progress is not being made toward meeting the standards due to causes other than (or in addition to) livestock grazing activities. (Those allotments where current livestock grazing is also a cause for not meeting the standards is included in Category 1 in addition to this category.) The authorized officer should take appropriate action based on regulation or policy; however, these actions not related to livestock grazing are outside the scope of this implementation plan and will not be addressed in this document.

An assumption has been made by the BLM field managers that, with few possible exceptions, the implementation needed for the regulatory fallback standards and guidelines will essentially be the same as for any anticipated set of final approved standards and guidelines implemented pursuant to this Record of Decision (ROD). Consequently, the categorization of allotments under the standards in this ROD is likely to be the same as the categorization under the fallback standards and guidelines. Existing allotment assessments and their resulting determinations as to category will be reviewed to ensure that the determination is correct under the standards set in place by this ROD.

New allotment assessments, reviews of existing allotment assessments, and determination of allotment category will be conducted in full consultation, coordination, and cooperation with permittees and other interests.

We intend to conduct rangeland health assessments on all allotments within the next 5 years. First priority for these assessments will be given to those allotments where we already know or suspect one or more of the standards are not being met. These include those allotments placed in Category 1 under the fallback standards and those allotments currently in Category 3 that we have reason to believe may not be meeting standards. After these allotments have been assessed, the remaining allotments will be assessed using the BLM I, M, and C priority management system, with first priority to I, second to M, and last to C.

For those allotments where the standards are not being met (Category 1), management actions will be implemented to correct the situation prior to the next grazing season turn-out period for the allotment. The management options will be determined in full coordination, consultation, and cooperation with permittees and other interests.

Monitoring will be conducted to evaluate the progress towards improving rangeland health and to evaluate the success of the specific management measures applied (see Guideline 17).

APPLICATION OF GUIDELINES

Once the guidelines are approved by the Secretary of the Interior, they will be applicable to the management of livestock grazing on all allotments not meeting the health standards. Some guidelines will be applicable regardless of the specific rangeland health condition, as they are designed to help protect and sustain rangeland health and are not intended to be applied only to remedy problems. Many of the guidelines will need to be more specifically identified and then applied as terms and conditions of a permit or lease, based upon the specific needs for meeting rangeland health standards. There will be instances where specific terms and conditions will be applied to grazing use authorizations for reasons other than those directly related to rangeland health, such as to accommodate other resource needs and land uses or to meet administrative requirements. Examples of this may include protecting cultural resource sites, requiring a specific breed of livestock to be used that is compatible with the needs of other permittees or lessees using the same allotment, or for meeting various regulatory requirements for grazing administration purposes. In some instances, existing terms and conditions will be carried over from previously made plans and commitments, such as those identified in allotment management plans or coordinated management plans. In these instances, the terms and conditions may or may not be related to rangeland health needs.

Any terms or conditions specified for a permit or lease must be consistent with and support appropriate BLM land use plans or other land use plans applicable to the public lands. BLM will also adhere to requirements such as those identified as terms or conditions from a biological opinion for protecting the habitat of a plant or animal under the Endangered Species Act.

Terms and conditions will be applied to grazing permits, leases, or other grazing authorizations as the authorized officer (Field Manager) determines the need. The determination of what terms and conditions will be applied will be made in full consultation, coordination, and cooperation with the respective permittees/lessees and other interested parties involved in the particular allotment. The same process will be used for making needed changes to any existing terms and conditions. Information from assessments and evaluations of monitoring data will be used to determine the management changes needed. Management options that would be expected to move allotments toward meeting the standards will be determined in full coordination, consultation, and cooperation with permittees/lessees and other interested parties.

Alternative management changes will be considered and evaluated through the NEPA process prior to making final determinations. It is anticipated that in most instances, the terms and conditions will be identified cooperatively and be agreed upon by the affected permittee/lessee and all interested parties. Where an agreement cannot be reached, then a formal decision (which is appealable) will be issued.

If reductions in permitted use are necessary to achieve the standards or meet the guidelines, the animal unit months (AUMs) by which the permitted use is reduced will be held in suspension. Once the authorized officer determines that rangeland health has recovered to an extent that all or part of the suspended permitted use can be restored, this suspended permitted use shall first be apportioned in satisfaction of suspended permitted use to the permittee(s) or lessee(s) authorized to graze in the allotment in which the forage is available (this is in accordance with 43 CFR 4110.3-1(b)).

REPORTING PROGRESS IN RANGELAND HEALTH ACHIEVEMENTS

Rangeland health conditions will be reported annually for each grazing allotment. This information will include the determinations of rangeland health conditions through assessments and monitoring and the progress made towards meeting rangeland health standards. At a minimum the report will identify, by allotment: (1) what standards, if any, are not being met; (2) whether significant progress is being made toward meeting those standards that are not currently being met; (3) the magnitude of those standards not being met, in terms such as acres, miles of stream, number of sites, etc.; (4) the progress that has been made in determining and implementing needed management changes; and (5) the results of making the management changes as determined from monitoring and assessment information. Additionally, any changes in the management categories of the allotments will be identified, accompanied by an explanation of the reasons for the change.

The above information will be gathered at the field office which administers the respective allotment(s). A summary of this information will be consolidated for all of the allotments within the EIS area and made available to the public annually.

Tables were provided in the Final EIS that showed all allotments in the State and the category to which they were assigned in 1997. Since that list was compiled, management changes have been implemented and additional assessment and monitoring work has been completed that makes those lists obsolete. When the annual report is compiled each year, an updated list of all allotments, by category, will be provided as part of the report.

Throughout all processes the public is encouraged to participate in the identification of rangeland health conditions, developing management remedies, monitoring results, and reviewing progress towards achieving rangeland health standards.

APPENDIX 2: ASSESSMENT AND MONITORING

Assessment to Determine if Allotments are Meeting Standards

"Assessment" means the analysis, synthesis, and interpretation of information, including monitoring data, to characterize the health of an allotment or other management unit. Gathering new information in the field may be necessary as part of the assessment process. "Monitoring" means the periodic gathering of information.

In some cases, quantitative monitoring data, gathered over a period of years, may be essential to determine whether an area meets the standards and whether livestock grazing is a significant factor contributing to a failure to meet the standards. However, quantitative monitoring data is not always required to make these determinations nor to implement actions to improve grazing management. The preamble to the 1995 grazing regulations (BLM 1995) states that managers may "use a variety of information, including monitoring records, assessments, and knowledge of the locale." The 1995 regulations also require the manager to "reduce permitted grazing use or otherwise modify management practices...when monitoring or field observations show grazing use or patterns of use are not consistent with the provisions of 43 CFR subpart 4180" (43 CFR 4110.3-2(b); subpart 4180 includes the standards and guidelines). Changes in permitted use are to be "...supported by monitoring, field observation, ecological site inventory, or other data acceptable to the authorized officer." Therefore, actions needed to improve grazing management in order to comply with guidelines or meet standards should not be delayed solely because monitoring data are lacking. Rangelands will not be allowed to deteriorate while prolonged monitoring studies are conducted, when reliable indicators of rangeland health demonstrate a need for corrective action.

Assessments should employ the minimum information needed to determine whether the standards are being met and whether livestock grazing is a significant factor in failing to meet the standards. All resource information or data collected should be tied directly to the standards, guidelines, or resource objectives.

Field Offices will conduct assessments of all allotments according to the priority described in Appendix

1. These assessments will be done using an interdisciplinary approach, and the findings and reasons for the findings will be documented. The format and content of this documentation will be left up to individual Field Managers, but the form used by the Eagle Lake Field Office (Appendix 24 in the Final EIS) is one example of the type of documentation that could be employed.

The term "assessment," when used by itself, has the meaning described above; that is, it considers all available information, whether from inventory, monitoring, or qualitative assessments. "Qualitative assessment" refers to a particular method used to rapidly assess whether allotments or areas within allotments are meeting standards. The Proper Functioning Condition (PFC) procedure is the qualitative assessment method that is applied to riparian/wetland areas (BLM 1993b and 1994). The Qualitative Procedure to Assess Rangeland Health (Appendix 25 in the Final EIS) is the qualitative method that will be applied to upland rangelands. The use of these procedures, and their relationship to monitoring, will be discussed in more detail below.

Application of Traditional Rangeland Monitoring to Assessing Whether Standards are Being Met

Many rangeland monitoring studies have been in place and read on a regular basis by BLM personnel in California for many years. These studies involve using qualitative or quantitative procedures, or both, and often are directed at determining the condition and trend of key species in key areas. The basic types of studies, as well as the use of the key species and key area approach, are described in Chapter 3, Section 3.2.5, of the Final EIS. The purpose of these studies has primarily been to determine if management objectives relative to particular grazing allotments are being met or if the trend is toward meeting these objectives. For example, a management objective might be to increase the frequency of a key species such as squirreltail (*Elymus elymoides* ssp. *elymoides*) by 10% in Pasture A of Allotment Z in 5 years. Some method of frequency monitoring is then set up in one or more key areas in Pasture A and read on a regular basis (this could be annually but might be once every five years; in this example the frequency of monitoring would have to be at least every five years). In another example, the objective might be to increase the basal cover of the key species bluebunch wheatgrass (*Pseudoregneria spicata* ssp. *spicata*) in Pasture B of Allotment X by 5 percent over the next 6 years. A method of monitoring that measures cover is then set up in one or more key areas of Pasture B and read on a regular basis (this could be annually or on some other schedule, but must be at least every 6 years).

Management objectives have not always been directed at key species. Objectives to increase the total vegetation cover on particular pastures or allotments have also been applied, as well as objectives to decrease the cover of shrubs or trees. In both of these examples, monitoring methods are chosen that measure or estimate cover. These methods might be quantitative in nature or qualitative; the latter might involve taking photographs, either on the ground or aerially.

A second monitoring objective of traditional rangeland monitoring has been to determine the "condition and trend" of rangelands. The condition is determined by comparing the current species composition and production of a given ecological site to the species composition and production of the potential natural community of that site (see Chapter 3, Section 3.3.3 in the Final EIS for a more complete description of the process).

Trend is recorded as upward, downward, or static, based on whether species composition and production are moving toward, away, or not at all, respectively, from the potential natural community. Ecological site inventory (ESI) is used to determine condition at any one point in time. A second ESI can then be used to determine trend; other monitoring studies, however, can also be used for this purpose, if they yield information on species composition.

Although much of the monitoring currently is being conducted will have applicability to determining the effectiveness of implementation of the rangeland standards, some old methods will have to be modified and new methods introduced. This is because the standards require monitoring of certain rangeland attributes that are not assessed under current methodology.

Table 1 is a list of rangeland attributes that may be assessed in order to determine whether standards are being met.

Table 1. List of rangeland attributes that may be assessed in order to determine whether standards are being met, along with the actual wording of the indicator(s) to which each attribute applies (parentheses following each indicator show the standard to which it applies). Several indicators apply to more than one attribute and therefore are listed under each of the appropriate attributes.
1. Ground cover a. "Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species" (Streams) b. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (Streams) c. "Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion" (Soils) 2. Litter/residual dry matter "Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health" (Biodiversity) 3. Plant species diversity a. "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (Upland Soils) b. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (Streams) c. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (Riparian and Wetland) d. "Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events" (Riparian and Wetland) e. "Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas" (Biodiversity) 4. Plant vigor a. "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (Upland Soils) b. "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (Streams) c. "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (Riparian and Wetland) d. "Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur." (Biodiversity)

Table 1, continued

5. Plant structure
   a) "Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site" (Upland Soils)
   b) Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species" (Streams)
   c) "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (Riparian and Wetland)
   d) "Age class and structure of woody riparian and wetland vegetation are appropriate for the site" (Riparian and Wetland)
   e) "A variety of age classes are present for most species" (Biodiversity)
   f) "Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations" (Biodiversity)

6. Spatial distribution of plants and their habitats
   a) "Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events" (Biodiversity)
   b) "Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations" (Biodiversity)
   c) "Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas" (Biodiversity)
   d) Natural disturbances "Natural disturbances such as fire are evident, but not catastrophic" (Biodiversity)
   e) Non-native plants and animals, including noxious and invasive species "Non-native plant and animal species are present at acceptable levels" (Biodiversity)
   f) Special status species
   g) "Habitat areas are sufficient to support viable populations and are connected adequately with other similar habitat areas" (Biodiversity)
   h) "Healthy, productive and diverse populations of native plant and animal species, including special status species, are maintained" (Biodiversity)

7. Tree and shrub canopy cover "The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter" (Streams)
   a) Woody debris "Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events" (Riparian and Wetland)

8. Streambank stability
   a) "Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events" (Streams)
   b) "Riparian vegetation is vigorous and mostly perennial, diverse in species composition, age class and life form sufficient to stabilize stream banks and shorelines." (Riparian and Wetland)

9. Chemical constituents of water "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)
   a) Water temperature
   b) "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity,

sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

c) "The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter" (Streams)

10. Nutrient loading "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

11. Fecal coliform "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)
    a) Turbidity "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

12. Suspended sediment "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

13. Dissolved oxygen "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

14. Aquatic and riparian organisms "The following do not exceed the applicable requirements for physical, chemical, and biological constituents including, but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, aquatic organisms and plants (e.g., macroinvertebrates, fish, algae, and plants)" (Water Quality)

15. Soil erosion
    a) "Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, deposition of dunes is either absent or if present does not exceed what is natural for the site" (Upland Soils)
    b) "Negligible accelerated erosion as a result of human activities is present" (Riparian and Wetland)

16. Degree of floodplain flooding "Portions of the primary floodplain are frequently flooded (inundated every 1-5 years)" (Streams)

Monitoring of Vegetation and Physical Attributes

Vegetation monitoring (including soil crusts). Table A.22.2 in the Final EIS lists the trend monitoring methods currently in use or described in the Interagency Technical Reference, Sampling Vegetation Attributes (BLM et al. 1996a) and the plant and vegetation attributes they measure. Of the attributes listed in Table 1 in this appendix, the following can be monitored using a combination of the methods from the technical reference:

- Ground cover
- Litter/residual dry matter
- Plant species diversity
- Plant vigor
- Soil crusts
- Plant structure
- Spatial distribution of plants and their habitats
- Natural disturbances (although not specifically identified by a column heading on Table A.22.2, these can be tracked under the heading "spatial distribution")
- Non-native plants (these can be monitored by measuring or estimating density, frequency, or cover)
- Special status plants (these can be monitored by measuring or estimating density, frequency, or cover)
- Tree and shrub canopy cover

Note, however, that in some cases these attributes are not measured or estimated as part of the standard procedure. For example, the typical way in which the Daubenmire method (which estimates canopy cover in either 6 or 10 categories in a series of plots) is used yields measurements of the cover of bare ground, vegetation, litter, gravel/rock, as well as frequency and species composition. Other attributes, such as the cover of biological, physical, and chemical crusts, cryptogams, production, and vigor *can* be incorporated into the standard procedure with proper planning.

Monitoring of Guidelines Associated with Utilization, Residue, and Stubble Heights.

For the reasons given in Section 3.2.5 in the Final EIS, it is important to set and monitor guidelines on utilization levels, minimum residues, and minimum stubble heights. Guidelines have been set for the entire EIS area where standards are not being met; site-specific guidelines may be set by Field Offices. Existing monitoring of utilization, residue, and stubble heights will continue, and new studies will be established as needed. On upland perennial rangelands not meeting the standards, utilization will be measured on key species in key areas, with the average (mean) utilization used to assess whether the portion of the allotment or pasture represented by the key area is meeting the utilization guideline (there are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make this determination after examining the data over a period of a few years). We recognize that residue, in terms of stubble height and litter, is a better measure of utilization in upland perennial grass communities than percent utilization, but we do not have sufficient information at this time to develop guidelines that use these attributes. We intend to investigate this matter further, however, as time and funding permit, and to eventually replace the utilization guidelines on perennial uplands (which specify percent of key species removed) with guidelines specifying minimum amounts of residue to be left. A very preliminary study proposal is given in Table 2.

Table 2. Preliminary Study Proposal: Developing Residue and Stubble Height Guidelines for Major Vegetation Types in the Great Basin

Objective: Develop upland residue and stubble height guidelines for the major vegetation types in the Great Basin
Conduct a literature review.
This review would look at material published in peer-reviewed publications and "gray" literature as well as information collected by field offices. In addition, range scientists at universities and in other agencies (e.g., NRCS, ARS, Forest Service) would be interviewed.

Conduct the following study.
A study would be conducted to fill in the gaps in information that are expected to exist following the literature review. Over a period of several years the residue left following known levels of utilization will be measured at several sites in different vegetation types. This will entail measuring total above ground production in ungrazed areas (using either cages or exclosures), measuring utilization after the grazing season on key species, and measuring the amount of standing and fallen dead plant material (separately) at that level of use. The stubble heights of key species will also be measured both in grazed and ungrazed condition. Photographs will be taken both of the key species and the landscape, both in grazed and ungrazed areas. As much as possible, sites should be selected that are close to existing weather stations (NOAA, RAWS stations, etc.) so the total production can be related to the amount of precipitation received.

The study should be conducted over several years in order to show a range of residue, stubble heights, and utilization levels as related to different amounts of precipitation. This study should enable field personnel to develop either State or regional guidelines on the appropriate residue and stubble height levels that should be left following grazing.

Following is a list of the utilization and residue studies from the Interagency Technical Reference, *Utilization Studies and Residual Measurements* (BLM et al. 1996b) that may be applied to public lands within the EIS area:

Browse Utilization Methods:
- Twig Length Measurement Method
- Cole Browse Method
- Extensive Browse Method

Residue Measuring Methods
- Stubble Height Method
- Visual Obstruction Method
- Comparative Yield Method

Herbaceous Utilization Methods
- Paired Plot Method
- Ocular Estimate
- Key Species Method
- Height-Weight Method
- Actual Weight Method
- Grazed-Class Method
- Landscape Appearance Method

Exact methods to be used to monitor utilization, residue, and stubble heights will be determined by the Field Offices.

The above utilization and residue monitoring studies are usually applied to key areas (see the glossary in the Final EIS for a definition of key area and the discussion of key areas in Chapter 3, Section 3.2.5 of the Final EIS). Utilization pattern mapping is another important monitoring tool. This method entails canvassing the entire allotment or individual pasture and mapping the area into several classes based on the level of utilization (e.g., no use, light use, moderate use, and heavy use) on key species (see Chapter 3, Section 3.2.5 for more information). These studies will continue where necessary.

Actual use monitoring. Actual use studies (BLM 1984) are another form of traditional range monitoring that will continue. These studies track the actual use made by livestock in pastures and/or allotments based on the numbers of livestock and the length of time livestock are present. These numbers are usually provided by lessees/permittees but are sometimes also estimated from counts by BLM professionals. The actual use made by other herbivores such as wild horses and burros and wildlife is often estimated as well. These data are important in determining what changes should be made when objectives and standards are not being met.

Climate monitoring. It is important to consider climate when interpreting monitoring data. Climate monitoring most often consists of compiling precipitation and temperature information collected by the National Oceanic and Atmospheric Administration at the many weather stations in the EIS area. In some cases, precipitation data are collected through the placement of rain gauges in allotments. Additionally, both temperature and precipitation data are collected from 14 Remote Automated Weather Stations (RAWS) within the EIS area.

Riparian-wetland monitoring. The vegetation attributes of riparian-wetland areas are monitored using one or more of the techniques described in Table A.22.2 in the Final EIS. The Greenline Riparian-Wetland Monitoring Method (BLM 1993a) is also used by some field offices. The following physical attributes are also monitored on some riparian-wetland areas:

- Bankfull discharge
- Sinuosity
- Riparian zone width
- Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody debris)
- Width/depth ratio

Use of Qualitative Assessments to Determine if Standards are Being Met

As noted above, traditional range monitoring studies can help assess whether standards are being met. The standards, however, call for the assessment of indicators that are not addressed by these traditional monitoring studies. Where the status of these indicators cannot be inferred from existing monitoring information, other monitoring or assessment methods must be employed. The following qualitative assessment procedures were developed to rapidly assess all the physical and biological components of rangeland health.

Qualitative Upland Assessment. For uplands, the qualitative assessment method will be used. Although a technical reference has not yet been finalized on the method, a draft has been prepared and field tested. The details were given in Appendix 25 in the Final EIS. Field Offices may adapt this method as necessary to meet local needs.

The results of the qualitative assessment will be used in conjunction with all other available information to determine if an allotment is meeting the standards. If it is not, and does not appear to be making significant progress toward meeting the standards, and grazing has been determined to be a significant factor, changes will be made to the management of livestock grazing. To assess whether these management changes are effective in moving toward meeting the standards, monitoring will be initiated (or, if already being conducted, will be continued) that is directed toward those indicators that caused the allotment to not meet the standards. For example, if the qualitative assessment indicates that insufficient litter is present, subsequent monitoring will focus on measuring the amount of litter (either the cover of litter or the amount in weight of litter).

Qualitative Riparian/Wetland Assessment. A qualitative procedure, called proper function condition (PFC) assessment (see Appendix 23 of the Final EIS), is already in place to help assess whether riparian and wetland areas are meeting the standards (BLM 1993b and 1994). This PFC assessment has already been applied to many riparian/wetland areas within the EIS area. Its use will be continued. Just as with the upland qualitative assessment procedure, when the PFC results in one or more indicators being responsible for an allotment not meeting the standards, subsequent monitoring will focus on those indicators. For example, if the width/depth ratio is the main reason a stream is determined to be not meeting the standard of proper functioning condition, subsequent monitoring would focus on the width/depth ratio of the stream.

Wildlife Monitoring for Rangeland Health

The standards for rangeland health include a "biodiversity" standard. They also include several indicators of animal habitats and populations that are attributes of a healthy rangeland ecosystem. These indicators can be divided into those related to habitat and those related to animal populations. The habitat indicators include habitat seral stages, vegetation structure and patch size, spatial distribution of habitats, habitat size, how habitats are connected, and the habitat's ability to support viable populations. The animal population indicators include the spatial distribution of animals, special status species numbers, stable to increasing populations, viable populations, and levels of non-native animals.

The BLM recognizes that determining the biodiversity health for each allotment is an impossible task involving the gathering of species-specific data at many locations and scales. However, a more achievable option is to design monitoring programs that evaluate ecosystem components, structures and processes as indicators of a habitat's *capability* to support healthy animal communities. We would then rely on focused studies to more directly monitor species of management concern.

There are different scales of monitoring and management to evaluate the relationships between habitat management from livestock grazing and animal populations. It is critical to evaluate the assumptions that habitat management at the allotment (or pasture) level will actually affect animal presence and abundance at the monitoring site(s). It is necessary to determine the appropriate scale of monitoring: coarse scale regional monitoring of several allotments for some animal community indicators; fine scale monitoring at the allotment level for some special status, game animals, and keystone species; and site-specific scale for some special status species and ecosystem health indicators that are restricted to very small habitat areas. Monitoring plans should consider these issues of scale when designing allotment monitoring programs.

Habitat mapping and vegetation monitoring would usually suffice to evaluate whether the allotments are providing *adequate opportunities* for wildlife communities in meeting the standards. Spot checking for selected species at the appropriate habitats over several allotments would evaluate rangeland health for many species. At a finer scale of analysis, population censuses at the allotment scale may be needed to determine if the standards are being met.

This finer scale monitoring would be directed at special status animals or at species with a very restricted habitat requirement as a rangeland health indicator.

Most allotment monitoring will evaluate the habitat capability for species of management concern. Vegetation characteristics of habitat structure (for example, ground cover, vertical layering, form of trees and shrubs), plant composition, age structure of plants (young, reproducing, old, or decadent trees or shrubs), plant vigor, and the distribution of plant communities across the landscape will be the focus of BLM's monitoring.

Field assessments should emphasize the use of habitat quality checklists to identify significant problems at the appropriate scale (allotment or landscape levels). These checklists can be designed to evaluate habitat quality for a particular species, group of species, or general animal community composition. The elements of such a checklist are given in Table 3. More focused studies or monitoring protocols may be developed where habitat monitoring indicates standards are not being met and where management priority is high.

The BLM will consider existing information on soils, habitats, scientific literature, historic records, fire history, and disturbance regimes to assess habitat capability. When more detailed information regarding a particular species is required, wildlife information systems and species records may be used to conduct assessments of habitat quality for animals of management concern. The California Wildlife Habitat Relationships System (CWHR) and Habitat Evaluation Procedures (HEP) models may be used for these assessments. These models are based on the assumptions that through habitat assessments, habitat capability (quality) for a particular species or group of species can be determined. The California Natural Diversity Data Base will be used to help assess the significance of BLM actions on special status animal species and rare plant communities.

The rangeland health indicators for animal (wildlife) populations cannot be assessed separately for each species. Evaluating animal numbers and distributions for each species would require an extensive amount of monitoring of hundreds of animal species, a task far beyond the capability of the BLM and our State and private management partners. Instead, monitoring must be focused on a subset of animal "indicator" species that represent wildlife communities and populations in general as indicators of ecosystem health. While this method of monitoring has been criticized as flawed since each species has its own niche in the ecosystem that cannot be represented by another species, this approach gives the BLM the opportunity to focus wildlife monitoring within our capability. The indicator species may be threatened or endangered, game animals, species of regional or special concern, keystone species, abundant, or rare. The selection of the indicator species will depend on the allotment management objectives, land use plan objectives, and/or BLM commitments to regional plans. The monitoring of the indicator species may include general distribution or abundance surveys or more focused research to better evaluate the relationships between the animals and their habitats and grazing effects. In many cases, data collection may not be required within each allotment, but across the landscape in habitats with similar characteristics.

Table 3. Elements of a Biodiversity and Species Checklist for Wildlife.

Habitats

CWHR Habitats and seral stage (es) present:

Habitat composition and seral stages related to management objectives:

- Seral stages meet management objectives
- Plant community composition indicates good rangeland health
- Native species present at acceptable levels
- Non-native species at acceptable levels
- Invasive weeds at acceptable levels

Habitat structure related to management objectives:

- Plant cover is adequate, within natural range
- Plant height adequate: herbaceous shrub trees
- Plant density is adequate
- Plants distributed normally
- Ground cover is within normal range
- Age-class indicates community maintenance
- Form-class indicates normal growth characteristics

Distribution of Habitats across landscape:

- Patch size is adequate
- Fragmentation is not excessive
- Habitats are connected within site capability

Species

Management indicators selected:
Habitats meet requirements of indicator species:

- Elements are considered acceptable:
- Elements lacking:

Key management areas present:

- Listed species habitats
- Riparian
- Wetlands
- Seasonal ranges (winter, migratory, calving/fawning, etc)
- Breeding/nesting sites

Focused Studies

- Focused studies in progress:
- Focused studies needed:

Evaluation:

Habitats are meeting management objectives Habitats promote diverse and viable wildlife populations Seral stages present Composition

Structure Distribution Habitats can withstand catastrophic events (flood/fire/windstorm) Species present indicate healthy ecosystem function Habitats meeting species/diversity standards Habitats not meeting species/diversity standards Livestock grazing/management is (is not) significant factor Management changes needed to meet standards

Water Quality Assessment and Monitoring

Most often, when riparian areas and wetlands are healthy, the quality of water for most beneficial uses meets standards. Many of the attributes assessed and monitored for riparian and wetland areas also affect the quality of the water, at least indirectly. There are exceptions, however, where this may not always be true, particularly with regard to the chemistry and physical properties of the water. Biological assessments and monitoring of aquatic organisms in water bodies serve to identify important attributes reflecting the quality of water for many beneficial uses and will be used when it is determined that the quality of the water may be in question.

In most situations BLM will depend upon the State and Regional water quality agencies to either identify, or assist BLM in identifying, where water quality is impaired or has a high probability of being impaired. For those areas where livestock grazing activities on public land are known to cause or are suspected of causing water quality impairment, BLM will closely coordinate with these agencies in obtaining any needed water quality monitoring and assessment information. Where sufficient information is not available, BLM will also closely coordinate with these agencies in the selection and design of the attributes to be assessed and monitored by BLM. Since the states have primary responsibility and primacy regarding the Clean Water Act and the Safe Drinking Water Act, it is important that any water quality assessment or monitoring information obtained by BLM meet the acceptance of those state agencies responsible for identifying the specific requirements of those Acts.

Effectiveness Monitoring of Guidelines

Effectiveness monitoring is used to evaluate whether a particular activity, when carried out as planned, results in the desired effect (MacDonald et al. 1991). In the context of rangeland standards and guidelines, effectiveness monitoring will be used to evaluate whether guidelines, if followed, result in either meeting or making progress toward meeting the standards. This type of monitoring will be employed when the other types of monitoring and assessment discussed in this appendix determine that progress is not being made toward meeting standards despite compliance with guidelines. For example, a grazing system is implemented in order to move an allotment toward meeting standards, but after five years of monitoring no progress is detected. The management system will then be evaluated to determine why it is not producing the desired effects and changed accordingly. Utilization and stubble height guidelines provide another example. If, after several years of compliance with these guidelines, allotments are not moving toward meeting standards, these guidelines will be evaluated and supplanted by new ones as appropriate.

Application of New Technology to Monitor and Assess Rangeland Health

Traditional transect-based techniques for measuring vegetation and other indicators of rangeland health provide detailed information at a plot level. Care must be used when using plot-based measurements to characterize large areas because of problems in extrapolating information from small samples to large areas. Methods for assessing rangeland health at multiple scales are currently in their infancy. The use of remotely-sensed data, primarily satellite imagery, will hopefully become a rapid and inexpensive method for measuring rangeland health on larger areas.

One pilot effort recently initiated in the northeastern portion of the EIS area is a cooperative project between BLM, the National Resource Conservation Service, and the Forest Service's Pacific Northwest Experiment Station. It involves the transitioning from traditional Soil Surveys to Resource Surveys, which are multi-resource, map-based surveys of soil, vegetation, water, and wildlife characteristics. Part of the project will include development of a set of tools that will be designed to assess rangeland health at multiple scales and areal extent.

As new methodologies such as this one are developed, they will be applied to monitoring and assessing rangeland health standards within the EIS area.

Monitoring and Assessment Plans

Each Field Office will develop a plan that will direct its monitoring and assessment activities relative to making determinations on whether standards are being met, whether progress is being made toward meeting the standards if they are not currently being met, and whether livestock grazing is the reason for standards not being met. These plans need not be elaborate, but at a minimum they will include a list of the attributes that will be monitored, the monitoring methods that will be used (with reference to a complete description of the method), the allotments that will be monitored using these methods, the frequency at which the allotments will be monitored, and how often interdisciplinary assessments will be made of all the information collected (including monitoring data, qualitative assessment information, inventory data, etc.). A monitoring and assessment schedule will also be included. These monitoring and assessment plans will be made available to all interested parties.

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Appendix C

Northeast California Resource Advisory Council Recommended Off-Highway Vehicle Management Guidelines

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Northeast California Resource Advisory Council Recommended Off-Highway Vehicle Management Guidelines

Bureau of Land Management

Northeast California Resource Advisory Council
Recommended Off-Highway-Vehicle Management Guidelines

Adopted and Forwarded to the Bureau of Land Management
at a Regularly Scheduled Business Meeting
August 29, 2000
Susanville, California

The guidelines for Off-Highway-Vehicle management are the methods and practices determined to be appropriate to ensure that BLM Land Health Standards can be met, or that significant progress can be made toward meeting the standards. The guidelines were designated to provide direction, yet offer flexibility, for implementation through OHV designations, activity plans and permit terms and conditions.

Guideline 1: OHV use will not be allowed on streams, riparian/wetland areas. Where needed, crossings will be bridged or hardened.

Guideline 2: OHV use will not degrade ecological status.

Guideline 3: OHV use requires review/action during/after periods of high use and or stress (fire, flood, drought). OHV closure may be appropriate in response to factors such as accelerated erosion or loss of natural barriers to off-road use.

Guideline 4: Plans for OHV use must consider other resources and uses (livestock grazing, recreation, archaeological sites, wildlife, horses and burros, mineral resources extraction, etc.) and be coordinated with other users of public lands. Management of OHV Use should be sensitive to the creation and management of areas for quiet activities.

Guideline 5: OHV use will be managed to provide for the maintenance and reproduction of desired plant species and the achievement of the potential natural vegetation or desired plant communities.

Guideline 6: OHV special events will require permits that will include site specific, measurable terms and conditions.

Guideline 7: OHV projects that are subject to California OHV grant funding shall comply with that program's requirements as well as Land Health Standards. Tread Lightly concepts and non-proliferation principles will be included in permits.

Guideline 8: OHV use must consider habitat requirements for fish and wildlife

Guideline 9: OHV management practices must consider soil erodiblity. Route designation and OHV management will be based on erosion hazard ratings.

Guideline 10: The spread of noxious weeds by OHV use will be combated through public education efforts, and vehicle cleaning requirements, or other measures, where appropriate.

Guideline 11: Locate routes, trails and developments away from sensitive areas.

Guideline 12: OHV related activities will be managed to protect and maintain watershed and water quality.

Guideline 13: Use various communication and interpretive measures and user groups to inform public land visitors about an ethic of public land use.

Guideline 14: OHV utilization and impacts will be monitored using currently accepted practices and techniques.

Guideline 15: "Open" OHV use areas must be specifically designated.

Appendix D

Energy and Minerals

Reasonably Foreseeable Development in the Eagle Lake Field Office

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Energy and Minerals

Reasonably Foreseeable Development in the Eagle Lake Field Office

Introduction

This appendix describes scenarios for the reasonably foreseeable development of leasable, locatable, and saleable mineral commodities. The scenario for reasonably foreseeable development estimates the level and type of future mineral activity in the planning area and provides a basis for the analysis of cumulative effects. The scenario first describes the steps in developing a mineral deposit, with presentation of hypothetical exploration and mining operations. Current levels of activity are discussed in Chapter 3. Trends and assumptions affecting mineral activity are discussed in this appendix, followed by estimates for future mineral exploration and development.

Scope

The scenario for reasonably foreseeable development is based on known or inferred mineral resource capabilities and applies the conditions and assumptions discussed below. Changes in available geologic data or economic conditions would alter reasonably foreseeable development, and some deviation should be expected over time. The development scenario is limited to BLM-administered land.

Leasable Mineral Resources

Reasonably Foreseeable Development of Oil and Gas

Future trends and assumptions: Based on the history of minimal interest for oil and gas exploration and the limited development potential of the planning area, activity over the next 15 to 20 years is likely to be sporadic. Oil and gas activity will probably consist of the issuance of some competitive and over-the-counter leases, a few geophysical surveys, and perhaps the drilling of two or three exploratory wells.

Geophysical exploration: Geophysical exploration is conducted to determine the subsurface structure of an area and the potential for mineral resources. 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 that are easily transported by light off-highway vehicles, such as 4-wheel drive pickup trucks and jeeps, or aircraft. Both off and on-highway travel may be necessary. Although these two survey methods can take measurements along defined lines, it is more common to have a grid of distinct measurement stations. Surface disturbance resulting from these surveys is negligible, consisting almost exclusively of soil or vegetation compaction that persists no more than a few months.

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 by mechanically beating the ground with a thumping or vibrating platform. In the mechanical technique, four large trucks are usually used, each equipped with pads about 4-feet square. The pads are lowered to the ground, and the vibrations are electronically triggered from the recording truck. Once information is recorded, the trucks move forward a short distance and the process is repeated. Surface disturbance includes flattening of vegetation and compaction of soils.

The explosive method—requires that small charges be detonated on the surface or in a shallow drill hole. Holes for the charges are drilled using truck-mounted or portable air drills. In general, this method uses 4 to 12 holes per mile of line, and a 5 to 50-pound explosive charge is placed in each hole, covered, and detonated. The shock wave created is recorded by geophones placed in a line on the surface.

In rugged terrain, a portable drill carried by helicopter can sometimes be used. The vehicles used for a drilling program may include heavy truck-mounted drill rigs, track-mounted drill rigs, water trucks, a computer recording truck, and a light pickup.

Existing roads and trails are used where possible, but off-road travel is necessary in some cases. Several trips per day are made along a seismograph line, usually resulting in a well defined two-track trail. The surface charge method uses 1 to 5-pound charges attached to wooden laths 3 to 8 feet above the ground. Placing charges lower than 6 feet usually results in destruction of vegetation, whereas placing the charges higher, or on the surface of deep snow, results in little visible surface disturbance.

It is expected that three to five notices of intent, involving seismic reflection and gravity/magnetic field surveys, would be filed under all Alternatives and the Proposed RMP during the life of this plan. The total expected surface disturbance would be approximately 1 acre.

Drilling phase: After an application to drill is approved, the operator may begin construction in accordance with lease stipulations and conditions of approval of the drilling permit. When a site requires construction of an access road, the shortest feasible route is usually 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 in the planning area is expected to be done using existing roads and construction of only short (approximately 0.5 mile) roads to access drill site locations.

Based on the history of oil and gas exploration in the planning area, it is projected that two or three exploratory wildcat wells would be drilled on BLM-administered land in the planning area during the life of this plan. The estimated success rate would be no greater than 10 percent, based on the average wildcat success rate. Drilling is expected to occur in areas of low oil and gas potential, the highest level of potential in the planning area. There is a low probability that a field will be discovered during the life of this plan, with a strong likelihood that the discovery would be natural gas because most of the occurrences, in surrounding areas, are gas. There are no known occurrences in the actual planning area.

During the first phase of drilling, the operator would move construction equipment over existing maintained roads to the point where the access road begins. Less than 0.5 mile of moderate duty access road with a gravel surface 18 or 20 feet wide is expected for construction. With ditches, cuts, and fill, the total width of surface disturbance would average 40 feet. The second part of the drilling phase is the construction of the drill pad (platform). The likely duration of well development, testing, and abandonment is 3 or 4 months per site. The total disturbance for each exploratory well and any new road is estimated to be less than 5 acres. The total surface disturbance caused by exploratory drilling over the life of this plan is expected to be about 13 acres.

Field development and production: Exploratory drilling is not expected to lead to the development of a producing field in the planning area. Nonetheless, the following scenario describes the operations and effects associated with field development. Any oil and gas deposits found in the planning area will probably be too small to be economically developed.

The minimum size considered economically feasible would be a field containing reserves of 50–60 billion cubic feet of gas with a productive life of 10 years. The total area of the field would be 800 acres, with a likely well spacing of 160 acres. The field would require four development wells in addition to the discovery well. Each development well would require 0.25 mile of road. Development well access roads would have a surface of crushed aggregate or gravel and would be approximately 20 feet wide (total disturbed width of 40 feet). Gas produced would be carried by pipelines that could be linked to existing and proposed gas transmission lines in the planning area.

Average pipeline length is estimated to be 40–50 miles. The width of the surface disturbance for pipelines would average 30 feet. Any oil produced would be trucked to refineries outside of the local area. Established companies would service the wells.

The total surface disturbance would be 8 acres for well pads, 5 acres for roads, 13 acres for field development; and 725 acres for pipelines (145 acres/well site). The total surface disturbance caused by exploration and development would be 761 acres.

Plugging and abandonment: Wells that are completed as dry holes are plugged according to a plan designed for the condition of each well. Plugging involves placing cement plugs at strategic locations in the hole. Drilling mud is used as a spacer between the plugs to prevent communication between fluid-bearing zones. The drill 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 restored as near as reasonably possible to its original condition. It is projected that one exploratory well that may be drilled would be plugged and abandoned.

Reasonably Foreseeable Development of Geothermal Resources Future trends and assumptions: Because environmental protection and enhancement are major concerns for the BLM, sources of energy with a small environmental impact are becoming increasingly important. The geothermal energy resources known to exist in the region are essentially undeveloped, especially in the planning area. With recent interest in geothermal resources expressed by some governmental and private entities, geothermal exploration may be initiated in the planning area which could possibly lead to development of the resource.

Geophysical/geochemical exploration: As with oil and gas, geophysical/geochemical operations can take place on leased or unleased public land. The operator must comply with all terms and conditions of permits, NEPA, regulations, and other requirements, including reclamation, prescribed by the authorized officer. Monitoring for compliance with these requirements would be done during operations and upon their completion. In addition to geophysical methods discussed in the previous section on oil and gas, the following exploration techniques are often employed in geothermal prospecting:

Microseismic: Small seismometers buried at a shallow depth (hand-dug holes) transmit signals from naturally occurring, extremely minor seismic activity (microearthquakes) to an amplifier on the surface. Stations are located away from roads to avoid the effects of traffic. 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 electric current into the ground through two widely spaced electrodes (usually about 2 miles apart). The behavior of these electrical pulses as they travel through underlying rocks is recorded by small devices that receive the current at different locations. The electrodes are either short rods (2–3 feet long) driven into the ground or aluminum foil shallowly buried over an area of several square feet. Two or three small trucks transport a crew of three to five people to transmitting and receiving sites.
Telluric: A string of receivers record the variations in the natural electric 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 measured using a hand-held scintillometer, often at hot spring locations. Another method 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 are left in place for 3 to 4 weeks. At the end of the sampling period, the cups are retrieved and all holes are backfilled. These surveys can be conducted by walking to the sites 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. Mercury associated with geothermal resources is often sampled using hand tools. These surveys can be conducted by walking to the sites 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 5,000 feet in depth. They are drilled using rotary or coring methods. Approximately 0.1 to 0.25 acre/drill hole would be disturbed. A typical drill site could contain a 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/day, with as much as 20,000 gallons/day under extreme lost circulation conditions.

Other equipment that could be used includes large flatbed trucks to haul drill rod, casing, and other drilling supplies; in some cases special cementing and bulk cement trucks; and two small vehicles for transporting workers. In most cases, existing roads would be used. It is likely that short spur trails (usually less than 500 yards) 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 could be required. Based upon past geothermal exploration in California and Nevada and a projected increase in power demand, it is expected that 6 notices of intent for surface geophysical surveys and 5 notices of intent to drill 30 temperature gradient holes would be filed under all Alternatives during the life of this plan. These notices of intent would most likely be filed in the Known Geothermal Resource Area (KGRA). Total surface disturbance resulting from geophysical surveys over the life of the plan is expected to be about 0.5 acre, and disturbance resulting from temperature gradient holes is expected to be about 5.5 acres.

Drilling and testing: Drilling to detect, test, develop, produce, or inject geothermal resources can be done only on land covered by a geothermal 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 to 20 feet wide (total disturbed width, with ditches, cuts, and fills, of 40 feet). Existing roads would be used whenever possible. Total surface disturbance for each well and any new road is expected to be less 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, the optimum number of wells for proposed use, protection of correlative rights, potential for well interference, interference with the multiple uses of the land, and protection of the surface and subsurface environment. There would be close coordination with the State of Nevada and/or California. The expected duration of well development, testing, and abandonment (if dry) would be 6 months. It is estimated that eight exploratory wells would be drilled under all alternatives and the Proposed RMP during the life of the plan, resulting in a total surface disturbance of 34 acres.

Plugging and abandonment: Before abandonment, the operator would be required to plug the hole to prevent contamination of aquifers and any effects to subsurface and surface resources. Cement plugs would be placed at strategic locations in the hole using the same techniques as for exploratory oil and gas wells. Any new roads not needed for other purposes would be reclaimed.

Geothermal power plant development: It is projected that one power plant generating 25 megawatts of electricity (gross) may be constructed within a Known Geothermal Resource Area under all alternatives during the life of the plan and employing an estimated 30 people. It is expected that the developed geothermal power plant would be water-dominated and that the geothermal power conversion system would either be 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 most likely occur from the development of a 25-megawatt power plant.

Five to seven production wells and one or two injection wells would be drilled. Access would be provided by existing roads and new, short roads (0.5–1 mile) 18 to 20 feet wide (up to 40 feet total disturbed width). Surface disturbance from well pad and road construction would probably range from 2 to 6 acres per well. The power plant, including separators, energy converters, turbines, generators, condensers, cooling towers, and switchyard, would cover an estimated 10 to 15 acres. Pipelines and power lines would disturb an additional 3 to 6 acres. If a water cooling system is employed, one to three water wells, requiring approximately 0.25 acre per well, would be drilled, unless the cooling water was obtained from the geothermal steam condensate. Depending upon the location, terrain, geothermal reservoir characteristics, and type of generating facility, the total surface disturbance would probably range from 25 to 75 acres, most likely about 50 acres. After construction, approximately one-third to one-half of the disturbed area would be revegetated. The remaining disturbed area would be reclaimed before abandonment.

Direct use of geothermal energy: Low and moderate-temperature (300 to 500 □F) geothermal resources may have direct applications, including space heating and cooling of residences and businesses; applications in agriculture and industry; and recreational and therapeutic bathing. Depending on the type of use and magnitude of operation, surface disturbance could range from a few acres for a well and greenhouse or food processing facility, to tens of acres for larger agricultural or aquacultural developments. Although geothermal resources are found throughout the planning area, the small, somewhat isolated population makes any direct use of geothermal energy on public land unlikely.

