

# Ely Proposed Resource Management Plan/Final Environmental Impact Statement



**Appendices**

**November 2007**

## **COOPERATING AGENCIES:**

Great Basin National Park  
Humboldt-Toiyabe National Forest  
Nellis Air Force Base  
Nevada Department of Wildlife  
Nevada Division of Minerals  
Nevada Division of Transportation  
Nevada State Historic Preservation Office

Lincoln County  
Nye County  
White Pine County  
Duckwater Shoshone Tribe  
Ely Shoshone Tribe  
Moapa Band of Paiutes  
Yomba Shoshone Tribe



**BLM**

**Ely Field Office / Nevada**

***BLM Mission Statement***

***It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.***

BLM/EL/PL-07/09+1793

DOI No. FES 07-40

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**APPENDIX A**  
**PHASES OF THE WATERSHED ANALYSIS PROCESS AND THE**  
**GRAZING ALLOTMENT EVALUATION PROCESS**

## **APPENDIX A PHASES OF THE WATERSHED ANALYSIS PROCESSES AND THE GRAZING ALLOTMENT EVALUATION PROCESS**

The watershed analysis process described in the BLM Handbook, *H-4180-1 Rangeland Health Standards* is being used to analyze 61 watersheds and associated grazing allotments in the planning area. This watershed approach allows the BLM to focus on the flexible management techniques necessary to accommodate the functionality of the watershed. It allows for a shift from species and individual use-driven management to the natural systems that support watersheds in properly functioning conditions (see the Glossary).

### **Assessment Phase**

The assessment of the watershed is the first step in the analysis process. It involves the collection of indicator data pertinent to the Resource Advisory Council Standards and Guidelines for Rangeland Health (Appendix B). An interdisciplinary team coordinates the collection of indicator data such as ground cover, ecological site inventory data, fire regime condition classes (see Appendix C), riparian proper function and condition ratings, vegetation structure and composition, or other indicator data such as road density, current cultural resource inventory data, and noxious and invasive weed data. The data is collected at an appropriate intensity and scale. In this phase of the analysis, the status of resource conditions is assessed and summarized. Information pertinent to livestock grazing management such as utilization, and trend and use pattern mapping, also is gathered and summarized. These data and information are then compiled and organized for the development of an overview of the physical and biological conditions of the watershed.

### **Evaluation Phase**

To evaluate a watershed, assessment data is compared against the Resource Advisory Council Standards for rangeland health using methods outlined in *H-4180-1 Rangeland Health Standards*. The evaluation phase is done in accordance with Title 43 Code of Federal Regulation, subpart 4180; BLM Handbook *H-4180-1 Rangeland Health Standards*; and Resource Advisory Council Standards and Guidelines.

The purpose of the standards and guidelines at Title 43 Code of Federal Regulations § 4180 is to provide measures (standards) to determine land health, and methods (guidelines) to improve the health of the public rangelands. The standards are intended to help the BLM, public land users, and others focus on a common understanding of acceptable resource conditions. The guidelines provide a basis for working together to achieve that vision. The standards are used to communicate current and desired resource conditions among the various groups.

Four fundamentals of rangeland health are listed in Title 43 Code of Federal Regulation § 4180.1. They combine the basic precepts of physical function and biological health with elements of law relating to water quality and plant and animal populations and communities. The fundamentals provide the basis for the development and implementation of the standards for land health. The standards were developed by regional Resource Advisory Councils.

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Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making “significant” progress towards these functions and conditions is required of all uses of public rangelands as stated in Title 43 Code of Federal Regulation 4180.1. Guidelines are practices, methods, or techniques. They are also tools such as grazing systems, and vegetation treatments that help achieve standards. Guidelines are used to describe or communicate techniques for managing activities to achieve desired healthy watershed conditions.

Standards often make reference to site potential. This potential can be described in ecological site descriptions at a site-specific level or when applied generally at a landscape scale. LANDFIRE biophysical setting models (Appendix C) also describe reference conditions at the landscape scale. These descriptions and models may be applied as reference conditions for the evaluation process. The evaluation is done at the landscape scale and not the site-specific scale.

During the evaluation process, interdisciplinary team members, cooperating agency, landowners and public land user groups meet during the evaluation process in both a formal setting and in the field to evaluate the assessment data against these reference conditions. When one or more standard(s) is not achieved or making substantial progress toward achievement, or when there is a lack of conformance with guidelines, causal factors would be identified by resource. The interdisciplinary team then makes recommendations of actions necessary to meet the standard. These recommendations form the foundation of the implementation strategy.

If the standards are met, then monitoring would continue to occur as necessary to ensure that standards would continue to be met. If current livestock management or levels of livestock use are determined to be significant factors in failing to achieve the standards and conform with the guidelines, then appropriate action as soon as practicable but not later than the start of the next grazing year is to occur through current BLM regulation. The evaluation process is documented in a report.

### **Determination Phase**

Once the evaluation is complete, and if standards are not being met, the determination that existing activity management is a significant causal factor for not achieving standards must be documented. Because the standards are developed to ensure the conditions described in 43 Code of Federal Regulation § 4180.1 exist, achievement of standards would mean that the four fundamentals of rangeland health are “in or making significant progress toward” being met.

The determination includes at a minimum:

1. Statement of achievement or non-achievement for each standard;
2. List of causal factors for not achieving standards;
3. Statement of conformance or non-conformance with guidelines; and
4. Date determination is made and signature of the authorized officer.

Documentation of causal factors should clearly identify the evidence used to reach conclusions regarding whether a standard is or is not being met, and which activities are causal factors for not achieving the standard.

The grazing-related questions that must be answered “Yes” or “No” as part of the determination process are listed below:

1. Is it more likely than not that existing grazing management practices or levels of grazing use are significant factors in failing to either achieve the standards or conform to the guidelines?
2. Is it more likely than not that existing grazing management should be modified to ensure that the fundamentals of rangeland health are met, or are making significant progress toward being met?

The authorized officer is responsible for making the determination based on the evaluation provided by the interdisciplinary team, and information gathered from other sources. The determination document is completed as soon as the evaluation is complete and any additional information is reviewed, normally no more than four months from completion of the evaluation. Following the determination, grazing permits will be fully processed using information from the land health standards evaluation to complete the environmental analysis.

### **Implementation Phase**

In this final phase, the watershed interdisciplinary team would develop an implementation strategy, which would address all of the standards not achieved, or condition where fundamentals of land health are not met or are not making substantial progress toward being met. The strategy would promote an interdisciplinary process to address all programs, and would use applicable BLM technical manuals, handbooks, etc. The interdisciplinary team would use the recommendations for modifications to existing land uses and decisions.

Objectives for each recommendation would be clearly stated. Recommendations would have an overall goal in mind, such as protecting (e.g. threatened and endangered species habitat), maintaining, or restoring ecological system processes that are not meeting standards or conforming to guidelines. Management actions would be consistent with state and transition models at a project level and with LANDFIRE biophysical setting models at the watershed level as well as other guidelines for meeting objective from the published Resource Advisory Councils standards. Site specific NEPA analysis would be completed on any proposed actions designed to achieve goals, except those specifically covered in the RMP/EIS. These actions would be monitored over the long-term to determine success.

### **Monitoring Plan**

Each watershed implementation strategy would have a monitoring plan developed. Monitoring is integral for implementation of adaptive management, and the relative importance of monitoring increases with uncertainty about the outcomes of management actions (Hellawell 1991).

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Treatment level effectiveness monitoring would verify that the restoration treatments achieved the goals identified. Such monitoring can answer key questions about the effect of a particular type or suite of treatment types in a particular ecological site and reduce uncertainty about management outcomes, effectively guiding future management.

### Watershed-level Monitoring

The goal of the watershed monitoring program will be to determine the condition of the Ely Field Office's 61 watershed management units and to compare their condition to a reference condition both before and after implementation of restoration plans. This level of monitoring will not determine the effectiveness of particular restoration techniques or offer direct information about causes of change in ecological condition. Rather, it will evaluate the data against rangeland health standards.

Baseline watershed-level monitoring will initially take place through the watershed analysis process. Data will be collected using BLM-approved quantitative methods, in a statistically valid fashion (Scheiner and Gurevich 2001), using random sampling stratified by Natural Resource Conservation Service ecological site, and/or other resource uses. Power analyses will be performed using methods described in Elzinga et al. (1998). Data will be either collected electronically or entered into a database, and will be housed in a central location, and overseen by a data manager. Data will be analyzed using a variety of valid procedures and metadata and reports will be available through the Ely Field Office. At the time of baseline assessment, data will be compared to a reference condition (such as in Natural Resource Conservation Service Ecological Site Descriptions as interpreted for state and transition models) on a landscape basis in LANDFIRE, biophysical setting models, and post-implementation monitoring data will be compared both with the reference condition and with the baseline condition.

### Treatment-level Effectiveness Monitoring

Some level of monitoring will be carried out for every restoration project; however, the method and level of monitoring will vary with the objectives and type of project. This project-level monitoring will address the attributes listed above, and methods will follow BLM-approved manuals but could employ future methods that address the selected indicators and offer statistical vigor. Data may be collected using statistically valid research designs when possible, and power analysis.

### **References**

- Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. Measuring and monitoring plant populations. Bureau of Land Management Technical Reference 1730-1.
- Hellawell, J. M. 1991. Development of a rationale for monitoring, Pages 1-14 in Goldsmith, F. B. (ed.), Monitoring for conservation and ecology, Chapman and Hall, New York.
- Scheiner, S. and Gurevich, J., 2001. The Design and Analysis of Ecological Experiments. New York: Oxford.

**APPENDIX B**  
**RESOURCE ADVISORY COUNCIL STANDARDS AND GUIDELINES**

**NORTHEASTERN GREAT BASIN RESOURCE ADVISORY COUNCIL  
STANDARDS AND GUIDELINES**

The Nevada Northeastern Great Basin Resource Advisory Council, as chartered by the Department of the Interior to promote healthy rangelands, has developed standards and guidelines for grazing administration on about 16.2 million acres of public lands administered by the Bureau of Land Management (BLM) within the designated geographic area of the Northeastern Great Basin. The Resource Advisory Council in developing these standards and guidelines, understands and agrees that grazing is only one of the multiple uses recognized under the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1739, 1740). These recommended standards and guidelines reflect the stated goals of improving rangeland health while providing for the viability of the livestock industry in the Northeastern Great Basin.

**1. Upland Sites**

- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform.

As indicated by:

- Indicators are canopy and ground cover, including litter, live vegetation and rock, appropriate to the potential of the site.

Guidelines

- 1.1 Livestock grazing management and wild horse and burro population levels are appropriate when in combination with other multiple uses they maintain or promote upland vegetation and other organisms and provide for infiltration and permeability rates, soil moisture storage, and soil stability appropriate to the ecological site within management units.
- 1.2 When livestock grazing management and wild horse and burro herd management alone are not likely to restore areas of low infiltration or permeability, land management treatments should be designed and implemented where appropriate.
- 1.3 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this standard.

**2. Riparian and Wetland Sites**

- Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria.

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As indicated by:

- Streamside riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows. Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics.
- Width/Depth ration, Channel roughness, Sinuosity of stream channel, Bank stability, Vegetative cover (amount, spacing, life form), and Other cover (large woody debris, rock).
- Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.
- Chemical, physical and biological water constituents are not exceeding the state water quality standards.

### **Guidelines**

- 2.1 Livestock grazing management and wild horse and burro population levels will maintain or promote sufficient vegetation cover, large woody debris, or rock to achieve proper functioning condition in riparian and wetland areas. Supporting the processes of energy dissipation, sediment capture, groundwater recharge, and stream bank stability will thus promote stream channel morphology (e.g., width/depth ration, channel roughness, and sinuosity) appropriate to climate, landform, gradient, and erosion history.
- 2.2 Where livestock grazing management and wild horse and burro herd management are not likely to restore riparian and wetland sites, land management treatments should be designed and implemented where appropriate to the site.
- 2.3 Livestock grazing management and wild horse and burro herd management will maintain, restore or enhance water quality and ensure the attainment of water quality that meets or exceeds state standards.
- 2.4 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this standard.

### **3. Habitat**

- Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.

As indicated by:

- Vegetation composition (relative abundance of species);
- Vegetation structure (life forms, cover, heights, or age classes);
- Vegetation distribution (patchiness, corridors); and
- Vegetation productivity, and Vegetation nutritional value.

### **Guidelines**

- 3.1 Livestock grazing management and wild horse and burro population levels will promote the conservation, restoration and maintenance of habitat for threatened and endangered species, and other special status species as may be appropriate.
- 3.2 Livestock grazing intensity, frequency, season of use and distribution and wild horse and burro population levels should provide for growth and reproduction of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition and trend/utilization will be in accordance with techniques identified in the Nevada Rangeland Monitoring Handbook.
- 3.3 Livestock grazing management and wild horse and burro management should be planned and implemented to allow for integrated use by domestic livestock, wildlife, and wild horses and burros consistent with land use plan objectives.
- 3.4 Where livestock grazing management and wild horse and burro herd management alone are not likely to achieve habitat objectives, land treatments may be designed and implemented as appropriate.
- 3.5 When native plant species adapted to the site are available in sufficient quantities, and it is economically and biologically feasible to establish or increase them to meet management objectives, they will be emphasized over non-native species.
- 3.6 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this Standard.

### **4. Cultural Resources**

- Land use plans will recognize cultural resources within the context of multiple uses.

### **Guidelines**

- 4.1 Rangeland management plans will consider listings of known sites that are National Historic Register eligible or considered to be of cultural significance and new eligible sites, as they become known.

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- 4.2 Wild horses and burro herd management will be designed to avoid or mitigate damage to significant cultural resources.

### **5. Healthy Wild Horse and Burro Populations**

- Wild horses and burros exhibit characteristics of a healthy, productive, and diverse population. Age structure and sex ratios are appropriate to maintain the long-term viability of the population as a distinct group. Herd management areas are able to provide suitable feed, water, cover and living space for wild horses and burros and maintain historic patterns of habitat use.

As indicated by:

- Healthy rangelands that provide sufficient quantities and quality of forage and water to sustain the appropriate management level on a year long basis within a herd management area.
- Wild horses and/or burros managed on a yearlong basis for a condition class greater than or equal to five to allow them normal chances for survival in the winter (see glossary for equine body conditioning definitions).
- Highly adoptable wild horses and burros that are readily available from herd management areas.
- Wild horse and burro herds that exhibit appropriate age structure and sex ratio for short-term and long-term genetic and reproductive health.

### **Guidelines**

- 5.1 Implement the objectives outlined in the Wild Free-Roaming Horse and Burros Tactical Plan for Nevada (May 1999).
- 5.2 Manage for wild horses and/or burros in herd management areas based on the capability of the HMA to provide suitable feed, water, cover and living space for all multiple use.
- 5.3 Set appropriate Management Levels based on the most limiting habitat factor (e.g., available water, suitable forage, living space and cover) in the context of multiple uses.
- 5.4 Manage herd management area populations to preserve and enhance physical and biological characteristics that are of historical significance to the herd.
- 5.5 Manage wild horse and burro herds for short-term and long-term increases and to enhance adoptability by ensuring that wild horses and burros displaying desirable traits are preserved in the herd thus providing a reproductive base to increase highly adoptable horses and burros for future demands.

- 5.6 Identify and preserve historic traits and characteristics within the herd which have proven to be highly desirable by the adoption public to increase the long-term availability of animals bearing these features.
- 5.7 Wild horse and burro selective removal criteria are modified on a per herd basis to correct deficiencies in population age and sex ratios, which threaten short-term and long-term genetic diversity and reproductive health.

**MOJAVE/SOUTHERN GREAT BASIN RESOURCE ADVISORY COUNCIL  
STANDARDS AND GUIDELINES**

The standards and guidelines for grazing administration on BLM lands in southern Nevada apply to livestock grazing. The Mojave/Southern Great Basin Resource Advisory Council intends that the standards and guidelines will result in a balance of sustainable development and multiple use along with progress, over time, toward attaining desired rangeland conditions. Standards are expressions of physical and biological conditions required for sustaining rangelands for multiple uses. Guidelines point to management actions related to livestock grazing for achieving the standards. Guidelines are options that move rangeland conditions toward the multiple use standards. Guidelines are based on science, best rangeland management practices, and public input. Guidelines indicate the types of grazing methods and practices for achieving the standards for multiple use, are developed for functional watersheds and implemented at the allotment level.

The Mojave-Southern Great Basin Resource Advisory Council recognizes that it will sometimes be a long-term process to restore rangelands to proper functioning condition. In some areas, it may take many years to achieve healthy rangelands.

The Resource Advisory Council may be requested by any party to assist reaching agreement in resolving disputes.

**1. Soils**

- Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.

Soil indicators:

- Ground cover (vegetation, litter, rock, bare ground);
- Surfaces (e.g., biological crusts, pavement); and
- Compaction/infiltration.

Riparian soil indicators:

- Stream bank stability.

All of the above indicators are appropriate to the potential of the ecological site.

**Guidelines**

- 1.1 Upland management practices should maintain or promote adequate vegetative ground cover to achieve the Standards.

- 1.2 Riparian-wetland management practices should maintain or promote sufficient residual vegetation to maintain, improve, or restore functions such as stream flow energy dissipation, sediment capture, groundwater recharge, and streambank stability.
- 1.3 When proper grazing practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.
- 1.4 Rangeland management practices should address improvement beyond this Standard, significant progress toward achieving Standards, time necessary for recovery, and time necessary for predicting trends.

## **2. Ecosystem Components**

- Watersheds should possess necessary ecological components to achieve state water criteria, maintain ecosystems and sustain uses.
- Riparian and watershed vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function).

### Upland indicators:

- Canopy and ground cover, including litter, live vegetation, biological crust, and rock appropriate to the potential of the ecological site.
- Ecological processes are adequate for the vegetative communities.

### Riparian indicators:

- Streamside riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows.
- Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics:
  - Width/Depth ratio;
  - Channel roughness;
  - Sinuosity of stream channel;
  - Bank stability;
  - Vegetative cover (amount, spacing, life form); and
  - Other cover (large woody debris, rock).

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- Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

Water quality indicators:

- Chemical, physical and biological constituents do not exceed the state water quality standards.

The above indicators shall be applied to the potential of the ecological site.