Locatable Mineral Resources

Reasonably Foreseeable Development Scenarios

The major commodities of interest over the next 15 to 20 years will probably be gold/silver and zeolites. Other commodities that may be present in the field area are diatomite, bentonite and perlite. This assessment is based on market conditions (especially for precious metals) and the favorable geologic environment for mineral occurrences. Reclamation science will continue to advance due to experience and research. More detailed design will be required for the reclamation of mined land in the future. This will likely increase reclamation costs but should also increase long-term reclamation success. The economics of mining in the planning area will be driven by the relationship between production costs and the market price of the commodity. Whereas production costs can be controlled, or anticipated through management and technology, the price of a commodity is difficult to predict over time. The overall profitability of an operation—and hence the level of activity at the prospecting, exploration, and mining stages—for development of ore bodies is closely related to the price of the mineral commodity.

Over the next 15 to 20 years, it is expected that two mines may be developed in the planning area: one open-pit gold mine using chemical heap leaching, at least in part; and one mine of zeolites.

Background on the Development of a Locatable Minerals Mine

Typically, the development of a mine goes through five stages, with each stage using progressively more sophisticated (and more expensive) techniques over a successively smaller area to identify, develop, and produce an economic mineral deposit. The full sequence of developing a mineral project involves reconnaissance, prospecting, exploration, economic evaluation, and development.

Reconnaissance: Reconnaissance is the first stage in exploring for a mineral deposit. This involves an initial literature search for the area of interest using available references, such as publications, reports, maps, and aerial photographs. Because the study area is usually large, varying from hundreds to thousands of square miles, this stage normally involves large-scale mapping, regional geochemical and/or geophysical studies, and remote sensing with aerial or satellite imagery. These studies are generally undertaken with minimal surface disturbance, which usually consists of stream sediment, soil, or rock sampling. Minor off-highway vehicle use may be required.

Prospecting: If reconnaissance identifies anomalous geochemical or geophysical readings, rare or unusual geological features, evidence of mineralization, or a historical reference to mineral occurrence, a prospecting area of interest is identified. This area could range from a single square mile to an entire mountain range of several hundred square miles.

Activity to locate a mineral prospect includes more detailed mapping, sampling, and geochemical and geophysical study programs. This is the time when property acquisition efforts usually begin and most mining claims are located to secure ground while trying to make a mineral discovery. Surface-disturbing activities associated with prospecting include more intense soil and rock chip sampling, using mostly hand tools; frequent off-highway vehicle use; and placement and maintenance of mining claim monuments. This activity is usually considered casual use (43 CFR 3809.1-2) 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 subjected to more intense evaluation through exploration techniques. Activities during exploration include those used during prospecting, but at a more intense level and in a small area. In addition, road construction, trenching, and drilling take place. In the 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 use 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 3809.1-3) which requires the operator to notify the BLM at least 15 days prior to beginning the activity. If a project disturbs more than 5 acres, it is conducted under a plan of operations (43 CFR 3809.1-4) and requires NEPA compliance prior to approval.

Economic evaluation: If an exploration project discovers a potentially economic deposit, activity would intensify to obtain detailed knowledge of the deposit (such as ore grade and deposit size), possible mining methods, and mineral processing requirements. This would involve applying all the previously used exploration tools in a more intense effort.

Once enough information is obtained, a feasibility study would be made to decide whether to proceed with mine development and what mining and ore processing methods would be used.

Mine development: Once the decision to develop a property has been made, the mine permitting process begins. Upon approval, work begins on development of the mine infrastructure. This includes constructing the mill, offices, and laboratory; driving development workings if the property is to be an underground mine, or prestripping if it is to be an open-pit mine; building access or haul roads; and placing utility services. Evaluations of ore reserves may be refined at this time.

Once enough facilities are in place, production begins. Satellite exploration efforts may be conducted simultaneously to expand the mine's reserve base and extend the project life. The property is reclaimed concurrently with the mining operation or upon its completion. Often uneconomic resources remain unmined and the property dormant until changes in commodity prices or production technology makes these resources economically feasible to mine.

Activities 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, laboratories, and offices. Such activities require the use of heavy earth-moving equipment and explosives for mining and materials handling, exploration equipment for refining the ore reserve base, hazardous or dangerous reagents for processing requirements, and other equipment for general construction.

The size of mines varies greatly, and not all mines require all of the previously mentioned facilities and equipment. The amount of land involved can range from only a few acres to several hundred, with most projects disturbing 5 acres or less and requiring a notice pursuant to 43 CFR 3809.1-3. Projects disturbing more than 5 acres require an approved plan of operations pursuant to 43 CFR 3809.1-4.

Reasonably Foreseeable Development

Gold/Silver

Exploration: Based on mineral exploration activity over the past 10 years and known occurrences in the planning area of hot springs type gold deposits, exploration for gold is expected to take place during the life of this plan.

Depending on the market for gold, up to 25 exploration projects for hot springs gold deposits are expected over the next 15 to 20 years. A typical hot springs exploration project would involve six drill holes and approximately 0.5 mile of new road 12 feet wide (total disturbed width of 20 feet) for each drill hole, resulting in 4.2 acres of disturbance/project, or 105 acres of total disturbance.

Economic evaluation/mine development: Exploration activity may result in the discovery 1 open-pit deposit, employing about 170 people. The possible deposit would be located in or adjacent to areas of known potential for gold/silver.

The open-pit mine is expected to contain between 10 and 90 million tons of ore, with a probable size of 15 million tons, averaging 0.06 troy ounces of gold per ton. Detailed exploration and feasibility studies would involve the construction of about 30 miles of road 12 feet wide (total disturbed width of 20 feet with ditches, cuts, and fills), and 300 drill sites, for a total disturbance of 75 acres.

Development of the deposit would involve creation of an open pit, 2,100 feet in diameter and 800 feet deep; a mill complex; a cyanide heap leach pad; a tailings disposal facility; a waste disposal facility;

approximately 5 miles of internal graveled haul road 90 feet wide with a total disturbance of 100 feet; and 15 miles of all-weather access road 20 feet wide (total disturbed width of 36 feet). Surface disturbance would cover 85 acres for the pit, 40 acres for the mill complex, 65 acres for the heap leach pad, 140 acres for the tailings disposal facilities, 260 acres for the waste disposal facilities, 60 acres for internal haul roads, and 65 acres for access roads. Total surface disturbance caused by this project would be 715 acres.

Industrial Minerals

Exploration: Based on mineral exploration activity over the past 10 years and known occurrences in the planning area, a moderate amount of exploration for industrial minerals—mainly zeolite—is expected during the life of this plan. Depending on market conditions, up to three projects are expected for zeolite. Exploration for this commodity consists of auger holes or trenching and road construction. An average project would involve up to 10 auger holes; 5 trenches 20–25 feet wide, 60–125 feet long, and 15–25 feet deep; and 1,000 feet of road 12 feet wide (total disturbed width of 20 feet), for a disturbance of 0.8 to 1 acre/project.

Economic evaluation/mine development: Exploration activity is not expected to result in the discovery of an economically viable deposit. In spite of the low probability of discovery the following scenario would be appropriate based on mine models developed by the U.S. Bureau of Mines. The zeolite deposit would be expected to contain between 50,000 and 120,000 tons of ore, most probably about 85,000 tons, with an assumed moisture content of 25 percent. Development of the deposit would involve an open pit approximately 1,000 feet long by 130 feet wide by 30 feet deep, with a zeolite bed 20 feet thick; a mill complex, assumed to be on public land 15 miles off-site and adjacent to a paved road; a stockpile near the pit; 100 feet of haul road 20 feet wide (total disturbed width of 36 feet); and 10 miles of access road 20 feet wide (total disturbed width of 36 feet). Surface disturbance resulting from this mine would be 3 acres for the pit, 1 acre for the stockpile, 0.1 acre for the haul road, 44 acres for the access road, and 5 acres for the mill.

Saleable Mineral Resources

Reasonably Foreseeable Development Scenarios

The major use of saleable minerals (primarily sand and gravel and crushed/broken rock) would continue to be for road construction and maintenance by Washoe County Road Department, Nevada and Modoc County Road Department, California. Most of this activity would be routine seasonal maintenance on county roads which would result in a moderate increase in demand for the materials. Because the population of the area is expected to increase over the life of this plan, it is likely that public demand for saleable minerals will increase slightly over current levels, with the highest demand for decorative stone.

Existing sources of material would handle some of the increased demand. Many of the sites, however, have a small reserve base and could be depleted in a few years. Consequently, up to 20 new sources of material—10 sand and gravel pits, 5 rock quarries and 5 collecting areas for decorative stone—may need to be developed during the next 15 to 20 years.

Background on the Development of Saleable Mineral Deposits

Development of a saleable mineral deposit goes through a sequence similar to that for locatable minerals and includes reconnaissance, prospecting, exploration (sampling and testing), and development. Unlike the process for locatable minerals, however, written approval (such as a permit) must be obtained from the BLM and the material must be purchased by the operator (in the case of a private citizen or commercial operator) before the deposit can be developed, as required by the 1947 "Materials Act" as

amended (30 U.S.C. 601 et seq.). The act also grants the Federal government discretionary authority to deny permission to develop a deposit if the damage to public land or resources would outweigh the economic benefits of development.

Reconnaissance and prospecting for saleable minerals involves a literature search, field examination, geologic mapping (if necessary), and surface sampling. Surface disturbance is usually negligible. Exploration is usually confined to a small area and generally involves drilling or core drilling to determine whether the material meets construction standards. Because exploration is normally limited to areas with good access to major roads, little or no road construction is involved. A typical operation usually involves a number of small trenches or core holes and would disturb less than 0.01 acre/site. Mine development normally involves a pit or quarry, space for processing (crusher, stockpile, and occasionally an asphalt plant), and a staging area for trucks (loading and a turnaround area). Disturbance normally covers about 2 to 3 acres/ project.

Reasonably Foreseeable Development

Exploration

During the next 15 to 20 years, up to 30 exploration projects are expected within the planning area in areas of known or suspected occurrences of mineral materials. Approximately 15 projects may be conducted for sand and gravel, 10 for rock aggregate (crushable or naturally broken material), and 5 for decorative rock.

A typical sand and gravel operation would involve up to five trenches, perhaps 8 by 10 feet and up to 20 feet deep, disturbing about 100 square feet per trench, or about 0.01 acre/project; total disturbance would be approximately 0.15 acre. A typical rock aggregate exploration project would involve up to eight core holes, disturbing about 0.01 acre/hole, or 0.1 acre/project; total disturbance would be about 1 acre. A typical decorative rock exploration project would use no mechanized equipment and would be limited to surface sampling, essentially identical to a prospecting project; surface disturbance would be negligible.

Development

Sand and gravel: During the life of the plan, it is expected that 10 new sand and gravel deposits with good quality material will be developed in easily accessible areas (such as within a few miles of major roads). Site-specific assessments required by NEPA, and inventories of cultural resources and threatened and endangered species, would be conducted prior to development. Existing pits would continue to be used as much as possible, with up to 20 percent closed due to depletion. A typical development of a sand and gravel deposit would contain a pit, stockpile area, processing area (crusher, washer, screener, conveyor, and perhaps asphalt plant), truck loading and turnaround area, and about 0.5 mile of new road 20 feet wide (36 feet total disturbed width). Disturbance for each project would be 2 acres for the pit, processing, and gravel and waste stockpile and 2 acres for the access road, or approximately 4 acres/project. Total disturbance would be 40 acres.

Rock aggregate: During the life of this plan, it is expected that 5 new deposits of good quality material will be developed in easily accessible areas (such as within a few miles of major roads). When the County Highway Departments need additional sources of material for major projects, highway material rights-of-way will be granted under title 23 of the "Federal Highway Act" for an estimated five deposits adjacent to highways.

Like sand and gravel, rock aggregate deposits would require site-specific NEPA assessments and inventories of cultural resources and threatened and endangered species prior to development.

A typical rock aggregate quarry would be essentially the same as a sand and gravel operation and would contain a pit, stockpile area, truck turnaround and loading area, processing area (crusher, screener, washer, conveyor, asphalt plant, etc.), and about 2,500 feet of new access road 20 feet wide (36 feet total disturbed width). Disturbance would cover 2 acres for the quarry operations and 2 acres for the access road, or 4 acres per project. Total disturbance would be 20 acres.

Decorative stone: A population increase over the next 15 to 20 years will result in a moderate increase in demand for decorative material. It is expected that five new collecting sites would be designated to meet the increase in demand. These sites would be scattered throughout the planning area and would generally be reached by existing roads. Site-specific NEPA assessments and inventories for cultural resources and threatened and endangered species would be required prior to designation.

Extraction of the material would be by surface methods only, such as loading onto pickup or flatbed trucks or pallets, by hand or by rubber-tired front-end loaders. Surface disturbance resulting from these operations would be negligible.

Appendix E

Relevance and Importance Criteria for Areas of Critical Environmental Concern in the Eagle Lake Field Office

Appendix B

Relevance and Importance Criteria for Areas of Critical Environmental Concern in the Eagle Lake Field Office

Areas of Critical Environmental Concern (ACEC) Relevant and Importance Criteria

1. Aspen Groves ACEC

Aspen Woodlands and Thickets

Quaking aspen (*Populus tremuloides*) is one of North America's most widespread tree species. Within the Eagle Lake Field Office area aspen are sparsely distributed, usually in small stands of a few trees. Aspen thickets form near the crest of mountains, where trees are bent into grotesque shapes by the weight of snow during winter.

"Quaking aspen usually occupies elevations between six thousand and eight thousand feet, where skiers can gain access in winter, deer hunters in the fall, and campers and fishermen in summer. Thus even the least tree-conscious of recreationists in our area is on familiar terms with these graceful, smooth-barked trees. Their round, silver dollar-sized leaves tremble in the faintest breeze on long, vertically flattened stalks, creating a rustling sound that serenades the ear, while the shimmering play of light between dark upper surfaces and silvery undersides offers beauty" (Lanner 1984).

Aspen are unique in that they do not usually grow randomly as individuals scattered in a forest matrix. Instead they occur in well-defined groves that range in size from a few clumped stems to many thousands of stems covering a large area. Each stem has its origin as a sprout from an existing root. Therefore, all stems, or sprouts of a grove are genetically identical, organically connected, vegetative off-spring of a single parent tree. The grove is collectively a clone, and individual stems are ramets, or branches. In effect, the clone consists of a great underground mass of interconnected roots that have given rise to leafy sprouts (Lanner 1984). But recent research (Romme and others. 2001) has found that aspen stands can be a single clone or contain more than one clone, which gives the stand a greater genetic diversity.

After inventorying 53 aspen stands east of Highway 395, Achtley (1993) determined that the most of those stands were aspen/snowberry/tall forb communities as described by Mueggler (1988). Atchley (1993) further determined that this type of community is in a mid-seral stage of development. This mid-seral stage appeared to be a result of historical grazing practices that allowed livestock to graze on young shoots and did not allow aspen to grow to the point of entering the stand. Domestic sheep were also allowed to bed in these stands on a yearly basis.

More recent changes in grazing patterns that provide for rest have not resulted in rapid recovery in the stands because of the highly competitive invasive understory species. Lack of wildland fire in other parts of the Eagle Lake Field Office area has led to invadion by western juniper and growth into single-age stands (Gruell 2001). These conditions limit an aspen stand's ability to support the variety of wildlife species usually found in healthy stands. Healthy stands provide multi-level tree cover and structure that benefit wildlife that depend on tree structure in a sea of sagebrush or within juniper-invaded stands.

Although not large in area, aspen stands within the field office area provide habitat for many wildlife species and wildlife biodiversity. Of the 14 mammals that should use aspen as their habitat, Atchley (1993) found six: deer mice, Nuttall cottontail, least chipmunk, bushy-tailed woodrat, long-tailed weasel, and North American porcupine. A total of 109 birds use aspen stands for habitat either seasonally or year round. Atchley (1993) found western tanagers, common nighthawks, mourning doves, Swainson's hawks (state listed), mountain bluebirds, hermit thrushes, and several species of flycatchers to be common during the breeding season.

Birds commonly inhabiting aspen stands during the winter are ruby-crowned kinglet, Townsend's solitaire, rough-legged hawk, Cooper's hawk, sharp-shinned hawks, purple and Cassin's finches, and cedar waxwings. Besides the Great Basin rattlesnake, 10 other reptiles and amphibians are known to use aspen stands for habitat.

Buffaloberry Stands

Silver buffaloberry (*Sheperdia argentea*) is an erect spiny shrub or small tree, 4 to 20 feet high, with shaggy gray bark and brown or silvery-scurfy twigs and branches that terminate in stout thorns (McMinn 1939). What makes buffaloberry unique within the Eagle Lake Field Office area is its rarity. Silver buffaloberry is widespread in other parts of the west and the Great Plains. It grows along streams, river banks, and deep soils. Emigrants traveling the Overland Trail used the sour berries to make a paste or sauce eaten with buffalo meat. The fruit is also made into jelly.

There are perhaps five small stands of buffaloberry within the field office area. The largest stand (about 5 acres) along Smoke Creek Road has been fenced to protect it and another sensitive plant species found in the area. This stand of buffaloberry grows around a small seep. It is unknown whether the small size of the unfenced stands is a result of abuse or soil and climatic conditions along the edge of this species' range.

Although livestock do not eat the forage they do use the shade of the buffaloberry and the shaggy bark on the trunk as scratching posts. Mule deer do eat the leaves and fruit, as do many birds and small mammals (Stuart and Sawyer 2001).

California Black Oak Woodlands

California black oak (*Quercus kelloggii*) woodlands are unique to the Eagle Lake Field Office area because, although this species is widely distributed west of the Sierra Nevada crest, it only moves onto the east side of the Sierras in a few places (Lanner 1984). Schoolcraft and Osborne (1995) place the geographical locations for California black oak on BLM-administered lands on the lower slopes of the Diamond Mountains, Susanville Peak and the Susan River Canyon along the Bizz Johnson Trail. No known pure stands of California black oak occur in the field office area on BLM-administered lands.

California black oak is found within the Eastside Pine Forest vegetation communities described by Schoolcraft and Osborne (1995). Black oak dominates the Black Oak/Eastside Pine community, with co-domination from Jeffrey pine, and ponderosa pine. In the Eastside Pine/Black Oak community, Jeffrey and ponderosa pine dominate the understory with heights to 100 feet. Black oak makes up the mid-tree layer with a canopy height at 20-50 feet. Within the Eastside Pine Forest Community Jeffrey and ponderosa pine provide a canopy cover of 50-100%, and black oak is an associated species.

California black oak serve as 'nurse trees' for conifer seedlings that become established in their shade until their growth pushes them above the oak (Lanner 1984). Gray squirrels, mule deer, black bears, and scrub and Steller's jays appear to be the main consumers of acorns. One other species, the acorn woodpecker, hammers thousands of holes into tree trunks, fence posts, and utility poles. When there is a bumper crop of acorns, the acorn woodpecker waits until they are mature and pounds them into its storage holes for consumption later (Lanner 1984). Indians also consumed acorns by pounding them into a mush or baking the mush into a form of bread. Oak acorns provide 42 to 52 percent carbohydrates, 3 to 5 percent protein, and 4 to 14 percent fats, with the Black oak's acorns being on the high end in fat. During years of high acorn production, Indians gathered large amounts of acorns and stored them in granaries for future use.

Historical logging that resulted in the California black oak being removed and treated as a "weed" caused a decline in this woodland species. Wildland fire control has resulted in almost closed canopy of coniferous forests, which can result in a loss of black oak presence in these forests (Gruell 2001). Black oak is a popular source of firewood in some parts of California, which has led to its decline in some areas. Cutting black oak for firewood is not allowed in the Eagle Lake Field Office area. After wildland fires, black oaks are left alone to recover and are not removed as part of post-burn salvage operations.

2. Buffalo Creek Canyons ACEC

BLM recommends designating the Buffalo Creek Canyons area as an ACEC to protect this geographically distinctive area by retaining:

- high scenic values,
- its current undeveloped character, and
- the setting of the historic Buffalo Hills Toll Road route, which passes through the North Fork of Buffalo Creek Canyon.

Studies and management plans have not focused special management attention on this visually distinct area in part because the North Fork of Buffalo Creek and its side canyons are within an area administered by three BLM field offices–Eagle Lake, Surprise and Winnemucca. Administrative responsibilities have, at times, precluded looking at the geographic whole and instead have focused on the individual administrative parts, which by themselves have not been considered distinctive enough to warrant special management attention.

Wilderness study area (WSA) boundaries are defined by roads, and the rough dirt road through the North Fork of Buffalo Creek divides the canyon complex into two WSAs, Buffalo Hills and Poodle Mountain. Wilderness evaluations by the Eagle Lake and Surprise Field Offices for the Buffalo Hills WSA and the Winnemucca Field Office for the Poodle Mountain WSA did not recommend wilderness designation for either of these WSA's because each WSA's overall area had many roads and ways on the more level uplands outside the Buffalo Creek canyon area and also included many parcels of private land. However, portions of both WSAs within the Buffalo Creek Canyon complex are steep walled canyons that are mainly roadless and highly scenic. When looked at geographically rather than administratively, the Buffalo Creek Canyons are a unique and highly scenic area within the region and warrant special management through designation as an ACEC to protect the area's unique scenic and historic values.

The following factors justify ACEC designation:

Historic Values

The Buffalo Hills Toll Road passed through the North Fork of Buffalo Creek. As part of a main transportation route between Reno and Cedarville during the mid 1880s, this toll road was also used by the military as a supply and patrol route between Fort Churchill, Nevada, east of Carson City, and Fort Bidwell, California, 25 miles north of Cedarville. The road was operated as a toll road for a portion of that period, but the military was not charged to use it. The toll gate was probably near Buffalo Meadows Ranch. The toll road served the region and is of more than local significance.

The North Fork of Buffalo Creek and the adjoining canyons are physically unchanged from their appearance when the Buffalo Hills Toll Road operated. Visitors with historical interests who seek back country discovery experiences have the unique opportunity to travel through and experience this rugged and dramatic canyon complex on an existing rough dirt road and view a landscape largely unchanged since the days when the Buffalo Hills Toll Road was in use.

Interest in history is increasing as our population ages and more people of retirement age seek to explore and learn about our history. Heritage tourism and sightseeing are in the top 10 activities that Americans now enjoy (Roper Starch Worldwide 2000). Protecting the canyon will allow people interested in backcountry travel, sightseeing, and history to travel through Buffalo Creek Canyon on a rough rocky road, enjoy BLM public lands and learn about regional history tied to the Fort Churchill to Fort Bidwell Military Supply Route and the Buffalo Hills Toll Road.

Scenic Values

The scenic values of the Buffalo Creek Canyons are unique throughout the northwest portion of the Great Basin region. The canyons are visually distinct and unusual in the mixture of formation, depth, and the concentration of steep narrow side canyons in a relatively small area. These canyons contain many distinctive features that, when combined in one area, create a highly unique and scenic area. The following statements describe the notable scenic aspects of this area.

- The North Fork of Buffalo Creek is the main canyon with many steep narrow side canyons feeding into the main canyon from the east and the Middle and West Forks of Buffalo Creek feeding in from the west.
- The North Fork of Buffalo Creek consists of a narrow inner canyon, a benched area in the mid level of the canyon, and steep upper slopes rising to the high surrounding uplands.
- Riparian species line the small creek within the inner canyon of the North Fork of Buffalo Creek Canyon and also grow along parts of many of the side canyons.
- Canyon depths vary from a few hundred to more than 1,000 feet deep.
- Many side canyons add to the visual interest of the Buffalo Creek Canyons area.
- Many steep narrow canyons dissect the west flank of Poodle Mountain on the east side of the North Fork of Buffalo Creek.
- Many short steep side canyons rise from the mid level bench to the top of the Buffalo Hills on the west side of the North Fork of Buffalo Creek Canyon.
- The Middle and West Forks of Buffalo Creek are visually distinct narrow steep-walled canyons lined with dark blocky talus slopes and topped with nearly vertical basalt rims.
- Thick riparian vegetation fills the bottom of the West Fork of Buffalo Creek Canyon.

Special Management Attention

Special management of the canyon complex is warranted under an ACEC designation to assure that the current undeveloped character of the canyons remain unchanged. The area is highly scenic and is proposed to be managed to meet BLM Visual Resource Management Class II objectives which require retention of the character of the existing landscape. (Under BLM's WSA Interim Management Policy that applies to this area until Congress acts to designate it as wilderness or release it to multiple use management, the Buffalo Hills Canyon's area is managed to meet VRM Class I objectives. These objectives require preserving the existing landseape character).

Most of the area adjoining the Buffalo Hills Toll Road is recommended for designation as Primitive under the Recreation Opportunity Spectrum (ROS) classifications proposed by the Preferred Alternative of this RMP. If Congress releases these areas from WSA status, BLM's intent in designating them as Primitive areas is to continue managing the roadless areas adjoining the Buffalo Hills Toll Road route for their roadless character. This designation would help retain the undeveloped character of the area currently enjoyed by chukar hunters and backcountry sightseers who use the Buffalo Creek Canyons. Protecting the Buffalo Hills Toll Road is also proposed as part of the Preferred Alternative in this RMP under provisions of the Historic Trails and Visual Resources Management portions of this RMP. Designating the area as an ACEC would give further management emphasis to retaining the area's existing character under VRM Class II objectives for protecting both scenic and historic values.

The continuing growth of the Reno/Sparks/Carson City area is stimulating water development, and future water resource development efforts are likely to evaluate all possible water storage locations in this area. If a dam were built in the North Fork of Buffalo Creek, the canyon area would change, and the existing character of the canyons would be permanently altered. Also, if deep wells were drilled to pump water from the Buffalo Creek Canyons aquifer for use as either cooling water for the proposed Granite Fox Power Plant west of Gerlach or for domestic water supplies in the Reno/Sparks/Carson City area, the many springs and riparian areas within the many canyons of the Buffalo Hills Canyons ACECs would likely be significantly altered if not dried up entirely, substantially changing the character of the canyon complex.

Vulnerability to Change

A proposal calls for the use of ground and surface water for a power plant on the other side of the Buffalo Hills at the base of the Granite Mountain Range. Such efforts could include a dam on Buffalo Creek or ground water pumping that could deplete surface springs critical for wildlife survival.

If a dam were built in the North Fork of Buffalo Creek, the existing character of the canyons would be significantly altered, disturbing the historical integrity of the Buffalo Hills wagon road route and the scenic setting of the North Fork of Buffalo Creek. A dam could not be built unless the existing wilderness study area (WSA) designations surrounding the canyon (Buffalo Hills WSA on the west and Poodle Mountain WSA on the east) are released by Congress from their interim protection under BLM's WSA requirements. BLM did not recommend either WSA for wilderness designation in the two wilderness study reports completed for these areas – Buffalo Hills WSA by the Eagle Lake Field Office (BLM 1987b) and Poodle Mountain WSA by the Winnemucca Field Office (BLM 2001d).

3. Eagle Lake ACEC

Cultural and Historic Values

- Eagle Lake Basin has many areas eligible for listing on the National Register of Historic Places.
- The lake was a seasonal hunting and gathering area for Maidu and Paiute peoples, and many sites are located within the basin.
- The basin also contains the historic Merrilleville-Beiber Wagon Road, a hand-built 1875 wagon road still readily evident along the 7 miles of the north shore of Eagle Lake.
- Between the 1890s and 1935 Eagle Lake was the site of three attempts to export the lake's water for irrigation through pumping, ditches, and tunnels.
- The third water exportation attempt at Eagle Lake resulted in completion of the Bly Tunnel in 1923. The tunnel drained water from the lake between 1923 and 1935. It lowered the lake 30 feet and disturbed the lake's fishery and biological health for decades.

Fish and Wildlife Resources

Eagle Lake is a closed basin, typical of the Great Basin, with a water pH that can reach into the low 9.0 range during low-water years. Unlike most Great Basin lakes Eagle Lake supports a unique endemic fishery.

- Eagle Lake fishery includes the Eagle Lake rainbow trout, Lahontan redside, Tahoe sucker, and tui chub.
- The Eagle Lake rainbow trout are endemic to Eagle Lake.
- Tahoe sucker, tui chub, and Lahontan redside are endemic to ancient Lake Lahontan.

- The California Department of Fish and Game operates a fish trap on Pine Creek, Eagle Lake's main tributary to rescue fish during period of low water. The agency has operated the trap since the 1950s, when the fishery was at risk of being lost due to past changes in the lake level and other watershed actions that adversely affected the lake and the fishery.
- The Eagle Lake rainbow trout are a very popular sport fish and the fishery is sustained by the California Department of Fish and Game's hatchery program.
- A coordinated resource management planning group has also completed many actions to restore Pine Creek to a viable spawning creek.
- Eagle Lake supports a large population of western grebes, eared grebes, waterfowl, and other water-dependent bird species.
- Nesting areas in the large tule beds in the shallow bays of the lake's north end are productive nesting areas and support one of the West's largest eared grebe rockeries.
- The lake supports a large population of osprey with a large area of the west shore on National Forest land designated as the Osprey Management Area with seasonal restrictions on human entry during the nesting season.
- BLM lands along the east and north shorelines and adjacent uplands provide large undeveloped areas for wildlife with little human disturbance since human activity centers mainly on the lake and near vehicle-accessible shorelines.
- A small number of bald eagles nest at the lake, and more than 150 have been observed wintering at the lake in January.

Importance

Eagle Lake, 28,000 acres, is the second largest natural lake entirely within the State of California. Eagle Lake's largely undeveloped shoreline is mostly in public ownership administered by Lassen National Forest (40%) and BLM (40%). The lake is a one-of-a-kind natural resource. It is a closed hydrologic basin that supports a unique trophy trout fishery and is home to a wide variety of waterfowl and other avian species, including large populations of western and eared grebes, white pelicans, osprey and bald eagles.

The Eagle Lake Basin is largely undeveloped, highly scenic, and a destination attraction for thousands of visitors annually. (Eagle Lake attracted an estimated 117,000 visitors on federal lands in 2003 and many more on private lands.) Visitors regularly travel to Eagle Lake from throughout the California, Nevada, and Oregon region, and some visitors travel from further away. Visitors come to the lake for fishing, camping, water sports and wildlife viewing. Trails are also popular at the south and north ends of the lake. Most camping occurs at developed campgrounds on National Forest at the south end and on private lands at Spalding and Stones subdivisions on the west and north shores.

BLM manages its lands within the Eagle Lake Basin as a special recreation management area (SRMA) for the mixture of camping, fishing, water sports, and wildlife viewing along the lake shore. BLM also manages these lands to protect their scenic quality, water quality, and wildlife habitat, which are integral parts of the experience visitors seek and enjoy at Eagle Lake.

Eagle Lake is a closed basin and is susceptible to adverse impacts to water quality from actions within the basin that could add nutrients and accelerate the lake's eutrophication.

Management agencies responsible for Eagle Lake have recognized the uniqueness of the Eagle Lake Basin and formed a five-agency Eagle Lake Interagency Board of Directors in the early 1980s. The Board coordinated responsibilities to collaboratively manage Eagle Lake to preserve and protect the lake's unique resources.

The five member agencies are

- Lassen National Forest,
- Bureau of Land Management,
- Lassen County,
- California State Lands Commission (submerged lands), and
- California Department of Fish and Game.

The Board meets twice yearly to coordinate efforts to protect and enhance Eagle Lake for present and future generations.

Designating the Eagle Lake Basin watershed as an area of critical environmental concern (ACEC) would help BLM strengthen its management of public lands within the basin by doing the following:

- improving resource protection measures at popular shoreline use areas,
- helping acquire undeveloped private lands from willing sellers in order to retain the primarily undeveloped character of Eagle Lake, and
- reducing impacts of land development on wildlife and wildlife habitat.

ACEC designation could also help establish nonmotorized trails in suitable areas for visitor use and enjoyment.

Natural Hazards and Human-Made Hazards: Bly Tunnel

The 2-mile-long Bly Tunnel, completed in 1923 and operated until 1935, transferred water from Eagle Lake's closed basin to Willow Creek, where it flowed to Honey Lake Valley and was used for irrigation. The tunnel project was a financial failure, and the irrigation company went out of business. The tunnel was environmentally disastrous to the lake, lowering it by 30 feet and drying up parts of the lake's shallow northern bays. The tunnel entrance was eventually dynamited to stop diversion.

Later work by BLM in the 1970s and 1980s sealed the tunnel to prevent future water flows. The tunnel's downstream end remains open and emits a steady flow of about 2 cubic feet per second from ground water that flows into the tunnel below the western tunnel closure through fractures in the tunnel's basalt walls.

A mid way adit (airshaft used during tunnel construction) is also open with a chain link fence around it. Entrance to the tunnel is possible through the adit and from the open downstream end. The tunnel is a human-made feature that is now a part of the natural landscape. Although now sealed, Bly Tunnel could be a hazard to lake levels if it is ever altered to allow flows from Eagle Lake through it.

Scenic Values

The Eagle Lake Basin is a high-quality scenic area because of a combination of factors that collectively create a highly scenic and visually pleasing landform and geographically unique setting. These factors include the following.

- The lake is lies at the junction of three geographic provinces and contains representative species from the Great Basin, southern Cascades, and the northern Sierra.
- Eagle Lake is a large natural lake (28,000 acres) situated in a mountain setting at an elevation of 5,100 feet.
- Rocky volcanic fault block escarpments form steep talus slopes topped with rocky rims on three peninsulas and along 7 miles of the north shore.
- Mountains and hills surround the lake, with peaks rising more than 2,000 feet above it.
- Eagle Lake has a largely (80%) undeveloped shoreline and adjacent uplands.
- Homes, businesses, and campgrounds are clustered in activity areas on the north, northwest, and south sides of the lake. Most of the east shoreline and large portions of the west shoreline are undeveloped.
- Wildlife is evident throughout the year. Waterfowl, grebes, white pelicans, cormorants, and osprey are often seen.
- Large emergent tule beds (reeds) in shallow bays of the lake provide extensive wildlife habitat for waterfowl.
- A small number of resident Bald Eagles nest at the lake and over 150 Bald Eagles have been observed in winter

4. Lower Smoke Creek ACEC

The following relevance and importance and special management statements support an ACEC designation for the Lower Smoke Creek area.

- According to the recent riparian functional assessments, land health assessments in the watershed, water quality assessment, and stream assessment, for full recovery of the stream and adjacent watershed, special management attention will need to be maintained.
- Two riparian functional assessments in Lower Smoke Creek gave ratings of functional at risk because of the following:
    - closeness of the county road to the stream,
    - upland health conditions, and
    - flow regulation upstream.

  Past livestock use in the riparian area also contributed to the stream's condition, but management has been adjusted with successful results. Livestock must continue to be intensively managed.
- Water quality, at best, is marginal for meeting the needs of the desired instream beneficial uses, including the Lahontan assemblage of native species of which the Tahoe sucker is a resident.
- BLM has a minimum flow water right in lower Smoke Creek. It is critical that this right is maintained for riparian function and instream values to meet BLM's standards.
- Proper functioning hydrology (i.e. reduced peak flows) is critical to best prevent damage to the county road from high-flow events.
- The route of Nobles Emigrant Trail follows the creek bed except in one area that was too rough for wagons. There the trail was cut into the hillside south of the creek. Trail traces are still evident in this area and are considered high-quality remnants of the trail because of the largely undisturbed setting around the trail traces.

- The Dry Valley Rim WSA encompasses all of Smoke Creek and the Nobles Trail within the 3.2 miles of Smoke Creek proposed as an ACEC.

5. North Dry Valley ACEC

The following relevance and importance and special management statements support an ACEC designation for the North Dry Valley.

- The area includes many significant cultural sites, including occupation, quarry and cave sites.
- Portions of the proposed ACEC include many rock cliff faces and steep escarpments, 400 to 1000 feet high used by raptors for nesting.
- The proposed ACEC is largely undeveloped and close to another large undeveloped area, the Dry Valley Rim WSA, which has an extensive steep escarpment close to and overlooking the proposed ACEC.
- The many cliffs and expansive vistas across the Smoke Creek Desert provide high scenic interest to visitors.
- The area is part of the pronghorn winter range.
- The area has several distinctive groupings of winterfat associated with rare soils.
- Northern Dry Valley has spotty exposures of a soil classified as Typic Torriorthents, fine, montomorillonitic (calcareous), mesic. It occurs on landscape geology of pre-Lake Lahontan lake deposits. From a geologic stand point they are a rare representation of the sedimentation environment in the late Pliocene Epoch and have been eroding at a rate such that soil development never has had time to become advanced. These soils support shad scale, bud sage, and squirrel-tail grass. These soils are seldom used by livestock, but because of their naturally high erosion rates, OHV or other recreational activities would dramatically increase the loss of the few remaining remnants. These soils should be considered rare in the Eagle Lake Field Office area and of scientific value.

6. Pine Dunes ACEC

The following relevance and importance and special management statements support an ACEC designation for the Pine Dunes.

The Pine Dune RNA was designated under the authority of 43 CFR 8223, April, 24, 1986. The Pine Dunes were listed by the California Natural Areas Council as *The Migrating Dunes* in July 1976. Currently the Pine Dunes RNA is managed under the Pine Dunes RNA Management Plan (BLM 1987a).

Griffin (1970) described the Madeline Plains as a "drab, treeless flat" with volcanic uplands that hardly support "trees", "only scrubby western juniper (*Juniperus occidentalis*) poke above the sagebrush." Piled against the eastern highlands is a sand dunes complex. The dune area was derived from windblown sand left by the drying of a Pleistocene lake, "Lake Madeline" whose bed is now the Madeline Plains. Within a portion of the dunes is a stand of 91 ponderosa pine (*Pinus ponderosa*), all but 24 growing on BLM lands. This stand is considered unique because the nearest naturally occurring individual pine is growing 15 miles to the north and 1,000 feet higher in elevation. The closest forest, which includes both ponderosa and Jeffrey pines (*Pinus jeffreyi*), lies in the south Warner Mountains, 20 miles to the north. Adding to the uniqueness of these dunes is that the pine grow within what is normally referred to as the sagebrush-steppe vegetation type (Barbour and Major 1977). This area is mapped into the mixed Great Basin shrub vegetation type (Map VEG-1) in this RMP.

The partially stabilized dunes themselves are a unique soil and geologic feature, sitting on and rising above the silt and clay soils of the Madeline Plains and surrounded by gentle sloping Miocene volcanic basalt and Pliocene volcanic pyroclastics at elevations of 5,400 to 5,600 feet. One would expect the sands to be a byproduct of volcanic ash, but no volcanic ash has been found in the sand forming these dunes.

The flora of the Pine Dunes-Madeline Dunes complex does not constitute a distinct desert dune flora, but consists mainly of plants contributed from the surrounding sagebrush-steppe vegetation (Hamon 1999). The main vegetation on the dunes surrounding the pine consists of the following (USDA 1987):

- curlleaf mountain mahogany (*Cercocarpus ledifolius*),
- antelope bitterbrush (*Purshia tridentata*),
- big sagebrush (*Artemisia tridentata*),
- rabbitbrushes (*Chrysothamnus* spp.),
- western juniper (*Juniperus occidentalis*),
- Indian ricegrass (*Achnatherum hymenoides*),
- large desert evening primrose (*Oenothera deltoides*), and
- larkspur (*Delphinium* spp.)

The stand of pine within the Pine Dunes is most likely a relict of a montane flora that was widely distributed throughout the Great Basin from 24,000 to 12,000 years before the present (Hamon 1999). The 66 species of vascular plants known to occur on the dune system represent 26 families and 48 genera. These species can be clustered into three assemblages: ponderosa pine, sedge/rush, and shrub grass. A total of 95% of the species are indigenous, and less than 7% are likely to occur on dunes with an estimated probability of 66 to 99%. A biological soil crust, including moss, stabilizes 10% of the dune surface (Hamon 1999).

Distribution of the three plant assemblages provides a unique and sometimes fragile pattern across the dunes complex. The shrub/grass assemblage occurs on the crest of the dunes and in the swales, raising the question of whether shrubs growing on the crests have long root systems or crown sprout each time sand migrates to the top of the original dune and raises its height.

The sedge/rush assemblage occurs mainly in bowls that formed within the dunes and hold water on or near the surface. This assemblage receives the most use from wildlife within the Pine Dunes and livestock within the Madeline Dunes. Biological soil crusts are obvious within the Pine Dunes but are lacking in the Madeline Dunes due to untimely trampling by livestock and off-highway vehicles. Loss of the biological soil crusts from the Madeline Dunes results in their migrating with the wind. Loose blowing sand causes visual and other potential health hazards for people living downwind from this portion of the dunes complex.

7. Susan River ACEC

The following relevance and importance and special management statements support an ACEC designation for the Susan River:

- Largest river on the east side of the Sierra, north of the Truckee River.
- One of only four eastside rivers in the northern Sierra that produce significant and sustained flows.
- Section being considered has no impoundments or diversions (Bizz Johnson Trail section of river, 16 miles, with 8 miles or river through BLM-managed lands).

- Highly scenic area with a diversity of geology, vegetation, and habitats.
- At the junction of three major geomorphic/ecological provinces: the Sierra Nevada, the Cascades, and the Great Basin.
- Dramatic volcanic features include columnar basalt bluffs, agglomerate cliffs, pyroclastic rocks, ash pinnacles, flow feeder dikes, and basalt flows on top of ash beds.
- Several upland habitat types include mixed conifer, ponderosa/Jeffrey pine, oak woodland, mixed Great Basin shrub and aspen/cottonwood communities.
- Sensitive plant species occurring within the segment include *Penstemon sudans* (Susanville beardtongue) and *Astragalas inversus* (Susanville milkvetch).
- Heavily used recreational fishery during spring and early summer–rainbow and brown trout–and native assemblage of Lahontan fish species.
- Popular recreation area used for fishing, swimming, tubing, picnicking, camping, and environmental education.
- Nonmotorized rail to trail conversion of the Fernley and Lassen Branch of the Southern Pacific Railroad, now the Bizz Johnson National Recreation Trail, parallels the Susan River along the entire segment through BLM land.
- Historic railroad bridges and tunnels of the 1914 Fernley and Lassen Railroad protected through compliance with Section 106 of the National Historic Preservation Act.
- Visual resource management Class II area where management objective is to retain natural appearing landscapes within the canyon.

8. Willow Creek ACEC

The following relevance and importance and special management statements support an ACEC designation for the Willow Creek area:

- Willow Creek is one of only three perennial creeks in the Eagle Lake Field Office area.
- Willow Creek flows through 8 miles of public land in a roadless canyon in Tunnison Mountain WSA.
- Willow Creek is a unique and beautiful area that is rated as a BLM visual resource management (VRM) Class II area, where the objective is to retain the character of the landscape. (This area has been given a Class II rating in the current land use plan and also under all alternatives of this RMP). The Class II rating is based on high-quality scenery, high public sensitivity to visual change, and foreground viewing of the area by visitors.
- Willow Creek flows through a small picturesque canyon of dark volcanic rock interspersed with sagebrush, juniper, pine, and a thick understory of grasses.
- With improved land management practices over the past 25 years, Willow Creek's riparian zone is continuing to improve in health and function and provides for improved watershed values, wildlife habitat, and livestock and wildlife water and forage.
- Willow Creek Canyon contains the following natural resources and support the following human uses::
    - National Register of Historic Places (Belfast Petroglyphs Area).
    - archeological values along much of the creek in the canyon bottom as well as at the top of the canyon walls.
    - water-based recreation close to the Honey Lake Valley population, the largest in Lassen County.

  - recreation opportunities such as fishing, creekside hiking, and scenic and historic sightseeing.
  - high cultural heritage value to Native Americans.
- Willow Creek is an important water source for wildlife and, at a limited number of water gaps, is also an important water source for livestock that are managed under BLM permits and require grazing practices to meet Land Health Standards.

Appendix F

Noxious Weed Prevention Schedule for the Eagle Lake Field Office

Appendix F

Noxious Weed Prevention Schedule for the Eagle Lake Field Office

Eagle Lake Field Office Prevention Schedule

Prevention Activity	When	Who Is Responsible
General		
Check body and undercarriage of off road vehicles and ATV's for plant material and clean with best available method before leaving weed infested area.	All Year	All Field employees
Include in all NEPA documents, Noxious Weeds in the list of Critical Elements of the Human Environment	All Year	All employees working with NEPA documents.
All field personnel will have an active role in detection/inventory of noxious weed; reporting species and location to the field office weed coordinator.	All Year	All field employees
Weed identification and reporting procedures, for all field office employees.	Continuing	All employees
Lands and Realty		
Include noxious weed prevention in all Right of Ways, leasing or permits; and acquisitions.	All Year	Lands/Realty
Coordinate with field office weed coordinator on all acquisitions.	All Year	Recreation, Lands/Realty
Assure permits that involve soil disturbing activities include sanitizing equipment prior to entering BLM sites.	All Year	All employees
Recreation and Wilderness		
Consider off road vehicle closures in areas of known weed infestations.	All Year	All Employees
Insure that activities under recreation permit have on site weed control and minimize spread to other locations.	All Year	Recreation

Prevention Activity	When	Who Is Responsible
Insure that developed recreation sites are managed to reduce noxious weed infestations.	All Year	Recreation
Require use of weed free hay in Wilderness Study Areas; Sign trail heads and include in hunting/guiding permits weed free ethics.	All Year	All employees
Monitor areas under concentrated recreation activities.	All Year	Recreation
Provide standard weed identification and prevention information to Special Recreation Permit applicants to encourage a weed free ethic. This information would be provided by the employee administering the permit.	All Year	Recreation
Minerals/Reclamation		
Insure that the standard stipulations and data adequacy standards developed by the minerals, soils, and weed coordinator are included in all mining permits etc.	All Year	Lands/ Realty
For mineral activity, retain bonds for weed control until the site is returned to desired vegetative conditions.	All Year	Lands/Reality
Require use of weed free seed for reclamation activities.	All Year	Lands/Realty
Require high-pressure washing of all heavy equipment for both notice and plan of operations level activity. This requirement will be included on all NEPA decisions and/or Acknowledgement letters.	All Year	Lands/Realty
Consider weed risk, prevention, and treatment in alternatives and evaluations for project planning.	All Year	All employees
If topsoil is bought or brought in from another location, require site identification/certification of borrow area (for absence of noxious weeds).	All Year	All employees, Weed Coordinator.