### **Guidelines**

- 2.1 Management practices should maintain or promote appropriate stream channel morphology and structure consistent with the watershed.
- 2.2 Watershed management practices should maintain, restore or enhance water quality and flow rate to support desired ecological conditions.
- 2.3 Management practices should maintain or promote the physical and biological conditions necessary for achieving surface characteristics and desired natural plant community.
- 2.4 Grazing management practices will consider both the economic and physical environment, and will address all multiple uses including, but not limited to, (i) recreation, (ii) minerals, (iii) cultural resources and values, and (iv) designated wilderness and wilderness study areas.
- 2.5 New livestock facilities will be located away from riparian and wetland areas if they conflict with achieving or maintaining riparian and wetland functions. Existing facilities will be used in a way that does not conflict with achieving or maintaining riparian and wetland functions, or they will be relocated or modified when necessary to mitigate adverse impacts on riparian and wetland functions. The location, relocation, design and use of livestock facilities will consider economic feasibility and benefits to be gained for management of lands outside the riparian area along with the effects on riparian functions.
- 2.6 Subject to all valid existing rights, the design of spring and seep developments shall include provisions to protect ecological functions and processes.
- 2.7 When proper grazing practices alone are not likely to restore areas of low infiltration or permeability, land management practices may be designed and implemented where appropriate. Grazing on designated ephemeral rangeland watersheds should be allowed only if (i) reliable estimates of production have been made, (ii) an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and (iii) adverse effects on perennial species and ecosystem processes are avoided.

2.8 Rangeland management practices should address improvement beyond these Standards, significant progress toward achieving Standards, time necessary for recovery, and time necessary for predicting trends.

### **3. Habitat and Biota**

- Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Habitat indicators:

- Vegetation composition (relative abundance of species);
- Vegetation structure (life forms, cover, height, and age classes);
- Vegetation distribution (patchiness, corridors);
- Vegetation productivity; and
- Vegetation nutritional value.

Wildlife indicators:

- Escape terrain;
- Relative abundance;
- Composition;
- Distribution;
- Nutritional value; and
- Edge-patch snags.

The above Indicators shall be applied to the potential of the ecological site.

### **Guidelines**

- 3.1 Mosaics of plant and animal communities that foster diverse and productive ecosystems should be maintained or achieved.
- 3.2 Management practices should emphasize native species except when others would serve better for attaining desired communities.
- 3.3 Intensity, frequency, season of use and distribution of grazing use should provide for growth, reproduction, and, when environmental conditions permit, seedling establishment of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition, trend, and utilization will be in accordance with techniques identified in the Nevada Rangeland Handbook.

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- 3.4 Grazing management practices should be planned and implemented to provide for integrated use by domestic livestock and wildlife, as well as wild horses and burros inside Herd Management Areas.
- 3.5 Management practices will promote the conservation, restoration, and maintenance of habitat for special status species.
- 3.6 Livestock grazing practices will be designed to protect fragile ecosystems of limited distribution and size that support unique sensitive/endemic species or communities. Where these practices are not successful, grazing will be excluded from these areas.
- 3.7 Where grazing practices alone are not likely to achieve habitat objectives, land management practices may be designed and implemented as appropriate.
- 3.8 Vegetation manipulation treatments may be implemented to improve native plant communities, consistent with appropriate land use plans, in areas where identified Standards cannot be achieved through proper grazing management practices alone. Fire is the preferred vegetation manipulation practice on areas historically adapted to fire; treatment of native vegetation with herbicides or through mechanical means will be used only when other management techniques are not effective.
- 3.9 Rangeland management practices should address improvement beyond these Standards, significant progress toward achieving Standards, time necessary for recovery, and time necessary for predicting trends.

**MOJAVE/SOUTHERN GREAT BASIN RESOURCE ADVISORY COUNCIL  
STANDARDS AND GUIDELINES FOR WILD HORSES AND BURRO**

Nevada is an arid state. The standards for rangeland health and guidelines for wild horse and burro management on BLM lands in southern Nevada apply to Herd Management Areas. The Mojave/Southern Great Basin Resource Advisory Council intends that the standards and guidelines will result in a balance of sustainable development and multiple use.

The standards for rangeland health will be reached and maintained by managing wild horse and burro numbers so as not to exceed appropriate management levels for each Herd Management Area. Controlling wild horse and burro numbers through gathers and other control programs is essential.

Standards are expressions of physical and biological conditions required for sustaining rangelands for multiple uses. Guidelines point to management actions related to Horse Management Areas for achieving the standards. Guidelines are options that move rangeland conditions toward the multiple use standards. Guidelines are based on science, best rangeland management practices, and public input. Guidelines indicate the types of management methods and practices for achieving the standards for multiple use and are developed for functional watersheds and implemented within Horse Management Areas.

The Mojave/Southern Great Basin Resource Advisory Council recognizes that it may be a long-term process to achieve proper functioning condition(s) on degraded rangelands. Healthy rangelands contribute to healthy herds.

The Resource Advisory Council may be requested by any party to assist in addressing issues related to these standards and guidelines.

**1. Soils**

- Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.

Soil indicators:

- Ground cover (vegetation, litter, rock, bare ground);
- Surfaces (e.g., biological crusts, pavement); and
- Compaction/infiltration.

Riparian soil indicators:

- Stream bank stability.

All of the above indicators are appropriate to the potential of the ecological site.

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### **Guidelines**

- 1.1 Upland management practices should maintain or promote adequate vegetative ground cover to achieve the standards.
- 1.2 Riparian-wetland management practices should maintain or promote sufficient residual vegetation to maintain, improve, or restore functions such as stream flow energy dissipation, sediment capture, groundwater recharge, and streambank stability.
- 1.3 When wild horse and burro herd management practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.
- 1.4 Wild horse and burro herd management practices should address improvement beyond this standard, significant process toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

### **2. Ecosystem Components**

- Watersheds should possess the necessary ecological components to achieve State water quality criteria, maintain ecological processes, and sustain appropriate uses.
- Riparian and wetland vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function).

#### Upland indicators:

- Canopy and ground cover, including litter, live vegetation, biological crust, and rock appropriate to the potential of the ecological site.
- Ecological processes are adequate for the vegetative communities.

#### Riparian indicators:

- Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows.
- Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics:
  - Width/depth ratio;
  - Channel roughness;
  - Sinuosity of stream channel;
  - Bank stability;

- Vegetative cover (among, spacing, life form); and
  - Other cover (large woody debris, rock).
- Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

Water quality indicators:

- Chemical, physical, and biological constituents do not exceed the State water quality Standards.

### **Guidelines**

- 2.1 Management practices should maintain or promote appropriate stream channel morphology and structure consistent with the watershed.
- 2.2 Watershed management practices should maintain, restore, or enhance water quality and flow rate to support desired ecological conditions.
- 2.3 Management practices should maintain or promote the physical and biological conditions necessary for achieving surface characteristics and desired natural plant community.
- 2.4 Wild horse and burro herd management practices will consider both economic and physical environment and will address all multiple uses including, but not limited to, (i) recreation, (ii) minerals, (iii) cultural resources, (iv) wildlife, (v) domestic livestock, (vi) community economics, (vii) Areas of Critical Environmental Concern, and (viii) designated wilderness (iv) and wilderness study areas (WSAs).
- 2.5 New facilities should be located away from riparian and wetland areas if existing facilities conflict with achieving or maintaining riparian and wetland functions. Existing facilities will be used in a way that does not conflict with achieving or maintaining riparian and wetland functions or they will be relocated or modified when necessary to mitigate adverse impacts on riparian and wetland functions.
- 2.6 Subject to all valid existing rights, the design of spring and seep developments shall include provisions to maintain or promote ecological functions and processes.
- 2.7 When proper wild horse and burro herd management is not likely to restore areas of low infiltration or permeability, land management practices may be designed and implemented where appropriate. When setting herd management levels on ephemeral rangeland watersheds, reliable estimates of production for drought conditions should be used to avoid adverse effects on perennial species and ecosystem processes and retain a desired minimum level of annual growth or residue remaining.

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2.8 Wild horse and burro herd management practices should address improvement beyond this standard, significant process toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

### **3. Habitat and Biota**

- Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Habitat indicators:

- Vegetation composition (relative abundance of species);
- Vegetation structure (life forms, cover, height, and age classes);
- Vegetation distribution (patchiness, corridors);
- Vegetation productivity; and
- Vegetation nutritional value.

Wildlife indicators:

- Escape terrain;
- Relative abundance;
- Composition;
- Distribution;
- Nutritional value; and
- Edge-patch snags.

The above indicators shall be applied to the potential of the ecological site.

#### **Guidelines:**

- 3.1 Mosaics of plant and animal communities that foster diverse and productive ecosystems should be maintained or achieved.
- 3.2 Management practices should emphasize native species except when others would serve better for attaining desired communities.
- 3.3 Wild horse and burro herd management should provide for growth, reproduction, and seedling establishment of those plant species needed to reach long-term land use plan objectives. Measurements of ecological conditions, trend, and utilization will be in accordance with techniques identified in the Nevada Rangeland Handbook.
- 3.4 Wild horse and burro herd management practices should be planned and implemented to provide for integrated use by domestic livestock and wildlife.

- 3.5 Wild horse and burro herd management practices will promote the conservation, restoration, and maintenance of habitat for special status species.
- 3.6 Wild horse and burro herd management practices will be designed to protect fragile ecosystems of limited distribution and size that support unique sensitive/endemic species or communities. Where these practices are not successful, herd levels will be reduced or eliminated from these areas.
- 3.7 When wild horse and burro herd management practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.
- 3.8 Vegetation manipulation treatments may be implemented to improve native plant communities, consistent with appropriate land use plans, in areas where identified standards cannot be achieved through wild horse and burro herd management practices alone. Fire is the preferred vegetation manipulation practice on areas historically adapted to fire; treatment of native vegetation with herbicides or through mechanical means will be used only when other management techniques are not effective.
- 3.9 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

#### **4. Wild Horse and Burro Standard**

- Wild horses and burros within Herd Management Areas should be managed for herd viability and sustainability. Herd Management Areas should be managed to maintain a healthy ecological balance among wild horse and/or burro populations, wildlife, livestock, and vegetation.

Herd health indicators:

- General horse and/or burro appearance: Problems are often apparent and can be easily identified by just looking at the herd.
- Crippled or injured horses and/or burros: Excessive injuries can indicate problems.

Herd demographics indicators:

- Size of bands: A band with one stud or jack, one mare or jenny, and one foal indicates a problem. An oversized band also indicates there is a problem. Band sizes of 5 to 10 animals with one dominant stud per band is a good indicator.
- Size of bachelor bands: Large bachelor bands in the immediate vicinity of other bands could indicate potential problems.

## APPENDIX B

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Herd viability indicators:

- Heavy trailing into water sources may indicate a significant problem with forage availability or water distribution. Animals may be travelling considerable distances to obtain water or forage.
- Waiting for water. When available water becomes so scarce that a waiting line develops, horses and burros are in trouble.
- Availability of water. Address legal and/or climatic considerations. Situations exist where wild horse and burros are present only because they currently have access to water, which they could legally be deprived of under Nevada water laws. Situations exist where existing wild horse and burro populations are dependent upon water hauling. If water hauling were to cease, these animals would die within a matter of days.
- Depleted forage near all available water sources. Adequate water, and forage adjacent to water sources, are essential.

### Guidelines:

- 4.1 Wild horse and burro population levels in Horse Management Areas should not exceed appropriate management levels.
- 4.2 Appropriate management levels should be set to reflect the carrying capacity of the land in dry conditions based upon the most limiting factor: living space, water, or forage. Management levels will not conflict with achieving or maintaining standards for soils, ecological components, or diversity of habitat and biota.
- 4.3 Interaction with herds should be minimized. Intrusive gathers should remove sufficient numbers of animals to ensure a period between gathers that reflects national wild horse and burro management strategies. Non-intrusive gathers such as water trapping can be done on an *'as needed'* basis.
- 4.4 Herd Management Plans should be made with the best predictive information available. When emergency actions occur, the Herd Management Plan should be re-evaluated.
- 4.5 Viable sex and age distribution should be a long term goal of any wild horse and burro Herd Management Plan. Sex and age distribution of the herd should be addressed when (after) appropriate management level has been reached.
- 4.6 When wild horse and burro herd management alone is not likely to restore areas, land management practices may be designed and implemented where appropriate.

- 4.7 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

**OFF-HIGHWAY VEHICLE ADMINISTRATION GUIDELINES  
FOR NEVADA PUBLIC LANDS**

The Nevada Northeastern Great Basin Resource Advisory Council, the Sierra Front Northwestern Great Basin Resource Advisory Council and the Mojave/Southern Great Basin Resource Advisory Council, as chartered by the Department of the Interior, have developed Guidelines for the administration of off-highway vehicle use on public lands within the State of Nevada. These guidelines are intended to promote cooperation among user groups, to share resources, and to minimize conflicts in accordance with the Nevada Standards for Rangeland Health. While recognizing the legitimacy and necessity of off-highway vehicle use on public lands, it has become necessary to define guidelines for management of off-highway vehicles to insure the protection of land health and the availability of the public lands for all multiple users. These guidelines are to assist land managers in administrative and planning decisions. Administrators can use the guidelines for managing for land health and making decisions with regard to restricting, or not restricting off-highway vehicle activity. Additionally, administrators can use the educational guidelines as tools to provide training for land managers and to inform the public on off-highway vehicle use issues and ethics. Planners should use these guidelines in developing timely plans for resources and recreation use, while addressing the increasing demand for off-highway vehicle use.

**On-the-ground Management Guidelines**

- Encourage off-highway vehicle use on existing or designated roads and trails, except in closed areas, prior to land use plans being updated and road and trail inventories completed.
- Locate and manage off-highway vehicle use to conserve soil functionality, vegetative cover, and watershed health. Manage off-highway vehicle use to minimize the impact on the land, while maintaining off-highway vehicle access.
- Manage off-highway vehicle use by type, season, intensity, distribution, and/or duration to minimize the impact on plant and animal habitats. If seasonal closures become appropriate to minimize adverse off-highway vehicle impact(s) on public lands resources, managers will strive to preserve public access by designating alternative routes.
- Manage off-highway vehicle activities to conserve watershed and water quality.
- Monitor the impact(s) of off-highway vehicle activities on all public land, water, air and other resources and uses.
- Maintain an inventory of existing road and trail systems.
- Manage off-highway vehicle use to preserve cultural, historical, archeological, and paleontological resources.

- Engineer, locate, and relocate roads and trails to accommodate off-highway vehicle activities while minimizing resource impacts.
- Encourage cooperation in law enforcement among all agencies.
- Off-highway vehicle use pursuant to a permitted activity shall be governed by the terms of the permit.

### **Planning Guidelines**

- In land use plans or plan amendments, designate areas as open, limited, or closed to off-highway vehicle use.
- Address off-highway vehicle management including land use and/or route designations, monitoring and adaptive management strategies, such as applying the Limits of Acceptable Change process, when developing new land use plans or amending existing land use plans. Work closely with local, state, tribal, and other affected parties and other resource users in off-highway vehicle planning.
- Establish and maintain an inventory of existing routes and trails as part of the land use planning process.
- Provide for other resources and uses in off-highway vehicle planning. This includes livestock grazing, other recreational uses, archeological sites, wildlife, horses and burros, and mineral extractions and coordinate with other users of public lands.
- Conduct an assessment of current and future off-highway vehicle demand, and plan for and balance the demand for this use with other multiple uses/users when developing all land use plans.
- Include in land use plans, social/economic effects of off-highway vehicle use, including special recreation events.
- Integrate concepts of habitat connectivity into off-highway vehicle planning to minimize habitat fragmentation.
- For addressing/resolving local site-specific off-highway vehicle issues/concerns, use collaborative planning groups consisting of local representative(s), affected/interested group(s) and agency(s).
- Clearly identify route and area designations.
- Where land health permits develop sustainable off-highway vehicle use areas to meet current and future demands, especially for urban interface.

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### Education Guidelines

- Cooperatively develop/improve public outreach programs to promote trail etiquette, environmental ethics, and responsible-use stewardship ethic.
- Promote/expand/disseminate materials from programs such as (but not limited to) "Tread Lightly!" and "Leave No Trace".
- Provide off-highway vehicle management education and training for managers, staff, partners and volunteers. Training should focus on state of the art practices and be tailored to meet local needs. Encourage communication between agencies, managers, staff, partners and volunteers to share expertise and effective techniques.
- Encourage the private sector, as well as the public sector, to conduct responsible marketing of activities on public lands while avoiding the promotion of products, behaviors and services that are inconsistent with existing regulations and land use plans.
- Develop communication and environmental education plan(s). Assess all situations where off-highway vehicle use may require public information and education. Develop materials and programs appropriate to each situation.
- Utilize high use areas and special events to maximize the dissemination of responsible use education materials and concepts to the public.

**APPENDIX C**  
**STATE AND TRANSITION MODELS**  
**LANDFIRE AND FIRE REGIME CONDITION CLASS**

## **APPENDIX C**

### **STATE AND TRANSITION MODELS, LANDFIRE, AND FIRE REGIME CONDITION CLASS**

A number of plant community models are referred to in this RMP including state and transition models, LANDFIRE biophysical models, and Fire Regime Condition Class. Each is used where appropriate, to provide information and context for vegetation management and interpretation of plant community succession. The ecological site inventory is designed to serve as the basic inventory of present and potential vegetation on BLM rangelands. This procedure is based on Natural Resource Conservation Service soil surveys and ecological site descriptions. The BLM has been using ecological site inventory and ecological site descriptions in its vegetation and range management programs for a longer period of time than the other models mentioned and so a state and transition model is provided as an example.

The following is a generalized explanation of some of the ecological principles involved in State and Transition Pathway Modeling. The presentation of this material is intended to be simplified for ease of communication. For a more in-depth explanation, please see Inventory and Monitoring, Technical Reference 1734-3, USDI-BLM, 2001, Chapter 3 – available at: <http://www.blm.gov/nstc>. Also refer to the National Range and Pasture Handbook of the National Resource Conservation Service.

#### **Different Plants**

Travel anywhere in the planning area and you will see areas that appear to have very different plants. Some plants are green trees, while others are medium sized shrubs (called sagebrush) and still other plant types are grass or forbs (flowers and weeds).

#### **Different Ecological Sites Meet Different Needs**

Different plant types have different needs. The soils of each site hold water and nutrients for plants, and rain and sunlight are also important. That's one reason why different plants are found in different places.