Prevention Activity	When	Who Is Responsible
Inspect gravel pits and fill sources to identify weed-free sources; Gravel and fill to be used in relatively weed-free areas must come from weed-free sources. Inspect mineral material site reclamation for infestation of noxious weeds.	All Year	Lands/Realty, Weed Coordinator, Support Services.
Rangeland Management		
Control timing of grazing animal movement from infested to non infested areas to minimize weed seed transport.	All Year	Range
Consider noxious weed in the allotment evaluation process.	All Year	Range
Include stipulations to stop the spread and introduction of weed in all contractual activities on BLM lands.	All Year	Range
Insure that weed free seed is utilized for reclamation or rangeland reseeding; avoid grazing reclaimed areas until perennial vegetation is established.	All Year	Renewable Resources
Manage grazing allotments and herd use so as to promote perennial grass species and minimize creation of bare soil or disturbed areas.	All Year	Range
Soil/Water/Air		
Insure that clay material used in dam/reservoir construction is weed free and comes from an area or is obtained from a certified weed free supplier.	All Year	Renewable Resources/ Weed Coordinator
Contract requirements will stipulate that all out of county equipment will be high pressure washed prior to entering public lands.	All Year	Renewable Resources
Re-vegetate all burned areas with site potential permits, with weed free seed.	All Year	Renewable Resources

Prevention Activity	When	Who Is Responsible
Wildlife/Fisheries		
Consider noxious weeds in all Habitat Management Plans.	All Year	Wildlife/Fisheries/ Botany
Consider the impacts of wildlife species in the expansion of noxious weeds through ingestion of seeds as well as the impacts noxious weed infestations may have on native wildlife habitat in all wildlife plans, and implementation of the Bio-diversity Standard for Rangeland Health.	All Year	Wildlife/Fisheries/ Botany
Threatened & Endangered Species		
Insure that Listed, T&E, and all BLM Sensitive plants are given protection and consideration in areas adjacent to (or within) weed infestations and that these plants are inventoried/ flagged prior to any noxious weed treatment.	All Year	Renewable Resources
Division of Support Services		
Consider construction and road maintenance schedule, then work with Force Account Team to avoid spreading weeds,if known infested sites are to be disturbed; high pressure wash plant parts, mud, etc, from construction equipment utilized by BLM personnel.	All Year	Support Services
Inspect gravel and fill material sites to assure weed-free material is used in relatively weed free area.	All Year	Support Services/Weed Coordinator
Incorporate weed prevention into road layout, design and alternative evaluations.	All Year	Support Services, Weed Coordinator
Remove seed source (flowering plants) that could be picked up by passing vehicles or maintenance equipment and limit seed transport into relatively weed free areas.	All Year	Support Services

Prevention Activity	When	Who Is Responsible
Provide Noxious weed awareness brochures for distribution to public land users.	All Year	Support Services
Include stipulations to stop the spread and introduction of weeds in all contractual activities on BLM lands.	All Year	Support Services
Law Enforcement		
Educate other law enforcement agencies on the prevention, identification and introduction of noxious weed species.	All Year	District Manager
Fire		
Ensure that fire suppression and rehabilitation efforts minimize weed spread.	All Year	Fire Team, Resource Advisor
Conduct controlled burns on some areas to eliminate overstory and lessen weed seed dispersal.	Spring/Summer/Fall	Fire Team, RX Fire Planning Process (Staff).
Wash down undercarriage with emphasis on the axles, frames, crossmembers, motormounts and on and underneath steps. Also, include the runningboards, and front bumper/brushguard assemblies. Vehicle cabs will be swept out with refuse disposed of in waste receptacles when leaving (or before returning to home station) a noxious weed infested area.	All Year	Fire Team
Include weed prevention in resource advisor duties on all overhead or fire rehab teams and EFR planning.	All Year	Fire Team
Weed Coordinator		
Coordinate and conduct noxious weed awareness/prevention programs.	All Year	Weed Coordinator
Initiate and maintain data base maps of noxious weed infestations.	All Year	Weed Coordinator

Prevention Activity	When	Who Is Responsible
Initiate and continue to cooperative with weed effort user groups, recreation, volunteers, local and state governments.	All Year	Weed Coordinator
Conduct inventory, monitoring, detection, evaluations, and prioritize and prepare treatment plans as necessary.	All Year	Weed Coordinator
Prepare Pesticide Use proposals, Pesticide applications Records, Biological Control Agent Request Proposals and Biological Control Agent Release Proposals and Records.	All Year	Weed Coordinator
Implement department Policy Manuals 9001, 9014, and 9015.	All Year	Weed Coordinator
Prepare Annual Pesticide Reports and maintain pesticide Application Certification (both State and Federal).	All Year	Weed Coordinator
Be available for Weed Identification training to all Field Office Personnel.		Weed Coordinator
Coordinate the purchase, application, storage and disposal of any herbicides with the Field Office Hazardous Materials Management Coordinator and Safety Officer.	All Year	Weed Coordinator
Inspect import earth-fill and borrow sites for noxious weed infestations.	Yearly	Weed Coordinator/Resource Staff.
Inventory all roads maintained by BLM for noxious weed infestations and supply Support Services with information as to prevention tactics for those sites.	Yearly	Weed Coordinator

Appendix G

List of Species Known to Occur in the Eagle Lake Field Office Area

Appendix C

List of Species Known to Occur in the Eagle Lake Field Office Area

Appendix G. List of Species Known to Occur in the Eagle Lake Field Office Area

Common Name	Scientific Name
AMPHIBIANS	
Great Basin spadefoot	*Scaphiopus intermontanus*
Boreal toad	*Bufo boreas boreas*
Pacific treefrog	*Hyla regilla*
Northern leopard frog	*Rana pipiens*
Bull frog	*Rana catesbeiana*
REPTILES	
Pigmy horned lizard	*Phtynosoma d. douglassi*
Short horned lizard	*Phtynosoma douglassi*
Northern desert herned lizard	*Phrynosoma p. platyrhinos*
Great Basin whiptail	*Cnemidophorus t. tigris*
Great Basin collared lizard	*Crotaphytus i. bicinctores*
Long-nosed leopard lizard	*Crotaphytus w. wislizenni*
Northern sagebrush lizard	*Sceloporus g. graciosus*
Great Basin fence lizard	*Sceloporus o. biseriatusm*
Northern side-blotched lizard	*Uta s. stansburiana*
Western skink	*Fumeces s. skiltonianus*
Rocky Mountain rubber boa	*Charina b. utahensis*
Western yellow-bellied racer	*Coluber c. morman*
Desert striped whipsnake	*Masticophis t. taeniatus*
Red coachwhip	*Masticophis flagellum piceus*
Western ground snake	*Sonora semiannulata*
Great Basin gopher snake	*Pituophis m. deserticola*
Valley garter snake	*Thmanophis s. fitchi*
Sierra garter snake	*Thamnophis c. couchi*
Wandering garter snake	*Thamnophis e. vagrans*
Great Basin rattlesnake	*Crotalus v. lutosus*
California king snake	*Lampropeltis g. californiae*
Long-nosed snake	*Rhinocleilus lecontei*
BIRDS	
Gaviidae - Loons	
Pacific loon	*Gavia pacifica*
Common loon	*Gavia immer*
Podicipedidae - Grebes	
Horned grebe	*Podiceps auritus*
Eared grebe	*Podiceps nigricollis*
Red-necked grebe	*Podiceps grisegena*
Pied-billed grebe	*Podilymbus podiceps*
Western grebe	*Aechmophorus occidentalis*
Clark's grebe	*Aechmophorus clarkii*
Pelecanidae - Pelicans	
American white pelican	*Pelecanus erythrorhynchos*
Phalacrocoracidae - Cormorants	
Double-crested cormorant	*Phalacrocorax auritus*
Ardeidae - Herons, Egrets and Bitterns	
American bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Tricolored heron	*Egretta tricolor*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*

Common Name	Scientific Name
Black-crowned heron	*Nycticorax nycticorax*
Threskiornithidae - Ibises	
White-faced ibis	*Plegadis chihi*
Anatidae - Swans, Geese, and Ducks	
Tundra swan	*Cygnus columbianus*
Trumpeter swan	*Cygnus buccinator*
Greater white-fronted goose	*Anser albifrons*
Ross' goose	*Chen rossii*
Snow goose	*Chen caerrulescens*
Canada goose	*Branta canadensis*
Brant	*Branta bernicla*
Wood duck	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Gadwall	*Anas strepera*
American widgeon	*Anas americana*
Eurasian widgeon	*Anas penelope*
Northern shoveler	*Anas clypeata*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
Green-winged teal	*Anas crecca*
Fulvous whistling duck	*Dendrocygna bicolor*
Lesser scaup	*Aythya affinis*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Surf scoter	*Melanitta perspicillata*
White-winged scoter	*Melanitta fusca*
Common goldeneye	*Bucephala clangula*
Barrow's goldeneye	*Bucephala islandica*
Bufflehead	*Bucephala abeola*
Common merganser	*Mergus merganser*
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Hooded merganser	*Lophodytes cucullatus*
Cathertidae - American Vultures	
Turkey vulture	*Cathertes aura*
Accipitridae - Hawks, Kites and Eagles	
Northern harrier	*Circus cyaneus*
White-tailed kite	*Elanus leucurus*
Cooper's hawk	*Accipiter cooperii*
Sharp-shinned hawk	*Accipiter striatus*
Norther goshawk	*Accipiter gentilis*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Swainson's hawk	*Buteo swainsoni*
Ferruginus hawk	*Bureo regalis*
Rough-legged hawk	*Buteo lagopus*
Osprey	*Pandion haliaetus*
Golden eagle	*Aquila chrysaetos*
Bald eagle	*Haliaeetus leucocephalus*
Falconidae - Falcons	
American kestrel	*Falco sparverius*

Common Name	Scientific Name
Prairie falcon	*Falco mexicanus*
Merlin	*Falco columbarius*
Pergrine falcon	*Falco peregrinus*
Phasianidae - Pheasants, Grouse, and Quail	
Ring-necked pheasant	*Phasianus colchicus*
Chukar	*Alectoris chukar*
Greater sage-grouse	*Centrocercus urophasianus*
Blue grouse	*Dendragapus obscurus*
Wild turkey	*Meleagris gallopavo*
Mountain quail	*Oreortyx pictus*
California quail	*Callipepla cilifornica*
Rallidae - Rails, Gallinules, and Coots	
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Gruidae - Cranes	
Sandhill crane	*Grus canadensis*
Charadriidae - Plovers	
Black-bellied plover	*Pluvialis squatarola*
Semipalmated plover	*Charadrius semipalmatus*
(Western) Snowy plover	*Charadrius alexandrinus nivosus*
Killdeer	*Charadrius vociferus*
Recurvirostridae - Avocets and Stilts	
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Scolopacidae - Sandpipers and Allies	
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Solitary sandpiper	*Tringa solitaria*
Spotted sandpiper	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Long-billed curlew	*Numenius americanus*
Marbled godwit	*Limosa fedoa*
Willet	*Catoptrophorus semipalmatus*
Wandering tattler	*Heteroscelus incanus*
Ruddy turnstone	*Arenaria interpres*
Sanderling	*Calidris alba*
Red knot	*Calidris canutus*
Dunlin	*Calidris alpina*
Baird's sandpiper	*Calidris bairdii*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Pectoral sandpiper	*Calidris melanotos*
Long-billed dowicher	*Limnodromus scolopaceus*
Short-billed dowitcher	*Limnodromus griseus*
Wilson's snipe	*Gallinago delicata*
Wilson's phalarope	*Phalaropus tricolor*
Red-necked phalarope	*Phalaropus lobatus*
Laridae - Gulls, Terns, and Allies	
Parasitic jaeger	*Stercorarius parasiticus*
Franklin's gull	*Larus pipixcan*
Bonaparte's gull	*Larus philadelphia*
Mew gull	*Larus canus*

Common Name	Scientific Name
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Thayer's gull	*Larus thayeri*
Glaucous-winged gull	*Larus glaucescens*
Black tern	*Childonias niger*
Caspian tern	*Sterna caspia*
Common tern	*Sterna hirundo*
Forester's tern	*Sterna forsteri*
Columbidae - Pigeons and Doves	
Rock dove (feral dove)	*Columba livia*
Band-tailed pigeon	*Columba fasciata*
Mourning dove	*Zenaida macroura*
Cuculidae - Cuckoos	
Yellow-billed cuckoo	*Coccyzus americanus*
Tytonidae - Barn owls	
Barn owl	*Tyto alba*
Strigidae - Typical owls	
Long-eared owl	*Asio otus*
Short-eared owl	*Asio flammeus*
Flammulated owl	*Otus flammeolus*
Western screech owl	*Otus kennicotti*
Great horned owl	*Bubo virginianus*
California spotted owl	*Strix occidentalis occidentalis*
Northern pygmy owl	*Glaucidium gnoma*
Burrowing owl	*Athene cunicularia*
Northern saw-whet owl	*Aegolius acadicus*
Caprimulgidae - Nightjars	
Common nighthawk	*Chordeiles minor*
Lesser nighthawk	*Chordeiles acutipennis*
Common poorwill	*Phalaenophilus nuttallii*
Apodidae - Swifts	
White-throated swift	*Aeronautes saxatalis*
Vaux's swift	*Chaetura vauxi*
Trochilidae - Hummingbirds	
Black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*
Calliope hummingbird	*Stellula calliope*
Broad-tailed hummingbird	*Selasphorus platycercus*
Rufous hummingbird	*Selasphorus rufus*
Alcedinidae - Kingfishers	
Balted kingfisher	*Ceryle alcyon*
Picidae - Woodpeckers	
Northern flicker	*Colaptes auratus*
Acorn woodpecker	*Melanerpes formicivorus*
Lewis' woodpecker	*Melanerpes lewis*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Nuttall's woodpecker	*Picoides nuttallii*
White-headed woodpecker	*Picoides albolarvatus*
Black-backed woodpecker	*Picoides arcticus*
Pileated woodpecker	*Dryocopus pileatus*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Red-breasted sapsucker	*Sphyrapicus ruber*

Common Name	Scientific Name
Red-naped sapsucker	*Sphyrapicus nuehalis*
Tyrannidae - Tyrant Flycatchers	
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax trailii*
Dusky flycatcher	*Empidonax oberholseri*
Hammond's flycatcher	*Empidonax hammondii*
Gray flycatcher	*Empidonax wrightii*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Alaudidae - Larks	
Horned lark	*Eremophila alpestris*
Hirundinidae - Swallows	
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Cliff swallow	*Hirundo pyrrhonota*
Purple martin	*Progne subis*
Corvidae - Jays, Magpies, and Crows	
Steller's jay	*Cyanocitta stelleri*
Western scrub-jay	*Aphelocoma californica*
Pinyon jay	*Gymnorhinus cyanocephalus*
Gray jay	*Perisoreus canadensis*
Clark's nutcracker	*Nucifraga columbiana*
Black-billed magpie	*Pica pica*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Paridae - Titmice	
Juniper titmouse	*Baeolophus ridgwayi*
Oak titmouse	*Baeolophus inornatus*
Black-capped chickadee	*Poecile atricapillus*
Mountain chickadee	*Poecile gambeli*
Aegithalidae - Bushtits	
Bushtit	*Psaltriparus minimus*
Sittidae - Nuthatches	
White-breasted nuthatch	*Sitta carolinensis*
Red-breasted nuthatch	*Sitta canadensis*
Pygmy nuthatch	*Sitta pygmaea*
Certhiidae - Creepers	
Brown creeper	*Certhia americana*
Troglodytidae - Wrens	
Marsh wren	*Cistothorus palustris*
Bewick's wren	*Thryomanes bewickii*
House wren	*Trolodytidae aedon*
Winter wren	*Troglodytidae troglodytes*
Rock wren	*Salpinctes obsoletus*
Canyon wren	*Catherpes mexicanus*
Cinclidae - Dippers	
American dipper	*Cinclus mexicanus*

Common Name	Scientific Name
Muscicapidae - Old World Flycatchers and Allies	
Wrentit	*Chamaea fasciata*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*
Western bluebird	*Sialia mexicana*
Mountain bluebird	*Sialia currucoides*
Townsend's solitare	*Myadestes townsendi*
Varied thrush	*Ixoreus naevius*
American robin	*Turdus migratorius*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
Mimidae - Mockingbirds and Thrashers	
Northern mockingbird	*Mimus polyglottos*
Brown thrasher	*Toxostoma rufum*
Sage thrasher	*Oreoscoptes montanus*
Motacillidae - Pipits	
American pipit	*Anthus rubescens*
Bombycillidae - Waxwings	
Bohemian waxwing	*Bombycilla garrulus*
Cedar waxwing	*Bombycilla cedrorum*
Laniidae - Shrikes	
Northern shrike	*Lanius excubitor*
Loggerhead shrike	*Lanius ludovicianus*
Sturnidae - Starlings	
European starling	*Sturnus vulgaris*
Vireonidae - Vireos	
Plumbeous vireo	*Vireo plumbeus*
Cassin's vireo	*Vireo cassinii*
Blue-headed vireo	*Vireo solitarius*
Warbling vireo	*Vireo gilvus*
Red-eyed vireo	*Vireo olivaceus*
Emberizidae - Emberizids	
Subfamily Parulinae - Wood-warblers	
Tennessee warbler	*Vernivora peregrina*
Orange-crowned warbler	*Vernivora celata*
Nashville warbler	*Vernivora ruficapilla*
Golden-winged warbler	*Vernivora chrysoptera*
Yellow warbler	*Dendroica petechia*
Chestnut-sided warbler	*Dendroica pensylvanica*
Black-throated blue warbler	*Dendroica caerulescens*
Townsend's warbler	*Dendroica townsendii*
Hernit warbler	*Dendroica occidentalis*
Black-throated gray warbler	*Dendroica nigrescens*
Yellow-rumped warbler	*Dendroica coronata*
Blackpoll warbler	*Dendroica striata*
Black and white warbler	*Mniotilta varia*
American redstart	*Setophaga ruticilla*
Northern waterthrush	*Seiurus noveboracensis*
MacGillivray's warbler	*Oporonis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Hooded warbler	*Wilsonia citrina*
Yellow-breasted chat	*Icteria virens*

Common Name	Scientific Name
Thraupinae - Tanagers	
Western tanager	*Piranga ludovicianus*
Cardinalinae - Cardinals, Grosbeaks, and Allies	
Lazuli bunting	*Passerina amoena*
Indigo bunting	*Passerina cyanea*
Black-headed grosbeak	*Pheucticus melanocephalus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Emberizinae - Emberizines	
Spotted towhee	*Pipilo maculatus*
Green-tailed towhee	*Pipilo chlorurus*
Rufous-crowned sparrow	*Aimophila ruficeps*
Black-throated sparrow	*Amphisiza belli*
Sage sparrow	*Amphispiza belli*
Chipping sparrow	*Spizella passerina*
Clay-colored sparrow	*Spizella pallida*
Brewer's sparrow	*Spizella breweri*
American tree sparrow	*Spizella arborea*
Black-chinned sparrow	*Spizella atrogularis*
Vesper sparrow	*Pooecetes gramineus*
Lark sparrow	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*
Grasshopper sparrow	*Ammodramus savannarum*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Swamp sparrow	*Melospiza georgiana*
Dark-eyed junco	*Junco hyemalis*
Harris's sparrow	*Zonotrichia querula*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atricapilla*
White-throated sparrow	*Zonotrichia albicollis*
McCown's longspur	*Calcarius mccownii*
Lapland longspur	*Calcarius lapponicus*
Chestnut-collared longspur	*Calcarius ornatus*
Snow bunting	*Plectrophenax nivalis*
Icterninae - Icterines	
Hooded oriole	*Icterus cucullatus*
Bullock's oriole	*Icterus bullockii*
Western meadowlark	*Sturnella neglecta*
Red-winged blackbird	*Agelaius phoeniceus*
Tricolored blackbird	*Agelaius tricolor*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus mexicanus*
Common grackle	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
Fringillidae - Old World Finches and Allies	
Gray-crowned rosy-finch	*Leucosticte tephrocotis*
Red crossbill	*Loxia curvirostra*
Evening grosbeak	*Coccothraustes mexicanus*
House finch	*Carpodacus mexicanus*
Purple finch	*Carpodacus purpureus*
Cassin's finch	*Carpodacus cassinii*
Lesser goldfinch	*Carduelis psaltria*

Common Name	Scientific Name
Lawrence's goldfinch	*Carduelis lawrencei*
American goldfinch	*Carduelis tristis*
Pine siskin	*Carduelis pinus*
Common redpoll	*Carduelis flammea*
Pine grosbeak	*Pinicola enucleator*
Passeridae - Old World Sparrows	
House sparrow	*Passer domesticus*
MAMMALS	
Bobcat	*Lynx rufus*
Mountain lion	*Felis concolor*
Coyote	*Canis latrans*
Kit fox	*Vulpes macrotis*
Red fox	*Vulpes fulva*
Gray fox	*Urocyon cinereoargenteus*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*
Spotted skunk	*Spilogale putoris*
Badger	*Taxidea taxus*
Mink	*Mustela vison*
Long-tailed weasel	*Mustela frenata*
Black bear	*Ursus americanus*
Mule deer	*Odocoileus hemionus*
Pronghorn	*Antilocapra americana*
Western gray squirrel	*Sciurus griseus*
Douglas' squirrel	*Tamiasciurus douglasi*
California ground squirrel	*Spermophilus beecheyi*
Townsend ground squirrel	*Spermophilus townsendii*
Belding ground squirrel	*Spermophilus beldingi*
Antelope ground squirrel	*Ammospermophilus lecurus*
Golden mantled ground squirrel	*Spermophilus lateralis*
Least chipmunk	*Tamias minimus*
Yellow pine chipmunk	*Tamias amoenus*
Porcupine	*Erethizon dorsatum*
Beaver	*Castor canadensis*
Yellow-bellied marmot	*Marmota flaviventris*
Townsend's pocket gopher	*Thomomys townsendii*
Northern pocket gopher	*Thomomys talpoides*
Great Basin pocket mouse	*Perognathus parvus*
Long-tailed pocket mouse	*Perognathus formosus*
Little pocket mouse	*Perognathus longimembris*
Ord's kangaroo rat	*Dipodomys ordii*
Dark kangaroo mouse	*Microdipodops megacephalus*
Heermann's kangaroo rat	*Dipodomys heermanni*
Merriam kangaroo rat	*Dipodomys merriami*
Western harvest mouse	*Reithrodontomys megalotis*
Northern grasshopper mouse	*Onychomys leucogaster*
Bushy-tailed woodrat	*Neotoma cinerea*
Dusky-footed woodrat	*Neotoma fuscipes*
Pinyon mouse	*Peromyscus truei*
Deer mouse	*Peromyscus maniculatus*
Canyon mouse	*Peromyscus crinitus*
Sagebrush vole	*Lagurus curtatus*
Long-tailed vole	*Microtus longicaudus*
Montane vole	*Microtus montanus*

Common Name	Scientific Name
Muskrat	*Ondatra zibethica*
House mouse	*Mus musculus*
Western jumping mouse	*Zapus princeps*
Pigmy rabbit	*Brachylagus idahoensis*
Nuttall's cottontail	*Sylvilagus nuttalli*
White-tailed jackrabbit (hare)	*Lepus townsendii*
Black-tailed jackrabbit (hare)	*Lepus californicus*
Snowshow hare	*Lepus americanus*
Townsend's big-eared bat	*Plecotus townsendii*
Pallid bat	*Antrozous pallidus*
Silver-haired bat	*Lasionycteris noctivagana*
Hoary bat	*Lasiurus cinereus*
Big brown bat	*Eptesicus fuscus*
Western pipistrelle	*Pipistrellus hesperus*
Fringed myotis	*Myotis thysanodes*
Long-eared myotis	*Myotis evotis*
Long-legged myotis	*Myotis volans*
California myotis	*Myotis californicus*
Small-footed myotis	*Myotis leibii*
Yuma myotis	*Myotis yumanensis*
Little brown myotis	*Myotis lucifugas*
Brazilian free-tailed bat	*Talarida brasiliensis*
Merriam shrew	*Sorex merriami*
Trowbridge's shrew	*Sorex trowbridgii*
Vagrant shrew	*Sorex vagrans*
Broad-footed mole	*Scapanus latimanus*

Sources: Scientific names of birds are from Sibley (2000) except where noted by "*" or "AKA" which is via Sibley and/or Scott et al. (1987). Mammals follow Ingles (1965), amphibians and reptiles follow Stebbins (1985)

Appendix H

RMP Alternatives Necessary to Ensure Compliance with the Conservation Strategy for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit

Appendix N

RMP Alternatives Necessary to Ensure Compliance with the Conservation Strategy for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit

PROGRAM AND ACTIVITY RMP ALTERNATIVES NECESSARY TO ENSURE COMPLIANCE WITH THE CONSERVATION STRATEGY FOR SAGE-GROUSE AND SAGEBRUSH ECOSYSTEMS WITHIN THE BUFFALO-SKEDADDLE POPULATION MANAGEMENT UNIT

Program - Activity	Goals	Actions
Lands & Realty	1: Protect, Conserve, Restore, and Maintain Lek Habitat	1. BLM shall not grant rights-of-way for any activity which would necessitate construction (erection) of any type of structure rising above the ground surface. These include overhead lines and structures, micro-wave towers, wind turbines, etc. within the lek viewshed and no closer than 3.2 km (2 miles) as was accomplished with the Alturas Intertie Transmission Line.
		2. Require that the section of land management agency, California State Power Commission, and Nevada Public Utilities Commission right-of-way grants addressing abandonment of an overhead line, or any other structure, include directions for removal of cross arms and structures.
	2: Protect Against Direct Loss of Leks Due to Paving, Surface Mining, Land Exchanges, Converting Native Vegetation to Cultivated Agricultural Vegetation, and Increased Vegetation Screening	1. BLM will not exchange or sell lands that have an active or inactive lek within them.
		2. Private land owners will be advised of any leks on their property to avoid, as much as possible loss of leks. Coordination should include the private land owner, NRCS, and CDFG.
		3. No paving of roads will be allowed on BLM administered lands if paving will harm lek habitat.
		4. Mining, such as material pits, where it is the option of the permitting agency to approve or deny a lease will not be allowed on or within 3.2 km (2 miles) of a lek.
		5. Mining for locatable minerals such as gold, under the 1872 Mining Law, is not as easily controlled. Conservation and effective rehabilitation measures will be made a part of the mine's operations plan.
OHV	1: Protect, Conserve, Restore, and Maintain Lek Habitat.	1. When monitoring data confirms that OHV use is a disturbance to lek activity, restrict OHV use as necessary.
	10: Manage OHV Use In Nesting Habitat to	1. Incorporate studies completed during 2004 by the

	Insure There is No Measurable Adverse Impact.	Point Reyes Bird Observatory (PRBO) concerning impacts to nesting birds from OHV use for application within sage-grouse habitat.
		2. Continue closure of OHV trails illegally pioneered into Wilderness Study areas (WSA).
	.	3. Close OHV trails where use is adversely impacting sage-grouse nesting as necessary
	12: Maintain Meadows (Lentic Wetlands) in a Healthy State.	3. Manage OHV use to enhance healthy riparian/wetland conservation.
Recreation	1: Protect, Conserve, Restore, and Maintain Lek Habitat.	1. Protect against overzealous human observers venturing too close or onto leks by establishing one viewing lek with a marked viewing platform or site. Use educational signs with suggested protocol while observing strutting activity.
		2. The 2005 Eagle Lake Field Office RMP shall initiate more closely managed use in what is now an "open" area within 3.2 km (2 miles) of leks.
Wild Horses & Burros	9: Manage Wild horse and Burro and Livestock Grazing in a Manner that Benefits Sage-grouse Habitat.	1. Manage the following Herd Management Areas (HMA) in the PMU to the following AMLs. (See Table in WH&B Section).
		2. Establish a priority within the Eagle Lake RMP to develop an Implementation Plan to manage Twin Peaks HMA as a meta-population, and at the appropriate AML for maintaining the Standards for Land Health.
Livestock Grazing	1: Protect, Conserve, Restore, and Maintain Lek Habitat.	4. Continue to protect against domestic sheep bedding and grazing on leks through continued operator/BLM cooperation and citing this restriction as a part of the grazing license (Cal-Neva Planning Unit Management Framework Plan III Wildlife Decision 11.2).
	3: Insure Fences Within Lek Flyways Do Not Pose a Hazard For Sage-Grouse In Low Trajectory Flight.	1. Do not construct new fences or move existing fences to within 1.6 kilometers (1 mile) of a lek.
		2. If fence construction cannot be avoided within the lek's buffer zone, the fence will consist of "let-down" panels which are let down during the strutting season.
		3. All braces, gateposts, or wooden posts used are required to have anti-perch structures.

	4: Maintain 124,120 Acres (8.4% of the PMU) of R-0 (Healthy) Sage-Grouse Habitat Vegetation Communities and Ecological Sites at Their Potential.	1. Where R-0 values are achieved, sustain them over the long term by periodic disturbances, as needed, to maintain vigor in the understory grasses and forbs and retain or replace an appropriate sagebrush canopy cover.
		2. Graze existing vegetation in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs), and facilitates understory vigor.
	8: Restore 684,627 Acres (46% of the PMU) of R-4 Habitat and Recover 175,041 Acres (12% of the PMU) of X-4 Habitat Vegetation Communities and Ecological Sites at Their Potential.	In areas where annual non-native grass species have invaded a site but the site has not crossed a threshold (R-4 to X-4) appropriate conservation actions will include the following:
		1. Adjust grazing levels, increase the length of rest, and other measures to allow existing perennial grasses and forbs to compete.
		2. Seek opportunities for vegetation treatment and reseeding with native perennial grasses and forbs.
	9: Manage Wild horse and Burro and Livestock Grazing in a Manner that Benefits Sage-Grouse Habitat.	3. In Nesting Habitat, maintain 18cm (7 inches) of residual grass height within the dripline of sagebrush.
		4. In R-2 areas where existing species of perennial grass cannot normally reach 18cm (7") of growth, reestablish native grass species that have greater vertical structure.
		5. In areas where the 7" stubble heights under sagebrush should, but do not, occur manage livestock grazing to ensure the objective can be met.
		6. In R-4 habitat adjust grazing levels, increase the length of rest, and include other measures to allow existing perennial grasses and forbs to compete with the non-native invasive grass present.
		7. Establish and fund research to investigate if trampling of nests by domestic sheep does occur, and if it is an issue of adverse affect.

Fire Management	5: Restore 322,966 Acres (22% of the PMU) of R-1, Limited Sage-Grouse Habitat Vegetation Communities and Ecological Sites to Their Potential.	1. Seed native sagebrush of the subspecies and ecotype that previously existed at the site, native grass, and forb species into each fire to accelerate recovery of R-1 lands to R-0. Establish appropriate management response wildland fire suppression in Wyoming big sagebrush ecosystems.
	8: Restore 684,627 Acres (46% of the PMU) of R-4 Habitat and Recover 175,041 Acres (12% of the PMU) of X-4 Habitat Vegetation Communities and Ecological Sites at Their Potential.	<u>In areas where annual non-native grass species have invaded a site but the site has not crossed a threshold (R-4 to X-4) appropriate conservation actions will include the following:</u>
		3. Seed native sagebrush of the subspecies and ecotype that previously existed at the site, native grass, and forb species into each fire to accelerate recovery of R-1 lands to R-0, and keep R-4 lands from degrading to X-4 (Section II.D). Establish appropriate management response wildland fire suppression in Wyoming big sagebrush ecosystems.
	13: Stabilize and Rehabilitate Wildland and Prescribed Fires in Nesting Habitat.	1. During fire-suppression activities do not remove or burn any remaining patches of sagebrush within the fire perimeter.
		2. In areas of large-scale loss (>/= 40% of original winter habitat), protect all remaining sagebrush habitats.
		3. Reseed former sage-grouse habitat with the appropriate subspecies of sagebrush and herbaceous species unless the species are recolonizing the area in a density that would allow recovery within 15 years (sagebrush canopy cover of 10 – 30% and total height of 60 – 71cm (24 – 28 inches)).
		4. Discourage prescribed burns > 50 ha. (123 acres), and do not burn > 20% of an area used by sage-grouse during winter within any 20-30 year interval (depending on estimated recovery time for the sagebrush habitat).
		5. WAFWA Guidelines (Connelly et al. 2000) provide additional direction for protection of breeding habitat (leks and nesting habitat) as follows: *Do not use fire in sage-grouse habitats prone to invasion by cheatgrass and other invasive weed*

		species unless adequate measures are included in restoration plans to replace the cheatgrass understory with perennial species using approved reseeding strategies. These strategies could include, but are not limited to, use of pre- emergent herbicides (e.g., Oust, Plateau) to retard cheatgrass germination until perennial herbaceous species become established. *When restoring habitats dominated by Wyoming big sagebrush, regardless of the techniques used (e.g., prescribed fire, herbicides), do not treat >20% of the nesting breeding habitat (including areas burned by wildfire) within a 30-year period (Bunting et al. 1987). The30-year period represents the approximate recovery time for a stand of Wyoming big sagebrush.* NOTE: Nesting habitat is approximately 30,000 acres per lek of appropriate habitat. Therefore, 20% = 6,000 acres. *When restoring habitats dominated by mountain big sagebrush, regardless of the techniques used (e.g., fire, herbicides, etc.), treat </= 20% of the breeding habitat (including areas burned by wildfire) within a 20-year period (Bunting et al. 1987). The 20-year period represents the approximate recovery time for a stand of mountain big sagebrush.*
Wildlife	1: Protect, Conserve, Restore, and Maintain Lek Habitat.	5. Continue to restrict aerial gunning for the control of predators by the USDA Wildlife Services to after 9:30 am within 3.2 km (2 miles) of a lek. This has been incorporated by Wildlife Services into their Animal Damage Control Plans for work in the Eagle Lake Field Office area.
	2: Protect Against Direct Loss of Leks Due to Paving, Surface Mining, Land Exchanges, Converting Native Vegetation to Cultivated Agricultural Vegetation, and Increased Vegetation	6. Vegetation is visually monitored during each annual lek count.

	Screening.	
		7. If visual monitoring detects an increase in screening vegetation on the lek, appropriate action is taken after strutting activity is completed for the season.
		8. Once a treatment is applied, quantitative monitoring will be established to measure treatment success.
	4: Manage 124,120 Acres (8.4% of the PMU) of R-0 (Healthy) Sage-Grouse Habitat Vegetation Communities and Ecological Sites at Their Potential.	1. Where R-0 values are achieved, sustain them over the long term by periodic disturbances, as needed, to maintain vigor in the understory grasses and forbs and retain or replace an appropriate sagebrush canopy cover.
		2. Graze existing vegetation in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs), and facilitates understory vigor.
		3. Manage sagebrush ecosystems to be consistent with the Biodiversity Standard For Land Health (Appendix F). Pellant et al. 2000, *Interpreting Indicators of Rangeland Health* will be used as one tool to evaluate whether the Objective is being met.
		4. If the three action items above are successful in maintaining healthy sage-grouse habitat and Standards for Land Health, stocking rates and grazing systems should not be affected.
	5: Restore 322,966 Acres (22% of the PMU) of R-1, Limited Sage-Grouse Habitat Vegetation Communities and Ecological Sites to Their Potential.	1. Seed native sagebrush of the subspecies and ecotype that previously existed at the site, native grass, and forb species into each fire to accelerate recovery of R-1 lands to R-0. Establish appropriate management response wildland fire suppression in Wyoming big sagebrush ecosystems.
	6: Restore 66,275 Acres (4.5% of the PMU) of R-2, Limited Sage-Grouse Habitat Vegetation Communities and Ecological Sites to Their Potential.	1. Seek opportunities for vegetation treatment and reseeding with native perennial grasses and forbs.
		2. Where wildland or prescribed fire has removed or thinned sagebrush overstory providing seed access to the bare understory, seed native grass and forb species to accelerate recovery of R-2 lands to R-0. If necessary, after wildland fire(s), reseed with native sagebrush subspecies and ecotype.

		3. In the absence of fire, thin the sagebrush overstory using mechanical or chemical means, and reseed with native perennial grasses and forbs.
	8: Restore 684,627 Acres (46% of the PMU) of R-4 Habitat and Recover 175,041 Acres (12% of the PMU) of X-4 Habitat Vegetation Communities and Ecological Sites at Their Potential.	In areas where annual non-native grass species have invaded a site but the site has not crossed a threshold (R-4 to X-4) appropriate conservation actions will include the following:
		1. Adjust grazing levels, increase the length of rest, and other measures to allow existing perennial grasses and forbs to compete.
		2. Seek opportunities for vegetation treatment and reseeding with native perennial grasses and forbs
		Recovery of X-4 areas is a highly expensive human intervention using mechanical treatments. Conservation actions apply to nesting, brood-rearing, and winter habitats.
		1. Conservation measures include taking advantage of grant, or large project initiative funding to complete site treatments which include removal or severe set- back of dominant annual non-native grass species, and reseeding with a mix of perennial native shrubs, grasses and forbs.
	12: Maintain Meadows (Lentic Wetlands) in a Healthy State.	1. If agencies or private land owners are enclosing a meadow to exclude over-utilization or degradation the agency(s) involved must establish adaptive management goals and actions, such as grazing or burning the meadows as necessary, to maintain appropriate vegetation structure, diversity, density, composition and vigor as described in Land Health Standards 3 – Water Quality and 4 – Riparian and Wetland Sites.
		2. Maintain or achieve Proper Functioning Condition (PFC), consistency with Land Health Standards 3 – Water Quality and 4 – Riparian and Wetland Sites, and proper sage-grouse habitat criteria of wetlands through application of the utilization levels prescribed in Livestock Grazing Guideline 16.
	14: Counter Low Production Rates by Meeting Sage-Grouse Proper Nutrition Needs.	1. Research conducted in the California portion of the PMU should be extended to any captures of adult females associated with any radio telemetry project in the Nevada portion.

		2. Measures to protect and restore sagebrush quality (age) and quantity should be considered a high priority on winter and breeding ranges within this PMU.
	15: Determine Population Counts and Trends in the PMU.	1. Nevada Department of Wildlife (NDOW) will implement counts of all active leks for peak male attendance within the Buffalo / Skedaddle PMU by 2005.
		2. Lek counts for peak male attendance will be completed by NDOW within the Nevada portion of the PMU on an annual basis.
		3. California Department of Fish and Game (CDFG) will continue to count all active leks for peak male attendance within the California portion of the PMU on an annual basis.
		4. CDFG and NDOW will monitor all known lek sites for activity by either aerial or ground checks by 2005 and each 5 years thereafter. The California portion was last completed in 2002.
		5. CDFG and NDOW will develop spring breeding population and fall population estimates for sage-grouse in the PMU on an annual basis.
		6. CDFG and NDOW will gather production and recruitment data in the PMU using hunter-harvested wings on an annual basis.
		7. NDOW will implement a radio telemetry project by 2007 to determine seasonal movement and use areas of sage-grouse using Nevada leks in the PMU.
	16: Eliminate Sage-Grouse Die-offs From Insecticide Poisoning.	1. Discourage use of highly toxic organophosphorus and carbamate insecticides as well as methamidiphos in potato fields and dimethoate through identification and use of less toxic alternatives.
		2. Federal and state agencies will ensure an insecticide response to naturally occurring defoliation is necessary before allowing insecticide use on lands they administer.
		3. Where insecticides must be used on federal and state administered lands, limit use for spot applications of the least toxic chemicals or biological treatment.

		4. Private landowners will be advised if brood-rearing occurs on their lands and efforts will be made to assist landowners to acquire the least toxic chemicals or biological controls.
	17: Insure Nesting Success is not Being Limited By Hunting, Poaching, or Predation.	1. Aerial gunning of coyotes under federal animal damage control programs for domestic sheep protection takes place near many active leks in the PMU. This may provide some benefit for sage-grouse and is expected to continue.
		2. Evaluation of female nesting success (from hunter-collected wings) will continue in both California and Nevada portions of the Buffalo - Skedaddle PMU.
		3. Should nesting success fall below 23%, aggressive predator control measures will be implemented.
		4. The CDFG and NDOW will continue to use season timing, bag limits, and permit hunting systems to carefully limit harvest.
		5. Seasons will continue to be structured to minimize the possibility that harvest could exceed 10% of the estimated fall populations.
		6. Both states will continue law enforcement patrols to help insure that illegal harvest remains minimal.
Forestry	7: Restore 4,251 Acres (0.3% of the PMU) of R-3 Habitat and Recover 97,222 Acres (6.6% of the PMU) of X-3 Habitat Vegetation Communities and Ecological Sites to Their Potential.	In areas where juniper have invaded a site but the site has not crossed a threshold (R-3 to X-3) appropriate conservation actions will include the following:
		1. In nesting habitat, remove primarily seedling and sapling trees leaving some mature juniper for use by native species that require the tree structure, except within 6 km (3.73 miles) of leks.
		2. In brood-rearing habitat, encourage wood and biomass cutting with reseeding of native perennial species.
		3. Winter habitat should be treated using a mixture of mechanical and prescribed fire treatments followed with reseeding of native perennial species.
		NOTE: Recovery of X-3 areas is a highly expensive human intervention using mechanical treatments. Conservation actions apply to nesting, brood-rearing, and winter habitats.

		1. Conservation measures include taking advantage of grants, or large project initiative funding to complete site treatments which include removal of dominant species, and reseeding with a mix of perennial native shrubs, grasses, and forbs.
Noxious Weeds	11: Restrict Herbicide Broadcast Spraying Around Leks, and Lek Complex Associated Habitats.	1. No broadcast herbicide treatments will occur within nesting and brood-rearing habitat unless they are shown to be beneficial to the sagebrush ecosystem and sage-grouse.
		2. Noxious weeds will be controlled using spot treatments focused on the specific infestations.
		3. No broadcast spraying of herbicide within 6 km (3.73 miles) of leks.
		4. From Connelly et al. (2000): *Until research unequivocally demonstrates that using tebuthiuron and similar-acting herbicides to control sagebrush has no long-lasting negative impacts on sage-grouse habitat, use these herbicides only on an experimental basis and over a sufficiently small area that any long-term negative impacts are negligible.*
		NOTE: Research from 1998-2000 in the California portion of the PMU showed a strong relationship between mass of females at breeding and persistence and ultimate success of nesting females. Many smaller and lighter females either did not attempt to nest or attempted to nest but did not re-nest as persistently as heavier females. This relationship was found to be independent of the age of females (yearlings or adults). Re-nesting can be considered to be crucial to recruitment in this population because re-nesting females were almost twice as likely to be successful in hatching a brood on their second, rather than first, nesting attempt. These relationships are likely habitat based and are also likely to be strongly influenced by forage quality available to females from pre-breeding (winter) through hatching.

Appendix I

Management of Lands with Wilderness Characteristics

Appendix I

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APPENDIX I

MANAGEMENT OF LANDS WITH WILDERNESS CHARACTERISTICS

MANAGEMENT DIRECTION

Management of Lands With Wilderness Characteristics is part of BLM's multiple-use mandate, and is recognized within the spectrum of resource values and uses.

Public lands with wilderness characteristics generally:

- Have been affected primarily by the forces of nature, with the imprint of humans substantially unnoticeable,
- Have outstanding opportunities for solitude or a primitive and unconfined type of recreation,
- Have at least five thousand acres of land or of sufficient size as to make practicable its preservation and use in unimpaired condition, and
- Potentially containing ecological, geological, or other features of scientific, educational, scenic, or historical value.

With exceptions, public lands having wilderness characteristics should be managed to protect these values. In addition, they should augment multiple-use management of the Eagle Lake Field Office and adjacent lands particularly for the protection of watersheds and water yield, wildlife habitat, natural plant communities, and similar natural values.

With exceptions, the following activities generally do not occur within lands having wilderness characteristics:

- Commercial enterprises
- Permanent roads
- Temporary roads
- Use of motor vehicles
- Use of motorized equipment
- Use of motorboats
- Landing of aircraft
- Mechanical transport
- Structures Installations

However, there are exceptions to these prohibitions and they are generally grouped into three categories.