#### **Ecological Sites**

As knowledge and experience have increased, the information, detail, and concepts contained in ecological site descriptions also have changed. Many plant communities did not follow the linear succession models pioneered by Frederic Clements and developed through the first three quarters of the 20<sup>th</sup> century. The state and transition concept was developed to describe and explain observed non-equilibrium succession. In the state and transition concept, several separate and possibly long-duration plant communities may occur at a given ecological site. In between these separate communities are thresholds. As long as a threshold is not crossed, succession can move between plant communities. When a threshold is crossed, extraordinary effort, beyond routine management, must be expended to move the community back to the previous threshold. This new state also may have several plant communities that will occur due to routine management and ecologically normal weather variation and disturbances. An ecological site may have several states and the thresholds between the states are all difficult to reverse. As knowledge of where transitions lie, and values for thresholds and other state and transition relationships increase, the model also will evolve. The state and transition model for Wyoming Big sagebrush in Nevada is included in this appendix.

## **APPENDIX C**

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### **Disturbance and Renewal**

Most often healthy sites have some kind of disturbance (like fire). Fire is a natural and historical disturbance in eastern Nevada. Fire will burn the plants, killing some and renewing others, often making it a younger image (a phase of the previous state) of the plant community before the fire. Then the movement begins all over again.

### **Threshold and Transition**

Sometimes, if the disturbance does not happen to renew the plants on the ecological site, the site itself will cross (transition) a threshold and other plants (better suited to the conditions without disturbance) will become established. The site may look quite different but will have the same soil characteristics. After the threshold is crossed, it is very rare that the site will ever return to its original plant community or state even after disturbance. Keeping the site from crossing a threshold makes disturbance both beneficial and important.

### **All of This Happens in the Planning Area**

All of these things happen in the planning area, different state on ecological sites, different phases in each state, disturbance, renewal, and sometimes without disturbance, thresholds are (have been) crossed and other plants established.

### **Ely Field Office Required to Manage**

The Ely Field Office is required to manage the land in the planning area in a manner that provides for both uses today and good condition for the future. The Ely Field Office recognizes the need for prescribed vegetation management to renew plant communities, so the plants can resist transitions across thresholds.

### **Good Communication Tool**

State and transition models provide a good way for managers and scientists to not only understand what is happening on the landscape, but to communicate that to each other and the owners of the land, the American people.

### **Summary**

State and transition models help managers and scientists to look at an ecological site and tell what state it is in and what phase is within that state. This understanding of ecological sites and their condition gives managers a way to know whether they must act immediately to keep a vegetation state from crossing (transitioning across) a threshold. Or if a site has crossed a threshold, immediate action may not be the best action or the most cost effective alternative. Keep in mind, the Ely Field Office must balance uses today with the future of the resource. In any event, this type of information helps to understand and communicate what is happening on the landscape and to help set priorities for management choices.

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## A GENERALIZED WYOMING BIG SAGEBRUSH STATE AND TRANSITION MODEL AND MANAGEMENT KEY FIRST APPROXIMATION

### INTRODUCTION

During the late twentieth century, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) [Beetle & A. Young] went from a 'weed' to a valuable resource in danger of extirpation in some landscapes. Neither perceiving it to be of no value and only competitive with grasses, nor perceiving it to be so valuable and scarce that we must never control it, serves land managers or the wildlife that depend on this important habitat. During this period, a focus on range condition has shifted to a focus on ecological thresholds, and the information needed to allocate limited financial and other resources to those areas, times, and actions that are most important for maintaining rangeland health.

This publication focuses on land capable of supporting plant communities dominated by Wyoming big sagebrush. This shrub occurs at lower elevations on valley bottoms, alluvial slopes, foothills, and mountain side slopes. It typically inhabits areas too moist for salt desert shrub species and too dry for mountain big sagebrush. While this subspecies is somewhat palatable to sheep and mule deer, it is not as palatable to these animals as black sagebrush (*Artemisia nova* [Nelson]) and it is not palatable to cattle.

This state and transition model and management key generally describes vegetation change and management alternatives for the Natural Resources Conservation Service ecological sites listed in **Table C-1**. However, some areas where these sites occur are better understood by disregarding their potential for transitioning to a tree state because they are far from those sites that generally have juniper (*Juniperus* sp.) and/or pinyon pine (*Pinus monophylla* [Torr. & Frem.]) trees. In general, the potential for transitioning to the tree state is greater for *Wyomingensis* sites that are higher in precipitation or elevation, have deeper soils, or are closer to sites with these characteristics.

For the areas within these sites that this model and management key applies, we discuss two management situations: 1) areas where cheatgrass (*Bromus tectorum* L.) and other invasive weeds (annuals and perennials) are established and becoming, or are already, an important management factor; and 2) areas where natives are the only ecologically important species established in the area or at least they still dominate ecological processes and management concerns.

### MANAGEMENT WITH CHEATGRASS AND OTHER INVASIVE WEEDS

On these landscapes, the presence of annual and/or perennial exotic (largely noxious) and invasive weeds threatens the natural resilience and utility of most if not all Wyoming sagebrush plant communities. These species compete very effectively with native plants. They can transition plant communities to new states (**Figure C-1**) or dominate after certain disturbances without appropriate and timely management action. Their presence is always a hazardous situation. When common, their presence typically results in a transition to a new state because the exotic weeds, not the desired species, determine ecological processes.

**APPENDIX C**

**Table C-1**  
**Wyoming Big Sagebrush Ecological Sites in Nevada**  
**(Natural Resource Conservation Service Ecological Site Descriptions 2003)**

<b>Site Number</b>	<b>Ecological Site Name</b>	<b>Site Number</b>	<b>Ecological Site Name</b>
023XY011NV	Dunes 8-10" P.Z.	026XY099NV	Coarse Loamy 8-10" P.Z.
023XY020NV	Loamy 10-12" P.Z.	026XY100NV	Stony Slope 10-12" P.Z.
023XY030NV	South Slope 8-12" P.Z.	026XY102NV	Gravelly Clay Loam 8-10" P.Z.
023XY033NV	Clayey 10-14" P.Z.	027XY007NV	Loamy Slope 8-10" P.Z.
023XY038NV	Droughty Loam 8-10" P.Z.	027XY008NV	Droughty Loam 8-10" P.Z.
023XY039NV	Loamy Slope 10-14" P.Z.	027XY029NV	Gravelly Fan 8-10" P.Z.
023XY040NV	Granitic Fan 8-10" P.Z.	027XY045NV	Sandy 8-10" P.Z.
023XY049NV	Granitic South Slope 8-12" P.Z.	027XY051NV	South Slope 8-10" P.Z.
023XY051NV	Sandy 8-12" P.Z.	027XY054NV	Loamy Slope 10-12" P.Z.
023XY057NV	Granitic Loam 10-12" P.Z.	027XY058NV	Loamy 10-12" P.Z.
023XY063NV	Shallow Granitic Hill 10-14" P.Z.	027XY065NV	Granitic Slope 8-10" P.Z.
023XY068NV	Granitic Loam 8-10" P.Z.	027XY067NV	Granitic Loam 8-10" P.Z.
023XY071NV	Ashy Loam 10-12" P.Z.	027XY072NV	Granitic Slope 10-12" P.Z.
023XY072NV	Ashy Slope 10-12" P.Z.	027XY088NV	Granitic Loam 10-12" P.Z.
023XY077NV	Shallow Loam 10-14" P.Z.	027XY091NV	Loamy Fan 10-12" P.Z.
023XY082NV	Loamy Fan 10-12" P.Z.	027XY092NV	Granitic Fan 10-12" P.Z.
023XY088NV	Chalky Knoll	028AY005NV	Sandy 8-10" P.Z.
023XY096NV	Ashy Sandy Loam 10-12" P.Z.	028AY010NV	Coarse Gravelly Loam 10-12" P.Z.
023XY097NV	Loamy Fan 8-10" P.Z.	028AY015NV	Loamy 8-10" P.Z.
023XY099NV	Channery Hill 8-10" P.Z.	028AY017NV	Shallow Loam 8-10" P.Z.
023XY101NV	Stony Slope 8-10" P.Z.	028AY022NV	Gravelly Clay 8-10" P.Z.
023XY102NV	Gravelly Clay Slope 10-12" P.Z.	028AY028NV	Droughty Loam 8-10" P.Z.
024XY001NV	Dunes 6-10" P.Z.	028AY031NV	Loamy Fan 8-10" P.Z.
024XY005NV	Loamy 8-10" P.Z.	028AY040NV	Gravelly Loam 10-12" P.Z.
024XY006NV	Dry Floodplain	028AY050NV	Gravelly Clay 10-12" P.Z.
024XY013NV	Loamy 10-12" P.Z.	028AY054NV	Coarse Loamy Fan 8-10" P.Z.
024XY017NV	Sandy 8-10" P.Z.	028AY086NV	Coarse Loamy Fan 10-12" P.Z.
024XY020NV	Droughty Loam 8-10" P.Z.	028AY091NV	Loamy Fan 10-14" P.Z.
024XY026NV	Stony Slope 6-10" P.Z.	028AY095NV	Loamy 10-12" P.Z.
024XY028NV	South Slope 8-12" P.Z.	028AY121NV	Deep Loamy 8-10" P.Z.
024XY033NV	Steep North Slope 10-12" P.Z.	028AY124NV	Loamy Plain
024XY035NV	Shallow Loam 10-14" P.Z.	028BY005NV	Sandy 8-10" P.Z.
024XY045NV	Eroded Slope 6-10" P.Z.	028BY007NV	Loamy 10-12" P.Z.
024XY046NV	Gravelly North Slope	028BY010NV	Loamy 8-10" P.Z.
024XY047NV	Shallow Loam 8-10" P.Z.	028BY014NV	Loamy Plain 8-10" P.Z.
024XY058NV	Sandy Loam 8-10" P.Z.	028BY045NV	Loamy Fan 8-12" P.Z.
025XY013NV	Churning Clay 8-12" P.Z.	028BY052NV	Droughty Loam 8-10" P.Z.
025XY014NV	Loamy 10-12" P.Z.	028BY054NV	Silty Plain 8-10" P.Z.
025XY015NV	South Slope 8-12" P.Z.	028BY056NV	Silt Flat
025XY019NV	Loamy 8-10" P.Z.	028BY068NV	Dune 8-10" P.Z.
025XY021NV	Shallow Loam 8-12" P.Z.	028BY080NV	Shallow Loam 8-10" P.Z.
025XY027NV	Loamy 12-14" P.Z.	028BY082NV	Loamy Fan 12+" P.Z.
025XY045NV	Ashy Loam 8-10" P.Z.	028BY086NV	Gravelly Clay 10-12" P.Z.
025XY066NV	Ashy Loam 10-12" P.Z.	028BY094NV	Calcareous Loam 10-14" P.Z.
025XY070NV	Loamy Fan 8-10" P.Z.	029XY006NV	Loamy 8-10" P.Z.
026XY010NV	Loamy 10-12" P.Z.	029XY010NV	Loamy Slope 8-10" P.Z.