- Valid Existing Rights. Prior-existing rights may continue. New discretionary uses that create valid existing rights are not allowed.
- Administrative Activities. New commercial activities or new permanent roads will not be authorized. BLM may authorize any of the other prohibitions if it is necessary to meet the minimum requirements to administer and protect the lands with wilderness

character (called the "minimum requirement exception") and to protect the health and safety of persons within the area.

- Other General Allowances. Subject to limitations determined by the State Director, general allowances could include actions necessary to control fire, insects, and diseases, recurring Federal mineral surveys, established livestock grazing, commercial services to the extent necessary for activities which are proper for realizing the recreational or other wilderness character purposes and compatible with the defined values, and adequate access to in-holdings.

SPECIFIC GUIDANCE

1. Emergencies. The use of motor vehicles and mechanical transport, and the construction of temporary roads, structures, and installations is allowed for emergency purposes and when consistent with the management principles of the Eagle Lake Field Office and the "minimum requirement exceptions."

2. Land Disposals, Rights-of-Ways, Use Authorizations. These lands will be retained in public ownership. They will not be disposed through any means, including public sales, exchanges, patents under the Recreation and Public Purposes Act, color of title Class II, desert land entries (except where a vested right was established prior to October 21, 1976) or State selections. Disposals may be permitted under normal BLM procedures for mining patents, color of title Class I, and desert land entries in which a vested right was established. Prior existing rights, such as leases under the Recreation and Public Purposes Act, leases/permits under 43 CFR 2920, and rights-of-ways (ROWs) may continue. These also could be renewed if they are still being used for their authorized purpose. New authorizations, leases, permit, and ROWs will not be authorized since they are considered new valid rights.

3. Routes of Travel. The construction of new permanent roads will not be allowed. New temporary roads could be allowed if the BLM determines it is consistent with the "minimum requirement exception," if it is necessary to protect the health and safety of persons within the area, or if necessary to control fire, insects, and diseases.

Motorized or mechanized use of the existing routes is allowed subject to prescriptions outlined in the route designation process or stipulations identified in an authorization. Unless stipulated in the plan, any motorized or mechanized uses off those routes of travel will not be allowed.

4. Mining. Existing and new mining operations will be regulated using the 43 CFR 3809 regulations to prevent unnecessary and undue degradation of the lands.

5. Mineral Leasing. Existing mineral leases represent a valid existing right. These rights are dependent upon the specific terms and conditions of each lease. Existing leases will be regulated to prevent unnecessary or undue degradation.

No new surface occupancy leases will be issued. Non-surface occupancy leases may be issued if they will not impact the area's wilderness character. This applies to public lands, including split-estate.

6. Grazing. Existing livestock grazing, and the activities and facilities that support a grazing program are permitted to continue at the same level and degree, subject to any additional prescriptions.

Adjustments in the numbers and kind of livestock permitted to graze would be made as a result of revisions in the land use plan. Consideration is given to range condition, the protection of the range resource from deterioration, and protection of the wilderness character of the area.

The construction of new grazing facilities would be permitted if they are primarily for the purpose of protecting wilderness characteristics and more effective management of resources, rather than to accommodate increased numbers of livestock.

The use of motorized equipment for emergency purposes is allowed.

7. Fire Management. Fire management will be consistent with Bureau policy. Fires must be controlled to prevent the loss of human life or property. They must also be controlled to prevent the spread of fires to areas outside of Lands With Wilderness Character where life, resources, or property may be threatened.

Human caused wildfires will be prevented and/or controlled. It may be appropriate to allow natural fires to burn in conformity with a fire management plan. Prescribed fires are allowed in conformity with a fire management plan so long as it consistent in improving or maintaining the areas wilderness character.

Light-on-the-land fire management techniques will be applied.

New fire management structures are allowed if it is necessary to meet the minimum requirements to administer and protect the Lands With Wilderness Character and to protect the health and safety of persons within the area.

8. Forest/Vegetation Health. Insects, disease, and invasive species may be controlled if determined that it is necessary to meet the minimum requirements to administer and protect these lands.

Insect and disease outbreaks must not be artificially controlled, except to protect timber or other valuable resources outside the Land With Wilderness Character, or in special instances when the loss to resources within these lands is undesirable.

Vegetative manipulation to control noxious, exotic, or invasive species is allowed when there is no effective alternative and when the control is necessary to maintain the natural ecological balances within the area. Control may include manual, chemical, and biological treatment provided it will not cause adverse impacts to the wilderness character.

Where naturalness has been impacted by past timber harvesting, forest stand treatments such as thinnings would be allowed in limited areas, as long as the primary purpose is to accelerate to return these impacted areas to a natural character.

9. Recreation. Primitive and unconfined recreational uses such as hiking, camping, rock climbing, caving, fishing, hunting, trapping, etc. are allowed on these lands. Recreational uses will not be allowed if they require:

- Motor vehicles or mechanical transport (e.g, mountain bikes) off routes designated as open or limited as designated through the route designation process.
- The use of motorboats.
- Permanent structures or installations (other than tents, tarpaulins, temporary corrals, and similar devices for overnight camping).

New commercial services will not be allowed unless they are necessary for realizing the primitive and unconfined recreational values. An example of an allowed commercial service would be an outfitting and guide service. Existing commercial recreational authorizations may be allowed to continue under its terms and conditions to their expiration date.

Recreational or hobby collecting of mineral specimens when conducted without location of a mining claim may be allowed. This use will be limited to hand collection and detection equipment.

10. Cultural and Paleontological Resources. Cultural and paleontological resources are recognized as unique and valuable. They are also important supplemental values to an area's wilderness character.

Resource inventories, studies, and research involving surface examination may be permitted if it benefits wilderness values. This same standard applies for the salvage of archeological and paleontological sites; rehabilitation, stabilization, reconstruction, and restoration work on historic structures; excavations; and extensive surface collection may also be permitted for a specific project.

Permanent physical protection, such as fences, will be limited to those measures needed to protect resources eligible for the National Register of Historic Places and will be constructed so as to minimize impacts on apparent naturalness.

11. Wildlife Management. Fish and wildlife resources are a special feature that may contribute to an area's wilderness character. Whenever possible, these resources should be managed to maintain that character.

Nothing will be construed as affecting the jurisdiction or responsibilities of the State agencies with respect to fish and wildlife management on these lands. Fishing, hunting and trapping are legitimate activities on these lands. The State establishes regulations and enforcement for these uses.

State wildlife agencies and the BLM are responsible for fostering a mutual understanding and cooperation in the management of fish and wildlife. Management activities on these lands will emphasize the protection of natural processes. Management activities will be guided by the principle of doing the minimum necessary to manage the area to preserve its natural character.

Management of public lands having wilderness character will follow the guidelines provided in the Memorandum of Understanding between the BLM and the International Association of Fish and Wildlife Agencies. It will also follow any additional site-specific wildlife decisions addressed through the land use planning process.

Appendix J

Livestock Grazing Allotments

Appendix J

Livestock Grazing Allotments

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Livestock Grazing Allotments

Allot. #	Allotment Name	Mgt Cat.	Public Acres	Type	Live-stock #	Begin date	End Date	Aums	Public %
00401	Walton Individual	C	920	Cattle	130	4/16	11/1	94	11
00402	Said Valley	C	1483	Cattle	35	4/16	10/31	229	100
00403	Grasshopper Ridge	M	4165	Cattle	48	5/1	9/1	196	100
00404	Dry Valley South	C	398	Cattle	3	4/16	10/31	20	100
00405	New Bailey Creek	I	17360	Cattle	388	5/1	9/30	1952	100
00405	New Bailey Creek	I	17360	Cattle	14	4/16	9/30	77	100
00406	Williams Individual	M	3080	Cattle	94	5/16	10/31	522	100
00407	Rave A.M.P.	I	29691	Cattle	437	4/1	10/15	2845	100
00408	North Horse Lake	I	24300	Cattle	80	5/15	9/15	326	100
00408	North Horse Lake	I	24300	Cattle	251	4/16	10/31	1642	100
00409	Slate Creek Amp	I	31855	Cattle	198	4/16	10/31	1295	100
00409	Slate Creek Amp	I	31855	Cattle	60	10/31	11/15	32	100
00409	Slate Creek Amp	I	31855	Cattle	85	5/10	9/30	402	100
00409	Slate Creek Amp	I	31855	Cattle	66	4/16	9/15	332	100
00410	Bucks Bay	I	5404	Cattle	167	5/1	9/30	840	100
00411	Hansen Individual	C	1120	Cattle	25	4/14	9/16	128	100
00413	Crest	I	11835	Cattle	34	5/1	9/15	154	100
00414	Snowstorm	I	45480	Cattle	45	4/4	9/30	266	100
00414	Snowstorm	I	45480	Cattle	475	4/1	10/30	3326	100
00415	Erick Allot.	I	2280	Cattle	46	5/1	9/30	231	100
00416	Wood Individual	M	2499	Cattle	50	5/1	9/30	252	100
00417	Cottonwood Fenced	M	1680	Cattle	40	5/10	8/31	150	100
00418	Stone Individual	C	928	Cattle	55	4/1	12/31	50	10
00419	Walsh Mountain	M	5260	Cattle	58	4/16	9/15	292	100
00420	Barron Individual	M	4000	Cattle	30	4/1	8/1	121	100
00421	South Horse Lake	I	41720	Cattle	81	4/1	8/31	407	100
00421	South Horse Lake	I	41720	Cattle	173	4/4	8/31	853	100
00421	South Horse Lake	I	41720	Cattle	98	4/1	8/31	493	100
00421	South Horse Lake	I	41720	Cattle	215	4/1	8/31	1081	100
00421	South Horse Lake	I	41720	Cattle	36	4/1	8/31	181	100
00422	Humphrey 3-C	C	2945	Cattle	37	4/1	5/31	74	100
00422	Humphrey 3-C	C	2945	Cattle	76	4/1	5/31	152	100
00422	Humphrey 3-C	C	2945	Cattle	39	4/1	5/30	77	100
00423	Tablelands	I	16052	Cattle	264	4/1	9/30	1588	100
00424	Coffin Individual	C	1559	Cattle	32	5/1	10/31	194	100
00425	Rice Canyon	I	11520	Cattle	34	4/1	8/31	171	100
00425	Rice Canyon	I	11520	Cattle	267	4/1	6/1	544	100
00426	Willow Creek	I	7124	Cattle	78	4/1	6/30	233	100
00427	Shaffer Mtn.	I	25752	Cattle	268	4/1	9/30	1612	100
00501	Round Valley	C	237	Cattle	2	4/1	11/30	16	100
00502	Jacks Valley	C	323	Cattle	15	10/1	10/31	1	2
00502	Jacks Valley	C	323	Cattle	160	4/11	8/31	15	2
00502	Jacks Valley	C	323	Cattle	150	9/1	9/30	3	2
00503	Ulch	C	240	Cattle	15	4/1	5/15	22	100
00505	Satica	C	920	Cattle	20	6/1	8/29	59	100

00507	East Bald Mountain	I	3000	Cattle	44	4/1	4/30	43	100
00507	East Bald Mountain	I	3000	Cattle	104	4/1	4/30	103	100
00510	North Fort Sage	M	2920	Cattle	27	4/1	10/31	190	100
00511	West Fort Sage	I	6532	Cattle	51	4/1	8/31	257	100
00511	West Fort Sage	I	6532	Cattle	51	4/1	8/31	257	100
00511	West Fort Sage	I	6532	Cattle	54	4/16	8/31	245	100
00512	South Fort Sage	I	4879	Cattle	13	4/16	8/31	59	100
00512	South Fort Sage	I	4879	Cattle	44	4/16	5/31	67	100
00513	Willow Creek Grade	C	2520	Cattle	124	9/1	9/1	4	100
00513	Willow Creek Grade	C	2520	Cattle	16	4/16	5/31	24	100
00513	Willow Creek Grade	C	2520	Cattle	124	4/16	5/31	188	100
00514	Rowland	C	400	Cattle	19	4/16	5/31	29	100
00601	Bonta	C	200	Cattle	24	5/1	5/31	12	50
00603	Harrison	C	520	Cattle	62	9/16	10/15	18	30
00603	Harrison	C	520	Cattle	62	5/1	5/31	19	30
00604	Magee	C	1078	Cattle	141	4/1	5/15	71	34
00605	Dotta	C	120	Cattle	20	7/1	10/31	8	10
00606	Dellera 1	C	440	Cattle	32	4/1	4/30	17	53
00606	Dellera 1	C	440	Cattle	32	7/1	9/15	16	20
00607	Pitchfork	I	40	Cattle	75	5/15	9/15	3	1
00608	Chilcoot Community	I	3040	Cattle	28	5/1	6/30	42	74
00608	Chilcoot Community	I	3040	Cattle	56	5/1	6/30	83	74
00608	Chilcoot Community	I	3040	Cattle	28	5/1	6/30	42	74
00608	Chilcoot Community	I	3040	Cattle	28	5/1	6/30	42	74
00608	Chilcoot Community	I	3040	Cattle	28	5/1	6/30	42	74
00609	Ramelli	C	80	Cattle	2	6/1	10/31	10	100
00612	Steffan	C	1719	Cattle	497	5/16	6/30	120	16
00614	Mcpherrin	C	83	Sheep	776	5/1	10/31	9	1
00615	Mello Canyon	C	603	Cattle	20	5/1	6/30	40	100
00616	Alpers	C	80	Cattle	3	5/16	6/15	3	100
00701	Twin Peaks	I	379788	Cattle	102	4/16	10/31	667	100
00701	Twin Peaks	I	379788	Sheep	4000	4/1	5/30	1578	100
00701	Twin Peaks	I	379788	Sheep	2000	6/1	6/30	395	100
00701	Twin Peaks	I	379788	Sheep	4000	10/1	10/25	658	100
00701	Twin Peaks	I	379788	Cattle	991	4/1	1/31	9970	100
00701	Twin Peaks	I	379788	Sheep	2000	9/16	9/30	197	100
00702	Winter Range, Nv+Ca	I	60277	Cattle	166	11/1	2/28	655	100
00702	Winter Range, Nv+Ca	I	60277	Cattle	95	11/1	2/28	375	100
00702	Winter Range, Nv+Ca	I	60277	Cattle	95	3/1	3/31	97	100
00702	Winter Range, Nv+Ca	I	60277	Sheep	1000	1/10	2/28	329	100
00702	Winter Range, Nv+Ca	I	60277	Cattle	166	3/1	3/31	169	100
00702	Winter Range, Nv+Ca	I	60277	Sheep	2000	3/17	3/31	197	100
00702	Winter Range, Nv+Ca	I	60277	Sheep	1000	3/1	4/10	270	100
00703	Observation	I	149063	Cattle	667	4/15	10/31	4386	100
00703	Observation	I	149063	Cattle	137	4/15	10/31	901	100
00703	Observation	I	149063	Sheep	4000	9/1	9/15	395	100
00703	Observation	I	149063	Sheep	2000	6/1	7/15	296	50
00703	Observation	I	149063	Cattle	108	5/1	10/31	653	100
00703	Observation	I	149063	Sheep	2000	9/16	9/30	197	100
00704	Deep Cut	I	53438	Cattle	763	4/1	6/15	1906	100

00704	Deep Cut	I	53438	Cattle	82	4/16	10/31	494	92
00708	Spanish Springs Ind.	M	958	Cattle	49	5/1	10/30	259	88
00709	Twin Buttes	M	2160	Cattle	24	5/1	10/31	145	100
00709	Twin Buttes	M	2160	Cattle	11	5/1	10/31	67	100
00710	Spanish Springs Amp	I	6986	Cattle	82	5/16	10/15	412	100
00710	Spanish Springs Amp	I	6986	Cattle	139	5/16	10/15	699	100
00711	Shinn Peak	M	4725	Sheep	2000	6/1	7/11	270	50
Total								52250	

Appendix K

Description of Land Health Assessment (LHA) On-The-Ground Procedures

Appendix K

Description of Land Health Assessment (LHA) On-The-Ground Procedures

Appendix K

Description of Land Health Assessment (LHA) On-The-Ground Procedures

Description of Land Health Assessment (LHA) On-The-Ground Procedures, and Determination of Acres Represented by Each Sample Site

To date Land Health Assessment (LHA) has been performed on 211,636 acres within the Eagle Lake Field Office area using 273 sample sites. Each sample site was assessed by an Interdisciplinary (ID) Team composed of a hydrologist, soils person, botanist, wildlife biologist/ecologist, and the rangeland management specialist responsible for livestock grazing within the area being sampled. The procedures used during the period from 1999 through present are summarized within this document, and will be used in future LHA work.

Sample sites are chosen using stratified random sampling as follows:

Land Health Field Assessment Procedures:

Land Health Assessment is performed using soils information gathered by the Natural Resources Conservation Service (NRCS) in Order 3 soil surveys. Within an order 3 soil survey each Soil Map Unit (SMU) can contain up to three distinct and dominant soil series, and up to four inclusions which usually do not represent more than 20% of the area within the SMU. Each soil series supports a specific ecological site described by NRCS during the soil survey. These ecological site descriptions are used in determining status of land health.

Stratification of the area was accomplished by:

1. Determining which soil map units are within the total sample area, and which cover the largest proportion of that area.

2. Those most familiar with the area to be sampled provide input as to which specific parts of that area are most representative of the whole.

3. Sites with specific questions or issues are also provided as potential sample areas.

4. Each area is first sampled using a reconnaissance survey.

5. Based on the reconnaissance a sample site is picked that is representative of the soil map unit, consists of one soil series, and covers an area large enough for the ID Team to complete their on-the-ground assessment.

<u>The following on-the-ground assessment activities are completed at each sample site:</u>

1. A hole is dug to confirm the soil series present and to determine if this soil series is a dominant within the soil map unit or an inclusion.

2. The ecological site description is reviewed to insure it is the accurate site for the soil series, and area to be sampled.

3. A complete plant species list is developed by walking over at least two acres. Note: Many plant species lists and assessments are applied over greater than five acres.

4. Five height measurements are recorded for each plant species to provide median plant species heights during evaluation. Note: In the case where less than five individuals of a plant species occur in the site the number of measurements is less than five.

5. Canopy cover provided by each species is recorded using the Braun-Blanquet cover and abundance scale. Cover classes are: 5 - >75% cover, 4 – 50 to75% cover, 3 – 25 to 50% cover, 2 – 5 to 25% cover. Abundance classes include: 1 – species common in the site but provide < 5% cover, + - a few individuals of a species are scattered throughout the site but provide <5% cover, and r – single individual of a species within the site. Note: This scale is also used by the ID Team to complete Appendix 3 *Cover Worksheet.*

6. A 100 point cover transect is paced through some sites to aid the ID Team in maintaining clear pictures of cover classes.

Note: Steps 2, 3, and 4 are additional to the procedure described in Technical Note 1734-6 *Interpreting Indicators of Rangeland Health,* Dated 2000. Estimating cover for each plant species recorded is also beyond the scope of Technical Note 1734-6.

7. The entire ID Team completes Appendices 4 - *Species Dominance Worksheet*, 3 – *Cover Worksheet*, and 1 – *Rangeland Health Evaluation Summary Worksheet* as indicated in Technical Reference 1734 – 6. In those cases where the site being assessed is considered by the ID Team to be qualified as an Ecological Reference Area, Appendix 2 – *Ecological Reference Area Worksheet* is completed along with Appendix 1.

8. Seventeen indicators are used to assess the health of three attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) (See Table 1). The ID Team determines the extent of departure from the ecological site description for each attribute. There are five levels of departure (None to Slight, Slight to Moderate, Moderate, Moderate to Extreme, and Extreme). The "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings determines the health of each attribute.

Table1. Land Health Indicators and Their Relation to the Three Attributes of Land Health.

Indicators	Soil/Site Stability	Hydrologic Function	Biotic Integrity
1. Rills	X	X	
2. Water Flow Patterns	X	X	
3. Pedestals and/or Terracettes	X	X	
4. Bare Ground	X	X	
5. Gullies	X	X	
6. Wind-Scoured, Blowouts, and/or Deposition Areas	X		
7. Litter Movement		X	
8. Soil Surface resistance to Erosion	X	X	X
9. Soil surface Loss or Degradation	X	X	X
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff		X	
11. Compaction Layer	X	X	X
12. Functional/Structural Groups			X
13. Plant Mortality/Decadence			X
14. Litter Amount		X	X
15. Annual Production			X
16. Invasive Plants			X
17. Reproductive Capability of Perennial Plants			X

Ratings of None to Slight, and Slight to Moderate are considered "Healthy", Moderate is equivalent to "At Risk", and Moderate to Extreme and Extreme are "Unhealthy".

Determination of Acres Represented:

Acres represented by each sample site are determined using a 7.5" (1:24,000) soil map as follows:

1. Total acres are first calculated for the specific SMU sampled within the boundaries of the quadrangle.

2. Total acres calculated for the SMU are than multiplied by the percent, in decimal format, of the soil series sampled. This percentage is given in the SMU description prepared by NRCS in the soil survey documentation.

3. The acres represented by the percent of the soil series within the SMU are adjusted further, as follows:

    a. If the Land Health Assessment is being completed within an administrative unit such as an allotment, and, the unit boundary bisects the specific SMU sampled only those acres within the administrative unit are included.

b. All sampling is bounded within sixth level watersheds. If a sixth level watershed boundary bisects the specific SMU sampled only the acres within the specific watershed being sampled are used. If the watershed boundary falls inside the allotment boundary only the acres for the allotment that fall within the specific watershed sampled are used.

4. The most conservative acre figure is used as the sample site representative acres for reporting and evaluation purposes.

Appendix L

Wild And Scenic River Eligibility And Suitability

Appendix L

Wild And Scenic River Eligibility And Suitability

WILD AND SCENIC RIVER ELIGIBILITY AND SUITABILITY

Wild and Scenic River System

The Wild and Scenic Rivers Act of 1968 (Public Law 90-542) was passed by Congress to preserve river systems that contain outstanding features. The law was enacted during an era when many rivers were being dammed or diverted, and is intended to balance this development by ensuring that certain rivers and streams remain in their free-flowing condition. The BLM is mandated to evaluate stream segments on public lands as potential additions to the National Wild and Scenic Rivers System (NWSRS) during the Resource Management Plan (RMP) Process under Section 5(d) of the Act. The NWSRS study guidelines are found in BLM Manual 8351, U.S. Departments of Agriculture and Interior Guidelines published in Federal Register Vol. 7, No.173, September 7, 1982 and in various BLM memoranda and policy statements. Formal designation as a Wild and Scenic River requires Congressional Legislation, or designation can be approved by the Secretary of Interior if nominated by the Governor of the state containing the river segment. The following discussion provides information on how BLM considered waterways for potential inclusion in the NWSRS.

The NWSRS study process has three distinct steps:

- Determine what rivers or river segments are eligible for NWSRS designation;
- Determine the potential classification of eligible river segments as wild, scenic, recreational or any combination thereof; and
- Conduct a suitability study to determine if the river segments are suitable for designation as components of the NWSRS.

This report documents all three steps of the process for the streams in the planning area.

Eligibility of Streams in the Eagle Lake Field Office

Identification

A variety of sources were reviewed to identify waterways which could have potential for wild and scenic river designation. They include the Nationwide Rivers Inventory List, the Outstanding Rivers List compiled by American Rivers, Inc., river segments identified in the riparian inventory (2002), and river segments identified by the planning team as having potential to meet Wild and Scenic River eligibility requirements.

The Wild and Scenic Rivers Act defines a river as a "flowing body of water or estuary or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes."

Eligibility Determination

Each identified river segment was evaluated to determine whether it is eligible for inclusion in the NWSRS. To be eligible, a river segment must be "free flowing" and must possess at least one "outstandingly remarkable value" (ORV). These ORVs include the following values:

- Scenic
- Recreational
- Geological
- Fish
- Wildlife

- Historical
- Cultural
- Ecological
- Riparian
- Botanical
- Hydrological
- Scientific

To be considered as "outstandingly remarkable," a river related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. Only one such value is needed for eligibility. All values should be directly river related, meaning they should:

- Be located in the river or on its immediate shorelands (generally within ¼ mile on either side of the river);
- Contribute substantially to the functioning of the river ecosystem; and/or
- Owe their location or existence to the presence of the river.

These are the only factors considered in determining the eligibility of a river segment. All other relevant factors are considered in determining suitability. A river need not be navigable by watercraft to be eligible. For purposes of eligibility determination, the volume of flow is sufficient if it is enough to maintain the outstandingly remarkable value(s) identified within the segment.

Table L-1 summarizes the eligibility evaluation of all identified river segments. The table includes information on the length of stream segments studied, indicates if outstandingly remarkable value(s) are present, and identifies the potential classification of each eligible segment.

Classification

The Wild and Scenic Rivers Act and subsequent interagency guidelines provide the following direction for establishing preliminary classifications for eligible rivers:

- **Wild Rivers:** 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.
- **Scenic Rivers:** 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.
- **Recreational Rivers:** 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.

Suitability of Streams

Segments displayed in Table L-1 were found to be eligible for inclusion into the NWSRS. Section 4(a) of the Wild and Scenic River Act mandates that all rivers found eligible as potential additions to the NWSRS be studied as to their suitability for such a designation. The purpose of the suitability study is to provide information upon which the President of the United States can base his recommendation and Congress can make a decision.

The study report describes the characteristics that do or do not make the stream segment a worthy addition to the system, the current status of land ownership and use in the area, the reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the system, and several other factors. The suitability study is designed to answer these questions:

- Should the river's free–flowing character, water quality, and outstandingly remarkable values (ORV) be protected, or are one or more other uses important enough to warrant doing otherwise?
- Will the river's free-flowing character, water quality, and ORVs be protected through designation? Is it the best method for protecting the river corridor? (In answering these questions, the benefits and impacts of wild and scenic river designation must be evaluated, and alternative protection methods considered.)
- Is there a demonstrated commitment to protect the river by any nonfederal entities that may be partially responsible for implementing protective management?

Pursuant to Sections 4(a) and 5(c) of the Wild and Scenic Rivers Act, the following factors were considered and evaluated as a basis for the suitability determination for each river.

- Characteristics that do or do not make the area a worthy addition to the NWSRS.
- The current status of land ownership, minerals (surface and subsurface), and use in the area, including the amount of private land involved and associated or incompatible uses.
- The reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS. Historical or existing rights which could be adversely affected.
- The federal agency that will administer the area should it be added to the NWSRS.
- The estimated cost to the United States of acquiring necessary lands and interests in lands and of administering the area should it be added to the NWSRS.
- 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 NWSRS.
- An evaluation of the adequacy of local zoning and other land use controls in protecting the river's ORVs by preventing incompatible development.
- Federal, public, state, local, or other interests in designation or non-designation of the river, including the extent to which the administrator of the river, including the cost thereof, may be shared by state, local, or other agencies and individuals. Support or opposition to the designation.
- The consistency of designation with other agency plans, programs or policies and in meeting regional objectives.
- The contribution to river system or basin integrity.
- The ability of BLM to manage thc river segments under designation, or ability to protect the river area other than Wild and Scenic designation.
- The potential for water resources development.

Table L-1

Wild and Scenic Rivers Eligibility and Classification for the Eagle Lake Field Office

River	Segment	Length (miles)	Outstandingly Remarkable Values	Proposed Classification
Susan	1 mile west of Devil's Corral to Hobo Camp adjacent to Susanville and within the Bizz Johnson National Recreation Trail Special Recreation Management Area	8	Scenic Recreational Geologic Historic Wildlife Botanical	Recreational
Willow Creek	Within Tunnison WSA	8	Scenic Recreational Cultural	Wild
Upper Smoke Creek	From Big Springs to Smoke Creek Reservoir and within a portion of Twin Peaks WSA	10.6	Scenic Recreational Cultural	Wild
Lower Smoke Creek	Within Lower Smoke Creek Canyon adjacent to Smoke Creek Road and within Dry Valley Rim WSA	3.2	Scenic Geologic Cultural Historic	Wild

Appendix M
2003 Stream Survey Summaries by Stream and Watershed

Appendix M

2003 Stream Survey Summaries by Stream and Watershed

Appendix M - 2003 Stream Survey Summaries by Stream and Watershed

Horse Lake Watershed

Summary of Stream Habitat Conditions
Shoals Creek (EL 207)

Current Conditions

General Description

Pine Creek is a small, shallow creek (mean width 1.3m, mean depth 0.04m), with a high proportion of fine sediment in the substrate. This stream has a pool/riffle ratio of 23/77, 55% sedimentation, and abundant rooted aquatic vegetation (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Shoals Creek (EL 207) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	23	45	Fair
Pool / Riffle ratio	23 / 77	45	Fair
Pool quality	4	40	Fair
Percent stream bottom with desirable materials	53	53	Fair
Bank cover	2	50	Fair
Bank stability	2.8	70	Good
Percent Habitat Optimum	44	44	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Shoals Creek (EL 207) during the 2003 field season.

Priority B Factors	Value	
Mean depth of stream (m)	0.04	
Mean width of stream (m)	1.3	
Mean % of stream shaded	5	
Mean % of bottom with clinging vegetation	0	
Mean % of bottom with rooted vegetation	51	
Mean % sedimentation	55	
Mean stream gradient (%)	5.6	
Mean landform gradient (%)	Left bank: 8.3	Right bank: 8.3
Mean stream flow rate during surveys (cfs)	0.2	
Mean water temperature (°C)	16	
Summer mean minimum water temperature (°C)[1]	NA	
Summer mean maximum water temperature (°C)[1]	NA	

Priority B Factors	Value
Number of days max. temperature exceeded 26°C[1]	NA
Mean air temperature (°C)	20
Turbidity description	Clear
Mean conductivity	167
Mean pH	7.6
Mean dissolved oxygen (% saturation)	69
Mean dissolved oxygen (mg/l)	6.8

[1]Hobo temperature gage measurements not taken at this site in 2003.

Condition of stream bank vegetation and bank stability
Stream banks are quite stable at most locations, due to abundant riparian vegetation (Table A). Riparian vegetation for the most part consists of grasses and forbs, and includes few woody perennials. Thus, although banks are currently stable, they are vulnerable to disturbance.

Shading of the water surface
Due to the low height of riparian vegetation, only 5% of the stream surface is shaded. This amount of shade contributes little to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Shoals Creek (Table C). The high relative abundance of Gastropoda is associated with the high abundance of aquatic vegetation, and also slow nonturbulent water. The presence of Odonata and Hemiptera indicates the presence of slow-water pool habitat.

Table C. Results of invertebrate sampling conducted on Shoals Creek (EL 207) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	3	96.0	25.1
Plecoptera	3	5.0	1.3
Trichoptera	5	77.0	20.1
Diptera	3	18.0	4.7
Odonata	2	6.0	1.6
Hemiptera	1	1.0	0.3
Coleoptera	2	4.5	1.2
Gastropoda	2	152.0	39.7
Bivalvia	1	19.0	5.0
Arachnida	1	2.5	0.7
Hirudinea	2	1.5	0.4
Percent EPT Taxa[1]			46.5

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
No fisheries surveys were conducted at Shoals Creek in 2003.

Potential to support Lahontan fish species
At the time of the survey on September 10, 2003, the water temperature and dissolved oxygen provided adequate habitat conditions for Lahontan cutthroat trout. However, due to the lack of shade and shallow water depth, temperatures may exceed acceptable limits for trout habitat during July and August. In addition, the small size of the stream limits habitat for all but small fish. Therefore, Shoals Creek probably would not support a trout population. Other Lahontan fish species which could potentially be supported by the habitat in Shoals Creek include relatively small fish which are tolerant of warm water such as tui chub, Lahontan redside, and speckled dace.

Summary of Stream Habitat Conditions
Cottonwood Canyon (EL 206)

Current Conditions
General Description
Cottonwood Canyon Creek is a small, high gradient, extremely shallow creek (mean width 2.6m, mean depth 0.02m), with a high proportion of gravel and cobble in the substrate. This stream has 100% riffle habitat, 23% sedimentation, and little aquatic vegetation (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Cottonwood Canyon Creek (EL 206) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	0	0	Poor
Pool / Riffle ratio	0 / 100	0	Poor
Pool quality	0	0	Poor
Percent stream bottom with desirable materials	77	77	Good
Bank cover	2.8	69	Fair
Bank stability	3.2	80	Excellent
Percent Habitat Optimum	69	69	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Cottonwood Canyon Creek (EL 206) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.02
Mean width of stream (m)	2.6
Mean % of stream shaded	60
Mean % of bottom with clinging vegetation	0.0
Mean % of bottom with rooted vegetation	1.3
Mean % sedimentation	23
Mean stream gradient (%)	8.3

Priority B Factors	Value
Mean landform gradient (%)	Left Bank: 18.1 Right Bank: 6.6
Mean stream flow rate during surveys (cfs)	0.2
Mean water temperature during surveys (°C)	9.2
Summer mean minimum water temperature (°C)[1]	11.8
Summer mean maximum water temperature (°C)[1]	23.1
Number of days max. temperature exceeded 26°C[1]	14
Mean air temperature during surveys (°C)	9.5
Turbidity description	Clear
Mean conductivity	181
Mean pH	7.3
Mean dissolved oxygen (% saturation)	66
Mean dissolved oxygen (mg/l)	7.6

[1]Based on Hobo temperature gage measurements recorded hourly from June 10 until August 31 (average of two stations on Cottonwood Canyon Creek).

Condition of stream bank vegetation and bank stability
Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes primarily perennials such as willow shrubs.

Shading of the water surface
Abundant perennial vegetation shades 60% of the water surface, which contributes to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Cottonwood Canyon Creek (Table C). Amphipods are most abundant in small habitats lacking fish (Voshell 2002). Amphipods are quite abundant in Cottonwood Canyon Creek, which may indicate a lack of fish in this stream.

Table C. Results of invertebrate sampling conducted on Cottonwood Canyon Creek (EL 206) during the 2003 field season.

Invertebrate Order	Maximum Types in a sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	3	95.0	33.0
Plecoptera (stoneflies)	2	5.0	1.7
Trichoptera (caddisflies)	3	28.0	9.7
Diptera (true flies)	1	1.0	0.3
Coleoptera (water beetles)	2	5.0	1.7
Gastropoda (snails)	1	3.0	1.0
Amphipoda (scuds)	1	151.0	52.4
Percent EPT Taxa[1]			44.4

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
No fisheries surveys were conducted at Cottonwood Canyon Creek in 2003.

Potential to support Lahontan fish species
Cottonwood Canyon Creek has a high proportion of desirable bottom materials and high dissolved oxygen content (Tables A and B). These are good attributes for supporting trout. However, the lack of pool habitat and the extremely shallow depth would prevent the establishment of trout in this stream. Lahontan fish species which could potentially be supported by the habitat in Cottonwood Creek include relatively small fish such as paiute sculpin, tui chub, Lahontan redside, and speckled dace. However, the shallowness of the water reduces the suitability of this stream for even these small fish. In addition, the high gradient of the reach surveyed, which includes some small waterfalls, may inhibit fish movement.

Summary of Stream Habitat Conditions
Pine Creek (EL193)

Current Conditions
General Description
Pine Creek is a small, shallow creek (mean width 1.8m, mean depth 0.05m), with a high proportion of fine sediment in the substrate. This stream has a pool/riffle ratio of 47/53, 72% sedimentation, and little aquatic vegetation (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Pine Creek (EL 193) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	62.5	93.0	Excellent
Pool / Riffle ratio	47 / 53	93.0	Excellent
Pool quality	3.8	45	Fair
Percent stream bottom with desirable materials	44	44	Fair
Bank cover	3.3	82.8	Excellent
Bank stability	2.8	70.3	Good
Percent Habitat Optimum	61	61	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Pine Creek (EL 193) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.05
Mean width of stream (m)	1.8
Mean % of stream shaded	60
Mean % of bottom with clinging vegetation	0

Priority B Factors	Value	
Mean % of bottom with rooted vegetation	8.8	
Mean % sedimentation	72	
Mean stream gradient (%)	1.2	
Mean landform gradient (%)	Left Bank: 21	Right Bank: 15
Mean stream flow rate during surveys (cfs)	0.4	
Mean water temperature during surveys (°C)	10	
Summer mean minimum water temperature (°C)[1]	NA	
Summer mean maximum water temperature (°C)[1]	NA	
Number of days max. temperature exceeded 26°C[1]	NA	
Mean air temperature during surveys (°C)	18	
Turbidity description	Clear	
Mean conductivity	163	
Mean pH	7.2	
Mean dissolved oxygen (% saturation)	71.5	
Mean dissolved oxygen (mg/l)	8.07	

[1]Hobo temperature gage measurements not taken at this site in 2003.

Condition of stream bank vegetation and bank stability
Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes primarily perennials such as willow shrubs.

Shading of the water surface
Abundant perennial vegetation shades 60% of the water surface, which contributes to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Pine Creek (Table C). The high relative abundance of Diptera may be associated with the high percentage of fine sediment. The presence of Odonata and Hemiptera indicates slow-water pool habitat.

Table C. Results of invertebrate sampling conducted on Pine Creek (EL 193) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	2	23.5	17.3
Plecoptera (stoneflies)	1	3.5	2.6
Trichoptera (caddisflies)	4	27.0	19.9
Diptera (true flies)	2	30.0	22.1
Odonata (damselflies & dragonflies)	2	6.5	4.8
Hemiptera (true bugs)	1	1.0	0.7

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Coleoptera (water beetles)	3	17.0	12.5
Gastropoda (snails)	2	26.0	19.1
Arachnida (water mites & spiders)	1	1.5	1.1
Percent EPT Taxa[1]			39.7

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
No fisheries surveys were conducted at Pine Creek in 2003.

Potential to support Lahontan fish species
Based on results of the survey, Pine Creek could conceivably support trout, although trout habitat is far from ideal. There is a high concentration of dissolved oxygen, and ample shade keeps the stream relatively cool. However, the high proportion of fine sediment indicates a lack of good trout spawning habitat, and the shallow depth would limit habitat for larger fish. Other Lahontan fish species which could potentially be supported by the habitat in Pine Creek include relatively small fish such as tui chub, Lahontan redside, and speckled dace.

Susan River/Honey Lake Watershed

Summary of Stream Habitat Conditions
Willow Creek (EL 178, 179, 180, 184, 185, 204)

Current Conditions
General Description
Willow Creek is a medium-sized creek (mean width 7.2m, mean depth 0.26m), which flows primarily within a canyon. Many boulders in the stream provide cover for fish, and sedimentation is relatively low throughout most of the length of Willow Creek. Of the stations surveyed, only Station 179 has greater than 16% sedimentation. The substrate at Station 179 was 100% fine sediment, and bank stability was lowest at this station. Most of Willow Creek is in good condition. Only Station 179 was given an overall habitat condition rating of poor, and ungulate damage was most evident at that station. Willow Creek has a pool/riffle ratio of 70/30, and aquatic vegetation in slow-water areas (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Willow Creek (EL 178, 179, 180, 184, 185, 204) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	70	61	Good
Pool / Riffle ratio	70 / 30	61	Good
Pool quality	3.6	48	Fair
Percent stream bottom with desirable materials	72	72	Good
Bank cover	2.3	58	Fair
Bank stability	3.5	88	Excellent
Percent Habitat Optimum	66	66	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Willow Creek (EL 178, 179, 180, 184, 185, 204) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.26
Mean width of stream (m)	7.2
Mean % of stream shaded	9.1
Mean % of bottom with clinging vegetation	15
Mean % of bottom with rooted vegetation	13
Mean % sedimentation	28
Mean stream gradient (%)	0.56
Mean landform gradient (%)	Left bank: 30 Right bank: 36
Mean stream flow rate during surveys (cfs)	5.9
Mean water temperature during surveys (°C)	20
Summer mean minimum water temperature (°C)[1]	16.8
Summer mean maximum water temperature (°C)[1]	23.3
Number of days max. temperature exceeded 26°C[1]	13
Mean air temperature during surveys (°C)	29
Turbidity description	Clear
Mean conductivity	267
Mean pH	8.2
Mean dissolved oxygen (% saturation)	68
Mean dissolved oxygen (mg/l)	6.3

[1]Based on Hobo temperature gage measurements recorded hourly June 11 - August 31, 2003. Values are means of temperature data from three stations.

Condition of stream bank vegetation and bank stability
Stream banks are quite stable throughout most of Willow Creek, due to abundant riparian vegetation (Table A). Riparian vegetation for the most part consists of grasses and forbs, as well as thick stands of willow and other woody perennials in some areas.

Shading of the water surface
Due to the low height of riparian vegetation relative to the stream width, only 9% of the stream surface is shaded. This amount of shade contributes little to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Willow Creek (Table C). The high diversity of invertebrate taxa is indicative of the variety of aquatic habitats in Willow Creek. The presence of Odonata and Hemiptera indicate slow-water pool habitat. The presence of Oligochaeta indicates areas with fine sediment. The presence of Gastropoda is often associated with aquatic vegetation.

Table C. Results of invertebrate sampling conducted on Willow Creek (EL 178, 179, 180, 184, 185, 204) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	4	9.3	15.8
Plecoptera	2	2.1	3.6
Trichoptera	6	13.7	23.1
Diptera	1	2.9	4.9
Odonata	2	0.8	1.3
Hemiptera	2	4.4	7.5
Coleoptera	3	4.3	7.3
Gastropoda	2	2.3	3.9
Bivalvia	1	0.3	0.6
Decapoda	1	0.1	0.2
Amphipoda	2	16.0	27.0
Oligochaeta	2	2.4	4.1
Hirudinea	1	0.1	0.2
Nematoda	1	0.3	0.6
Percent EPT Taxa[1]			42.4

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
Fish population surveys were conducted using electrofishing at Stations 178-1 and 178-2 (Table D). Fish species found included speckled dace, Lahontan redside, tui chub, Tahoe sucker, paiute sculpin, and brown trout. The three most abundant species were Lahontan redside, Tahoe sucker, and speckled dace. Based on a comparison with previous electrofishing surveys conducted in 1980 and 1994 (Tables E and F), the fish species composition appears to have

remained similar to that found by previous research. The low relative abundance of trout in Willow Creek is probably related to high water temperatures during the summer, which reach the upper tolerance of most trout species. A fishery survey was completed during 2005 that is consistent with previous surveys.

Potential to support Lahontan fish species

Habitat characteristics of Willow Creek are adequate (though marginal) to support trout populations. The main habitat characteristic limiting trout production in Willow Creek is high summer temperature. Mean maximum summer temperature was 23.3°C in 2003, slightly above the recommended maximum for cutthroat trout of 22°C (Hickman and Raleigh 1982). In addition, maximum daily temperature exceeded 26°C on 16 days (average of 3 temperature gaging stations). Therefore, high temperatures probably limit trout survival and growth in Willow Creek, especially during particularly hot summers or if flow is reduced. During fish population surveys at Station 178-1 and 178-2 on October 16 2003, brown trout were found in Willow Creek (Table D). During surveys in 1980 and 1994, both brown trout and rainbow trout were evident, though only a few rainbow trout were found (Tables E and F). Reintroduction of Lahontan cutthroat trout might be successful in Willow Creek, if stocked LCT were of a large size which could avoid predation of brown trout. In addition to brown trout and rainbow trout, Willow Creek currently supports populations of speckled dace, mountain sucker, Tahoe sucker, Lahontan redside, paiute sculpin, and tui chub, based on surveys in 1994 and 2003. Willow Creek thus supports a high diversity of Lahontan fish species.

Table D. Fish composition of Willow Creek sample sites, BLM 2003.

Site RFA #	Approx Site 80-94 #	Survey Length (m)	# of Fish	SD (%)	LRS (%)	TS (%)	MS (%)	PS (%)	BT (%)	RT (%)	TC (%)
178-1	WC-1	100	110	15	54	26	0	2	0	0	3
178-2	WC-1	100	145	31	38	17	0	13	1	0	0

Table E. Fish composition of Willow Creek sample sites, UCD, 1994.

Site 80-94 #	Approx Site RFA #	Survey Length (m)	# of Fish	SD (%)	LRS (%)	TS (%)	MS (%)	PS (%)	BT (%)	RT (%)	TC (%)
WC-1	178	86	197	20	53	15	5	2	5	0	0
WC-2	179	91	125	54	27	9	2	0	8	0	0
WC-3	204	31	161	37	50	2	1	8	2	1	0
WC-4	185-1	57	363	61	19	13	0	5	2	0	0
WC-5	185-2	29	139	47	38	9	1	5	0	0	0
WC-6	-	37	193	63	21	16	0	<1	0	0	0
WC-7	-	44	315	91	3	6	0	0	0	<1	0
WC-8	-	80	263	37	34	5	0	8	0	0	16
WC-9	-	35	85	55	41	4	0	0	0	**	0
WC-10	-	104	86	62	36	2	0	0	0	0	0

Table F. Fish composition of Willow Creek sample sites, BLM, 1980

Site 80-94 #	Approx Site RFA #	# of Fish	SD (%)	LRS (%)	TS (%)	MS (%)	PS (%)	BT (%)	RT (%)	TC (%)
WC-1	178	86	6	35	47	5	0	0	0	0
WC-2	179	87	60	25	5	1	6	2	0	0
WC-3	204	51	10	43	4	2	37	4	0	0
WC-4	185-1	39	21	56	31	3	18	3	0	0
WC-5	185-2	356	44	35	13	5	2	<1	<1	0

Summary of Stream Habitat Conditions
Pete's Creek (EL200)

Current Conditions
General Description
Pete's Creek is a very slow-moving, small creek with 99% pool habitat, 1.28 cubic feet per second, average width of 1.3 meters, average depth of 0.18 meters, and 60% sedimentation. (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Pete's Creek (EL200) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	99	1	Poor
Pool / Riffle ratio	100 / 0	0	Poor
Pool quality	4	40	Fair
Percent stream bottom with desirable materials	40	40	Fair
Bank cover	1.9	48.4	Fair
Bank stability	1.3	31.3	Poor
Percent Habitat Optimum		41.6	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Pete's Creek (EL200) during the 2003 field season.