Table C-1 (Continued)

Site Number	Ecological Site Name	Site Number	Ecological Site Name
026XY011NV	South Slope 8-10" P.Z.	029XY029NV	Loamy 10-12" P.Z.
026XY015NV	Shallow Loam 10-12" P.Z.	029XY049NV	Sandy Loam 8-12" P.Z.
026XY016NV	Loamy 8-10" P.Z.	029XY057NV	Loamy Slope 12-14" P.Z.
026XY019NV	Churning Clay 10-12" P.Z.	029XY073NV	Bouldery Loam 8-12" P.Z.
026XY020NV	Sandy 8-10" P.Z.	029XY075NV	Loamy Slope 10-12" P.Z.
026XY022NV	Stony Slope 8-10" P.Z.	029XY105NV	Gravelly Clay 10-12" P.Z.
026XY024NV	Droughty Loam 8-10" P.Z.	029XY106NV	Gravelly Clay Slope 10-12" P.Z.
026XY026NV	Granitic Slope 10-12" P.Z.	029XY114NV	Loamy Fan 8-10" P.Z.
026XY029NV	Eroded Slope 8-12" P.Z.	029XY116NV	Loamy Plain
026XY051NV	Dune 8-10" P.Z.	029XY117NV	Silty Plain
026XY096NV	Sandy Plain	029XY119NV	Silt Flat
026XY098NV	Gravelly Loam 8-10" P.Z.	029XY158NV	Coarse Loamy 8-10" P.Z.

### PERENNIAL HERBACEOUS STATE

**Description:** The plant community is dominated by deep-rooted perennial bunchgrasses, with perennial forbs and varying amounts of Wyoming big sagebrush and other shrubs. Sagebrush can dominate the plant community and juniper and/or pinyon pine trees may be present as seedlings, saplings, or very sparse mature trees as long as the understory remains robust. If the perennial understory is dense and vigorous enough to recover quickly after being released from the competition of woody plants, the vegetation has not crossed a threshold to the shrub or tree state. Descriptions of the ecological sites listed in **Table C-1** provide relative species composition and production data for each ecological site in this perennial herbaceous state. Cheatgrass (or other nonnative annual plants) is a minor component of the understory vegetation.

**Successional trajectories:** The perennial herbaceous state plant community is resilient or cyclic because secondary succession processes and disturbance regimes are functional. Periodic release of the understory perennials from increasing competition from sagebrush is facilitated primarily by fire. However, other causes for widespread shrub die-offs have been noted. Normal fire frequency is approximately 50 to 100 years (Wright and Bailey 1982). Without woody plant removal, the plant community transitions to the shrub state or if trees are present, to the tree state. On drier sites, juniper may increase and on more mesic sites, pinyon may increase. As transition to shrubs or trees occurs, the proportion of cheatgrass in the herbaceous understory increases as perennial herbaceous species decline. Poor grazing management of large domestic and/or wild herbivores can diminish the vigor and expression of palatable perennial herbaceous plants. Removal of deep-rooted species may leave only or primarily sandberg's bluegrass (*Poa secunda* [J.S. Presl.]) or cheatgrass. This makes summer moisture and other resources more available to nonpalatable shrubs and/or trees and accelerates and increases the likelihood of the transition to the shrub, tree, or annual grass fire cycle state.

**Management strategies to maintain the state:** Manage for the vigor, density, and diversity of perennial herbaceous species. Include sagebrush and other woody species in management objectives as desired. However, manage for no more shrub and young tree canopy cover than is appropriate for the site in order to maintain a resilient understory. Management should not allow the plant community to transition across a

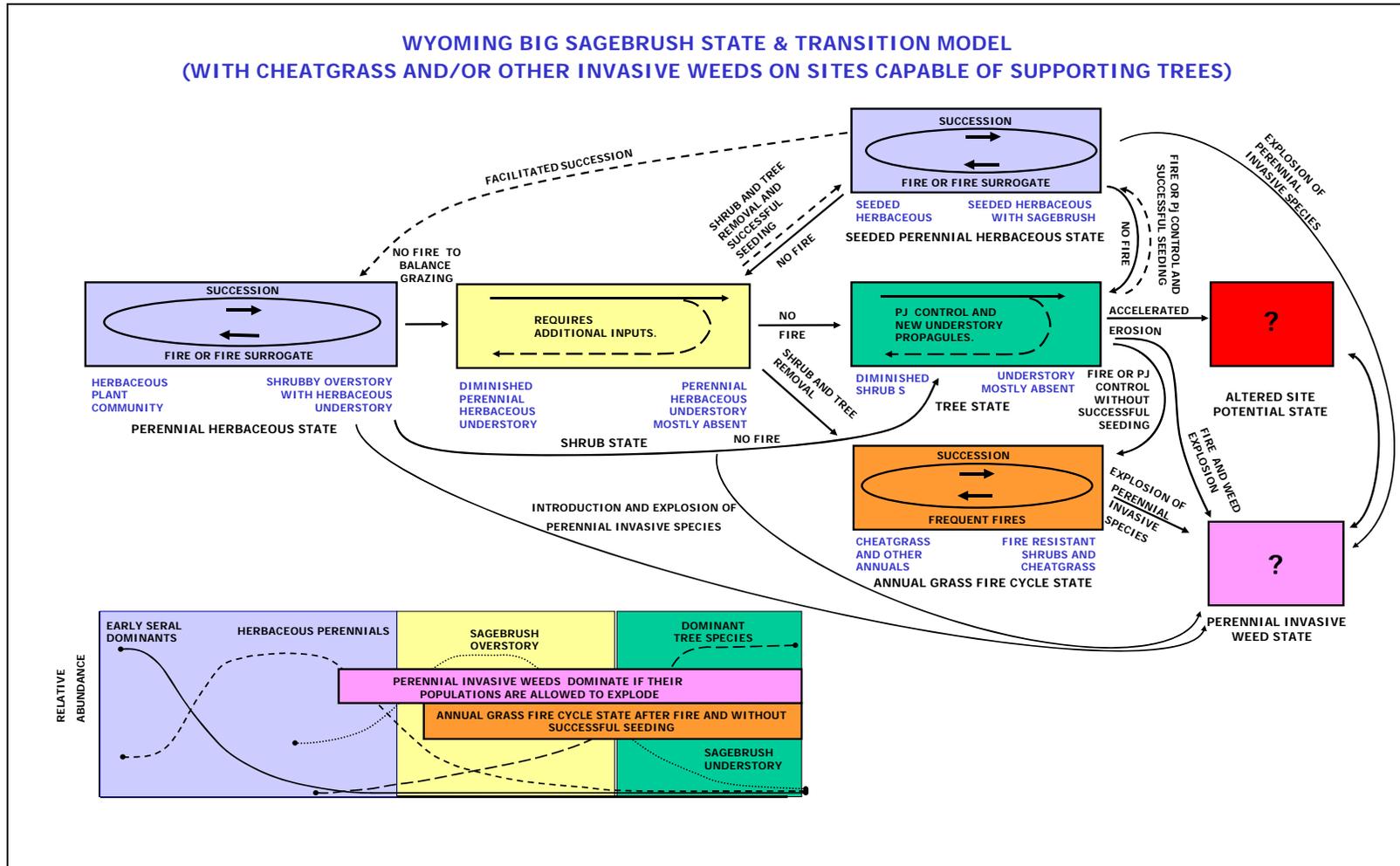


Figure C-1 Each box is shown as a different color to identify that it is a different state. The arrows between boxes are transitions across thresholds. Solid line arrows are irreversible transitions without active restoration of ecological processes, dashed arrows. Inset box shows relative abundance of plant groups and relative sequence of transitions through succession without proactive management.

threshold to the shrub or tree state. To increase the vigor and density of the native perennial herbaceous plants, intervene with mechanical control measures, prescription grazing, herbicides, or very judicious use of prescribed fire. Shrub and young tree control should be practiced as woody plant cover increases. However, caution is advised because cheatgrass can erupt from a seed bank soon after control of woody plants opens niches that a sparse understory cannot rapidly fill. The winter-annual, cheatgrass, outcompetes perennial seedlings in most years on all but the sandiest soils. To minimize bare patches, woody plant management may be needed more frequently than where only native perennial plants occur in the understory. Where soils are erodible, minimize soil surface disturbance. Wherever treatments disturb soil, ensure that adapted perennial plants or seeds are available to compete with cheatgrass given the specific treatment conditions, such as seedbed preparation, grazing regime, etc.