Priority B Factors	Value	
Mean depth of stream (m)	0.18	
Mean width of stream (m)	1.3	
Mean % of stream shaded	0.5	
Mean % of bottom with clinging vegetation	0	
Mean % of bottom with rooted vegetation	48.1	
Mean % sedimentation	60	
Mean stream gradient (%)	1.2	
Mean landform gradient (%)	Left Bank: 51.8	Right Bank: 58.9
Mean stream flow rate during surveys (cfs)	1.28	
Mean water temperature during surveys (°C)	21.1	

Priority B Factors	Value
Summer minimum water temperature (°C)[1]	
Summer mean maximum water temperature (°C)[1]	
Number of days max. temperature exceeded 26°C[1]	
Mean air temperature during surveys (°C)	24
Turbidity description	Clear
Mean conductivity	179
Mean pH	7.25
Mean dissolved oxygen (% saturation)	58.7
Mean dissolved oxygen (mg/l)	5.24

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003.

Condition of stream bank vegetation and bank stability
Stream banks are not stable (Table A). Riparian vegetation is dominated by herbaceous vegetation.

Shading of the water surface
Due to the low height of riparian vegetation relative to stream width, only about 0.5% of the water surface is shaded (Table B). This amount of shade has little effect on keeping water cooler in summer or reducing ice formation in winter.

Potential to support a native assemblage of Lahontan species
Because if its size and depth Pete's Creek has little potential for supporting native trout but is probably supporting small native fish. Because the creek was not sampled we do not know the exact fishery in Pete's Creek.

Invertebrate Sampling
The high abundance and diversity of Ephemeroptera, Plecoptera, and Trichoptera indicate this is a healthy environment with little or no pollution. The high abundance of Odonata indicates there is a lot of aquatic vegetation in the stream.

Fisheries Surveys
No fisheries surveys were conducted at Pete's Creek in 2003.

Table C. Results of invertebrate sampling conducted on Buffalo Creek (EL 177) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	3	15	36
Plecoptera (stoneflies)	1	0.5	0.01
Trichoptera (caddisflies)	5	4	0.09
Odonata (dragonflies and damselflies)	3	19	45

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Hemiptera (true bugs)	5	3	0.07
Coleoptera (water beetles)	1	0.5	0.01
Gastropoda (snails)	0	0	0
Amphipoda (scuds)	0	0	0
Oligochaeta (segmented worms)	0	0	0
Nematoda (round worms)	0	0	0
Percent EPT Taxa[1]		19.5	

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Summary of Stream Habitat Conditions
Secret Creek (EL 205)

General Description
Secret Creek is a small creek (mean width 2.8m, mean depth 0.16m) with abundant willows along the banks. Boulders in the stream and over-hanging riparian vegetation provide cover for fish (Tables A and B). The stream bottom material is 39% fine sediment. Secret Creek has a pool/riffle ratio of 96/4, and aquatic vegetation in slow-water areas. NOTE: After the 2003 survey was completed a portion of Secret Creek was burned in a wildland fire. A follow-up survey has not been completed.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Secret Creek (EL 205) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	96	9	Poor
Pool / Riffle ratio	96 / 4	9	Poor
Pool quality	4	40	Fair
Percent stream bottom with desirable materials	54	54	Fair
Bank cover	3.8	95	Excellent
Bank stability	3.1	78	Good
Percent Habitat Optimum	61	61	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Secret Creek (EL 205) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.16
Mean width of stream (m)	2.8
Mean % of stream shaded	60
Mean % of bottom with clinging vegetation	0
Mean % of bottom with rooted vegetation	14

Priority B Factors	Value	
Mean % sedimentation	39	
Mean stream gradient (%)	2.0	
Mean landform gradient (%)	Left bank: 29.2	Right bank:32.4
Mean stream flow rate during surveys (cfs)	2.0	
Mean water temperature during surveys (°C)	16	
Summer mean minimum water temperature (°C)[1]	15.1	
Summer mean maximum water temperature (°C)[1]	22.1	
Number of days max. temperature exceeded 27°C[1]	0	
Mean air temperature during surveys (°C)	28	
Turbidity description	Clear	
Mean conductivity	176	
Mean pH	7.0	
Mean dissolved oxygen (% saturation)	67	
Mean dissolved oxygen (mg/l)	6.6	

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003.

Condition of stream bank vegetation and bank stability
Stream banks are quite stable along Secret Creek, due to abundant and diverse perennial vegetation in the riparian zone (Table A). Riparian vegetation for the most part consists of forbs, grasses, and thick stands of willow and other woody perennials.

Shading of the water surface
Due to abundant riparian vegetation including willow and other shrubs, about 60% of the stream surface is shaded. This contributes to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Secret Creek (Table C). The high diversity of invertebrate taxa is indicative of the variety of aquatic habitats in Willow Creek. The presence of Odonata indicates areas of slow-water pool habitat. The presence of Oligochaeta indicates areas with fine sediment. The presence of Gastropoda is often associated with aquatic vegetation.

Table C. Results of invertebrate sampling conducted on Secret Creek (EL 205) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	2	7.5	17.4
Plecoptera	1	4.0	9.3
Trichoptera	4	21.0	48.8
Diptera	1	2.0	4.7

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Odonata	1	2.0	4.7
Coleoptera	1	2.5	5.8
Gastropoda	1	1.5	3.5
Amphipoda	1	1.5	3.5
Oligochaeta	1	1.0	2.3
Percent EPT Taxa[1]			75.6

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
No fisheries surveys were conducted at Secret Creek in 2003.

Potential to support Lahontan fish species
Based on results of the survey, Secret Creek could support Lahontan cutthroat trout. There is a high concentration of dissolved oxygen, and ample shade keeps the stream relatively cool. Water temperature did not exceed 26°C during the summer of 2003, and mean summer maximum temperature was 22.1°C, right at the top of the temperature scale recommended for optimum growth and survival of Lahontan cutthroat trout. However, the pool/riffle ratio is less than optimum, and the moderately high proportion of fine sediment (39%) would limit trout spawning habitat. Secret Creek could also support other Lahontan fish species including Tahoe sucker, mountain sucker, tui chub, Lahontan redside, and speckled dace, and Paiute sculpin. However, lack of riffle habitat and stream sedimentation would limit abundance of Paiute sculpin.

Summary of Stream Habitat Conditions
Susan River

Current Conditions
General Description
Susan River is one of the main rivers within the Lahontan Basin. At the time of the survey, mean width was 10.5m, and mean depth was 0.33m. This stream has a high proportion of riffle habitat (pool / riffle ratio = 21 / 79), and little aquatic vegetation (Tables A and B).

Condition of stream bank vegetation and bank stability
Stream banks were quite stable, due to abundant riparian vegetation (Table B). Riparian vegetation was diverse and vigorous, and included primarily perennials such as willow shrubs.

Shading of the water surface
Due to the high ratio of water width to height of riparian vegetation, there is little shading of Susan River during most of the day. However, due to the fact that Susan River is in a valley and large trees grow within several meters of the banks, there is some shading of the water surface in early morning and late afternoon. This contributes to cooler water in summer and reduced icing in winter.

Potential to support Lahontan fish species

Susan River currently provides habitat for rainbow trout and brown trout, according to data from surveys conducted in 1992 and 1996. Dissolved oxygen, measured at 5.7 mg/l, is sufficient for growth and survival of trout. The temperature in the Susan River is within a good range to support trout (Table B). Cutthroat trout require gravelly riffles with low amounts of sediment for spawning (reviewed in Moyle 2002). Susan River has 79% riffle habitat, and 30% gravel in the substrate. Desirable bottom materials, including boulders, cobble, and gravel, was 81%. A comparison of stream summaries reported here shows that the Susan River is the most suitable site for possible reintroduction of Lahontan cutthroat trout within the Eagle Lake Resource Area, with respect to physical habitat characteristics. However, the presence of rainbow trout and brown trout in Susan River would hamper the success of cutthroat trout reintroduction, due to effects of competition, predation, and interbreeding of cutthroat trout and rainbow trout. However, if the practice of stocking rainbow trout in the Susan River was discontinued, and large Lahontan cutthroat trout were stocked, these cutthroat trout would prey on smaller trout of other species. A concerted effort could potentially result in successful repopulation of the Susan River with Lahontan cutthroat trout. In addition, the aquatic habitat in the Susan River could potentially support other Lahontan fish species including paiute sculpin, tui chub, Lahontan redside, speckled dace, Tahoe sucker, and mountain sucker.

Invertebrate Sampling

As each invertebrate taxa is characteristically found in certain habitats, the presence of particular invertebrate taxa in a given stream location provides an indication of the type of habitat at the stream location. In the Susan River, the abundance of Plecoptera and the high EPT ratio of 58% indicates good water quality (Table C). The presence of Hemiptera indicates some pool habitat, and the low relative abundance of Oligochaeta and Nematoda indicates a low proportion of fine sediment in the substrate.

Fisheries Surveys

No fisheries surveys were conducted on the Susan River in 2003. Fisheries surveys were conducted in the Susan River in 1992 and 1996. These surveys showed that fish species present in the Susan River included brown trout, rainbow trout, Tahoe suckers, speckled dace, and Lahontan redsides.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on the Susan River during the 2003 field season.

Priority A Factors	**Value**	**Percent Optimum**	**Rating[1]**
Percent total stream width in pools	21	43	Fair
Pool / Riffle ratio	21 / 79	43	Fair
Pool quality	2.4	71	Good
Percent stream bottom with desirable materials	81	81	Excellent
Bank cover	3.0	75	Good
Bank stability	3.5	81	Excellent
Percent Habitat Optimum	61	61	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on the Susan River during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.33
Mean width of stream (m)	10.5
Mean % of stream shaded	5
Mean % of bottom with clinging vegetation	0
Mean % of bottom with rooted vegetation	1.5
Mean % sedimentation	19
Mean stream gradient (%)	0.55
Mean landform gradient (%)	Left Bank: 25.9 Right Bank: 28.3
Mean stream flow rate during surveys (cfs)[1]	72.5
Mean water temperature during surveys (°C)	20
Summer mean minimum water temperature (°C)[2]	15.6
Summer mean maximum water temperature (°C)[2]	22.2
Number of days max. temperature exceeded 27°C[2]	3
Mean air temperature during surveys (°C)	30
Turbidity description	Cloudy
Mean conductivity	70.6
Mean pH	7.4
Mean dissolved oxygen (% saturation)	65
Mean dissolved oxygen (mg/l)	5.7

[1]Flow rate was unusually high during the survey due to heavy rain the previous day.
[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003. Values are means of temperature data from three stations.

Table C. Results of invertebrate sampling conducted on the Susan River during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	2	4.8	6.7
Plecoptera (stoneflies)	3	7.2	10.0
Trichoptera (caddisflies)	7	29.6	41.2
Diptera (true flies)	1	24.8	34.5
Hemiptera (true bugs)	1	2.0	2.8
Coleoptera (water beetles)	2	2.2	3.1
Megaloptera (Dobson flies, etc.)	1	0.2	0.3
Oligochaeta (segmented worms)	1	0.4	0.6
Nematoda (round worms)	1	0.6	0.8
Percent EPT Taxa[1]			57.9

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Summary of Stream Habitat Conditions
Cheney Creek (EL199)

Current Conditions
General Description
Cheney Creek is a small, shallow creek (mean width 2.5m, mean depth 0.08m), with a high proportion of boulders and cobble in the substrate. This stream has 70% pool habitat, 33% sedimentation, and little aquatic vegetation (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Cheney Creek (EL 199) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	70	59	Fair
Pool / Riffle ratio	70 / 30	59	Fair
Pool quality	4.0	40	Fair
Percent stream bottom with desirable materials	67	67	Good
Bank cover	2.3	58	Fair
Bank stability	3.8	95	Excellent
Percent Habitat Optimum	62	62	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Cheney Creek during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.08
Mean width of stream (m)	2.5
Mean % of stream shaded	25
Mean % of bottom with clinging vegetation	1.3
Mean % of bottom with rooted vegetation	4.4
Mean % sedimentation	33
Mean stream gradient (%)	1.8
Mean landform gradient (%)	Left bank: 32 Right bank: 31
Mean stream flow rate during surveys (cfs)	0.2
Mean water temperature during surveys (°C)	14.4
Summer mean minimum water temperature (°C)[1]	14.3
Summer mean maximum water temperature (°C)[1]	20.8
Number of days max. temperature exceeded 26°C[1]	0
Mean air temperature during surveys (°C)	19.5

Priority B Factors	Value
Turbidity description	Clear
Mean conductivity	220
Mean pH	7.05
Mean dissolved oxygen (% saturation)	59
Mean dissolved oxygen (mg/l)	6.1

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003.

Condition of stream bank vegetation and bank stability
Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes primarily perennials such as willow shrubs.

Shading of the water surface
Abundant perennial vegetation shades 25% of the water surface, which contributes to cooler water in summer and reduced icing in winter (Table B).

Potential to support a native assemblage of Lahontan species
Cheney Creek presently provides habitat for trout. Dissolved oxygen, measured at 6.1 mg/l, is sufficient for growth and survival of trout. The temperature in Cheney Creek is within a good range to support trout, with mean maximum summer water temperature of 20.8°C in 2003. Cutthroat trout require gravelly riffles with low amounts of sediment for spawning. Cheney Creek has 30% riffle habitat. However, at the time of the survey, the substrate consisted for the most part of boulders, cobbles and fines, with little gravel. A logging operation upstream in the Cheney Creek watershed earlier in the summer, followed by heavy rain, contributed a substantial load of sediment into Cheney Creek. This probably contributed to the lack of visible gravel substrate observed during the survey. The mean depth of Cheney Creek is only 0.08m, which would limit the habitat to small fish with the possibility of a few larger fish in pools. Lahontan fish species which could potentially be supported by the habitat in Cheney Creek include Lahontan cutthroat trout, paiute sculpin, tui chub, Lahontan redside, speckled dace, Tahoe sucker, and mountain sucker.

Invertebrate Sampling
The presence of Plecoptera and abundance of Trichoptera indicates good water quality in Cheney Creek (Table C). Dipterans were the most abundant invertebrates found in Cheney Creek during the survey. Various types of Dipterans can inhabitat a variety of substrates and environmental conditions, but several species are associated with fine substrate. The high relative abundance of this insect order may be associated with the 33% sedimentation in Cheney Creek in summer 2003.

Table C. Results of invertebrate sampling conducted on Cheney Creek during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	2	5.0	4.6
Plecoptera (stoneflies)	1	4.0	3.7
Trichoptera (caddisflies)	3	23.0	21.1
Diptera (true flies)	1	71.5	65.6
Hemiptera (true bugs)	1	2.0	1.8
Coleoptera (water beetles)	2	3.5	3.2
Percent EPT Taxa[1]			29.4

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys

No fisheries surveys were conducted at Cheney Creek in 2003. California Department of Fish and Game reports a reproducing rainbow trout population occurs in the stream (Paul Chappell, personal communication).

Smoke Desert South

Summary of Stream Habitat Conditions
Stony Creek (EL208)

Current Conditions

General Description

Stony Creek is a small, shallow creek (mean width 1.8m, mean depth 0.17m), with a high proportion of fine sediment in the substrate. This slow-moving stream has a pool/riffle ratio of 93/7, 91% sedimentation, and abundant aquatic vegetation (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Stony Creek (EL 208) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	93	14	Poor
Pool / Riffle ratio	93 / 7	14	Poor
Pool quality	2.0	80	Excellent
Percent stream bottom with desirable materials	8	8	Poor
Bank cover	2.5	62	Good
Bank stability	3.0	76	Good
Percent Habitat Optimum	54	54	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Stony Creek (EL 208) during the 2003 field season.

Priority B Factors	Value	
Mean depth of stream (m)	0.17	
Mean width of stream (m)	1.6	
Mean % of stream shaded	91	
Mean % of bottom with clinging vegetation	9.6	
Mean % of bottom with rooted vegetation	63	
Mean % sedimentation	90	
Mean stream gradient (%)	1.5	
Mean landform gradient (%)	Left Bank: 32	Right Bank: 35
Mean stream flow rate during surveys (cfs)	0.1	
Mean water temperature during surveys (°C)	12	
Summer mean minimum water temperature (°C)[1]	14.6	
Summer mean maximum water temperature (°C)[1]	18.9	
Number of days max. temperature exceeded 27°C[1]	0	
Mean air temperature during surveys (°C)	22	
Turbidity description	Clear	
Mean conductivity	210	
Mean pH	6.9	
Mean dissolved oxygen (% saturation)	47	
Mean dissolved oxygen (mg/l)	5.1	

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003. Values are means of temperature data from four stations.

Condition of stream bank vegetation and bank stability

Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes perennials such as willow shrubs. At the downstream Stations 1 and 2, riparian vegetation consists primarily of grasses and forbs, with little woody perennial vegetation, while at the upstream Stations 3 and 4, there is abundant woody perennial vegetation.

Shading of the water surface

Abundant perennial vegetation shades 91% of the water surface, which contributes to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling

The high EPT ratio indicates good water quality in Stony Creek (Table C). The high relative abundance of Gastropoda is associated with the high abundance of aquatic vegetation, and also slow nonturbulent water. The presence of Odonata and Hemiptera indicates the presence of slow-water pool habitat.

Table C. Results of invertebrate sampling conducted on Stony Creek (EL 208) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	2	40.3	26.6
Trichoptera	2	18.3	12.1
Diptera	3	10.3	6.8
Odonata	2	8.7	5.7
Hemiptera	3	15.7	10.3
Coleoptera	2	6.0	4.0
Gastropoda	1	41.3	27.3
Bivalvia	1	1.0	0.7
Amphipoda	1	6.7	4.4
Arachnida	2	3.3	2.2
Percent EPT Taxa[1]			38.7

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys

No fisheries surveys were conducted at Stony Creek in 2003. A fishery survey was completed during 2005 with tahoe sucker, Lahontan redsides, and speckled dace being found.

Potential to support Lahontan fish species

At the time of the survey on Setember 15, 2003, dissolved oxygen was measured at 5.1 mg/l, which is approximately the minimum level which can support trout. Dissolved oxygen probably dips to below this level during July and August, when temperatures are warmer and bacterial and fungal metabolic rates are higher, therefore removing more oxygen. Slow-moving water in Stony Creek also contributes to the low dissolved oxygen content, as well to high sedimentation. Due to these factors, Stony Creek probably wouldn't support a trout population. Other Lahontan fish species which could potentially be supported by the habitat in Stony Creek include fish species tolerant of lower oxygen level, such as Tahoe sucker, tui chub, Lahontan redside, and speckled dace.

Summary of Stream Habitat Conditions
Upper Smoke Creek (EL166, 167, 168)

General Description

Upper Smoke Creek is a small creek (mean width 2.2m, mean depth 0.18m) with primarily pool habitat, 56% sedimentation, and heavy growth of rooted aquatic vegetation in some areas (Tables A and B). The flow rate was determined as 1.6 cfs during the survey, and dissolved oxygen was measured as 7.8 mg/l.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Upper Smoke Creek (EL166, 167, 168) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	84	33	Poor
Pool / Riffle ratio	84 / 16	33	Poor
Pool quality	4	40	Fair
Percent stream bottom with desirable materials	44	44	Fair
Bank cover	1.6	41	Fair
Bank stability	3.2	79	Good
Percent Habitat Optimum	53	53	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Upper Smoke Creek (EL166, 167, 168) during the 2003 field season.

Priority B Factors	Value	
Mean depth of stream (m)	0.18	
Mean width of stream (m)	2.2	
Mean % of stream shaded	2.1	
Mean % of bottom with clinging vegetation	4.8	
Mean % of bottom with rooted vegetation	28	
Mean % sedimentation	56	
Mean stream gradient (%)	1.3	
Mean landform gradient (%)	Left bank: 10	Right bank: 10
Mean stream flow rate during surveys (cfs)	1.6	
Mean water temperature during surveys (°C)	18	
Summer mean minimum water temperature (°C)[1]	16.4	
Summer mean maximum water temperature (°C)[1]	20.6	
Number of days max. temperature exceeded 26°C[1]	5	
Mean air temperature during surveys (°C)	25	
Turbidity description	Clear (most stations)	
Mean conductivity	137	
Mean pH	7.4	
Mean dissolved oxygen (% saturation)	82	
Mean dissolved oxygen (mg/l)	7.8	

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003. Values are means of temperature data from two stations.

Condition of stream bank vegetation and bank stability

Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation primarily consists of grasses and forbs. There is a lack of woody shrubs such as willows.

Shading of the water surface
Due to the low height of riparian vegetation relative to stream width, only about 2% of the water surface is shaded. This does not contribute significantly to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The high EPT ratio indicates good water quality in Upper Smoke Creek (Table C). The presence of Odonata indicates slow-water pool habitat. The presence of Gastropoda is associated with non-turbulent water and with the rooted aquatic vegetation at this site. The presence of Trichoptera indicates the presence of rocks to which they attach.

Table C. Results of invertebrate sampling conducted on Upper Smoke Creek (EL166, 167, 168) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	2	13.6	12.4
Plecoptera	1	0.1	0.1
Trichoptera	6	45.1	41.3
Diptera	1	3.4	3.1
Odonata	4	14.1	12.9
Hemiptera	1	0.4	0.4
Coleoptera	1	0.9	0.8
Gastropoda	2	27.9	25.5
Bivalvia	1	0.3	0.3
Amphipoda	1	1.4	1.3
Oligochaeta	1	0.1	0.1
Arachnida	1	0.1	0.1
Hirudinea	1	1.9	1.7
Percent EPT Taxa[1]			53.8

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
Fish population surveys were conducted on Upper Smoke Creek in July 1980 by California Department of Fish and Game (CDFG), and in October 2003 by the Bureau of Land Management (BLM). Species found by CDFG in 1980 included Tahoe sucker, speckled dace, and Lahontan redside. Species found by BLM in 2003 included Tahoe sucker, speckled dace, and rainbow trout, with speckled dace and Tahoe suckers the most abundant (Table D).

Table D. Fish composition of Upper Smoke Creek sample sites, BLM 2003.

Site #	Survey Length (m)	# of Fish	Speckled Dace (%)	Tahoe Sucker (%)	Rainbow Trout (%)
166	100	147	49.7	43.5	6.8
167	100	76	56.6	43.4	0
168	100	102	99.0	1.0	0

Potential to support Lahontan fish species

Upper Smoke Creek currently supports a small population of rainbow trout, and could probably support Lahontan cutthroat trout as well. Dissolved oxygen content of the water is quite adequate for trout (measured at 7.8 mg/l in summer 2003). Water temperature is rather warm for trout, but within the range which supports growth and survival. Mean summer maximum temperature was 20.6°C in 2003, slightly below the recommended maximum for optimum survival and growth of Lahontan cutthroat trout (22°C). Maximum daily water temperature exceeded 26°C on 5 days. The factors which probably limit population growth of rainbow trout, and which would similarly limit the success of Lahontan cutthroat trout, are lack of cover (including deep pools), and lack of spawning gravel due to heavy sedimentation of the stream bottom. This stream is now substantially smaller than it was previously, due to lower flow rates (see Trends Section below). Habitat area has therefore decreased. The likelihood of success of a reintroduction of Lahontan cutthroat trout to Upper Smoke Creek could be improved by decreasing sediment input, increasing flow rate to scour existing sediment and move it downstream, planting willows in riparian areas to provide shade and cover, and preventing excessive livestock use which could prevent establishment of willows.

TRENDS

Flow was measured as 9.8 cfs during a habitat survey by the BLM in 1977, whereas flow was measured as 1.6 cfs in 2003. Average width and depth were 3.2m and 0.23m in 1977, and 2.2m and 0.18m in 2003.

Summary of Stream Habitat Conditions
Lower Smoke Creek

General Description

Lower Smoke Creek is a medium-sized creek (mean width 5.6m, mean depth 0.26m) with primarily pool habitat, 63% sedimentation, and heavy growth of rooted aquatic vegetation (Tables A and B). The flow rate was determined as 0.8 cfs during the survey, and dissolved oxygen was measured as 6.1 mg/l.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Lower Smoke Creek (EL 198) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	84	20	Poor
Pool / Riffle ratio	90 / 10	20	Poor
Pool quality	2.9	62.9	Good
Percent stream bottom with desirable materials	38	38	Poor
Bank cover	3.0	75.0	Good
Bank stability	3.9	96.9	Excellent
Percent Habitat Optimum	**61.2**	**61.2**	**Good**

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Lower Smoke Creek (EL 198) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.26
Mean width of stream (m)	5.6
Mean % of stream shaded	30
Mean % of bottom with clinging vegetation	6.3
Mean % of bottom with rooted vegetation	71.3
Mean % sedimentation	63.1
Mean stream gradient (%)	0.8
Mean landform gradient (%)	Left Bank: 10.9 Right Bank: 14.1
Mean stream flow rate during surveys (cfs)	0.8
Mean water temperature during surveys (°C)	26
Summer mean minimum water temperature (°C)[1]	14.2
Summer mean maximum water temperature (°C)[1]	23.5
Number of days max. temperature exceeded 26°C[1]	8
Mean air temperature during surveys (°C)	36
Turbidity description	Clear
Mean conductivity	287
Mean pH	8.5
Mean dissolved oxygen (% saturation)	76
Mean dissolved oxygen (mg/l)	6.1

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003. Values are means of temperature data from two stations.

Condition of stream bank vegetation and bank stability

Stream banks are quite stable, due to abundant riparian vegetation (Table A). Riparian vegetation consists of grasses, forbs, and shrubs including willows and other woody perennials.

Shading of the water surface

Perennial shrubs, primarily willows, shade about 30% of the water surface. This contributes to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling

The high EPT ratio indicates good water quality in Lower Smoke Creek (Table C). The presence of Odonata indicates slow-water pool habitat. The presence of Gastropoda is probably associated with the abundant rooted aquatic vegetation at this site.

Table C. Results of invertebrate sampling conducted on Lower Smoke Creek (EL 198) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	4	14.0	26.9
Trichoptera (caddisflies)	4	7.0	13.5
Diptera (true flies)	2	6.0	11.5
Odonata (dragonflies & damselflies)	5	9.5	18.3
Coleoptera (water beetles)	2	3.5	6.7
Gastropoda (snails)	1	3.0	5.8
Amphipoda (scuds)	1	9.0	17.3
Percent EPT Taxa[1]			40.4

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys

Fish population surveys were conducted on Lower Smoke Creek by Nevada Department of Wildlife in the summer of 2003. Only two fish species were found: green sunfish and Tahoe sculpin. Both species were abundant.

Potential to support Lahontan fish species

Lower Smoke Creek probably would not support Lahontan cutthroat trout, due to the warm summer water temperature, high percent fine sediment on the stream bottom, and lack of riffle habitat. Mean summer maximum temperature was 23.5°C, above the recommended maximum of 22°C, and daily temperature maximum exceeded 26°C on 8 days. The habitat at Lower Smoke Creek could support other Lahontan fish species including speckled dace, mountain sucker, Tahoe sucker, Lahontan redside, and tui chub. The lack of riffle habitat and predominance of fine sediment would limit abundance of paiute sculpin. The introduction of the non-native green sunfish may have contributed to the decline in fish species diversity in Lower Smoke Creek, due to effects of competition or egg predation by green sunfish.

Summary of Stream Habitat Conditions
West Fork Buffalo Creek (EL159)

Current Conditions

General Description

West Fork Buffalo Creek is a shallow creek with low flow rate (mean width 3.3m , mean depth 0.15m, flow rate 0.1 cfs). This stream has 100% pool habitat, 61% sedimentation, and 24% of the stream bottom is covered with rooted aquatic vegetation (Tables A and B). Due to the low flow rate and organic decomposition processes in West Fork Buffalo Creek, dissolved oxygen reaches low levels. Dissolved oxygen measured during the survey was 4.2 mg/l.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on West Fork Buffalo Creek (EL159) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	100	0	Poor
Pool / Riffle ratio	100 / 0	0	Poor
Pool quality	4.0	40	Fair
Percent stream bottom with desirable materials	39	39	Poor
Bank cover	3.6	90.6	Excellent
Bank stability	4.0	100	Excellent
Percent Habitat Optimum	61.5	61.5	Good

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on West Fork Buffalo Creek (EL159) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.15
Mean width of stream (m)	3.3
Mean % of stream shaded	75
Mean % of bottom with clinging vegetation	1.3
Mean % of bottom with rooted vegetation	24
Mean % sedimentation	61
Mean stream gradient (%)	2.3
Mean landform gradient (%)	Left Bank: 26.7 Right Bank: 21.3
Mean stream flow rate during surveys (cfs)	0.1
Mean water temperature during surveys (°C)	20
Summer mean minimum water temperature (°C)[1]	NA
Summer mean maximum water temperature (°C)[1]	NA
No. days max. temperature exceeded 26°C[1]	NA
Mean air temperature during surveys (°C)	33
Turbidity description	Clear
Mean conductivity	403
Mean pH	7.5
Mean dissolved oxygen (% saturation)	46
Mean dissolved oxygen (mg/l)	4.2

[1]Hobo temperature gage measurements not taken at this site in 2003.

Condition of stream bank vegetation and bank stability

Stream banks are very stable, due to abundant riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes primarily perennials such as willow shrubs.

Shading of the water surface
Willow shrubs in the riparian area provide ample shade, and water surface shaded is estimated at 75% (Table B). This certainly contributes to keeping water cooler in summer and reducing ice formation in winter.

Potential to support a native assemblage of Lahontan species
West Fork Buffalo Creek is not suitable habitat for Lahontan cutthroat trout. Cutthroat trout, as other trout, require water containing a high level of dissolved oxygen (minimum 5 mg/l). As stated above, dissolved oxygen measured in Middle Fork Buffalo Creek during the survey was 4.2 mg/l. Cutthroat trout also require gravelly riffles with low amounts of sediment for spawning. West Fork Buffalo Creek contains no riffle habitat, and high amounts of sediment. Lahontan fish species which could be supported by the habitat in West Fork Buffalo Creek include speckled dace, Tahoe sucker, and tui chub. These species are tolerant of warm water, a high proportion of sediment on the stream bottom, and low dissolved oxygen (Castleberry and Cech 1992, Moyle 2002). West Fork Buffalo Creek, when last surveyed, supported Tahoe sucker and specked dace (Nevada Department of Wildlife 1990).

Invertebrate Sampling
As each invertebrate taxa is characteristically found in certain habitats, the presence of particular invertebrate taxa in a given stream location provides an indication of the type of habitat at the stream location. At West Fork Buffalo Creek, abundance of Ephemeroptera and presence of Plecoptera indicates good water quality (Table C). Abundance of Odonata and Gastropoda indicate slow water pool habitat. These results are in accord with our findings regarding the stream habitat condition.

Fisheries Surveys
No fisheries surveys were conducted at West Fork Buffalo Creek in 2003. Electrofishing surveys were conducted on Buffalo Creek (main stem, West Fork and Middle Fork) in 1990 (Nevada Department of Wildlife 1990). Two fish species were found in the main stem and West Fork of Buffalo Creek: Tahoe sucker and speckled dace.

Table C. Results of invertebrate sampling conducted on West Fork Buffalo Creek (EL159) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	3	32.0	49.2
Plecoptera	1	2.0	3.1
Diptera	4	5.0	7.7
Odonata	1	4.0	6.2
Coleoptera	4	7.0	10.8
Gastropoda	1	13.0	20.0
Arachnida	2	2.0	3.1
Percent EPT Taxa[1]			52.3

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Summary of Stream Habitat Conditions
Middle Fork Buffalo Creek (EL 161)

Current Conditions

General Description

Middle Fork Buffalo Creek is a very small creek with a low flow rate (mean width 1.6m , mean depth 0.13m, flow rate 0.13 cfs). This stream has 69% pool habitat, 87% sedimentation, and heavy growth of rooted aquatic vegetation (Tables A and B). Due to the low flow rate and organic decomposition processes in Middle Fork Buffalo Creek, dissolved oxygen reaches low levels. Dissolved oxygen measured during the survey was 3.6 mg/l.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Middle Fork Buffalo Creek (EL 161) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	69	61.2	Good
Pool / Riffle ratio	69 / 31	61.2	Good
Pool quality	4.0	40	Fair
Percent stream bottom with desirable materials	13	13	Poor
Bank cover	1.5	36.5	Poor
Bank stability	3.8	93.8	Excellent
Percent Habitat Optimum	**49.5**	**49.5**	**Fair**

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Middle Fork Buffalo Creek (EL 161) during the 2003 field season.

Priority B Factors	Value	
Mean depth of stream (m)	0.13	
Mean width of stream (m)	1.6	
Mean % of stream shaded	20	
Mean % of bottom with clinging vegetation	3.3	
Mean % of bottom with rooted vegetation	54	
Mean % sedimentation	87	
Mean stream gradient (%)	3.9	
Mean landform gradient (%)	Left Bank: 23	Right Bank: 22
Mean stream flow rate during surveys (cfs)	0.13	
Mean water temperature during surveys (°C)	21	
Summer mean minimum water temperature (°C)[1]	NA	
Summer mean maximum water temperature (°C)[1]	NA	
No. days avg. temperature exceeded 22°C[1]	NA	
No. days max. temperature exceeded 26°C[1]	NA	
Mean air temperature during surveys (°C)	31	
Turbidity description	Clear	

Priority B Factors	Value
Mean conductivity	259
Mean pH	7.2
Mean dissolved oxygen (% saturation)	39
Mean dissolved oxygen (mg/l)	3.6

[1]Hobo temperature gage measurements not taken at this site in 2003.

Condition of stream bank vegetation and bank stability

Stream banks are for the most part quite stable, due to riparian vegetation (Table A). At transect 1, riparian vegetation is diverse and vigorous, and includes perennials such as willow shrubs. At transects 2, 3, and 4 riparian vegetation consists primarily of grasses and forbs. Stream banks seem to be stable primarily because of the low flow conditions which don't stress the banks. In some areas, stream banks are unstable, and bank sloughing is apparent.

Shading of the water surface

Although riparian vegetation mostly consists of grasses and forbs, the narrow width of the channel relative to the height of riparian vegetation results in about 20% shading of the water surface (Table B). This amount of shade probably contributes to keeping water cooler in summer and reducing ice formation in winter.

Potential to support a native assemblage of Lahontan species

Middle Fork Buffalo Creek is not suitable habitat for Lahontan cutthroat trout. Cutthroat trout, as other trout, require water containing a high level of dissolved oxygen (minimum 5 mg/l). As stated above, dissolved oxygen measured in Middle Fork Buffalo Creek during the survey was 3.6 mg/l. Cutthroat trout also require gravelly riffles with low amounts of sediment for spawning. Middle Fork Buffalo Creek contained some riffle habitat, but high amounts of sediment. Lahontan fish species which could be supported by the habitat in Buffalo Creek include speckled dace, Tahoe sucker, and tui chub. These species are tolerant of warm water, a high proportion of sediment on the stream bottom, and low dissolved oxygen (Castleberry and Cech 1992, Moyle 2002). Middle Fork Buffalo Creek, when last surveyed, supported only specked dace (Nevada Department of Wildlife 1990).

Invertebrate Sampling

As each invertebrate taxa is characteristically found in certain habitats, the presence of particular invertebrate taxa in a given stream location provides an indication of the type of habitat at the stream location. At Middle Fork Buffalo Creek, abundance of Ephemeroptera indicates good water quality (Table C). Abundance of Odonata, Hemiptera, and Gastropoda indicates slow water pool habitat. These results are in accord with our findings regarding the stream habitat condition.

Fisheries Surveys

No fisheries surveys were conducted at Middle Fork Buffalo Creek in 2003. Electrofishing surveys were conducted on Buffalo Creek (main stem, West Fork and Middle Fork) in 1990 (Nevada Department of Wildlife 1990). Two fish species were found in the main stem and West Fork of Buffalo Creek: Tahoe sucker and speckled dace. In the Middle Fork of Buffalo Creek, only speckled dace were found.

Table C. Results of invertebrate sampling conducted on Middle Fork Buffalo Creek (EL 161) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	4	41.3	49.4
Trichoptera	1	0.3	0.4
Diptera	3	13.3	15.9
Odonata	2	7.3	8.8
Hemiptera	3	2.7	3.2
Coleoptera	1	1.0	1.2
Gastropoda	2	16.0	19.1
Amphipoda	1	0.3	0.4
Arachnida	1	1.3	1.6
Percent EPT Taxa[1]			49.8

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Summary of Stream Habitat Conditions
Buffalo Creek (EL177)

Current Conditions

General Description

Buffalo Creek is a very slow-moving creek with 100% pool habitat, 77% sedimentation, and heavy growth of both rooted aquatic vegetation and filamentous algae (Tables A and B). Buffalo Creek at Station 1 was dry at the time of the survey, so only Station 2 was surveyed. Due to the low flow rate, algae growth, and organic decomposition processes in Buffalo Creek, dissolved oxygen reaches low levels. Dissolved oxygen measured during the survey was 3.5 mg/l.

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Buffalo Creek (EL 177) during the 2003 field season.

Priority A Factors	Value	Percent Optimum	Rating[1]
Percent total stream width in pools	100	0	Poor
Pool / Riffle ratio	100 / 0	0	Poor
Pool quality	3.3	55	Fair
Percent stream bottom with desirable materials	23	23	Poor
Bank cover	3.3	81.3	Excellent
Bank stability	3.4	84.4	Excellent
Percent Habitat Optimum	53.8	53.8	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Buffalo Creek (EL 177) during the 2003 field season.

Priority B Factors	Value
Mean depth of stream (m)	0.34
Mean width of stream (m)	4.9
Mean % of stream shaded	10
Mean % of bottom with clinging vegetation	25
Mean % of bottom with rooted vegetation	73
Mean % sedimentation	77
Mean stream gradient (%)	2.3
Mean landform gradient (%)	Left Bank: 9.0 Right Bank: 58.3
Mean stream flow rate during surveys (cfs)	0.2
Mean water temperature during surveys (°C)	17
Summer minimum water temperature (°C)[1]	17.7
Summer mean maximum water temperature (°C)[1]	28.0
Number of days max. temperature exceeded 26°C[1]	62
Mean air temperature during surveys (°C)	NA
Turbidity description	Clear
Mean conductivity	411
Mean pH	7.5
Mean dissolved oxygen (% saturation)	35
Mean dissolved oxygen (mg/l)	3.4

[1]Based on Hobo temperature gage measurements recorded hourly June 10 - August 31, 2003.

Condition of stream bank vegetation and bank stability

Except for a cut bank observed at transects 2 and 3, stream banks are quite stable, due to riparian vegetation (Table A). Riparian vegetation is diverse and vigorous, and includes perennials such as willow shrubs.

Shading of the water surface

Due to the low height of riparian vegetation relative to stream width, only about 10% of the water surface is shaded (Table B). This amount of shade has little effect on keeping water cooler in summer or reducing ice formation in winter.

Potential to support a native assemblage of Lahontan species

Buffalo Creek is not suitable habitat for Lahontan cutthroat trout. Cutthroat trout, as other trout, require water containing a high level of dissolved oxygen (minimum 5 mg/l). As stated above, dissolved oxygen measured in Buffalo Creek during the survey was 3.5 mg/l. The mean maximum summer temperature of Buffalo Creek was 28°C during the summer of 2003, considerably higher than the recommended mean maximum of 22°C for optimum survival and growth of cutthroat trout. The daily maximum temperature exceeded 26°C on 62 days during the summer of 2003. Therefore Lahontan cutthroat trout probably could not survive the warm temperatures there. Cutthroat trout also require gravelly riffles with low amounts of sediment for spawning (reviewed in Moyle 2002). In contrast, Buffalo Creek contains no riffle habitat and

high amounts of sediment. Lahontan fish species which could be supported by the habitat in Buffalo Creek include speckled dace, Tahoe sucker, and tui chub. These species are tolerant of warm water, a high proportion of sediment on the stream bottom, and low dissolved oxygen (Castleberry and Cech 1992, Moyle 2002). Buffalo Creek, when last surveyed, supported Lahontan fish species including specked dace and Tahoe sucker (Nevada Department of Wildlife 1990).

Invertebrate Sampling

As each invertebrate taxa is characteristically found in certain habitats, the presence of particular invertebrate taxa in a given stream location provides an indication of the type of habitat at the stream location. At Buffalo Creek, abundance of Odonata and Gastropoda indicate slow water pool habitat (Table C). Presence of Oligochaeta and Nematoda indicate fine sediment. These results are in accord with our findings regarding the stream habitat condition.

Fisheries Surveys

No fisheries surveys were conducted at Buffalo Creek in 2003. Electrofishing surveys were conducted on Buffalo Creek (main stem, West Fork and Middle Fork) in 1990 (Nevada Department of Wildlife 1990). Two fish species were found in the main stem and West Fork of Buffalo Creek: Tahoe sucker and speckled dace. In the Middle Fork of Buffalo Creek, only speckled dace were found.

Table C. Results of invertebrate sampling conducted on Buffalo Creek (EL 177) during the 2003 field season.

Invertebrate Order	Maximum Types in a Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera (mayflies)	2	9.0	18.8
Odonata (dragonflies and damselflies)	3	7.0	14.6
Hemiptera (true bugs)	1	2.0	4.2
Coleoptera (water beetles)	1	4.0	8.3
Gastropoda (snails)	1	8.0	16.7
Amphipoda (scuds)	1	15.0	31.3
Oligochaeta (segmented worms)	1	2.0	4.2
Nematoda (round worms)	1	1.0	2.0
Percent EPT Taxa[1]			18.8

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Summary of Stream Habitat Conditions
Red Rock Creek (EL 201, 202, 203)

Current Conditions

General Description

Red Rock Creek is a medium-sized creek (mean width 7.2m, mean depth 0.26m), which flows primarily within a canyon. Many boulders in the stream provide cover for fish, and

sedimentation is moderate throughout most of the length of Red Rock Creek. There is and average of 25% sedimentation (Station 201-13.7, Station 202-22.7, and Station 203-43.8). Station 203 has the lowest bank stability. Most of Red Rock Creek is in Fair condition. Only Station 201 was given an overall habitat condition rating of good. Ungulate damage was most evident at Station 203. This station is where the stream leaves the canyon. Red Rock Creek has a pool/riffle ratio of 88/12 (Tables A and B).

Table A. Values, percent optimum, and rating for Priority A Factors determined based on habitat surveys conducted on Red Rock Creek (EL 201, 202, 203,) during the 2003 field season.

Priority A Factors	**Rating**	**Percent Optimum**	**Rating[1]**
Percent total stream width in pools		85	Excellent
Pool / Riffle ratio	88 / 12	24	Poor
Pool quality	3.6	48	Fair
Percent stream bottom with desirable materials		75	Good
Bank cover	1.8	45	Fair
Bank stability	3.1	77	Good
Percent Habitat Optimum	59	59	Fair

[1]Rating is based on Percent Optimum as 0-39 = Poor, 40-59 = Fair, 60-79 = Good, 80-100% = Excellent.

Table B. Values for Priority B Factors determined based on habitat surveys conducted on Willow Creek (EL 178, 179, 180, 184, 185, 204) during the 2003 field season.

Priority B Factors	**Value**	
Mean depth of stream (m)	0.27	
Mean width of stream (m)	4.0	
Mean % of stream shaded	2.4	
Mean % of bottom with clinging vegetation	3.7	
Mean % of bottom with rooted vegetation	4.8	
Mean % sedimentation	25	
Mean stream gradient (%)	3	
Mean landform gradient (%)	Left bank: 34	Right bank: 30
Mean stream flow rate during surveys (cfs)	7.6	
Mean water temperature during surveys (°C)	20	
Summer mean minimum water temperature (°C)[1]	16.8	
Summer mean maximum water temperature (°C)[1]		
Number of days max. temperature exceeded 26°C[1]		
Mean air temperature during surveys (°C)	23	
Turbidity description	Milky	
Mean conductivity	162	
Mean pH	8.2	
Mean dissolved oxygen (% saturation)	64.2	
Mean dissolved oxygen (mg/l)	5.8	

[1]Based on Hobo temperature gage measurements recorded hourly June 11 - August 31, 2003. Values are means of temperature data from three stations.

Condition of stream bank vegetation and bank stability
Stream banks are reasonably stable throughout most of Red Rock Creek, due to its flowing through a canyon which limits access (Table A). Riparian vegetation for the most part consists of grasses and forbs, as well as some juniper.

Shading of the water surface
Due to the low height of riparian vegetation relative to the stream width, only 2.4% of the stream surface is shaded. This amount of shade contributes little to cooler water in summer and reduced icing in winter (Table B).

Invertebrate Sampling
The presence of Ephemeroptera and Trichoptera, and their high relative abundance indicates this is a healthy environment with little or no pollution. The presence of Odonata indicates some pool habitats. The presence of Oligochaeta indicates some silt or mud in the substrate.

Table C. Results of invertebrate sampling conducted on Willow Creek (EL 178, 179, 180, 184, 185, 204) during the 2003 field season.

Invertebrate Order	Maximum Types per Sample	Mean Abundance per Sample	Relative Abundance (%)
Ephemeroptera	1	4.5	28
Plecoptera	1	0.25	0.01
Trichoptera	3	11	70
Diptera	2	2.8	18
Odonata	1	0.8	0.05
Hemiptera	0	0	0
Coleoptera	0	0	0
Gastropoda	1	0.75	0.05
Bivalvia	0	0	0
Decapoda	2	0.5	0.03
Amphipoda	1	0.25	0.01
Oligochaeta	1	0.8	0.05
Hirudinea	0	0	0
Nematoda	0	0	0
Percent EPT Taxa[1]	5	15.75	

[1]Percent EPT Taxa is percent invertebrate abundance in the orders Ephemeroptera, Plecoptera, and Trichoptera. High Percent EPT Taxa indicates good water quality.

Fisheries Surveys
Fish population surveys were conducted during 2005. Lahontan cutthroat trout. tahoe sucker, and Lahontan redside were found.

Potential to support Lahontan fish specie: Habitat characteristics of Red Rock Creek are marginal for supporting trout populations.

Abbreviations and Glossary

Abbreviations

ACEC:	area of critical environmental concern
AML:	Appropriate management level
AMP:	allotment management plan
AMR:	Appropriate management response
AUM:	animal unit month
ATV:	all-terrain vehicle
BA:	biological assessment
BLM:	U.S. Department of the Interior, Bureau of Land Management
BMP:	best management practices
BO:	biological opinion
BP:	before present (in cultural resources discussion)
CAA:	Clean Air Act
CDF:	California Department of Forestry
CDFG:	California Department of Fish and Game
CEQ:	Council on Environmental Quality
CFR:	Code of Federal Regulations
CRMA:	Cultural resource management area
CRMP:	Cultural resource management plan
DBH:	diameter at breast height
DFC:	desired future condition
DOI IB:	U.S. Department of the Interior, Information Bulletin
DPA:	direct protection area
EA:	Environmental Assessment
EIS:	Environmental Impact Statement
EO:	Executive Order
EPA:	United States Environmental Protection Agency
ERMA:	extensive recreation management area
ESA:	Endangered Species Act
ESI:	ecological site inventory
ES&R:	emergency stabilization and rehabilitation
FEIS:	Final Environmental Impact Statement

FGDC:	Federal Geographic Data Committee
FLPMA:	Federal Land Policy and Management Act
FPA:	Fire Program Analysis
GIS:	geographic information system
HFRA:	Healthy Forest Restoration Act
HMA:	herd management area
IMP:	Interim Management Policy for Lands under Wilderness Review
IRN:	interim route network
ISA:	instant (wilderness) study area
IWM:	integrated weed management
KGRA:	known geothermal resource area
LD:	limited to designated routes (OHV use)
LE:	limited to existing routes (OHV use)
LHA:	land health assessment
LOP:	limited operating period
LUP:	land use plan
LRU:	land resource unit
LTA:	land tenure adjustment
MFP:	management framework plan
Mg/L:	milligrams per liter
MLRA:	Major Land Resource Area
MOA:	Memorandum of Agreement
MOU:	Memorandum of Understanding
NAGPRA:	National American Graves Protection and Repatriation Act
NCA:	Black Rock Desert–High Rock Canyon Emigrant Trails National Conservation Area
NEPA:	National Environmental Policy Act
NDOT:	Nevada Department of Transportation
NDOW:	Nevada Department of Wildlife
NHPA:	National Historic Preservation Act
NPAB:	Northeast Plateau Air Basin
NPS:	National Park Service
NRCS:	Natural Resources Conservation Service
NRHP:	National Register of Historic Places
NSO:	no surface occupancy

NWR: National Wildlife Refuge

OHV: off-highway vehicle

PFC: properly functioning condition

PM: particulate matter (PM10 = PM less than 10 microns in diameter; PM2.5 = PM less than 2.5 microns in diameter)

PRIA: Public Rangelands Improvement Act

PU: planning unit

RAC: resource advisory council

RAMS: Risk Assessment and Mitigation Strategies

RFA: Riparian Functional Assessment

RFD: Reasonably Foreseeable Development

RHA: Rangeland Health Assessment

R&PP: Recreation and Public Purposes Act

RMP: resource management plan

RNA: research natural area

ROG: reactive organic gases

ROS: Recreation Opportunity Spectrum

ROW: right-of-way

S&G: Approved Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing, (July, 2000)

SFO: Surprise Field Office

SHPO: State Historic Preservation Officer

SRA: State Responsibility Area

SRMA: special recreation management area

SRP: special recreation permit

SSS: special status species

SYU: Sustained Yield Unit

TCP: traditional cultural property

U.S.: United States

USDA: United States Department of Agriculture

USDI: United States Department of the Interior

USFWS: U.S. Department of the Interior, Fish and Wildlife Service

USFS: United States Forest Service

USGS: United States Geological Survey

VRM: visual resource management

WMA: wildlife management area

WFU: wildland fire use

WSA: wilderness study area

WSR: wild and scenic river

WUI: wildland-urban interface

Glossary

Accelerated Erosion – Soil loss above natural levels resulting directly from human activities. Because of the slow rate of soil formation, accelerated erosion can lead to a permanent reduction in plant productivity.

Access Easement – An easement that allows foot, automobile, or other means of access by the public, including access to private property, and is useful for crossing private lands to access public lands.

Activity Plan – See IMPLEMENTATION PLAN.

Actual Use – The number of livestock actually grazing on a given allotment; the use made of forage by livestock or wildlife without reference to permitted or recommended use.

Adaptive Management – An iterative process, designed to experimentally compare selected management actions by evaluating alternative hypotheses about the ecosystem being managed. Adaptive management consists of three parts: management actions, monitoring, and adaptation. Management actions are treated as experiments subject to modification. Monitoring is conducted to detect the effects of the management actions. Finally, management actions are refined in response to the enhanced understanding of how the ecosystem responds.

Advisory Council on Historic Preservation (ACHP) – An independent federal agency that serves as the chief policy advisor to the President and Congress on matters concerning historic preservation. Included on the 20 member Council are the heads of several federal agencies including the Secretary of the Interior and the Secretary of Agriculture.

Age Class – (1) A descriptive term to indicate the relative age of plants. (2) Refers to age and class of animals (USDA NRCS 1997); vegetation that is roughly the same age.

Aggregate – Any combination of sand, gravel, and crushed stone in its natural or processed state.

Airshed – An area that shares the same air because of topography, meteorology, and climate; an atmospheric zone potentially influenced by air pollutants from various sources.

Aliquot Part – A tract or other parcel of land definitely located by reference to the division of a United States Government survey township into sections (640 acres), 1/2 sections (320 acres), 1/4 sections (160 acres), half-quarter or 1/8 sections (80 acres), quarter-quarter or 1/16 sections (40 acres), 1/32 sections (20 acres), 1/64 sections (10 acres), 1/128 sections (5 acres), or 1/256 sections (2.5 acres).

Alliance – See VEGETATION ALLIANCE.

Allocation – The process of specifically assigning use between and rationing among competing users for a particular area of public land or related waters.

Allotment (range) – An area of land designated and managed for grazing of livestock (43 CFR Subpart 4100 Grazing Administration-Exclusive of Alaska; General §4100.0-5 Definitions).

Allotment Management Categories – A management approach for allotment lands using three categories based mainly on current rangeland condition: Improve (I), Maintain (M), and Custodial (C). Criteria used to assign each of these management approaches are as follows:

Improve – Allotments generally have the potential for increasing resource production or conditions but are not producing at that potential. There may be conflicts or controversy involving resource conditions and uses, but there are realistic opportunities to improve resource conditions.

Maintain – Allotments are in satisfactory resource conditions and are producing near their potential under existing management strategies. There are little or no known resource use conflicts or controversies.

Custodial – Allotments usually consist of relatively small acreages or parcels of public land. often intermingled with larger amounts of nonfederal lands. There should be no known resource conflicts involving use or resource conditions. Typically, opportunities for positive economic returns from public investments are limited on these lands.

Also see RANGELAND HEALTH ASSESSMENT and ALLOTMENT MANAGEMENT PLAN.

Allotment Management Plan (AMP) – A documented program developed as an activity plan, consistent with the definition at 43 U.S.C. 1702(k), that focuses on, and contains the necessary instructions for, the management of livestock grazing on specified public lands to meet resource conditions, sustained yield, multiple use, economic and other objectives (43 CFR Subpart 4100 Grazing Administration-Exclusive of Alaska; General §4100.0-5 Definitions). (Synonymous with a single activity Implementation Plan).

Allowable Cut – The amount of timber that may be harvested from an area over a specified period of time in accord with the management objectives.

All-Terrain Vehicle (ATV) – A motorized off-highway vehicle, designed to travel on four or more low-pressure tires with or without tracks added, with a seat designed to be straddled by the operator and handlebars for steering.

Alluvial fan – A low, outspread, relatively flat to gently sloping mass of sediment, shaped like an open fan and deposited by a stream where it flows from a narrow mountain valley onto a plain or broad valley (SCS 1993

Alluvium – Unconsolidated rock or sediment deposited by flowing water including gravel, sand, silt, clay, and various mixtures thereof (SCS 1993).

Alternative – One of at least two proposed means of meeting planning objectives.

Analysis of the Management Situation (AMS) – Chapter 3 in BLM's resource management planning process. An AMS describes a planning area's current public land management and suggests opportunities to better manage this land.

Animal Unit – One mature (1,000-pound) cow or the equivalent, based on an average forage consumption of 26 pounds of dry matter per day.

Animal Unit Month (AUM) – The amount of forage needed to sustain one cow, five sheep, or five goats for 1 month (43 CFR Subpart 4100 Grazing Administration-Exclusive of Alaska; General § 4100.0-5).

Annual Plant – A plant that completes its life cycle within a single growing season (FDGC 1997). Also see PERENNIAL PLANT.

Appropriate Management Level (AML) – The population objective (median number of wild horses and burros) for a herd management area (HMA) that will ensure a thriving ecological balance among all the users and resources of the HMA—for example, wildlife, livestock, wild horses, vegetation, water, and soil.

Appropriate Management Response (AMR) – The response to a wildland fire based on an evaluation of risks to firefighters and public safety; the circumstances under which the fire occurs, including weather and fuel conditions; natural and cultural resource management objectives; protection priorities; and values to be protected. The evaluation must also include an analysis of the context of the specific fire within the overall local geographic area or national wildland fire situation.

Aquifer – A water-bearing bed or layer of rock, sand, or gravel that contains enough saturated permeable material to conduct groundwater and yield large amounts of water to wells or springs.

Archaeological District – A significant concentration, linkage, or continuity of sites important in history or prehistory.

Archaeological Resources Protection Act of 1979 (ARPA) – A federal law that prohibits the removal, sale, receipt and interstate transportation of archaeological resources obtained illegally (without permits), from federal or Indian lands and authorizes agency permit procedures for investigations of archaeological resources on lands under the agency's control.

Archaeology/Archeology – The scientific discipline responsible for recovering, analyzing, interpreting, and explaining the material culture of the historic and prehistoric past.

Area of Critical Environmental Concern (ACEC) – An area of BLM-administered land where special management attention is needed to do the following:

- to protect and prevent irreparable damage to important historic, cultural, or scenic values and to fish and wildlife or other natural systems or processes; or
- to protect life and provide safety from natural hazards.

Archaeological Site – Any place where human-made or modified artifacts, features, or ecofacts are found.

Artifact – A discrete or portable object manufactured or modified by human. Major artifact categories include lithic, ceramic, organic, and metal.

Assemblage – All the artifacts found in a component of a site.

Association – See VEGETATION ASSOCIATION.

Association – The relationship between an artifact and other archaeological finds (other artifacts, features, faunal remains, datable sediments) within an archaeological deposit.

At Risk – A designation of lands that have a reversible loss in productive capability and increased vulnerability to irreversible degradation according to an evaluation of current conditions of the soil and ecological processes (National Research Council 1994). The at-risk designation may point out the need for more information to better determine the functional status of an attribute.

Authorized Officer – Any Bureau of Land Management employee who has been delegated the authority to perform defined duties.

Available Forage – Forage that can be grazed and still allow sustained forage production on rangeland. Available forage may or may not be authorized for grazing.

Avoidance Areas – Areas with sensitive resources where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not otherwise feasible on lands outside the avoidance area. Also see EXCLUSION AREAS.

Back Country Byway – A road segment designated as part of the National Scenic Byway System.

Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction or force of the fire's convection column.

Band (of horses) – An organized social group of horses in the wild based on the family unit. A band normally contains a dominant stallion, mares, and juveniles.

Bare Ground (bare soil) – All land surface not covered by vegetation, rock, or litter (NRCS 1997).

Basal Area – Basal Area – The cross-sectional area of the stem or stems of a plant or all plants in a stand. Herbaceous and small woody plants are measured at or near the ground level; larger woody plants are measured at breast height (4.5 feet above the ground) or other designated height (NRCS 1997).

Base Flow – The portion of stream discharge derived from such natural storage sources as groundwater, large lakes, and swamps but not derived from direct runoff or flow from stream regulation, water diversion, or other human activities.

Base Metal – A metal inferior in value to gold and silver, a term generally applied to the commercial metals such as copper and lead.

Basin – A geographic area drained by a single major stream and consisting of a drainage system of streams and often natural or artificial lakes, also referred to as drainage basin, watershed, or hydrographic region.

Basin and Range – A region of north-south trending mountains ranges and valleys encompassing western Utah and essentially all of Nevada. This geologic territory includes virtually all of the Great Basin and extends north to Oregon; south and east through Arizona, New Mexico, and Texas; and all the way into Mexico. The Basin and Range can be differentiated from its surrounding geologic regions by its uplifted and tilted ranges separated by broad elongated basins. The Great Basin forms a unique part of this geologic region because this hydrologic area has no drainage to the ocean.

Bioengineering – See SOIL BIOENGINEERING.

Biological Assessment – The gathering and evaluation of information on proposed endangered and threatened species and critical habitat and proposed critical habitat. Required when a management action potentially conflicts with endangered or threatened species, the biological assessment is the way federal agencies enter into formal consultation with the Fish and Wildlife Service and describe a proposed action and the consequences to the species the action would affect.

Biological Diversity (Biodiversity) – The full range of variability within and among living organisms and the ecological complexes in which they occur. Biological diversity encompasses ecosystem or community diversity, species diversity, and genetic diversity. In this document, *biodiversity* refers to species richness defined as a number of species in a given habitat or location across habitats.

Biological Fuels Treatments – Methods of vegetation treatment that employ living organisms to selectively suppress, inhibit, or control herbaceous, and wood vegetation. Examples of such methods include insects; pathogens; and grazing by cattle, sheep, or goats.

Biological Integrity – The ability to support and maintain an integrated, adaptive community with a biological composition and functional organization comparable to a region's natural systems; the measure of a system's wholeness, including presence of all suitable elements and occurrence of all processes at suitable rates. Integrity refers to conditions under little or no human influence. A biota with high integrity reflects natural evolutionary and biogeographic processes.

Biological Opinion – A document that includes the following:

- the opinion of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service as to whether a federal action is likely to jeopardize the existence of a species listed as threatened or endangered, or destroy or adversely modify designated critical habitat,
- a summary of the information on which the opinion is based, and
- a detailed discussion of the effects of the action on listed species or designated critical habitat.

Biologic Crusts – A biological community that forms a surface layer or crust on some soils. This community consists of cyanobacteria (blue-green bacteria), microfungi, mosses, lichens, and green algae. This community performs many important functions, including fixing nitrogen and carbon, maintaining soil surface stability, and preventing erosion. Biologic crusts also influence the nutrient levels of soils and the status and germination of plants in the desert. These crusts are slow to recover after severe disturbance, requiring 40 years or more to recolonize even small areas.

Biomass – The total amount of living plants and animals above and/or below ground in an area at a given time (NRCS 1997); plant material that can be burned as fuel.

Biome – A major biotic unit consisting of plant and animal communities having similarities in form and environmental conditions.

Biota – The animal and plant life of a given region.

Biotic Integrity – The capability of a site to support characteristic functional and structural communities in the context of normal variability, to resist loss of this function and structure due to disturbance, and to recover following disturbance (National Research Council 1994).

BLM Sensitive Species – Species designated by a state director, usually in cooperation with the state agency responsible for managing the species and state natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a state. Or within a significant portion of or distribution; (2) are under status review by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or State listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State listed but which may be better conserved through application of BLM sensitive species status (BLM 2001a).

Blowout – An excavation in areas of loose soil, usually sand, produced by wind; a breakthrough or rupture of a soil surface attributable to hydraulic pressure, usually associated with sand boils.

Board Foot – The amount of timber equivalent to a piece of wood 12 inches square and 1 inch thick.

Bole – A tree trunk.

Bone Dry Ton (BDT) (Oven Dry Ton) – The amount of wood that would weigh 2,000 pounds at 0% moisture content.

BP – Before present (in cultural resources discussions).

Browse – The part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption; the act of consuming browse (NRCS 1997).

Brush-Beating – The use of huge special machinery pulled by a tractor to knock over brush to allow understory plants to grow.

Buffer – A strip of natural plant growth that helps to prevent soil erosion from along a river or stream or around a site; a strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities next to roads, trails, waterways, and recreation sites.

Bulk Density – Mass (weight) per unit volume of undisturbed soil, dried to constant weight at 105°C, Usually expressed as grams/cubic centimeter.

Bunch Grass – Any of various grasses in many different genera that grow in clumplike fashion rather than forming a sod or mat.

Burned Area Emergency Stabilization and Rehabilitation (BAER) – A post-fire process. Emergency stabilization (such as seeding to prevent erosion or the establishing of invasive plants) actions are taken within 1 year of a wildland fire for the following purposes:

- to stabilize the site,
- to prevent unacceptable degradation to natural and cultural resources, and
- to minimize threats to life or property resulting from wildland fire.

Rehabilitation (such as tree planting, invasive plant treatments, and fence replacement) actions are taken within 3 years of a wildland fire to repair or improve lands unlikely to recover from wildland fire or to repair or replace minor facilities damaged by fire.

California Department of Fish and Game (CDFG) – The California state agency whose mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. CDFG maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. CDFG is also responsible for the diversified use of fish and wildlife, including recreational, commercial, scientific, and educational uses (CDFG website).

California National Historic Trail – A trail that stretched from starting points along the Missouri River to points in California and Oregon and was used by more than 200,000 gold seekers and farmers in the 1840s and '50s.

CALVEG – A California statewide system for describing and contrasting vegetation types (alliances) across the state and in mapping their general distributions.

Candidate Species – Plants and animals listed in the *Federal Register* "Notices of Review" that the U.S. Fish and Wildlife Service (USFWS) is considering for listing as threatened or endangered. Two categories are of main concern to BLM:

Category 1 – Taxa for which the USFWS has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

Category 2 – Taxa for which the USFWS has information to show that listing is possibly appropriate. More information is being collected.

Canopy – The vertical projection downward of the aerial portion of shrubs and trees, usually expressed as a percent of the ground so occupied.

Canopy Fuels – The live and dead foliage, live and dead branches, and lichens of trees and tall shrubs that lie above the surface fuels. Also see SURFACE FUELS.

Carrying Capacity – The maximum stocking rate possible without inducing permanent or long-term damage to vegetation or related resources. The rate may vary from year to year in the same area as a result of fluctuating forage production (NRCS 1997).

Casual Use (Mineral Materials) – Extracting mineral materials for limited personal (noncommercial) uses.

Casual Use (Locatable Mining) – Mining that only negligibly disturbs federal lands and resources and does not include the use of mechanized earth moving equipment or explosives or motorized equipment in areas closed to off-highway vehicles. Casual use generally includes panning, nonmotorized sluicing, and collecting mineral specimens using hand tools.

Casual Use (Recreation) – Noncommercial or nonorganized group or individual activities on public land. Casual use does the following:

- complies with land use decisions and designations, i.e. special area designations,
- does not award cash prizes,
- is not publicly advertised,
- poses minimal risk for damage to public land or related water resources, and
- generally requires no monitoring.

Catastrophic Wildfire – Fire that burns more intensely than the natural or historical range of variability, thereby causing unacceptable erosion, fundamentally changing the ecosystem, or destroying communities of rare or threatened species or habitat.

Categorical Exclusion – A category of actions that do not individually or cumulatively have a significant effect on the human environment and that have been found to have no such effect in procedures adopted by a federal agency and for which, therefore, neither an environmental assessment (EA) nor an environmental impact statement (EIS) is required.

Check Dam – A small dam built in a gully or other small water course to decrease the streamflow velocity, minimize channel erosion, promote deposition of sediment and to divert water from a channel.

Chemical Fuels Treatments – The applying of chemicals to control unwanted vegetation.

Cherry Stem –(roads called "cherry stem")—roads extend into a Wilderness Study Area (WSA) but are officially outside the WSA. The WSA boundary follows along the edge of the road at the edge of disturbance – up one side, around the far end and back down the other side. Because the appearance of the WSA boundary around the edge of the road resembles a cherry stem on a map, these types of roads are called "cherry stem" roads.

Chiseling – Breaking or loosening the soil, without inversion, with a chisel cultivator or chisel plow.

Clean Water Action Plan (CWAP) – A plan developed by federal agencies in response to President Clinton's request for a comprehensive plan to revitalize the Nation's commitment to protect and restore water resources.

Climax Condition – The final vegetation community and highest ecological development of a plant community that emerges after a series of successive vegetation stages. The climax community perpetuates itself indefinitely unless disturbed by outside forces.

Code of Federal Regulations – The official legal compilation of regulations directing Federal Government agencies.

Collaboration – A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may or may not involve an agency as a cooperating agency.

Commercial Forest Land – Forested land that can produce new growth at a minimum rate of 20 ft^3/acre/year, excluding lands withdrawn from timber production by statute or administrative regulation.

Commercial Thinning – The harvesting of trees that have reached economic maturity; a silviculture treatment that thins out an overstocked stand by removing trees that are large enough to be sold as products such as poles or fence posts. See THINNING and PRECOMMERCIAL THINNING.

Communication Site – A hilltop or favorable signal receiving and transmitting location where a collection of facilities are located. A facility consisting of a small building and tower, used for transmitting or receiving radio, television, telephone, or other electronic signals.

Community (Plant Community) – An assemblage of plants occurring together at any point in time, while denoting no particular ecological status. A unit of vegetation (FGDC 1997).

Community Pit – A designated mineral materials pit, where anyone with a BLM permit may go to acquire such materials as sand and gravel.

Compaction Layer – A near-surface layer of dense soil caused by the repeated impact on or disturbance of the soil surface. When soil is compacted, soil grains are rearranged to decrease the void space and bring them into closer contact with one another, thereby increasing the bulk density (Pellant and others 2000). Also see SOIL COMPACTION.

Component (Cultural Resources) – An association of all the artifacts from one occupation level and one time period at a site.

Composition (Species Composition) – The proportions of plant species in relation to the total in a given area. Composition may be expressed as cover, density, and weight (BLM 1996a).

Condition Class – See FIRE REGIME AND CONDITION CLASS.

Confinement (Confine Strategy) - The strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Containment - The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread.

Conformation (Horse) – The physical appearance of an animal due to the arrangement of muscle, bone, and other body tissue. The sum of these body parts and how they blend together determine the acceptability or unacceptability of the horse's conformation. Good conformation is the overall blending of body parts to form a beautiful athlete.

Connectivity – The degree to which habitats for a species are continuous or interrupted across a spatial extent, where habitats defined as continuous are within a prescribed distance over which a species can successfully conduct key activities, and habitats defined as interrupted are outside the prescribed distance.

Conservation Easement – A legal agreement allowing a landowner to transfer selected property rights to a land trust. The landowner retains title to the property, the easement becomes part of the land deed, and all future property owners will be bound by the terms of the easement.

Consistency – Under the Federal Land Policy and Management Act, the adherence of BLM resource management plans to the terms, conditions, and decisions of officially approved and adopted resource related plans, or in their absence, with policies and programs of other federal agencies, state and local governments and Indian tribes, so long as the plans also conform to the purposes, policies, and programs of federal laws and regulations that apply to BLM-administered lands (BLM 2000b).

Contact – Contact with Europeans (in cultural resource discussions).

Context – The position of an archaeological find in time and space, established by measuring and assessing its associations, matrix, and provenience.

Conveyance – In real property law, a transfer of legal title to land; an instrument, such as a deed, by which interest in real property is created or by which title to real property is transferred from grantor
to grantee.

Cooperating Agency – An agency that helps the lead federal agency develop the environmental analysis for a proposed major action. U.S. Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA. Any North American Indian tribe or federal, state, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency. Cooperating agency status is generally formalized through a memorandum of understanding between BLM and the cooperating agency.

Cooperative Management Agreement – A document that describes agreements made between BLM and the public on adjusting grazing use. This document also defines the specific adjustments and the schedule of adjustments (usually over a 5-year period).

Cooperative Weed Management Area – An organization that brings together landowners and private, county, state, and federal managers within a watershed or other geographic area to combine expertise, energy, and resources to implement on the ground a comprehensive weed management program.

Coordinated Resource Management – An approach to reaching decisions and resolving resource conflicts that can complement any planning or management situation involving mixed land ownership or multiple resource management use. The following are elements common to this approach:

- cooperation and equitable voluntary participation of all affected interests, using a team approach;
- open communication among all participants;
- availability of technical expertise;
- strong and effective local leadership;
- agreement by consensus of the team; and
- commitment to monitoring, reviewing, and revising plans, agreements, and projects to ensure that objectives are met.

Corridor – See DESIGNATED CORRIDOR.

Cover – Any form of environmental protection that helps an animal stay alive (mainly shelter from weather and concealment from predators). Also see SOIL COVER.

Critical Habitat – (1) The specific areas within the geographical area currently occupied by a species, at the time it is listed in accord with the Endangered Species Act, on which are found physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the

geographical area occupied by a species at the time it is listed upon determination by the Secretary of the Interior that such areas are essential for the conservation of the species (50 CFR Part 424-Listing Endangered and Threatened Species and Designating Critical Habitat § 424.02 Definitions).

Cross Fencing – The building of fences across allotments to create more pastures or across pastures to create smaller, easier to manage pastures.

Crown – The upper portion of a tree containing the limbs, twigs, leaves, buds, flowers, and fruit.

Crown Bulk Density – A measure of fuel in the forest canopy used in fire behavior modeling. Crown bulk density is usually calculated by dividing the weight of needles, leaves, and smaller branches by the canopy volume.

Crown Class—an evaluation of an individual tree's crown in relation to its position in the canopy and the amount of full sunlight it receives. The four recognized categories are dominant (D), co-dominant (C), intermediate (I), and overtopped or suppressed (S).

Crown-Sprouting – Growing shoots from a root crown (large vegetative mass just below the soil surface in some plants) after a fire or other disturbance.

Cultural Landscape – A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cultural Matrix – A cultural resource site's composition in cultural layers. For example, the removal of vegetation from a site and the resulting erosion can mix artifacts from different layers and disturb or destroy a site's cultural matrix and the information it may contain.

Cultural Resource – Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence, including archaeological or architectural sites, structures, or places; and places of traditional cultural or religious importance to specified groups, whether or not represented by physical remains.

Cultural Resource Data – Cultural resource information embodied in material remains and manifested in studies, notes, records, diaries, analyses, and published and unpublished manuscripts.

Cultural Resource Integrity – The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.
Cultural Resource Inventory (Survey) – A descriptive listing and documentation, including photographs and maps of cultural resources. Also included in an inventory are the processes of locating, identifying, and recording sites, structures, buildings, objects, and districts through library and archival research, information from persons knowledgeable about cultural resources, and on-the-ground surveys of varying intensity. The three classes, or levels, of cultural resource inventories (surveys) are the following:

> **Class I** – A professionally prepared study that compiles, analyzes, and synthesizes all available data on an area's cultural resources. Information sources for this study include published and unpublished documents, BLM inventory records, institutional site files, and state and National Register files. Class I inventories may have prehistoric, historic, and ethnological and sociological elements. These inventories are periodically updated to include new data from other studies and Class II and III inventories.

Class II – A professionally conducted, statistically based sample survey designed to describe the probable density, diversity, and distribution of cultural properties in a large area. This survey is achieved by projecting the results of an intensive survey carried out over limited parts of the target area. Within individual sample units, survey aims, methods, and intensities are the same as those applied in Class III inventories. To improve statistical reliability, Class II inventories may be conducted in several phases with different sample designs.

Class III – A professionally conducted intensive survey of an entire target area aimed at locating and recording all visible cultural properties. In a Class III survey, trained observers commonly conduct systematic inspections by walking a series of close-interval parallel transects until they have thoroughly examined an area.

Cultural Resource Management Plan (CRMP) – A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

Cultural Site – A physical location of past human activities or events, more commonly referred to as an archaeological site or a historic property. Such sites vary greatly in size and range from the location of a single cultural resource object to a cluster of cultural resource structures with associated objects and features.

Cumulative Impacts – The effect on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. The following: Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508-Terminology and Index § 1508.7 Cumulative Impact).

Debitage – The sharp-edged waste material left when someone creates a stone tool.

Decadent – Being in a state of decline or decay.

Decision Record – A manager's decision on a categorical exclusion review or an environmental assessment. Comparable to the record of decision for an environmental impact statement, the decision record includes: (1) a finding of no significant impact, (2) a decision to prepare an environmental impact statement, or (3) a decision not to proceed with a proposal. Also see RECORD OF DECISION.

Defensible Space – An natural or human-made area where material that can cause a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area of at least 30 feet around a structure that is cleared of flammable brush or vegetation.

Deferred Grazing – Postponing grazing or resting an area for a prescribed period, usually to meet a specific management objective (NRCS 1997). Also see REST.

Deferred-Rotation Grazing – Any grazing system that provides for a systematic rotation of the deferment among pastures. The time of the rest period generally changes in succeeding years (NRCS 1997).

Deposition Area – An area offsite from where the original soil erosion occurred that now has the soil deposits from the original soil erosion area.

Desert Land Entry – An application to acquire title to irrigable arid agricultural public lands for the purpose of reclamation, irrigation, and cultivation in part.

Designated Corridor – BLM's preferred route for placing rights-of-way for utilities (pipelines and power lines) and modes of transportation (highways and railroads).

Desired Future Condition – The future condition of land resources on a landscape scale that meet management objectives. Desired future condition is based on ecological (such as desired plant community), social, and economic considerations during the land and resource planning process. Desired future condition is usually expressed as a ecological status of vegetation (species composition, habitat diversity, age, and size classes of species) and desired soil qualities (conditions of soil cover, erosion, compaction, loss of soil productivity).

Desired Plant Community – One of several plant community types that may occupy an ecological site, the one or combination that meets the minimum quality criteria for the soil, water, air, plant, and animal resources, and that meets the landowner's or manager's objective (NRCS 1997); the plant community that has been determined through a land use or management plan to best meet the plan's objective for the site (BLM 1998a).

Diameter at Breast Height (dbh) – The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Directional Drilling – The technique of drilling at an angle from the vertical by deflecting the drill bit.

Direct Protection Area (DPA) – A concept developed by federal and state fire protection agencies to help resolve the management and fiscal complexities of wildland fires burning across intermingled and adjacent areas of state and federal responsibility. Within DPAs, federal and state agencies assume fire protection responsibility for the lands of another agency, along with their own. The agencies also, as nearly as possible, represent the other agencies' interests and objectives. Each agency must, therefore recognize, know, and understand each other's mission objectives, policies, and authorities.

State Responsibility Areas (SRAs) – Land in California for which the state is responsible for wildlife fire protection under California Public Resource Code Sections 4125 to 4127. These lands are often referred to as state and private lands.

Federal Responsibility Areas (FRAs) – Land in national forests for which the U.S. Forest Service is responsible, national park land for which the National Park Service is responsible, and public land for which BLM is responsible for wildland fire protection.

Discharge – The rate of flow or volume of water flowing in a stream at a given place or within a given period of time.

Dispersed Recreation – Recreation activities that do not require developed sites or facilities.

Disposal Areas – Broad areas of public lands where BLM generally intends to dispose of existing public lands, either by land exchange or sale.

Dissolved Oxygen (DO) – The amount of free (not chemically combined) oxygen dissolved in water, wastewater, or other liquid, usually expressed in milligrams per liter, parts per million, or percent of saturation. Adequate concentrations of dissolved oxygen are needed for the life of fish and other aquatic organisms and the prevention of offensive odors. Dissolved oxygen levels are considered the most important and commonly employed measure of water quality and indicator of a water body's ability to support desirable aquatic life.

Disturbance Regime – The historic patterns (frequency and extent) of fire, insects, wind, landslides, and other natural processes in an area.

Dominant Species – Plants that, in abundance, coverage, or size, exert a major controlling influence on the conditions of existence for associated species in the ecosystem Also see SUBDOMINANT SPECIES.

Drift Fences – Fences built to prevent livestock from wandering from their allotted range.

Duff – The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

Eagle Lake shoreline self contained camping: - Same as Self Contained Camping; additional requirement that campers do not drain any soapy wash water from dishpans, or RV holding tanks on the shoreline and do not drain any toilet wastes from RV holding tanks onto the shoreline.

Easement – The right to use land in a certain way granted by a landowner to a second party.

Ecofact – Bones, vegetal matter, pollen, shells, modified soils, or other archaeological finds that though not human manufactured, give important clues as to human behavior or the environmental context of such behavior.

Ecological Health – The degree to which the integrity of the soil and ecological processes of ecosystems are sustained (adapted from National Research Council 1994).

Ecological Potential – The capability of an ecological site to function within a normal range of variation in ecological processes in a state, or after having crossed a threshold. The same capability can also apply to a vegetation alliance and association but most normally applies to an ecological site. Also see STATE and THRESHOLD.

Ecological Processes – Processes that include the water cycle (the capture, storage, and redistribution of precipitation) energy flow (conversion of sunlight to plant and animal matter) and the nutrient cycle (the cycle of nutrients, such as nitrogen and phosphorus through the physical and biotic components of the environment). Ecological processes functioning within a normal range of variation at an ecological site will support specific plant and animal communities (Herrick and others 2005).

Ecological Site (Range Site) – A distinctive kind of land that has specific physical characteristics and that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Ecological Site Inventory – A resource inventory that involves the use of soils information to map ecological sites and plant communities and the collection of natural resource and vegetation attributes.

The sampling data from each of these soil-vegetation units, referred to as site write-up areas (SWAs), become the baseline data for natural resource management and planning.

Ecological Succession – An ecosystem's gradual evolution to a stable state. If, through the ability of its populations and elements, an ecosystem can absorb changes, it tends to persist and become stable through time.

Ecosystem – A dynamic complex of plant, animal, fungal, and microorganism communities and their associated nonliving environment interacting as an ecological unit (Noss and Cooperrider 1994).

Ecosystem Diversity – The variety of species and ecological processes that occur in different physical settings.

Ecosystem Management – Any land-management system that seeks to protect viable populations of all native species, perpetuate natural-disturbance regimes on the regional scale, adopt a planning timeline of centuries, and allow human use at levels that do not result in long-term ecological degradation (Noss and Cooperrider 1994).

Ecotourism – Tourism that essentially focuses on natural rather than developed attractions with the goal of enhancing the visitor's understanding and appreciation of nature and natural features. Such tourism often attempts to be environmentally sound and to contribute economically to the local community.

Effects – Effects and impacts in the regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Effects include

- Direct effects, which are caused by the action and occur at the same time and place and
- Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate and are related effects on air and water and other natural systems, including ecosystems (40 CFR Part 1508-Terminology and Index).

Electrofishing – A fish sampling technique using electric currents and electric fields to control fish movement and/or immobilize fish, allowing capture.

Eligible River – A river or river segment found—through interdisciplinary team and, in some cases, interagency review—to meet Wild and Scenic River Act criteria of being free-flowing and having one or more outstandingly remarkable values.

Endangered Species – Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the *Federal Register* (50 CFR Part 424-Listing Endangered and Threatened Species and Designating Critical Habitat § 424.02 Definitions). Also see THREATENED SPECIES.

Entry – An application to acquire title to public lands.

Environmental Assessment (EA) – A concise public document for which a federal agency is responsible. An EA serves (1) to briefly provide enough evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI), and to aid an agency's compliance with the National Environmental Policy Act (NEPA) when no EIS is needed; and (2) to facilitate preparing an EIS when one is needed. Also see ENVIRONMENTAL IMPACT STATEMENT and FINDING OF NO SIGNIFICANT IMPACT (FONSI).

Environmental Impact – The positive or negative effect of any action upon a given area or resource.

Environmental Impact Statement (EIS) – A detailed written statement as required by section 102(2)(C) of the National Environmental Policy Act (40 CFR Part 1508-Terminology and Index).

Environmental Justice (EJ) – The fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income in developing, implementing, and enforcing environmental laws, regulations, and policies.

Ephemeral Stream – A stream that flows only in direct response to precipitation, and whose channel is at al times above the water table (BLM 1993).

Erosion – The wearing away of the land surface by running water, waves, or moving ice and wind, or by such processes as mass wasting and corrosion (solution and other chemical processes). The term "geologic erosion" refers to natural erosion processes occurring over long (geologic) time spans. "Accelerated erosion" generally refers to erosion in excess of what is presumed or estimated to be naturally occurring levels, and which is a direct result of human activities (SCS 1993).

Ethnographic – See ETHNOLOGY.

Ethnology – The branch of cultural anthropology that deals with the scientific investigation of living cultures. Ethnology's main data collection technique is participant observation–living with the people being investigated with the intention of full immersion in their culture. Such research is called ethnography.

Eutrophication – The process of enrichment of water bodies by nutrients. Eutrophication of a lake normally contributes to its slow evolution into a bog or marsh and ultimately to dry land. Eutrophication may be accelerated by human activities.

Even Aged Management – Timber management that creates stands of trees that are essentially the same age.

Excess Animals – Wild, free-roaming horses or burros that (1) have been removed from an area by the Secretary of the Interior pursuant to application of law, or (2) must be removed from an area to preserve and maintain a thriving natural ecological balance and multiple use relationship in that area.

Exclosures – Areas of land enclosed by a fence for the purpose of excluding all animals or specified species or groups of animals. Exclosures serve as control areas where biotic factors can be measured, recorded, and evaluated. These can be compared with plots in adjacent areas to which the excluded animals do have access (BLM 1989b).

Exclusion Areas – Areas with sensitive resources where rights-of-way, Section 302 permits, leases, and easements would not be authorized. Also see AVOIDANCE AREAS.

Executive Order 11644 as Amended by Executive Order 11989 – Executive orders (signed respectively by President Nixon in 1972 and President Carter in 1977) issued to control the use of off-highway vehicles on public lands, protect resources, promote the safety of public land users, and minimize conflicts among uses. The order requires federal agencies to monitor the effects of OHV use and to close areas or trails to OHVs if it is determined that their use will damage the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources.

Existing Ways – Routes inventoried in the 1979 BLM roadless area inventory.

Exotic – All species of plants and animals not naturally occurring, either presently or historically, in any ecosystem of the United States (EO 11987 1977).

Extensive Recreation Management Area (ERMA) – A resource management plan (RMP) allocation for recreation use made for all BLM land covered by the plan but not otherwise allocated in special recreation management areas. In ERMAs

- visitors would engage in dispersed recreation uses;
- management would emphasize self-sufficient exploration and discovery; and
- recreation facilities would be developed only as needed to mitigate the impacts of visitor use, protect resources, and provide visitor information and interpretation needed to meet BLM management goals established in the RMP for land health and customer service. Also see SPECIAL RECREATION MANAGEMENT AREAS.

Extirpated Species – A locally extinct species; a species that is no longer found in a locality but exists elsewhere (adapted from Noss and Cooperrider 1994).

Facultative – Capable of existing under different conditions or using different modes for nutrition. For example, facultative wetland plants can occur in either wetlands or uplands although they may be more abundant in the wetlands.

Fault Block – A rock mass bounded by faults on at least two sides.

Feature – A nonportable artifact, such as a house, structure, or storage pit, that cannot be removed from a site.

Fecal Coliform Bacteria – A group of bacteria that are passed through the fecal excrement of humans, livestock, and wildlife. These organisms can enter rivers through runoff. Although these bacteria do not directly cause disease, high amounts of fecal coliform bacteria suggest the presence of disease-causing agents. Possible diseases caused by this type of water contamination include dysentery, typhoid fever, hepatitis, and gastroenteritis.

Federal Candidate Species – Species not protected under the Endangered Species Act but being considered by the U.S. Fish and Wildlife Service for inclusion on the list of federally threatened or endangered species.

Federal Land Policy And Management Act (FLPMA) – Public Law 94-579, the act that (1) established, for the BLM, standards for managing the public lands including land use planning, sales, withdrawals, acquisitions, and exchanges; (2) authorized the setting up of local advisory councils representing major citizens groups interested in land use planning and management, (3)

established criteria for reviewing proposed wilderness areas, and (4) provided guidelines for other aspects of public land management such as grazing.

Federal Proposed Species – Any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under Section 4 of the Endangered Species Act.

Federal Register – The Federal Government's official daily publication for rules, proposed rules, and notices of federal agencies and organizations, as well as executive orders and other presidential documents.

Fee Interest (Fee Simple or Fee Simple Interest) – Full ownership of a piece of land, including all legal rights of the property. Also see LESS-THAN-FEE INTEREST.

Fibre Saturation Point (fsp) – The moisture content of wood at which all free water is lost from cell cavities and only water bound within the cell walls remains; generally between 25 and 30% moisture content; shrinkage occurs only as wood moisture content drops below fsp.

Fifth-Level Watershed – See STREAM ORDER.

Finding of No Significant Impact (FONSI) – A document prepared by a federal agency, usually accompanying an environmental assessment, that briefly explains why a given action will not have a significant effect on the human environment and why an environmental impact statement (EIS) will therefore not be required. Also see ENVIRONMENTAL ASSESSMENT.

Fireline (Control Line) – An inclusive term for all constructed or natural barriers, and treated fire edges used to control a fire. Also called a fire trail.

Fire Management Plan – A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use plan. The fire management plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Management Unit – A fire planning unit in which preparedness strategies are designed to meet watershed or resource management objectives, designated by logical fire control or containment criteria such as watershed basins, sub-basins, ridgetops, topographic features, roads, or vegetation changes.

Fire Return Interval (Fire Frequency) – How often fire burns a given area, expressed as the interval or average time between fires (e.g. fire returns to an area every 5 to 7 years).

Fire Regime – A combination of components that characterize fire in a potential natural vegetation group, including frequency, intensity, seasonality, and extent. Historical fire regimes may differ from current fire regimes, measured by Fire Regime Condition Class. There are five fire regime groups:

Group 1	0 – 35 year frequency	Low Severity
Group 2	0 – 35 year frequency	Stand Replacement
Group 3	35 – 100+ year frequency	Mixed Severity
Group 4	35 – 100+ year frequency	Stand Replacement
Group 5	200+ year frequency	Stand Replacement

Fire Regime Condition Class (FRCC) – A qualitative measure describing the degree of departure from reference (historical) fire regimes. Severe departures may result in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused departures: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or diseases, or other management activities. The three condition classes for a fire regime are the following:

Condition Class 1: Fire regimes in this condition class are mostly within historical ranges. Vegetation composition and structure are intact. The risk of losing key components of the ecosystem from fire is low.

Condition Class 2: Fire regimes in this condition class have been moderately altered from their historic range, either by increasing or decreasing the fire frequency. The risk of losing key components of the ecosystem from fire is moderate.

Condition Class 3: Fire regimes in this condition class have been significantly altered from their historical return intervals. Vegetation composition, structure, and diversity have been substantially modified. The risk of losing key components of the ecosystem from fire is high.

Fire Retardant – Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

Fire Suppression – Suppression of wildfires under full suppression or appropriate management response
criteria. Also see APPROPRIATE MANAGEMENT RESPONSE.

Fishery – Habitat that supports the propagation and maintenance of fish.

Flag-and-Avoid Approach – An approach to or tactic in cultural resource management under which a cultural resource site is marked with flagging and then avoided.

Flat Rock – Volcanic decorative rock occurring in relatively thin (often less than an inch) layers in northeast California and used for construction, landscaping, and Native American ceremonies.