Grazing management should be designed to foster perennial herbaceous species in the community. Excessive or prolonged grazing, especially during the growing season by herb-consuming herbivores, can increase shrubs. Whereas, shrubs can be decreased by relatively intense winter grazing by shrub-consuming herbivores. Supplemental feeding, to concentrate cattle for mechanical damage, controls sagebrush in small patches, especially when the shrubs are dry and brittle. To limit bare ground after future disturbances, grazing and other land or vegetation management actions should not weaken the perennial herbaceous community. Bare ground is more susceptible to accelerated erosion, and invasive plants establish faster in open niches. Management to maintain the perennial herbaceous state (prescribed grazing and periodic control of woody plants) is much more cost effective than management to return to this state once a threshold has been crossed (control of woody plants, weed control, reseeding and temporary rest from grazing).

## **SHRUB STATE**

**Description:** Shrub cover has increased and perennial herbaceous understory cover has decreased across a threshold level. Deep-rooted, perennial bunchgrasses are rare to absent in the understory. The cheatgrass component varies from present to dominant in the herbaceous understory. This state is very susceptible to invasion by annual weeds before and especially after fire or other large scale disturbance. Wyoming big sagebrush and other shrubs dominate the plant community. Juniper and/or pinyon pine trees may be established on the site but do not yet dominate ecological processes.

**Successional trajectories:** Native herbaceous understory is diminished from the perennial herbaceous state levels and may be absent or nearly so when sagebrush cover reaches its maximum for the site. The relative abundance of cheatgrass in the understory increases as perennial grasses decline. Eventually cheatgrass dominates the sparse understory but drives long-term community change for both shrubs and herbaceous species. Because a threshold has been crossed, removal of grazing pressure will not restore the native herbaceous component. This will coincidentally require fire or other shrub control measures. However, burning or other woody plant control measures without reseeding will not return a mix of deep-rooted bunchgrasses and other plants characteristic of the perennial herbaceous state. Return to the perennial herbaceous state requires shrub control, cheatgrass control, reseeding and possibly additional management, depending on site-specific conditions. Thus return to the perennial herbaceous state requires facilitated succession starting with the seeded perennial herbaceous state.

## APPENDIX C

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Fire or other major disturbance will increase the abundance of cheatgrass and other annuals. A decline of big sagebrush in the overstory, coupled with an increase in cheatgrass density indicates a transitional pathway to the annual grass fire cycle state. With increasing cheatgrass fuel loads, the threat of wildfire increases due to better fuel continuity and the much higher flammability of this fine-stemmed, often evenly distributed, early growing and early drying, annual grass. This change in fuel characteristics indicates a transition to the annual grass fire cycle state that is completed by an inevitable fire. Or, if trees are present, fire is delayed, and tree invasion is not controlled, the plant community will transition to the tree state. At the landscape scale, the rate of transition largely depends on the size of the fires, which can be very large (100,000 acres).

**Management strategies:** To maintain the shrub state, or at least sagebrush, prevention of wildfire is critical. Strategies often include creation of green strips or other fuel breaks to keep wild fires small so that all sagebrush habitats are not lost at once. Prescribed grazing may be used to reduce fine and/or woody fuels.

To transition to the seeded perennial herbaceous state, apply shrub and weed control in conjunction with reseeding operations. Shrub control measures could include herbicide, mechanical, or shrub-consuming herbivore treatments or the judicious application of prescribed fire. After wildfire or other shrub removal, reseeding becomes urgent. Seeding is absolutely required before or within the first fall or early winter after shrub control. Thereafter, competition from a rapidly expanding cheatgrass population may prevent seeding success. Reseeding requires cheatgrass control unless a very hot fire removed all but 0 to 3 cheatgrass seeds per square foot. It also requires appropriate seedbed preparation, planting date and follow-up management. Reseeding treatments could include native perennials, grasses, forbs and shrubs and/or adapted nonnative perennial species. Where soil stabilization following wildfire is a priority objective, seeding nonnative perennial grasses having high seedling vigor may be the best option.

Where perennial herbaceous understory is weak and shrub cover is still well below maximum, consider using selective herbicides to manage cheatgrass and adjusting grazing management to restore vigor and density of desirable understory species several growing seasons prior to controlling shrubs. Investigate the feasibility of facilitated succession, seeding initially with adapted nonnative grasses and later inter-seeding with adapted native herbaceous and/or shrub species.

### SEEDED PERENNIAL HERBACEOUS STATE

**Description:** The choice of species in the seed mix, species in the pre-existing seed bank, and the growing conditions in the first few years after the seeding largely determine the species composition of the seeding. On many Wyoming big sagebrush sites, not very many species will predictably do well. Even for crested wheatgrass (*Agropyron cristatum* L. Gaertner), the most commonly seeded and most dependable species, moisture following seedings is sometimes insufficient, especially in the driest sites with the greatest soil limitations. Because perennial bunchgrasses provide a clumped fuel composed of coarser stems that stay green longer than cheatgrass, they depress fire spread rates and the fire interval is generally long enough to allow sagebrush to become well established unless seeding design or management keeps it out. Although

functionally quite similar to the perennial herbaceous state, the seeded perennial herbaceous state is shown as a separate state because there is always a loss of genetic diversity once seeding is required.

**Successional trajectories:** Seedlings often begin with expression of early seral species present in the seed bank such as annual forbs. As perennials and shrubs become better established, they typically exclude or severely diminish all but the most aggressive of these early seral species or limit them to small disturbed areas. If sagebrush was initially established by seeding or from seeds left in safe sites, it structurally dominates a seeding more quickly. If not, recruitment occurs from the edges or from unburned or untreated shrub islands. Other species move in depending on the mechanisms of their seed dispersal and their success in finding favorable microsites, or on treatments designed to facilitate succession.

**Management strategies:** Seeding size, shape or amount of edge and orientation with respect to prevailing winds, as well as fire management strategies to leave shrub islands or create a mosaic, can influence the process of sagebrush re-establishment. During and after seeding establishment, livestock grazing can be used to encourage niches for sagebrush and other species that may be present. Conversely, grazing can be discouraged or managed conservatively to favor only those species more palatable to livestock. Once the seeding has been used to avoid the transition to an annual grass fire cycle state, management and additional seeding can be used to facilitate succession toward various species compositions. Natives can be interseeded but often do not compete well with the initially seeded species unless steps like soil disturbance are used to open new niches. Often the focus for management is simply maintaining the seeding. This requires maintenance of ecological processes and therefore keeping the seeding from becoming so dominated by shrubs or weeds that the seeded understory becomes unable to survive a fire or otherwise thrive. Management strategies described for the perennial herbaceous state also apply to the seeded perennial herbaceous state. However, specifics of grazing management may differ according to the needs of the seeded species.

## **TREE STATE**

**Description:** Juniper and/or pinyon pine has established on a site and has caused a decline in understory (herbaceous and shrub) cover and production due to extended fire return interval. Although trees generally establish under shrub canopies, they can invade the perennial herbaceous, seeded perennial herbaceous, and shrub states. The trees have assumed ecological dominance, driving future ecological processes. Understory (herbaceous and/or sagebrush) has decreased across a threshold level defined by its lack of resilience to a tree-removing disturbance. Tree biomass now dominates the plant community, with leaf and fuel biomass as much as seven to eleven times the levels of perennial herbaceous or shrub states. However, tree cover is highly concentrated, often leaving large bare interspaces that are susceptible to rill erosion, especially on drier sites. Cheatgrass is present and often dominates the understory as trees mature. Although live cheatgrass density and vigor may be lower in the tree state than in other states, its seed bank is often large.