Forage – All browse and herbage that is available and acceptable to grazing animals or that may be harvested for feed; the act of consuming forage (NRCS 1997).

Forb – Any broad-leafed herbaceous plant that is not a grass, sedge, or rush (NRCS 1997).

Forestlands – Land on which the historic climax plant community is dominated by trees (NRCS 1997).

Fourth-Level Watershed – A sub-basin category in the hydrologic unit hierarchy. The average size of a sub-basin is about 450,000 acres. Also see STREAM ORDER.

Free Use Permit – A permit that allows the removal of timber or other resources from the public lands free of charge.

Fuel Break – A wide strip or block of land on which the native vegetation has been permanently modified so that fires burning into it can be easier to extinguish. In area where cheetgrass is widespread, landowners or managers may install fuel breaks of some other, less fire-prone vegetation to reduce fire spread.

Fuel Load (in fire ecology) – The oven-dry weight of fuel per unit area, usually expressed in tons/acre.

Fuel Loading – The amount of fuel present expressed by weight of fuel per unit area.

Fuel Model – A standardized description of fuels available to a fire based on the amount, distribution, and continuity of vegetation and wood. This information is used for rating fire danger and predicting fire behavior.

Fuel Moisture Content (Fuel Moisture) (in fire ecology) – The water content of a fuel expressed as a percentage of the fuel's oven dry weight. For dead fuels, which have no living tissue, moisture content is determined almost entirely by relative humidity, precipitation, dry-bulb temperature, and solar radiation. The moisture content of live fuels is physiologically controlled within the living plant.

Fuelwood – Trees used for the production of firewood logs or other wood fuel.

Full Suppression – An appropriate management response to wildfire (or an escaped wildland fire use or prescribed fire) that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

Functional Plant Community – A suite or group of species that–because of similar shoot or root structure, photosynthetic pathways, nitrogen-fixing ability, or life cycle–are grouped together on an ecological basis.

Functional/Structural Groups – A suite of species that because of similar shoot (height and volume) or root (fibrous versus tap) structure, photosynthetic pathways, nitrogen fixing ability, or life cycle are grouped together on an ecological site basis (Pellant and others 2000)

Functioning – Refers to health attributes where most of the associated indicators are functioning properly relative to the ecological site description or ecological reference area, given the normal range of variability associated with the site and climate (Pellant and others 2000).

Fundamentals of Rangeland Health – As described in 43 CFR 4180, the conditions in which rangelands are in properly functioning physical condition, ecological processes are supporting healthy biotic populations and communities, water quality is meeting state standards and BLM objectives, and special status species habitat is being restored or maintained.

Gather – The operation in which wild horses are herded to collection points and excess animals are removed either to the adoption system or to holding facilities outside the area.

Geophysical Survey – A scientific method of prospecting that measures the physical properties of rock formations. Common properties investigated include magnetism, specific gravity, electrical conductivity, and radioactivity.

Geographic Information System (GIS) – A computer application used to store, view, and analyze geographical information, especially maps.

Geomorphology – The science dealing with the form and surface configuration of the solid earth. Geomorphology is mainly an attempt to reveal the complex interrelationships between the origin of surface features and the causes of the surface alteration.

Geothermal Energy – Energy produced by tapping the earth's internal heat from hydrothermal convection systems, where water or steam transfers the heat from the deeper part of the earth to the areas where the energy can be tapped.

Global Positioning System (GPS) – A system for providing precise locations for points on the Earth's surface, which is based on data transmitted by satellites.

Goal – A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established timeframes for achievement. Also see OBJECTIVE.

Grandfathered – The status accorded certain properties, uses, and activities that were legally existing before the adoption of a law, regulation, or restriction and therefore are not required to adhere to the law, regulation, or restriction. See, for example, VALID EXISTING RIGHTS.

Gravitational Creep – The slow mass movement of soil and soil material down relatively steep slopes, mainly under the influence of gravity but facilitated by saturation with water and alternating freezing and thawing.

Grazing Allotment – See ALLOTMENT.

Grazing Capacity – See CARRYING CAPACITY.

Grazing Cycle – The amount of time required for livestock to rotate completely through all the pastures in an allotment management plan.

Grazing Permit/License/Lease – A contractual agreement between BLM and another party that permits grazing of a specific number, kind, and class of livestock for a specified period on a defined rangeland. The permit allows fee-based use of public land, subject to permit stipulations and annual adjustment based on current rangeland condition.

Grazing Privileges – The use of public land for livestock grazing under permits or leases.

Grazing Rest – See REST.

Grazing Season – An established period for which grazing permits are issued.

Grazing System – A specialization of grazing management that defines systematically recurring periods of grazing and deferment for two or more pastures or management units. Examples of grazing systems include rest-rotation grazing, deferred grazing, deferred rotation grazing (BLM 1989a).

Great Basin – An area covering most of Nevada and much of western Utah and portions of southern Oregon and eastern California consisting mainly of arid, high-elevation desert valleys, sinks (playas), dry lake beds, and salt flats. In the Great Basin all surface waters drain inward to terminal lakes or sinks. None flow to the oceans.

Green Stripping – A common term for a vegetation fuel break system that consists of planned corridors of vegetation to break up large blocks of highly flammable species such as cheatgrass, to improve fire suppression effectiveness. These breaks are planned to be compatible with, and take advantage of, resource development such as seedings and natural barriers (BLM 1985).

Green Timber – Freshly felled or undried timber with its moisture content above the fibre saturation point.

Ground Cover – See SOIL COVER.

Ground Fuel – All combustible materials below the surface litter that normally support a glowing combustion without flame, including duff, tree or shrub roots, punchy wood, peat, and sawdust.

Groundwater – Subsurface water that is in the zone of saturation. The top surface of the ground water is the water table. Groundwater is the source of water for wells, seepage, and springs (NRCS 1997).

Growing Stock – Live sawtimber trees and smaller trees capable of growing into sawtimber trees that meet certain standards of quality.

Guidelines – Practices, methods, or techniques determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting standards. Guidelines are tools such as grazing systems, vegetation treatments, or improvement projects that help managers and permittees achieve standards. Guidelines may be adapted or modified when monitoring or other information finds that they are not effective, or a better means of achieving the applicable standard becomes appropriate (USDI 4180). Guidelines for grazing were developed by the Northeast California Resource Advisory Council (RAC) in cooperation with the California State Director. These were given National Environmental Policy Act analysis in the *Rangeland Health Standards and Guidelines for California and Northwestern Nevada Final Environmental Impact Statement* (Appendix B). Off-highway vehicle (OHV) guidelines developed by the Northeast RAC are a part of this RMP and EIS. Guidelines can only be changed through cooperation between the State Director and the Northeast California RAC and with the approval of the Secretary of the Interior (43 CFR §4180.2).

Guidelines for Livestock Grazing – Livestock grazing management grazing tools, methods, strategies, and techniques designed to maintain or achieve healthy public lands; as defined by the Standards for Rangeland Health (Appendix B). Guidelines for Livestock Grazing within Northeastern California and Northwestern Nevada were developed by the State Director in consultation with the Northeast California Resource Advisory Council (RAC) as directed in 43 CFR Subpart 4180-Fundementals of Rangeland Health and Standards and Guidelines for Grazing Administration § 4180.2 Standards and guidelines for grazing administration. The Eagle Lake Field Office RMP will establish Guidelines for OHV Use which were also developed by the State Director in consultation with the Northeast California RAC.

Guild – A group of species having similar ecological resource requirements or foraging strategies.

Gully – A very small channel with steep sides cut by running water ordinarily runs only after rain or ice or snow melt. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage (SCS 1993).

Guzzler – A device for collecting and storing precipitation for use by wildlife or livestock. A guzzler consists of an impenetrable water collecting area, a storage facility, and a trough from which animals can drink (NRCS 1997).

Habitat – A specific set of physical conditions that surround a species, group of species, or a large community. Wildlife management considers the major constituents of habitat to be food, water, cover, and living space.

Habitat Connectivity – The degree to which similar habitats are linked.

Habitat Diversity – The number of different types of habitat within a given area.

Habitat Maintenance – The care and preserving of the biological resources of conserved habitat, which occur naturally or are created through habitat enhancement techniques.

Habitat Management Plan – A written and approved activity plan for a geographic area of public lands that identifies wildlife habitat management actions to be implemented in achieving specific objectives related to resource management plan/management framework plan planning document decisions (a single-activity form of an implementation plan).

Healthy Forests Initiative – An initiative launched in August 2002 by President Bush to reduce the risks that severe wildfires pose to people, communities, and the environment. The initiative proposes that protecting forests, woodlands, shrublands, and grasslands from unnaturally intensive and destructive fires helps improve the condition of public lands, increases firefighter safety, and conserves landscape attributes valued by society.

Hedging – The appearance of browse plants that have been browsed so as to appear artificially clipped. The consistent browsing of terminal buds of browse species causes excessive lateral branching and a reduction in upward growth.

Herbaceous – Of, relating to, or having the characteristics of a vascular plant that does not develop woody tissue; nonwoody vegetation such as grasses and forbs.

Herbivory – The eating of plants by animals.

Herd – One or more stallions and his mares.

Herd Area – A geographic area occupied by a wild horse or burro and its habitat in 1971.

Herding – The controlled movement of livestock.

Herd Management Areas (HMAs) – A geographic area of a suitable size and location to provide adequate range for a herd, or herds, occupying the area.

Hibernaculum – The place where an organism spends the winter.

High Site – In forestry, a site that has a higher site index (will grow a tree faster) than a low site. Being a high or low site is a quality that is relative to another site, for example relative from juniper to juniper, pine to mixed conifer, or any site to another. A high juniper site might have a site index of 30, whereas a low juniper site might have a site index of 15. But the high juniper site is a low site when compared to a Douglas-fir low site, which has a site index of 60. See SITE INDEX.

Historic District – An area that generally includes within its boundaries a significant concentration of properties linked by architectural style, historical development, or a past event.

Historic Integrity – See CULTURAL RESOURCE INTEGRITY.

Home Range – The area in which an animal travels in the scope of natural activities; the established territory of a wild animal.

Hydrologic Function (Stability) – The capacity of a site to capture, store, and safely release water from rainfall, run-on, and snowmelt; to resist a reduction in this capacity; and to recover this capacity following degradation. Hydrologic function is one of the three attributes of rangeland health.

Ingrowth – The process whereby previously open forest becomes more dense and treed grassland become more densely covered with young trees.

Initial Attack – The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

Impacts – See EFFECTS.

Implementation Plan – A site-specific plan written to implement decisions made in a land use plan. An implementation plan usually selects and applies best management practices to meet land use plan objectives. Implementation plans are synonymous with "activity" plans. Examples of implementation plans include interdisciplinary management plans, habitat management plans, and allotment management plans.

Incised Channel – A channel that has been cut through the bed of the valley floor and formed by the process of degradation, as opposed to one flowing on a floodplain.

Indian Trust Resource – Any resource in collective tribal holding or individual ownership for which the Secretary of the Interior has a continuing trust responsibility to manage in a manner to benefit the respective tribe or individual. The most common example is extractive resources on a reservation. Some trust lands were set aside as compensation for claims made against the Government, most of which are off-reservation. (Adapted from: Forest Service National Resource Guide to American Indian and Alaska Native Relations at http://www.fs.fed.us/people/tribal/.) Also see TRUST ALLOTMENT and TRUST RESPONSIBILITY.

Infiltration – The downward entry of water into the soil or other material.

Infrastructure – The set of systems and facilities that support a region or community's social and economic structures. Examples of such systems include energy, transportation, communication, education, medical service, and fire and police protection.

Inholdings – Parcels of land owned or managed by someone other than BLM but surrounded in part or entirely by BLM-administered land.

Instant Study Areas (ISAs) – Lands that were previously classified as natural or primitive areas and were determined to be ISAs under Section 603 of the Federal Land Policy and Management Act.

Instream Water Right – The right to maintain water in-stream for public use. An instream water right does not require a diversion or any other means of physical control over the water.

Instream Water Use – Typically nonconsumptive uses of water that do not require diversion from its natural watercourse (e.g. fish and other aquatic life, recreation, navigation, esthetics, and scenic enjoyment). Hydroelectric power production is also considered nonconsumptive but may require temporary diversion from the natural streamflow.

Integrated Weed Management Program (IWMP) – A noxious and invasive plants program that emphasizes prevention and education and implements cultural, physical, biological, and chemical treatments to reduce or eliminate weeds.

Interim Management Policy for Lands under Wilderness Review (IMP) (BLM 1995 – BLM's strategy for managing wilderness study areas following their recommendation for designation but before Congress designates them as wilderness or releases them to multiple use management.

Intensive Grazing Management – Grazing management that attempts to increase production or utilization per unit area or production per animal through a relative increase in stocking rates, forage utilization, labor, resources, or capital.

Inter-Basin Water Transfer – The import or export of water from one basin to another. Also see BASIN.

Interim Management Policy for Lands under Wilderness Review (IMP) – A document (BLM 1995) that lays out the requirements for managing BLM wilderness study areas so as "not to impair their suitability as wilderness."

Intermittent Stream – A stream or reach of a stream that does not flow year round and that flows only when it receives baseflow solely during wet periods or it receives groundwater discharge or protracted contributions from melting now or other erratic surface and shallow subsurface sources (SCS 1993). See EPHEMERAL STREAM.

Interpretation – Conveying information about the origin, meaning, or values of natural or cultural heritage through live, interactive, or static media. Interpretation occurs near the subject and is designed to stimulate visitor interest, increase understanding, and promote support for conservation.

Invasive Species – An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112 1999).

Keystone Species – A species, such as the beaver, that affects the survival and abundance of many other species in its community.

Known Geothermal Resource Area (KGRA) – An area where geothermal resources are known to exist.

Ladder Fuels – Fuels like shrubs and branches that carry the fire from the ground to the tops of trees.

Land Use Authorization – BLM's authorizing through leases, permits, and easements of uses of the public land. Land use authorizations may allow occupancy, recreational residences and cabin sites, farming, manufacturing, outdoor recreation concessions, National Guard maneuvers, and many other uses.

Leasable Minerals – Minerals whose extraction from federally managed land requires a lease and the payment of royalties. Leasable minerals include coal, oil and gas, oil shale and tar sands, potash, phosphate, sodium, and geothermal steam.

Land Capability Classification – The U.S. Department of Agriculture, Natural Resources Conservation Service's eight classes of land capability according to the risk of land damage or the difficulty of land use. These classes range from ***Class I***—Soils with few limitations restricting their use to ***Class VIII***—Soils and landforms that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply, or aesthetic purposes.

Land Health – The degree to which the integrity of the soil and ecological processes of ecosystems are maintained (National Research Council 1994). The degree to which the integrity of the soil, vegetation, water, and air, as well as the ecological processes of ecosystems, are balanced and sustained (Task Group on Unity in Concepts and Terminology 1995).

Land Health Assessment – The estimation or judgment of the status of ecosystem structures, functions, or processes, within a specified geographic are (preferably a watershed or a group of contiguous watersheds) at a specific time. An assessment is conducted by gathering, synthesizing, and interpreting information, from observations or data from inventories and monitoring. An assessment characterizes the status of resource conditions so that the status can be evaluated (see definition of evaluation) relative to land health standards. An assessment sets the stage for an evaluation. An assessment is not a decision (BLM 2001b).

Land Health Standards – Expressions of levels of physical and biological condition or degree of function required for healthy lands and sustainable uses and for defining minimum resource conditions that must be achieved and maintained (BLM 2001b). Standards for rangeland health for northeast California and northwest Nevada were developed by the Northeast California Resource Advisory Council (RAC) in cooperation with the BLM California State Director. These standards were given National Environmental Policy Act (NEPA) analysis in the *Rangeland Health Standards and Guidelines for California and Northwestern Nevada Environmental Impact Statement* (BLM 1998a). The record of decision (BLM 1999b) was signed by the State Director in June 1999 and was approved by the Secretary of the Interior on July 13, 2001. At the same time the record of decision was signed by the BLM California State Director, Instruction Memorandum CA-99-09, dated June 1, 1999, was issued, stating that the rangeland standards applied to all lands managed by the Bureau of Land Management, California, hence Land Health Standards. Land Health Standards can be changed only through cooperation between the California State Director and the Northeast California RAC with the approval of the Secretary of the Interior (43 CFR §4180.2).

Land Resource Units (LRUs) – Geographic areas, usually of several thousand acres, that have a particular pattern of soils, climate, water resources, and land uses.

Landscape – A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout. Landscapes vary in size, down to a few kilometers (miles) in diameter (Forman and Godron 1986).

Landscape Element – The basic, relatively homogeneous, ecological unit, whether of natural or human origin, on land at the scale of a landscape (Forman and Godron 1986).

Landscape Features – The land and water form, vegetation, and structures that compose the characteristic landscape.

Landscape Structure – The distribution of energy, materials, and species in relation to the size, shapes, numbers, kinds, and configuration of landscape elements or ecosystem (Forman and Godron 1986).

Land Use Allocations – The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (BLM 2005).

Land Use Plan – A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of the Federal Land Policy and Management Act; an assimilation of land-use-plan-level decisions developed through the planning process outlined in 43 CRF 1600, regardless of the scale at which the decisions were developed. Also see RESOURCE MANAGEMENT PLAN.

Late Seral Forest – A forest that has evolved, through successional processes, near to the end of the successional line, or climax forest. Only through disturbance (fire or clear-cutting, for example) will the forest return to an earlier seral (successional) stage.

Leasable Minerals – Minerals whose extraction from federally managed land requires a lease and the payment of royalties. Leasable minerals include coal, oil and gas, oil shale and tar sands, potash, phosphate, sodium, and geothermal steam.

Leave No Trace – A nationwide (and international) program to help visitors with their decisions when they travel and camp on America's public lands. The program strives to educate visitors about the nature of their recreational impacts as well as techniques to prevent and minimize such impacts.

Lek – Traditional small open areas usually from 0.04 to 4 ha (0.1 to 10 acres) surrounded by sagebrush where sage-grouse gather to breed. (synonymous with strutting ground) (Call and Maser 1985). Occupied leks are traditional display areas in or next to sagebrush-dominated habitats that have been attended by ≥ two male sage-grouse in ≥ 2 of the previous 5 years (Connelly and others 2000).

Less-Than-Fee Interest – Ownership of land with restricted rights. Also see FEE INTEREST.

Let-Down Fences – Fences that can be taken down but remain in place on the ground when they are not needed.

Life History – The combination of age-specific survival probabilities and fertilities characteristic of a species; the time-table of individual development and aging for a representative organism.

Limited Operating Period – A restriction placed on a management action as to when during the year an event can take place; to protect wildlife species and habitats.

Lithic Scatter – Pertaining to or composed of stones that are dispersed; a form of an archaeological resource.

Litter – The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material (NRCS 1997).

Livestock Trespass – The unauthorized grazing of livestock.

Locatable Minerals – Minerals subject to exploration, development and disposal by staking mining claims as authorized by the Mining Law of 1872 (as amended). Locatable minerals include valuable deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Location – The act of taking or appropriating a parcel of mineral land, including the posting of notices, the recording thereof when required, and marking the boundaries so they can be readily traced.

Low-Income Population – Persons living below the poverty level according to a particular total income for a family household of four persons and based on the most current data from the U.S. Bureau of Census. The average poverty threshold for a family of four in 1999, based on the most recent census data, was $17,029.

Low-Site Forest – Forestland with at least 10% canopy cover and producing < 20 ft^3/acre/year of commercial species. In northeast California, commercial species include Jeffrey pine, ponderosa pine, sugar pine, Washoe pine, Douglas-fir, white fir, and incense cedar. Also see OLD-GROWTH FOREST.

Major Land Resource Areas (MRLAs) – Broad geographic areas that are characterized by a particular pattern of soils, climate, water resources, vegetation, and land use. Each MLRA in which rangeland and forest land occur is further broken into range (ecological) sites (NRCS 1997). Also see LAND RESOURCE UNITS.

Management Actions/Direction – Measures planned to achieve the stated objectives.

Management Activity – An activity undertaken to harvest, traverse, transport, protect, change, replenish, or otherwise use resources.

Management Framework Plans (MFPs) – BLM land use plans that were prepared before 1985 and that have been replaced by resource management plans. Some MFPs are still in effect. Also see LAND USE PLAN and RESOURCE MANAGEMENT PLAN.

Master Title Plat – A plat map showing parcel boundaries and land status of lands, including public lands.

Mastication (Mulching) – In forestry, the chewing up of woody materials into a mulch that remains on the ground, protecting the soil, adding nutrients, and inhabiting the return of shrubs that need bare soil to germinate.

Matrix – The material that surrounds archaeological artifacts before they are excavated.

Mechanical Fuels Treatments – The use of mechanical equipment to suppress, inhibit, or control herbaceous and woody vegetation. BLM uses wheeled tractors, crawler-type tractors, mowers, or specially designed vehicles with attached implements for such treatments.

Mesic – Characterized by having intermediate moisture conditions, i.e. neither decidedly wet nor decidedly dry.

Metadata – Data about data. Data that describes how and when and by whom a particular set of data was collected, and how the data is formatted.

Mineral Entry – The filing of a claim on public land to obtain the right to any minerals it may contain.

Mineral Estate – The ownership of the minerals at or beneath the land's surface.

Mineralization – The processes taking place in the earth's crust resulting in the formation of valuable minerals or ore bodies.

Mineral Materials – Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Mineral Materials Act of 1947, as amended.

Mineral Withdrawal – A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872 and closes the area to mineral location (staking mining claims), development, and leasing.

Minimum Pool – The lowest level of reservoir capacity safe for maintaining fish and aquatic life or for some other designated beneficial purpose.

Minimum Tool Principle – A two-part analysis that is a guiding principle applied to wilderness management decisions: (1) Is the action needed to meet legitimate wilderness objectives? and (2) If the action is deemed necessary, what methods and equipment will accomplish the task with least impact on the physical, biological, and social characteristics of wilderness?

Mining Claims – Portions of public lands claimed for possession of locatable mineral deposits by locating and recording under established rules and pursuant to the Mining Law of 1872.

Mining District – An area, usually designated by name, with described or understood boundaries, where minerals are found and mined under rules prescribed by the miners, consistent with the Mining Law of 1872.

Mining Law of 1872 (General Mining Law) – The federal act that, with its amendments, formed the framework for the mining of locatable minerals on the public lands. This law declared that "valuable" mineral deposits rather than simply "mineral deposits" were to be free and open to exploration and purchase, limited individual claims to 20 acres, required $100 worth of assessment work yearly, and allowed milling or processing claims of 5 acres or less to be entered on nonmineral lands.

Minority – Individuals classified by the Office of Management and Budget Directive No. 15 as Black/African, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other nonwhite persons.

Minority Population – Identified as either: (1) the minority population of the affected area exceeds 50%, or (2) population percentage of the affected area is meaningfully greater than the minority population percentage in the state or other appropriate unit of geographic analysis.

Mitigating Measures – Modification of actions that (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree of magnitude of the actions and its implementation, (c) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance

operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring – The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Mortality – Death or destruction of forest trees as a result of competition, disease, insect damage, drought, wind, fire and other factors (excluding harvesting).

Motorized Trail – A designated route that allows for the use of small-wheel based motorized vehicles, such as all-terrain vehicles and motorcycles.

Multiple Use – The management of the public lands and their resources so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output" (Federal Land Policy and Management Act 1976).

National Ambient Air Quality Standards (NAAQS) – The allowable concentrations of air pollutants in the ambient (public outdoor) air specified in 40 CFR 50. National ambient air quality standards are based on the air quality criteria and divided into primary standards (allowing an adequate margin of safety to protect the public health including the health of "sensitive" populations such as asthmatics, children, and the elderly) and secondary standards (allowing an adequate margin of safety to protect the public welfare). Welfare is defined as including effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, climate, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

National Environmental Policy Act of 1969 (NEPA) – The federal law, effective January 1, 1970, that established a national policy for the environment and requires federal agencies: (1) to become aware of the environmental ramifications of their proposed actions, (2) to fully disclose to the public proposed federal actions and provide a mechanism for public input to federal decision making, and (3) to prepare environmental impact statements for every major action that would significantly affect the quality of the human environment.

National Fire Plan (NFP) – A plan developed in August 2000 to actively respond to severe wildland fires and their impacts to communities while ensuring enough firefighting capacity for the future. The NFP addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.

National Historic Preservation Act, As Amended (NHPA) – A federal statute that established a federal program to further the efforts of private agencies and individuals in preserving the Nation's historic and cultural foundations. The National Historic Preservation Act: (1) authorized the National Register of Historic Places, (2) established the Advisory Council on Historic Preservation and a National Trust Fund to administer grants for historic preservation, and (3) authorized the development of regulations to require federal agencies to consider the effects of federally assisted activities on properties included on or eligible for the National Register of Historic Places. Also see NATIONAL REGISTER OF HISTORIC PLACES and SECTIONS 106 and 110 OF THE NATIONAL HISTORIC PRESERVATION ACT.

National Historic Trails – Federally designated extended trails that closely follow original routes of nationally significant travel (explorers, emigrants, traders, military). These trails do not have to be continuous, can be less than 100 miles long, and can include land and water segments. The Iditarod, Lewis and Clark, Mormon Pioneer, and Oregon Trails were the first national historic trails to be designated (in 1978).

National Pollutant Discharge Elimination System (NPDES) – A process for controlling the amount of pollution discharged into waters by requiring polluters to obtain NPDES permits from the states involved and to comply with discharge standards. The NPDES is mandated by the Federal Water Pollution Control Act Amendments.

National Recreation Trails – Trails that provide a variety of outdoor recreation uses in or reasonably accessible to urban areas and recognized by the Federal Government (Secretary of the Interior or Secretary of Agriculture, not Congress) as contributing to the National Trails System. National Register – See NATIONAL REGISTER OF HISTORIC PLACES.

National Register of Historic Places – The official list, established by the National Historic Preservation Act, of the Nation's cultural resources worthy of preservation. The National Register lists archeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and federal agencies and approved by the National Register Staff. The National Park Service maintains the National Register. Also see NATIONAL HISTORIC PRESERVATION ACT.

National Trails System – The network of scenic, historic, and recreation trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of open-air, outdoor areas, and historic resources; and encourage public access and citizen involvement.

National Wild And Scenic Rivers System – A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historical, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails with watersheds or shorelines essentially primitive and waters unpolluted.

Native Species – A plant or animal species that naturally occurs in an area and was not introduced by humans.

Naturalize – To plant randomly, without a pattern to create the effect that the plants grew in that space without human help

Naturalized Species – Those exotic species which are already occurring within defined areas in a self-sustaining wild state (e.g. English sparrow, ring-necked pheasant, chukar, brown trout, crested wheatgrass, red brome, cheat grass, Russian olive, and dandelion) (BLM 1992).

Natural Vegetation Community – Plant communities that develop in the absence of human activities.

Neotropical Migratory Birds – Birds that travel to Central America, South America, the Caribbean, and Mexico during fall to spend the winter and then return to the United States and Canada during spring to breed. These birds include almost half of the bird species that breed in the United States and Canada.

Nevada Department of Wildlife (NDOW) – The state agency in Nevada responsible for the restoration and management of fish and wildlife resources, and the promotion of boating safety on Nevada's waters. NDOW has responsibility for the wildlife resources and enforcement of the wildlife and boating safety laws on 109,894 square miles of land, 667 square miles of water, and 529 streams that flow 2,750 miles (NDOW Website).

Niche – The place of an organism in its biotic environment; the position or function of an organism in a community of plants or animals; a microhabitat.

Non-Impairment of Wilderness Values Criteria – A set of criteria regulating land use to protect the wilderness values and characteristics of an area until Congress determines whether to preserve it as a wilderness. The nonimpairment criteria are as follows.

- The use, facility, or activity must be temporary. (This means a temporary use that does not create surface disturbance or involve permanent placement of facilities may be allowed if such use can easily and immediately be terminated upon wilderness designation.
- When the use, activity, or facility is terminated, the wilderness values must not have been degraded so far as to significantly constrain the area's suitability for preservation as wilderness.

The only permitted exceptions to the nonimpairment criteria are the following:

- wildfire or search and rescue emergencies,
- reclamation to minimize impacts of violations and emergencies,
- uses and facilities that are considered grandfathered or valid existing rights under the Interim Management Policy for Lands Under Wilderness Review.
- uses and facilities that clearly protect or enhance the land's wilderness values or are the least needed for public health and safety, and
- reclamation of pre-Federal Land Policy and Management Act impacts.

Nonpoint Source Pollution (Water) – Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving water body from a specific outlet. These pollutants are generally carried off the land by storm water runoff from such sources as farming, forestry, mining, urban land uses, construction, and land disposal.

No Surface Occupancy (NSO) – A fluid mineral leasing stipulation that prohibits occupancy or disturbance on all or part of the land surface to protect special values or uses. Lessees may access the oil and gas or geothermal resources under leases restricted by this stipulation through use of directional drilling from sites outside the NSO area.

Notice-Level Operation – A locatable mining or exploration operation involving more than casual use but disturbing an area of 5 acres or less, and therefore requiring that the operator submit only a notice rather than a plan of operations.

Noxious Plant (Weed) – An unwanted plant specified by federal or state laws as being undesirable and requiring control. Noxious weed refers to any plant that, when established, is highly destructive, competitive, or difficult to control by cultural or chemical practices. Noxious weeds are usually non-natives and highly invasive.

Nutrient Cycling (Cycle) – The circulation of chemical elements such as carbon or nitrogen in specific pathways from the nonliving (abiotic) parts of the environment to organic substances (plans and animals), and then back again to abiotic forms.

Objective – A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement (BLM 2000b). Also see GOAL.

Obligate – Restricted to one particularly characteristic mode of life.

Obsidian Hydration – A dating method that measures the thickness of the hydration layer or "rind" of obsidian artifacts, because of the way that obsidian absorbs water.

Occupancy Trespass – The illegal occupation or possession of land or property.

Off-Highway Vehicle (OHV) – Any motorized track or wheeled vehicle designed for cross-country travel over natural terrain. OHVs exclude (1) any non-amphibious registered motorboat; (2) any fire, emergency, or law enforcement vehicle while being used for official or emergency purposes; and (3) any vehicle whose use is expressly authorized by a permit, lease, license, agreement, or contract issued by an authorized officer or otherwise approved. (The term "off-highway vehicle" is used in place of the term "off-road vehicle" to comply with the purposes of Executive Orders 11644 and 11989. The definition for both terms is the same.)

Off-Highway Vehicle (OHV) Use Designations

Open – Designated areas and trails where OHVs may be operated subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343.

Limited – Designated areas and trails where OHVs are subject to restrictions limiting the number or types of vehicles, date, and time of use; limited to existing or designated roads and trails.

Closed – Areas and trails where OHV use is permanently or temporarily prohibited. Emergency use is allowed.

OHV Play – Nearly unrestricted OHV use whose object is more to have fun and excitement and to challenge one's driving skills than to drive anywhere in particular.

OHV Play Area – An area where on- or off-route OHV use is nearly unrestricted. Often attracting many riders, such areas may be on dunes, in sand and gravel pits, and in other areas that present challenges to OHV users.

Old-Growth (Old Forest) – Ecosystems distinguished by old trees and related structural attributes. The age at which old growth develops and the specific structural attributes that characterize old growth vary widely according to forest type, climate, site conditions, and disturbance regime. Most old growth is typically distinguished from younger growth by several of the following structural attributes: large trees for species and site; wide variation in tree sizes and spacing; accumulations of large, dead, standing and fallen trees (except in forest types with frequent, low-intensity fires); decadence in the form of broken or deformed tops or bole and root decay; multiple canopy layers (in some forest types); and canopy gaps and understory patchiness.

Orographic : of or relating to mountains; *especially* **:** associated with or induced by the presence of mountains <*orographic* rainfall> Produced by the forced ascent of warm air into cooler regions because a mountain range lies in its path

Outstandingly Remarkable Values – Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values." Other similar values that may be considered include ecological, biological or botanical, paleontological, hydrological, scientific, or research.

Overstory – The upper canopy or canopies of plants. Overstory usually refers to trees, tall shrubs, and vines (NRCS 1997).

Paleontological Resources – The remains of plants and animals preserved in soils and sedimentary rock. Paleontological resources are important for understanding past environments, environmental change, and the evolution of life.

Particulate Matter – Fine liquid (other than water) or solid particles suspended in the air, consisting of dust, smoke, fumes, and compounds containing sulfur, nitrogen, and metals.

Pasturage – Land covered with grass or other vegetation suitable for grazing animals.

Pasture – A subunit of a grazing allotment established and managed generally by building fences or, less commonly, by actively herding livestock.

Patch – A distinct area, such as a polygon or pixel, with a specific habitat type, cover type, or other homogeneous environmental condition.

Patch Size – The area constituting a separate piece of habitat for a species, where the piece is defined as the pixels (smallest mapping unit used to estimate environmental conditions) of habitat adjacent to one another or by some alternative rule set designed for a species.

Patenting Lands – Transferring lands out of government ownership for the first time.

Payment in Lieu of Taxes (PILT) – Federal payments to local governments to offset their inability to collect taxes for federally owned land.

Pedestal – A relatively slender column of soil or rock that is capped by a wider residual or erosional soil or rock

Perennial Plant – A plant species with a life-cycle that characteristically lasts more than two growing seasons and persists for several years (FGDC 1997). Also see ANNUAL PLANT.

Perennial Stream – A stream or reach of a stream that flows continuously throughout the year and whose surface is generally lower than the water table adjacent to the region adjoining the stream (SCS 1993).

Permeability, Soil – The ease with which gases, liquids (water), or plant roots penetrate or pass through a bulk mass of soil or a layer of soil. Since different soil horizons vary in permeability, the particular horizon under question should be designated.

Permittee – An individual or business that holds a valid grazing permit (43 CFR Subpart 4100 Grazing Administration-Exclusive of Alaska; General).

Petroglyphs – Pictures, symbols, or other art work pecked, carved, or incised on natural rock surfaces.

pH (Hydrogen Ion Concentration) – An expression of both acidity and alkalinity on a scale of 0 to 14, with 7 representing neutrality, numbers less than 7 indicating increasing acidity, and numbers greater than 7 indicating increasing alkalinity.

Pitting – Making shallow pits or basins of suitable capacity and distribution on range to reduce overland flow from rainfall and snowmelt.

Placer: An alluvial deposit of sand and gravel containing valuable minerals such as gold.

Placer Claim – A mining claim located on surficial or bedded deposits, particularly for gold located in stream gravels.

Placer Deposit – Mass of gravel, sand, or similar material resulting from the crumbling and erosion of solid rocks containing particles of gold or other valuable minerals that have been derived from rocks or veins.

Planning Criteria – The constraints or ground rules that guide the developing of a resource management plan. The criteria determine how the planning team develops alternatives and ultimately selects a Preferred Alternative.

Plan of Operations – A plan for mining exploration and development that an operation must submit to BLM for approval when more than 5 acres a year will be disturbed or when an operator plans to work in an area of critical environmental concern or a wilderness area. A plan of operations must document in detail all actions that the operator plans to take from exploration through reclamation.

Plant Association – See VEGETATION ASSOCIATION.

Plant Community – See COMMUNITY.

Plant Vigor – Plant health.

Playa – An ephemerally flooded area on a basin floor that is barren of vegetation, is veneered with fine-textured sediment, and acts as a temporary or final sink for drainage water

Pleistocene – An epoch in Earth history from about 2-5 million years to 10,000 years ago, when the Earth experienced a series of glacial and interglacial periods.

Ponding – Runoff that collects in depressions and cannot drain out, creating temporary ponds; the process, occurring after a rainfall, of water gathering in low-lying areas, forming ponds.

Population – A group of interbreeding individuals of the same species often occupying the same geographical area.

Possessory Interest Tax – A tax on anyone who has exclusive use of a publicly owned property or facility.

Potential Natural Community (PNC) – The biotic community that would become established on an ecological site if all successional sequences were completed without human interference under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized nonnative species (NRCS 1997). Also see POTENTIAL NATURAL VEGETATION, DESIRED FUTURE CONDITION, and PROPER FUNCTIONING CONDITION.

Potential Natural Vegetation (PNV) – The stable biotic community that would become established on an ecological site if all successional stages were completed without human interference under present environmental conditions. The PNV is the vegetation type best adapted to fully use the resources of an ecological site.

Potential Plant Community (PPC) – The seral stage the botanical community would achieve if all successional sequences were completed without human interference under the present environmental conditions.

Precious Metal – A general term for gold, silver, or any of the minerals of the platinum group.

Precommercial Thinning – Cutting trees from a young stand so that the remaining trees will have more room to grow to marketable size. Trees cut in a precommercial thinning have no commercial value, and normally none of the felled trees are removed for use. Also see THINNING AND COMMERCIAL THINNING.

Preferred Alternative – The alternative in this EIS that BLM has initially selected because it best fulfills BLM's mission and responsibilities and offers the most acceptable resolution of the planning issues and management concerns.

Prescribed Fire (Burning) – The planned application of fire to rangeland vegetation and fuels under specified conditions of fuels, weather, and other variables to allow the fire to remain in a predetermined area to achieve such site-specific objectives as controlling certain plant species; enhancing growth, reproduction, or vigor of plant species; managing fuel loads; and managing vegetation community types.

Prey Base – Populations and types of prey species available to predators, for example fish species and populations available to river otters.

Primary Road – regularly maintained route, paved or unpaved, wide enough for at least two vehicles to pass. A primary road provides access between two major points and serves a large area with many routes of lesser quality branching from it.

Primitive Area – A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area that is essentially an unmodified natural environment of large size, where interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use is not permitted.

Primitive Campground – An undesignated area within or outside the backcountry that lacks any facilities and is maintained only by use.

Primitive Recreation – Recreation that occurs in a natural-appearing environment and that allows visitors to achieve solitude and isolation from human civilization. Primitive recreation may include hunting, horseback riding, wildlife viewing, nature study, photography, hiking, and backpacking.

Progression of Seral Stages (Succession) – The progressive replacement of plant communities on an ecological site that leads to the climax community (e.g. early seral stages are normally dominated by perennial grasses and annual as well as perennial forbs with few shrubs. During mid seral the woody species that the site supports such as shrubs and trees begin to make an obvious appearance, and annual forbs are dominated by perennial forbs. During late seral stages the shrubs normally dominate the cover on the site, but the perennial grasses still provide the most annual production on into the potential natural community)(NRCS 1997). Also see POTENTIAL NATURAL COMMUNITY.

Proper Functioning Condition (PFC) (Riparian-Wetland Areas) – Riparian and Wetland areas are in properly functioning condition and are meeting regional and local management objectives. The riparian and wetland vegetation is controlling erosion, stabilizing streambanks, shading water areas to reduce water temperature, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater, and increasing recharge of ground water that is characteristic for those sites. Vegetation surrounding seeps and springs is controlling erosion and reflects the potential natural vegetation for the site (BLM 1999a).

Proper Functioning Condition (Uplands) – Uplands are functioning properly when the existing vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. The functioning condition of uplands is influenced by landform, soil, water, and vegetation.

Proposed Threatened or Endangered Species – Any species of fish, wildlife, or plant that is proposed in the FEDERAL REGISTER to be listed under Section 4 of the Endangered Species Act of 1973, as amended (50 CFR Part 402-Interagency Cooperation-Endangered Species Act of 1973, as Amended § 402.02 Definitions).

Protocol Agreements between BLM and the Nevada and California State Historic Preservation Officers – Agreements that specify the approach for cultural resources protection, including site identification, interpretation, protection, and stabilization.

Public Lands – Any land administered by the Secretary of the Interior through the U.S. Bureau of Land Management or by the Secretary of Agriculture through the U.S. Forest Service.

Pyroclastics – Particles off all sizes ejected into the air during volcanic eruptions, from volcanic ash to bombs and blocks.

Radiocarbon Dating – An age estimate based on the amount of a natural radioactive carbon isotope (carbon-14) that remains in any organic matter (formerly living things such as bone or plants or material made from living things such as cloth and leather).

Rail Banking – A practice of preserving abandoned rail rights-of-way to reuse them for transportation purposes in the future. Federal rail banking law allows railroads to bank unused rail corridors for future rail use while allowing interim use as trails.

Rail Trail – A multi-purpose public path (paved or natural) created along an inactive rail corridor.

Range – See RANGELAND.

Range Drill – A heavy duty seeding machine that is dragged over rough terrain by a tractor or dozer to seed areas.

Range Improvement – Any activity or program on or relating to the public lands designed to improve forage production, change vegetation composition, control use patterns, provide water, stabilize soil and water conditions, or provide habitat for livestock and wildlife. Range improvements may be structural or nonstructural. A structural improvement requires placement or construction to facilitate the management or control the distribution and movement of animals. Such improvements may include fences, wells, troughs, reservoirs, pipelines, and cattleguards. Nonstructural improvements consist of practices or treatments that improve resource conditions. Such improvements include pitting; chiseling; seedings; prescribed burning; water spreaders, contour furrowing, and chemical, mechanical, and biological plant control.

Rangeland – A type of land on which the native vegetation, climax, or natural potential consists predominately of grasses, grasslike plants, forbs, or shrubs. Rangeland includes lands revegetated naturally or artificially to provide a plant cover that is managed like native vegetation. Rangelands may consist of natural grasslands, savannas, shrublands, moist deserts, tundra, alpine communities, coastal marshes, and wet meadows (NRCS 1977).

Rangeland (Land) Health - The degree to which the integrity of the soil, vegetation, water, and air, as well as the ecological processes of the rangeland (land) ecosystem, are balanced and sustained. Integrity is defined as maintenance of the structure and functional attributes characteristic of a locale, including normal variability (Pellant and others 2000).

Rangeland Composition – A list of species present in an area, or discrete vegetation community, and the proportional abundance of each individual species.

Rangeland (Land) Health Assessment – An estimate or judgment of the status of ecosystem structures, functions, or processes, within a specified geographic area (preferably a watershed or a group of contiguous watersheds) at a specific time. Rangeland health is assessed by gathering, synthesizing, and interpreting information, from observations or data from inventories and monitoring. An assessment characterizes the status of resource conditions so that the status can be evaluated (see definition of evaluation) relative to land health standards. An assessment sets the stage for an evaluation. An assessment is not a decision (BLM 2001b).

Rangeland (Land) Evaluation – An evaluation is conducted to arrive at two outcomes. First, an evaluation conducts an analysis and interpretation of the findings resulting from the assessment, relative to land health standards, to evaluate the degree of achievement of Land Health Standards.

Second, an evaluation conducts an analysis and interpretation of information–be it observations or data from inventories and monitoring–on the causal factors for not achieving a land health standard. An evaluation of causal factors provides the foundation for a determination (BLM 2001b).

Rangeland (Land) Health Allotment Evaluation Reporting System – A reporting system for grazing allotments as to how they relate to the following four categories:

Category 1 – Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standard(s) and livestock grazing is a significant contributor to the problem.

Category 2 – Areas where all standards are being met or significant progress is being made toward meeting the standard(s).

Category 3 – Areas where the status for one or more standards is not known, or the cause of the failure to meet the standard(s) is not known.

Category 4 – Allotments where one or more of the standards are not being met or significant progress is not being made toward meeting the standards due to causes other than (or in addition to) livestock grazing activities. (Allotments where current livestock grazing is also a cause for not meeting the standards are included in both Categories 1 and 4.)

Rangeland Productivity – The annual total forage availability of the vegetation for an area of rangeland.

Raptors – Birds of prey, such as eagles, owls, and hawks.

Reach – A relatively homogeneous section of a stream having a repetitious sequence of physical characteristics and habitat types.

Record of Decision – A document signed by a responsible official recording a decision that was preceded by the preparing of an environmental impact statement. Also see DECISION RECORD.

Recovery – The return of an unhealthy vegetation alliance, vegetation association, and ecological site back across the degradation threshold to its original community structure, natural complement of species, and natural functions. Also see RESTORATION.

Recreation and Public Purposes Act of 1926 – An act of Congress that allows local governments (counties or cities) and nonprofit organizations to lease or acquire public land to be used for recreation or public purposes such as health, safety, or welfare.

Recreation Management Zone – In recreation management, an area with four defining characteristics: (1) it serves a different recreation niche within the primary recreation market, (2) it produces a different set of recreation opportunities and facilitates attaining different experiences and benefit outcomes, (3) it has a distinctive recreation setting character, and (4) it requires a different set of recreation provider actions to meet primary recreation market demand.

Recreation Opportunity Spectrum (ROS) – A planning process that provides a framework for defining classes of outdoor recreation environments, activities, and experience opportunities. In ROS, the setting, activities, and opportunities for experiences are arranged along a spectrum of six classes: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban. The resulting ROS analysis defines specific geographic areas on the ground, each of which encompasses one of the six classes.

In this RMP the Ecosystem Restoration and Preferred Alternatives also propose a Backcountry class, which is a combination of Semi-Primitive Non-Motorized and Semi-Primitive Motorized.

Recreation Site – A developed site with such features as a trailhead, campground, or kiosk.

Recruitment – The successful entry of new individuals into the breeding population (Pellant and others 2000).

Remnant Species – Plant species present in a deteriorated plant association that are representative of a climax plant association.

Research Natural Area (RNA) – An area that is established and maintained for the main purpose of research and education because the land has one or more of the following characteristics: (1) a typical representation of a common plant or animal association; (2) an unusual plant or animal association; (3) a threatened or endangered plant or animal species; (4) a typical representation of common geologic, soil, or water features; or (5) outstanding or unusual geological, soil, or water features (43 CFR Subpart 8223-Research Natural Areas § 8223.0-5 Definitions).

Residual Plant Cover – Standing herbaceous vegetation that has cured and become decayed. When these plants fall, they become litter.

Residue Analysis – The study of remaining material traces that have been subjected to reductive physical or chemical processes.

Resource Advisory Councils (RACs) – Advisory councils appointed by the Secretary of the Interior and consisting of representatives of major public land interest groups (e.g. commodity industries and recreation, environmental, and local area interests) in a state or smaller area. RACs advise BLM, focusing on a full array of multiple use public land issues. RACs also help develop fundamentals for rangeland health and guidelines for livestock grazing (§ 4180.2 Standards and guidelines for grazing administration).

Resource Conservation Area (RCA) – A land management designation that provides management consideration to areas with special resources that do not need the levels of protection conferred by designation as an area of critical environmental concern (ACEC).

Resource Management Plan (RMP) – A land use plan as described by the Federal Land Policy and Management Act. The RMP generally establishes in a written document: (1) land areas for limited, restricted or exclusive use; designations, including ACEC designations; and transfer from BLM administration; (2) allowable resource uses (either singly or in combination) and related levels of production or use to be maintained; (3) resource condition goals and objectives to be attained; (4) program constraints and general management practices needed to achieve the above items; (5) need for an area to be covered by more detailed and specific plans; (6) support actions, including such measures as resource protection, access development, realty action, and cadastral survey., as needed to achieve the above; (7) general implementation sequences, where carrying out a planned action depends on prior accomplishment of another planned action; and (8) intervals and standards for monitoring and evaluating the plan to determine its effectiveness and the need for amendment or revision. It is not a final implementation decision on actions that require further specific plans, process steps, or decisions under specific provisions of law and regulations (43 CFR Subpart 1610-Resource Management Planning § 1610.0-5 Definitions).

Rest – The absence of livestock grazing to benefit plants for regrowth between grazing periods, for critical periods of plant growth, and development, or for critical periods of plant establishment (is synonymous with deferred grazing) (NRCS 1997).

Restoration – The act of restoring healthy but lacking key attributes and at-risk states of vegetation alliances, vegetation associations, and ecological sites to a healthy state with its original community structure, natural complement of species, and natural functions. Also see RECOVERY.

Rest-Rotation Grazing – Any grazing system that provides for the rotation of rest (see REST) among pastures. The period of rest can be for a full year or more, or a portion of the growing season. The time and length of rest generally changes each successive year (NRCS 1997).

Retardant – See FIRE RETARDANT.

Right-of-Way (ROW) – A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, communication sites, reservoirs, and the lands covered by such an easement or permit.

Right-of Way Corridor – A parcel of land that has been identified by law, Secretarial order, or through a land use plan or by other management decision as being the preferred location for existing and future right-of-way grants and suitable for one type of right-of-way or one or more rights-of-way that are similar, identical, or compatible.

Rill – A small channel formed by soil erosion.

Riparian – Area, zone, and/or habitat adjacent to streams, lakes, or other natural free water, which have a predominant influence on associated vegetation or biotic community (NRCS 1997); pertaining to or situated on or along the bank of a stream or other water body.

Riparian Area/Riparian Zone – Terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial or intermittent water, high water tables, and soils that exhibit some wetness characteristics. These terms are normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

Riparian Community Type – A repeating, classified, defined, and recognizable assemblage of riparian plant species (USDA NRCS 1997).

Riparian Ecosystems – Ecosystems that occur along watercourses or water bodies. They distinctly differ from surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil (NRCS 1997).

Riparian Rights – The rights of a land owner to the water on or bordering his property, including the right to prevent diversion or misuse of upstream water.

Riparian Species – Plant species occurring within the riparian zone. Obligate species require the environmental conditions within the riparian zone; facultative species tolerate the environmental conditions and therefore may also occur away from the riparian zone (NRCS 1997).

Riparian Vegetation – Plant communities in the riparian zone consisting of riparian species (NRCS 1997).

Riprap – Large pieces of rock (usually 6 to 30 inches in diameter) that have undergone only primary crushing and sizing, or larger, uncrushed pieces. Riprap is used to stabilize slopes and shorelines and build erosion-control structures.

Road – A transportation facility used mainly by vehicles having four or more wheels documented as such by the owner, and maintained for regular and continuous use. Also see ROUTE, TRAIL, PRIMARY ROAD and SECONDARY ROAD.

Root Ball – The network of roots and the soil clinging to them when a plant is lifted from the soil or removed from a container.

Root Reserve – The ability of plants to store energy (which has been converted from sunlight and water
and nutrients from the soil) in their roots to promote plant growth. Overgrazing reduces root reserves, which leads to fewer leaves and a weaker root system.

Route – Any motorized, nonmotorized, or mechanized, terrestrial or water transportation corridor. Roads and trails are considered routes. Also see ROAD and TRAIL.

Runoff – The portion of precipitation or irrigation on an area that does not infiltrate (enter the soil) but is discharged by the area (Pellant and others 2000)

Run-on – Water that flows onto a given area.

R Value – Response "R" values are given to condition classes of sagebrush habitat to reflect that vegetation association's ability to respond favorably to management or mechanical treatment (Northeast California Sage-grouse Working Group 2005)

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Safety Zone – An area cleared of flammable materials used for escape in the event the fireline is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe.

Sagebrush-Steppe Community – A semiarid plant community characterized by a predominance of big sagebrush and other sagebrush species, plus grasses and forbs

Sagebrush Obligate – A species that is restricted to sagebrush habitats during the breeding season, or year-round.

Saleable Minerals – High volume, low-value mineral resources, including common varieties of rock, clay, decorative stone, sand, and gravel.

Salvage Logging (Harvest) – The removal of dead or downed commercially valuable timber after a disturbance (fire, wind, insect attack, or disease).

Satellite Wild Horse and Burro Adoption – An adoption held away from BLM corrals and facilities at such places as fairgrounds and rodeo grounds that have horse facilities.

Sawlog – A log large enough to yield lumber. Usually the small end of a sawlog must be at least 6 to 8 inches in diameter for softwoods and 10 to 12 inches for hardwoods.

Scenic Byway – A public road having special scenic, historic, recreational, cultural, archaeological, or natural qualities that have been recognized as such through legislation or some other official declaration.

Scoping – An early and open process for determining the scope of issues to be addressed in an environmental impact statement and the significant issues related to a proposed action (40 CFR Part 1508-Termminology and Index).

Secondary Road – A regularly maintained paved or unpaved one-to-two-lane route with routes of less quality branching from it. A secondary road connects primary roads and major points.

Section 404 Permit – A permit required by the Clean Water Act, under specified circumstances, when dredge or fill material is placed in the waters of the United States, including wetlands.

Section 7 – The section of the Endangered Species Act of 1973, as amended, outlining procedures for interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(1) requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Other paragraphs of this section

- establish the requirement to conduct conferences on proposed species;
- allow applicants to initiate early consultation;
- require U.S. Fish and Wildlife Services and National Marine Fisheries Service to prepare biological opinions and issue incidental take statements.

Section 7 also establishes procedures for seeking exemptions from the requirements of Section 7(a)(2) from the Endangered Species Committee (USFWS and NMFS 1998).

Section 7 Consultation – The Section 7 processes, including both consultation and conference if proposed species are involved (50 CFR Part 402-Interagency Cooperation-Endangered Species Act of 1973, As Amended).

Section 106 of the National Historic Preservation Act – The section of the National Historic Preservation Act that requires that federal agencies having direct or indirect jurisdiction over a proposed federal, federally assisted, or federally licensed undertaking, before approving the spending of funds or issuing a license, consider the effect of the undertaking on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places, and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. Also see NATIONAL HISTORIC PRESERVATION ACT and NATIONAL REGISTER OF HISTORIC PLACES, and SECTION 110 OF THE NATIONAL HISTORIC PRESERVATION ACT.

Section 110 of the National Historic Preservation Act – The section of the National Historic Preservation Act that concerns the managing of federally owned historic properties. Among other provisions, Section 110 requires each federal agency to establish a program to locate, inventory, and nominate to the Secretary of the Interior all properties under its control that appear to qualify for the National Register of Historic Places. Also see NATIONAL HISTORIC PRESERVATION ACT, NATIONAL REGISTER OF HISTORIC PLACES, and SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT.

Sedimentation – The act or process of depositing sediment from suspension in water; all the processes by which particles of rock material are accumulated to form sedimentary deposits.

Sediment Intrusion Buffer – A buffer that helps prevent sediment generated through soil erosion during overland water flow from entering a body of water. Buffer widths are determined by soil erodibility, which is influenced by soil type, slope, and upland soil and vegetation condition upslope from the buffer. Buffers can be vegetative of mechanical. Vegetation buffers are usually naturally occurring, soil-holding native vegetation or are areas that have been reseeded using suitable soil-holding local native species. Mechanical buffers include contour furrows, contour trenches, and erosion fencing (Brooks and others 1991).

Sediment Load (Sediment Discharge) – The amount of sediment, measured in dry weight or by volume, that is transported through a stream cross-section in a given time. Sediment load consists of sediment suspended in water and sediment that moves by sliding, rolling, or bounding on or near the streambed.

Seed Viability – A seed's capability of germinating and growing.

Seeding – The planting of seeds to revegetate the land after a disturbance; an area that has been revegetated by seeding.

Seeds of Success – An interagency program that is coordinated though the Plant Conservation Alliance and that supports and coordinates seed collection of native plant populations in the United States to increase the number of species and the amount of native seed that is available for use in stabilizing, rehabilitating, and restoring lands in the United States.

Seen Area – The portion of the landscape that is visible from roads, trails, rivers, campgrounds, communities, or other key observation points.

Self Contained Camping: - Primitive camping in undeveloped areas where the camper provides everything needed for camping and follows Leave No Trace practices to minimize impacts to the land.

Sensitivity (Cultural Resource) – How prone a cultural resource site is to outside impacts.

Seral Stages – The development stages of ecological succession (NRCS 1997).

Shared Use Trail – A trail shared for a variety of uses such as motorized and nonmotorized uses; a combination of nonmotorized uses such as hiking, horseback riding, and bicycling; or a combination of motorized uses such as dirt bikes and small and large four-wheel vehicles.

Sheet Erosion – The uniform washing or eroding of surface soils on a large denuded surface area.

Shrub-Steppe Community – A plant community of low drought-tolerant shrubs and bunch grasses. A community consisting of one or more layers of perennial grass above which rises a conspicuous but discontinuous layer of shrubs.

Sikes Act Implementation Plans – Comprehensive integrated natural resource management plans based on ecosystem management and required by Public Law 105-85, the Sikes Act Reauthorization Act of 2003. Under this law, the Department of Defense must complete such a plan for all of its installations that have significant fish, wildlife or natural resources.

The law requires that these plans include fish and wildlife management and wildlife-oriented recreation; fish and wildlife habitat enhancement; wetland protection; the setting of specific management goals; and the public use of natural resources. These plans must be written in consultation with the U.S. Fish and Wildlife Service and the affected states and must undergo a formal review process every 5 years.

Silviculture – The branch of forestry concerned with cultivating trees.

Site Index – An expression of a site's ability to produce wood growth relative to other sites, expressed in height growth over a century. A site index of 120, therefore, means that a tree will grow from 0 to 120 feet in 100 years.

Sixth-Level Watershed – See STREAM ORDER.

Snag – A standing dead tree that provides food and habitat for creatures such as insects and tree-nesting birds.

Soil Bioengineering – An applied science that combines structural, biological, and ecological concepts to build living structures to control erosion, sediment, and floods. Soil bioengineering is always based on sound engineering practices integrated with ecological principles.

Soil (Ground) Cover – Plants or plant parts, living or dead, on the surface of the ground.

Soil Classification – The systematic arrangement of soil units into groups or categories by their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties (Pellant and other 2002).

Soil Compaction – Compression of the soil, resulting in reduced soil pore space (the spaces between soil particles), decreased movement of water and air into and within the soil, decreased soil water storage, and increased surface runoff and erosion.

Soil Fertility – The ability of a soil to support plant growth by providing water, nutrients, and a growth medium.

Soil Horizon – A layer of soil or soil material roughly parallel to the land surface and differing from adjacent, genetically related layers in physical, chemical, and biological properties or characteristics, such as color, structure, texture, consistence, degree of acidity or alkalinity, and kinds and numbers of organisms present.

Soil Productivity – The capacity of a soil in its normal environment for producing a specified plant or sequence of plants under a specified system of management.

Soil Profile – A vertical section of the soil from the surface through all of its horizons.

Soil/Site Stability – The capacity of a site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water (one of the three attributes of rangeland (land) health) (Pellant and others 2000).

Soil Structure – The combination or arrangement of primary soil particles into secondary units or peds, which are characterized by size, shape, and grade. Soil structure largely determines the soil's pore space and density, which affect the soil's ability to hold air and water.

Spawning Gravels – Stream-bottom gravels where fish deposit and fertilize their eggs. The covering of these gravels with silt can block the supply of oxygen to the eggs or serve as a cementing agent to prevent fry from emerging.

Special Category Lands – Lands where locatable mining operations always require plans of operations, regardless of the amount of land that would be involved. Special category lands include the following areas:

- areas in the National Wild and Scenic Rivers System and areas designated for potential addition to the system;
- designated areas of critical environmental concern (ACECs); and
- areas designated as closed to off-highway vehicle (OHV) use (as defined in 43 CFR 8340-5); lands or waters known to contain federally proposed or listed threatened or endangered species, or their proposed or designated critical habitat.

Special Interest Plants – Plants on List 2 (not including List 2 plants that are already on the BLM sensitive list) and List 4 in the California Native Plant Society's Inventory of Rare and Endangered Plants of California (Rare Plant Scientific Advisory Committee 2001). These plants are considered rare by the scientific community but are not included in BLM's sensitive plant list. These plants receive no legal protection but are managed, where possible, on a case-by-case basis by individual field offices to maintain populations and reproductive viability.

Special Management Areas – Areas that may need special management, such as management as an ACEC, RNA, environmental education area, or other special category.

Special Recreation Management Area (SRMA) – An area of intensive recreation use where a commitment has been made to provide specific recreation activity and experience opportunities. SRMAs usually require a high level of recreation investment or management. SRMAs include recreation sites, but recreation sites alone do not constitute SRMAs. Also see EXTENSIVE USE AREA and RECREATION MANAGEMENT ZONE.

Special Recreation Permit (SRP) – An authorization that allows for specific nonexclusive permitted recreational uses of the public lands and related waters. SRPs are issued to control visitor use, protect recreational and natural resources, provide for the health and safety of visitors, and accommodate commercial recreational uses.

Special Status Species – Plant or animal species falling in any of the following categories:

- threatened or endangered species
- proposed threatened or endangered species
- candidate species
- state-listed species
- BLM sensitive species
- BLM special-interest species

Also see SPECIAL INTEREST PLANTS.

Species – From Section 3(15) of the Federal Endangered Species Act: "The term 'species' includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." A population of individuals that are more or less alike and that can breed and produce fertile offspring under natural conditions.

Species Composition – The proportions of plant species in relation to the total on a given area. It may be expressed in terms of cover, density, or weight (Pellant and others 2000).

Split-Estate – Land whose surface rights and mineral rights are owned by different entities. Such a condition commonly occurs when surface rights are owned by the Federal Government and the mineral rights are privately or state owned.

Stabilization (Cultural Resource) – Protective techniques usually applied to structures and ruins to keep them in their existing condition, prevent further deterioration, and provide structural safety without significant rebuilding. Capping mud-mortared masonry walls with concrete mortar is an example of a stabilization technique.

Stand – A group of trees that occupies a specific area and is similar in species, age, and condition.

Standards and Guidelines (Northeastern California and Northwestern Nevada Standards for Rangeland Health and Guidelines for Livestock Grazing Management) – Standards and guidelines developed collaboratively by BLM and the Resource Advisory Council (RAC) to address the minimum requirements of the Department of the Interior's final rule for grazing administration, effective August 21, 1995.

Standards for Rangeland (Land) Health – A description of conditions needed to sustain public land health; relates to all uses of the public land. Standards for Northeastern California and Northwestern Nevada were developed by the State Director in consultation with the Northeast California Resource Advisory Council (RAC) as directed in 43 CFR § 4180.2. These standards are applied to all lands administered by the BLM in northeast California and northwest Nevada (Appendix B) and address upland soils, streams, water quality, riparian-wetlands, and biodiversity (BLM 2000a).

Standing Volume – The total volume of wood contained in stems of trees of all size classes in cubic meters. The standing volume includes some nonrecoverable volume but excludes bark.

Stand Replacement Fire Regime – A regime in forests, shrublands, or grasslands in which fires kill or top-kill aboveground parts of the dominant vegetation, substantially changing the aboveground structure. About 80% or more of the aboveground dominant vegetation is either consumed or dies as a result of the fire.

State – One or more biological (including soil) communities that occur on a particular ecological site and that are functionally similar in respect to the three attributes (soil and site stability, hydrologic function, and biotic integrity). States are distinguished by relatively large differences in plant functional groups, soil properties, and ecosystem processes and, consequently, in vegetation structure, biodiversity, and management requirements. They are also distinguished by their responses to disturbance. A number of different plant communities may be included in a state, and the communities are often connected by traditionally defined successional pathways (Herrick and others 2005).

State Historic Preservation Officer (SHPO) – The state official authorized to act as a liaison to the Secretary of the Interior for implementing the National Historic Preservation Act of 1966.

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

Stewardship Contract – A contract BLM enters into for services to achieve land management goals and meet local and rural community needs, for which a source for performance must be selected on a best-value basis. Section 323 of Public Law 108-7, the Consolidated Appropriations Resolution, 2003, authorizes trading goods for services and multi-year contract authority between 5 and 10 years.

Stipulation – A condition or requirement attached to a lease or contract, usually dealing with protection of the environment or recovery of a mineral.

Stock (Fish) – A group of fish that is genetically self-sustaining and isolated geographically or temporally during reproduction. Generally, stock refers to a local population of fish.

Stocking Rate – The number of specific kinds and classes of animals grazing or using a unit of land for a specific period. Stocking rates may be expressed as a ratio, such as of animal units/section, acres/animal unit, or acres/animal unit month.

Streambanks – The usual boundaries, not the flood boundaries, of a stream channel. Right and left banks are named facing downstream (in the direction of flow).

Streambank Stability – A streambank's relative resistance to erosion, which is measured as a percentage of alteration to streambanks.

Stream Channel – The bed where a natural stream of water runs or may run; the long narrow depression shaped by the concentrated flow of a stream and covered continuously or periodically by water.

Stream Channel Integrity (Stability) – A relative measure of the resistance of a stream to erosion. Stable streams do not change markedly in appearance from year to year. An assessment of stability helps determine how well a stream will adjust to and recover from changes in flow or sediment transport.

Stream Order – A method of numbering streams as part of a drainage basin network. The smallest unbranched mapped tributary is called first order, the stream receiving the tributary is called second order, the stream receiving that tributary is called the third order, and so on. Stream order may depend on the scale of the map used. A first-order stream on a 1:62,500 map may be a third-order stream on a 1:12,000 map.

Structural Diversity – Variety in a vegetation type that results from layering or tiering of the canopy and understory and the dieback, death and ultimate decay of plants; the diversity of the composition, abundance, spacing, and other attributes of plants in a community.

Structure – The height and area occupied by different plants or life forms in a community.

Stubble – The basal portion of herbaceous plants remaining after the top portion has been harvested either artificially or by grazing animals.

Subdominant Species – An important species within a plant community, but one that is less prevalent, smaller, or less important than the dominant species. Also see DOMINANT SPECIES

Subeconomic Mineral – A mineral that at present is unavailable for use because of the high cost of extraction.

Substrate – Mineral and organic material forming the bottom of a waterway or water body; the base or substance upon which an organism is growing.

Succession – The progressive replacement of plant communities on an ecological site that leads to the climax community. Early seral stages are normally dominated by perennial grasses and annual as well as perennial forbs with few shrubs. During mid seral the woody species that the site supports such as shrubs and trees begin to make an obvious appearance, and annual forbs are dominated by perennial forbs. During late seral the shrubs normally dominate the cover on the site, but the perennial grasses still provide the most annual production on into the potential natural community (NRCS 1997). Also see POTENTIAL NATURAL COMMUNITY.

Suckering – A common method of asexual reproduction in the willow family by which suckers sprout up from the roots of mother trees, forming new trees.

Suitable River – A river segment found through administrative study by an appropriate agency to meet the criteria for designation as a component of the National Wild and Scenic Rivers System, as specified in Section 4(a) of the Wild and Scenic Rivers Act.

Suite – A group or array of characteristics associated with a given organism or species.

Suppression – A management action intended to protect values from a fire, extinguish a fire, or alter a fire's direction of spread.

Surface Fuels – Needles, leaves, grass, forbs, dead and down branches and boles, stumps, shrubs, and short trees.

Sustained Yield – Achieving and maintaining a permanently high level, annual or regular period production of renewable land resources without impairing the productivity of the land and its environmental values (FLPMA 1976).

Sylvaglyphs (Dendroglyphs) – Historic carvings found on the bark of smooth-bark trees, often aspens.

Take – To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (Endangered Species Act § 3 (19) 1973). Harm is further defined by the U.S. Fish and Wildlife Service (USFWS) as to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. USFWS defines Harass as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include breeding, feeding, or sheltering (50 CFR Part 17-Endangered And Threatened Wildlife And Plants§ 17.3 Definitions).

Talus – A sloping heap of loose rock fragments lying at the foot of a cliff or steep slope.

Taylor Grazing Act – An act passed in 1934 that provides for the regulation of grazing on the public lands (excluding Alaska) to improve rangeland conditions and stabilize the western livestock industry.

Terms and Conditions – The provisions and stipulations specified by BLM as part of a livestock grazing permit or other land use authorization.

Terracette – Benches of soil deposition behind obstacles caused by water, not wind, erosion (Pellant and others 2000).

Thinning – A tree removal practice that reduces tree density and competition between trees in a stand. Thinning concentrates growth on fewer, high-quality trees, provides periodic income, and generally enhances tree vigor. See COMMERCIAL THINNING and PRECOMMERCIAL THINNING.

Thinning from Below – The removal of trees from the middle and upper crown classes in a stand, to favor the most promising trees of these classes.

Threatened Species – Any species defined through the Endangered Species Act (ESA) as likely to become endangered within the foreseeable future throughout all or a significant portion of its range, as published in the *Federal Register* (ESA § 3 (20) 1973). Also see ENDANGERED SPECIES.

Threshold – A transition boundary that an ecosystem crosses that results in a new stable state that is not easily reversed without significant inputs in resources (Herrick and others 2005). Ecological thresholds describe a complex set of potentially interacting components, rather than discrete boundaries in time and space. "A specific disturbance or event may trigger the occurrence of a threshold that effects both structural and functional modifications during ecosystem transitions at various time scales." "The potential for threshold reversibility depends upon the extent and duration of ecosystem modifications, especially those altering nutrient and water cycles and energy flow pathways" (Briske and others 2005). "One or more of the primary ecological processes has been irreversibly changed and must be actively restored before return to the pervious state is possible" (Stringham and others 2003).

Trace Metals – Metals that are present in small concentrations.

Traditional Cultural Property (TCP) – A property that is eligible for the National Register of Historic Places because of its association with a living community's cultural practices or beliefs that are important in maintaining the continuing community's cultural identity. TCPs are essential to maintaining the cultural integrity of many Native American Indian nations and are critical to the cultural lives of many of their communities.

Trail – A linear route managed for human-powered, stock, or off-highway vehicle forms of recreation or for historic or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles. Also see ROUTE and ROAD.

Trail Alignment – The topographic location of a trail in relation to local landforms. Trail alignment can be expressed by the slope alignment angle. Trails can be aligned parallel to the prevailing slope (0° angle), perpendicular to the slope (90° angle), or at any angle in between (1 - 89° angle).

Trailing – Controlled directional movement of livestock; the habit of livestock or wildlife of repeatedly treading in the same line or path.

Trail Tread – The walking surface of a trail.

Transition – A shift from one state to another on an ecological site, or within vegetation alliances or associations (NRCS 1997).

Trailhead – The terminus of a hiking, horse, or bicycle trail accessible by motor vehicle and sometimes

Tread Lightly – An educational program designed to instill outdoor ethics of responsible behavior when participating in outdoor activities.

Trespass: – Any occupancy, use, or development of the public lands or their resources of the United States without authority.

Trophic Level: The level in a nutritive series of an ecosystem in which a group of organisms in a certain stage in the food chain secures food in the same general manner. The first or lower trophic level consists of producers (green plants), the second level consists of herbivores, the third level consists of secondary carnivores, and the fourth level consists of reducers (decomposers).

Trust Allotment – Federal land set aside for the exclusive use of an Indian, who is the allottee. The Federal Government retains land ownership. Many allotments are outside Indian reservations and are called public domain allotments. (Forest Service National Resource Guide to American Indian and Alaska Native Relations at http://www.fs.fed.us/people/tribal/)

Trust Responsibility – This term has never been defined by the U.S. Congress, any president, or any cabinet official. Generally, a set of principles and concepts outlining the responsibilities of the U.S. Government to act as the trustee of Indian people and Indian-owned assets. The U.S. Government, through the President, has certain responsibilities to protect Indian property and rights, Indian lands, and resources. The trust responsibility may involve a fiduciary obligation in which the President, through the Secretary of the Interior, acts as the trustee of the Indian assets. Fulfilling or redeeming a trust responsibility can best be reflected or demonstrated as a matter of action; a stream that was protected, a site that was maintained intact, a property right that has been left unaffected by a federal action. The writing of an environmental document is not an example of fulfillment of a trust responsibility. (Forest Service National Resource Guide to American Indian and Alaska Native Relations at http://www.fs.fed.us/people/tribal/.)

Turbidity – A measure of cloudiness of water, which is a function of the suspended organic and inorganic material.

Turn Out Area – A location within an allotment or grazing area where livestock are placed to achieve management objectives, generally at the beginning of the grazing season but possibly throughout the grazing season as livestock are moved into new use areas.

Unallotted Lands – Public lands that are open to grazing but currently have no livestock grazing authorized.

Underburning – Prescribed burning under a timber canopy.

Understory – Plants growing under the canopy of other plants. Understory usually refers to grasses, forbs, and low shrubs under a tree or brush canopy.

Ungulates – Hoofed animals, including ruminants such as cows, sheep, goats, and deer, but also horses, tapirs, elephants, rhinoceroses, and swine.

Upland Game – A term used in wildlife management to refer to hunted animals that are neither big game nor waterfowl. Upland game includes such birds as grouse, turkey, pheasant, quail, and dove, and such mammals as rabbit and squirrel.
Uplands – Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian wetland and aquatic zones.

Utilization – The proportion of the current year's forage production that is consumed or destroyed by grazing animals. Utilization may refer to a single species of forage or to all forage as a whole.

Utility Corridor – A parcel of land, without fixed limits or boundaries, that is being used as the location for one or more utility rights-of-way (43 CFR Part 2800-Use; Rights-Of-Way, Principles and Procedures § 2800.0-5 Definitions).

Valid Existing Rights – Locatable mineral development rights that existed when the Federal Land Policy and Management Act (FLPMA) was enacted on October 21, 1976. Some areas are segregated from entry and location under the Mining Law to protect certain values or allow certain uses. Mining claims that existed as of the effective date of the segregation may still be valid if they can meet the test of discovery of a valuable mineral required under the Mining Law. Determining the validity of mining claims located in segregated lands requires BLM to conduct a validity examination and is called a "valid existing rights" determination.

Vascular Plants – Any of various plants, such as the ferns and seed-bearing plants, in which the phloem transports sugar and the xylem transports water and salts.

Vault Toilet – An outdoor toilet without running water that has a sealed underground vault for holding wastes and from which waste is pumped out.

Vector – Any person, animal or things that carries the seeds of noxious weeds from one place to another and promotes their invasion and spread.

Vegetation Alliance - A vegetation classification unit containing one or more associations, and defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation (E.g. Forestland, Shrubland) (ESA 2004).

Vegetation Association - A vegetation classification unit defined by a characteristic range of species composition, diagnostic species occurrence, habitat conditions, and physiognomy (e.g. Mountain big sagebrush/perennial grass) (ESA 2004).

Vegetative Fuel Break System - Planned corridors of vegetation to break-up large blocks of highly flammable species such as cheatgrass, to improve fire suppression effectiveness. These breaks are planned to be compatible with, and take advantage of, resource development such as seedings and natural barriers (BLM 1985).

Vertisols – Dark black soils rich (at least 30%) in expandable clay that readily swells when wet and shrinks when dried. Vertisols are one of the U.S. Department of Agriculture soil orders.

Viable Population – A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species (Noss and Cooperrider 1994).

Viewshed – The entire area visible from a viewpoint.

Vigor – The capacity for natural growth and survival of plants and animals.

Visual Resource Management (VRM) – The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Visual Resource Management (VRM) Classes – Categories assigned to public by scenic quality, sensitivity level, and distance zones. Each class has an objective that prescribes the amount of modification allowed in the landscape. The four classes are as follows:

Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes, but it does not preclude very limited management activities. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any change must repeat the basic element of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective of this class is to partially retain the landscape's existing character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements in the predominant natural features of the characteristic landscape.

Class IV: The objective of this class is to provide for management activities that require major changes to the landscape's existing character. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of the viewer's attention. But every attempt should be made to minimize the impact of these activities by careful location, minimal disturbance, and repeating the basic elements of the characteristic landscape.

Waterfowl Nesting Island – A wildlife habitat improvement that consists of a vegetated mound of dirt
built in a lake or reservoir to provide cover and distance from the shoreline for nesting waterfowl.

Water Quality – Within the context of the Land Health Standards, water quality means that "water will have characteristics suitable for existing and potential beneficial uses. Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada State standards, excepting approved variances" (BLM 2000a).

Water Reserve – An area set aside for the protection and use of water on or under the land for public water supplies.

Water Right – A right to use, in accord with its priority, a certain portion of the waters of the state for irrigation, power, domestic use or another similar use

Watershed – An area of land from which water drains toward a single stream. The watershed is a hydrologic unit often used as a physical-biological unit and a socioeconomic-political unit for planning and managing natural resources.

Waters of the State – All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies of water above or below ground that are partially or wholly within a state. Private waters that do not combine or have a junction with natural surface or underground waters are not included (such as an isolated stock pond that does not infiltrate to groundwater or connect to surface water).

Water Table (Ground Water Table) – The level of groundwater; the upper surface of the zone of saturation for underground water. The water table is an irregular surface with a slope or shape determined by the amount of groundwater and the permeability of the earth material.

Way –A travel route that was not constructed but rather was worn onto the surface of the land by repeat passage of vehicles. Also see EXISTING WAYS.

Wetlands or Wetland Habitat – Areas characterized by soils that are usually saturated or ponded; i.e., hydric soils, and that support mostly water-loving plants; i.e. hydrophytic plants (NRCS 1997). Wetlands generally include swamps, marshes, bogs, and similar areas.

Weed Management Areas (WMAs) – Local organizations that bring together landowners and managers (private, city, county, state, and federal) in a county, multi-county, or other geographical area to coordinate efforts and expertise against common invasive weed species.

Wikiup – A temporary dwelling of nomadic Native North Americans. It consists of a framework of arched poles covered by brush, bark, rushes, or mats. The wickiup is found among Native Americans in Arizona, New Mexico, Utah, Idaho, and California. Sometimes other dwellings of tribes in this region are called wickiups even when made of more permanent materials. The name is also spelled wickiup.

Wild and Scenic River System – A national system of rivers or river segments that have been designated by Congress and the President as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968). Each designated river is classified as one of the following:

Wild River – A river or section of a river free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Designated wild as part of the National Wild and Scenic Rivers System.

Scenic River – A river or section of a river free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads. Designated scenic as part of the National Wild and Scenic Rivers System.

Recreational River – A river or section of a river that is readily accessible by road or railroad, may have some development along its shorelines, and may have undergone some impoundment of diversion in the past. Designated as recreational as part of the National Wild and Scenic Rivers System.

Wilderness – An area of undeveloped federal land retaining its primeval character and influence, without permanent improvement or human habitation, that is protected and managed so as to preserve its natural conditions and that (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Wilderness Study Area (WSA) – A roadless area that has been inventoried and found to be wilderness in character, has few human developments, and provides outstanding opportunities for solitude and primitive recreation, as described in Section 603 of the Federal Land Policy and Management Act of 1976 and in Section 2(c) of the Wilderness Act of 1964.

Wilderness Values – Values established in the Wilderness Act, such as solitude and naturalness.

Wildfire – Any unwanted wildland fire.

Wild Horses and Burros – Animals that are the subject of the Wild Free-Roaming Horse and Burro Act of 1971 (PL 92-195) and defined as "all unbranded and unclaimed horses and burros on public lands of the United States."

Wildland Fire – Any non-structure fire that occurs in the wild. Three distinct types of wildland fire have been defined and include wildfire, wildland fire use, and prescribed fire.

Wildfire – An unplanned and unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Wildland Fire Use – The application of the appropriate management response to naturally ignited wildland fires to meet specific resource management objectives in predefined designated areas outlined in fire management plans.

Prescribed Fire – Any fire ignited by management actions to meet specific objectives.

Wildland Fire Situation Analysis – A decisionmaking process in which the agency administrator or representative does the following:

- describes the situation (fire),
- establishes objectives and constraints for managing the fire,
- compares multiple strategic wildland fire management alternatives,
- evaluates the expected effects of the alternatives,
- selects the preferred alternative, and
- documents the decision.

The format and level of detail required depend on the incident and its complexity. The key is to document the decision.

Wildland-Urban Interface (WUI) – The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.

Wildlife Management Area (WMA) – Within the context of the Eagle Lake Field Office RMP, a wildlife management area is the Biscar Reservoir National Cooperative Land and Wildlife Management Area (Biscar) designated by the Secretary of the Interior; "to be managed by the Bureau of Land Management for the development, conservation, utilization and maintenance of their natural resources, including their recreational and wildlife resources." BLM manages Biscar in cooperation with the U.S. Fish and Wildlife service and the California Department of Fish and Game (*Federal Register* 1962)

Wildlings– Young seedlings that develop naturally in the wild and are sometimes transplanted

Wind-Scoured Areas – Areas, generally in interstitial spaces, where the finer soil particles have blown away, sometimes leaving residual gravel, rock, or exposed roots on the soil surface.

Withdrawal – An action that restricts the use of public lands by removing them from the operation of some or all of the public land or mining laws.

Woodland – A forest community occupied mainly by uncommercial species such as juniper, mountain mahogany, and aspen.

Yield – Total forest growth over a specified period of time, less mortality, unmarketable fiber, and cull.

Zeolites – Hydrated sodium alumina silicates, either naturally-occurring (mined) or synthetically manufactured, with ion exchange properties. Zeolites were formerly used extensively for residential and commercial water softening, but have been largely replaced by synthetic organic cation resin ion exchangers.

Zone of Saturation – Underground region within which all openings are filled with water. The top of the zone of saturation is called the water table. The water within the zone of saturation is called groundwater.

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http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2004all/r134161i.htm
Fire Effects Information System (threatened and endangered species habitat and fire information)
http://www.fs.fed.us/database/feis/index.html
National Fire Plan Project Design and Consultation
http://www.or.blm.gov/fcp/
Science Synthesis and Integration for Fuels Planning: Ecological Consequences
http://www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index
Wildland fire in ecosystems: effects of fire on fauna
http://www.fs.fed.us/rm/pubs/rmrs_gtr42_1.html

Wildland fire in ecosystems: effects of fire on flora
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MAP: TRAVEL-1
Existing Routes

Existing Routes

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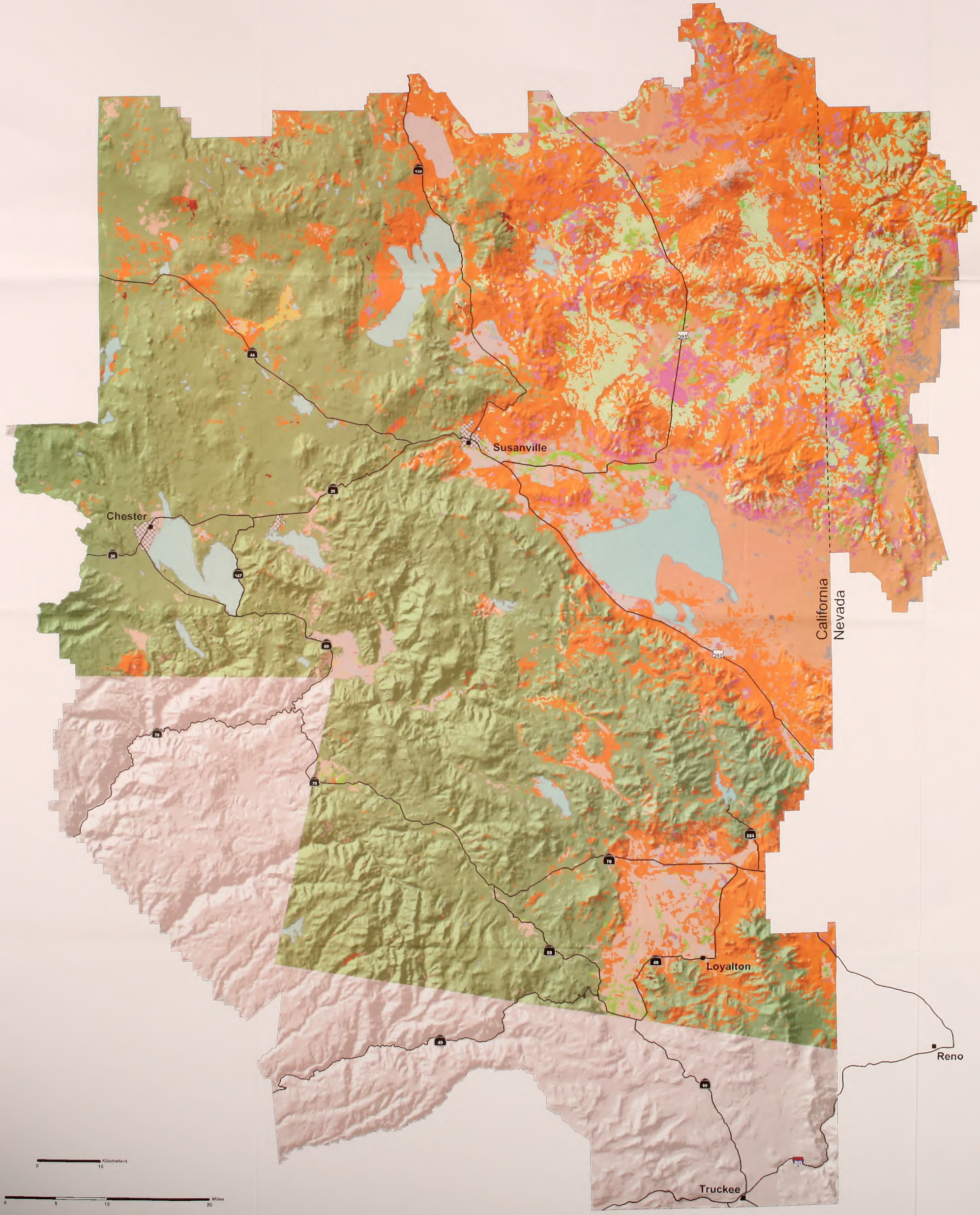
EAGLE LAKE FIELD OFFICE
Draft Resource Management Plan / EIS

Fall 2005

Kilometers 0 10

Miles 0 2.5 5 10



MAP: VEG-1

Vegetation Classes

LEGEND

- Cities
- Highways
- Lands Other Than BLM

Vegetation Classes

- Herbaceous and Grassland Communities
- Low Sagebrush
- Basin Big Sagebrush
- Mountain Big Sagebrush
- Wyoming Big Sagebrush
- Mixed Desert Shrub
- Mixed Great Basin Shrub
- Aspen - Riparian Shrub
- Mountain Mahogany
- Coniferous Forest and Juniper Woodland
- Pasture/Croplands
- Dry Lakebed/Alkali Playa
- Rock/Bare Ground
- Urban or Densely Settled Areas
- Water

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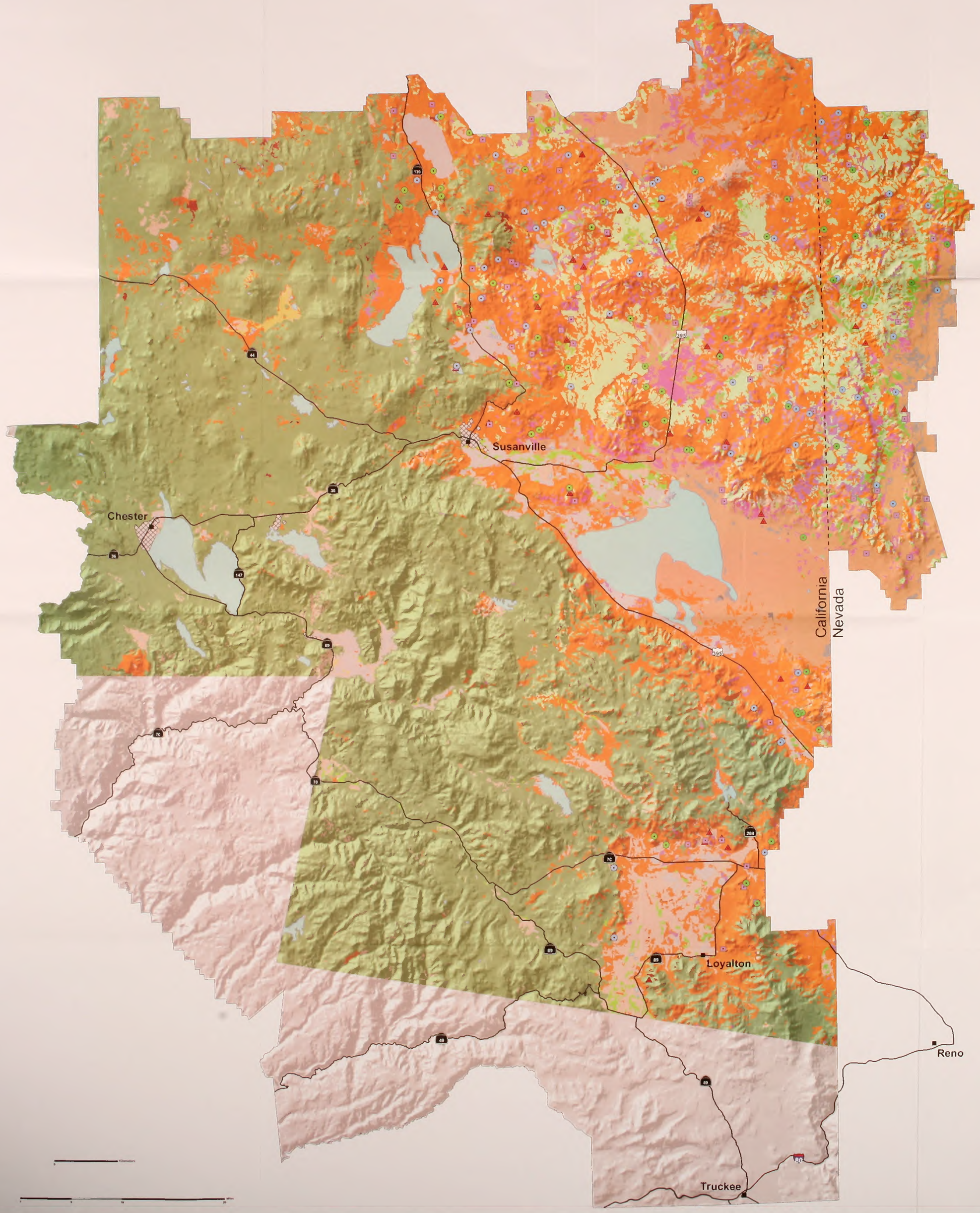
Data Source: Tetra Tech Vegetation Inventory, February 2004.

Minimum Mapping Unit: 20 Acres



MAP: VEG-2

Biotic Integrity Based on Land Health Assessments

LEGEND

- Cities
- Highways
- Lands Other Than BLM

Land Health Assessment Ranking

- Healthy
- Healthy/Lacking Key Attributes
- At Risk
- Unhealthy

Vegetation Classes

- Herbaceous and Grassland Communities
- Low Sagebrush
- Basin Big Sagebrush
- Mountain Big Sagebrush
- Wyoming Big Sagebrush
- Mixed Desert Shrub
- Mixed Great Basin Shrub
- Aspen - Riparian Shrub
- Mountain Mahogany
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- Urban or Densely Settled Areas
- Water

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