**Successional trajectories:** Herbaceous and/or shrub understory diminished from previous state levels to almost absent where trees are mature and the site fully stocked. Shrub cover declines to approximately 20 to 25 percent of potential when tree cover approaches 50 percent of maximum potential for the site

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(Tausch and West 1995; Miller et al. 2000). During this process a ten percent increase in tree cover can result in a fifty percent decline in understory production. The degree of resilience of the understory is determined in part by the tree-removing disturbance. A very hot wildfire may remove remaining herbaceous species and their seed reserves (indicating the threshold to the tree state has been crossed) while a more gentle form of tree removal may release these species from the tree competition (indicating that the threshold had not yet been crossed). Once one or more thresholds have been crossed in getting to the tree state, return to the perennial herbaceous state requires going to the seeded perennial herbaceous state first. This requires shrub and/or tree control, reseeding, and generally other management actions such as weed control. Cheatgrass is present and its proportion in the understory tends to increase as native understory species decline. If the native perennial understory is absent or sparse, fire or other tree control measures alone will not increase most herbaceous/shrub understory species of the perennial herbaceous state. Rather the cheatgrass seed bank will increase cheatgrass abundance after the release from tree competition and transition of the site to the annual grass fire cycle state. Major soil erosion events from severe wind after large and/or hot fires, or from major precipitation events on moderate or steeper slopes, can trigger a transition to an altered site potential state. Mature tree stands may increase this risk by allowing rills to form in large bare interspaces.

**Management strategies:** To manage this state for continued tree production, protection from fire is essential. However, as trees grow, fuel accumulates and tree canopies grow closer to each other. This increases the likelihood of a catastrophic fire spreading across the landscape. Thinning a stand reduces fuel loads. However, larger bare interspaces increase erosion hazard. Continued net fuel production on this type often increases the risk of fires in neighboring woodland types including areas where trees are very old because fire was historically rare or involved only single trees. Management plans designed to break up the landscape scale continuity of fuels with firebreaks, greenstrips, or imposed differences in vegetation structure serve to reduce the risk of large fires that leave watersheds barren. Applying tree control and rehabilitation treatments in smaller patches increases the likelihood of fires creating a diverse mosaic of habitats. This reduces the cost of future fire fighting, increases the opportunity for fire use, and increases sustainability for ecological processes.

To transition to the seeded perennial herbaceous state, apply tree and weed control and seed adapted perennials. After successfully attaining the seeded perennial herbaceous state, facilitated succession can return the site to the perennial herbaceous state. Tree control measures could include prescribed fire, herbicide, or mechanical treatments. Restoration requires the use of site-adapted grass, forb, and shrub species and methods. If site stabilization is a priority objective, nonnative perennial herbaceous species may be the best option for revegetation. Rehabilitation is required in the fall or early winter immediately following tree removal.

### ANNUAL GRASS FIRE CYCLE STATE

**Description:** Cheatgrass and/or other annual grasses and forbs (e.g., mustards) dominate the herbaceous community. Most perennial herbaceous species cannot compete with the dense population of cheatgrass and are absent or nearly so. Fire intervals often shorten to 2 to 10 years. Sagebrush is generally unable to

survive and reproduce with this fire frequency. Sprouting, fire-tolerant shrubs may form a shrub overstory where fires are too frequent for sagebrush but infrequent enough to support non-palatable sprouting shrubs.

**Successional trajectories:** This plant community is functionally an annual grassland. Cheatgrass initially dominates the site following wildfire. Sprouting, fire-tolerant shrubs are the only woody plants and these shrubs may eventually dominate the visual aspects of the area if fires do not return too frequently. Cheatgrass and annual forbs become the dominant vegetation after repeated frequent fires. Poor grazing management can shift species composition toward less palatable species and decrease soil cover, thereby increasing erosion hazard. Thus, the level of risk has increased for the community to transition to a perennial invasive weed state. If perennial invasive species such as knapweeds (*Centaurea* sp.) are introduced to the system, the plant community could rapidly become dominated by these species, marking a transition to the perennial invasive weed state. This makes rehabilitation to a seeded perennial herbaceous state more difficult, even with extensive and intensive inputs. Fires export nitrogen and frequent fires may shift the plant community toward undesired species tolerant of low-nitrogen soils. Repeated fires expose soil to erosion more often. During severe hydrologic or wind events this may facilitate transition to the altered site potential state.

**Management strategies:** To manage this state for continual annual grass production, apply proper grazing for annual grassland. Leave sufficient residue for seed production and soil protection while consuming sufficient fuel to reduce fire risk. This can be challenging due to highly variable production among wet and dry years. In the wettest years, grazing may consume the abundant forage in only some pastures or use areas, or in fuel breaks. In the driest years forage may be essentially absent. To transition to the perennial herbaceous state, cheatgrass control and reseeding operations are required. Mechanical, chemical, or herbivory treatments can reduce cheatgrass seed. If fire intolerant shrubs like sagebrush are included in the seed mix, a fuel management strategy must be employed to reduce fire danger to newly established species. Prescription grazing and green stripping can be used across a landscape to reduce fuel loads and fire size (reducing fire frequency). Establishment of seeded perennial herbaceous species (such as bunchgrasses) also will reduce fuel continuity, potentially reducing the rate of fire spread and size of fires.

#### **PERENNIAL INVASIVE WEED STATE**

**Description:** One or more of the weeds that are on the state noxious or invasive weed lists, or a new invasive weed, dominates the herbaceous vegetation, competitively excluding the native perennial herbaceous dominants. Such weeds may burn readily and typically exclude sagebrush and/or pinyon and juniper trees. Their competitive advantage in an environment without diseases, insects, etc., from their ancestral home allows them to displace most other plants to form virtual monocultures. Initial weeds may facilitate the establishment of even more competitive invasive weeds.

**Successional trajectories:** The risk of transitioning to the perennial invasive weed state increases after transition to the Shrub, Tree, Annual Grassland Fire Cycle, and the Altered Site Potential states. Risk increases as soon as invasive perennial plants, such as one of several knapweed species, begin to colonize an area; unless they are eradicated immediately upon discovery. Otherwise, initial colonization generally expands toward a monoculture. Experience in other parts of the western U.S. demonstrates the highly

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competitive nature of some invasive weeds. However, which species will be most competitive on each ecological site, state, or phase is still unknown. As initial infestations change species composition and/or soil characteristics and site potential, other weeds will likely become more competitive, causing instability in species composition. Many invasive weeds are competitive, but do not effectively protect soil from erosion or they are highly flammable, leading to unprotected soils after frequent fires. These increase the risk of transitioning to the Altered Site Potential state.

**Management strategies:** Invasive plant colonies should be eradicated immediately upon discovery. Once invasive weeds dominate a site, the expense of weed control, follow-up control, and revegetation treatments generally exceed on-site economic returns. However, these management strategies are justified to quarantine weeds in one area, reducing spread potentials. Herbicides and/or hand grubbing should be used to eradicate small populations. Where eradication is no longer possible, mechanical, chemical, and/or biological controls such as insects or prescribed grazing should be used to control/confine infestations. Weed control areas will require reseeding with the most competitive of adapted (native or nonnative) desired species and careful post-seeding grazing management to reduce the risk and consequences of reinvasion. They may also require periodic treatment for residual weeds. For whole landscapes dominated by noxious weeds, there may be little option other than biological control. Yet biological controls are not available for many weed species.

To accomplish the vegetation management objectives suggested for this state and transition model, care should be taken to avoid facilitating the spread of invasive weeds. Expansions to the road network and soil disturbances increase bare areas where invasive weeds can more easily establish. Virtually every invasive weed population is first a roadside weed before its population explodes. Many weed infestations begin in areas disturbed by machines, and some of these are for vegetation management purposes. To prevent weed infestations from spreading, it is important to routinely scout for new invasive weeds, especially in areas likely to be initially colonized (roadsides, waters, riparian areas, turnout areas, corrals, utility corridors, borrow pits, etc.). Also, remove/alter stresses that can aid expansion from an affected area.

### ALTERED SITE POTENTIAL STATE

**Description:** Accelerated erosion has resulted in loss of topsoil, altered hydrologic characteristics (i.e., reduced infiltration and increased runoff), and lowered water and nutrient storage capacity. These changes to the growing environment have resulted in an altered ecological potential for the site. For example, a Wyoming big sagebrush site may become a shadscale (*Atriplex confertifolia* [Torr. & Frem.]) site. Lowered site potential means lowered vegetation production, less soil protection, and increased soil loss until a new equilibrium is reached.

**Successional trajectories:** The risk of transitioning to the altered site potential state increases after transitioning to the shrub, tree, annual grass fire cycle or perennial invasive weed states. The new site potential and the array of possible plant species and successional trajectories greatly depend on the soil remaining as the rate of soil erosion stabilizes. For very shallow soils, plants survive by tolerating extended periods without available soil moisture or by sending roots deep into rock fissures. Cheatgrass, a winter annual, survives drought as seeds that do not germinate in some years and by developing seed early. On

sites where the topsoil has been eroded away, clayey subsoil becomes exposed at the surface. Roots must penetrate the heavy clay and tolerate any shrinking and swelling of the clayey soil during germination. Then the plants must be able to persist with less soil moisture than available within an intact, non-eroded soil. Clayey sites are susceptible to invasion by medusahead rye (*Taeniatherum caput-medusa* [L. Nevski]).

**Management strategies:** Because topsoil or even subsoil has been lost, return of the native perennial herbs and shrubs characteristic of the perennial herbaceous state depends on soil forming processes that are slow under most conditions. The area should now be managed under the guidance provided by the state and transition model and ecological site description for the new ecological site if available. It is expected that the species composition and limited productivity of the vegetation established on the altered site will have a low resiliency and minimal utility.

### **NATIVES ONLY**

In these plant communities and landscapes, exotic plants are not usually present. Only plant species native to the Great Basin are important in ecological processes and management. If present, exotics reflect a disturbance of vegetation that has left an open niche that can easily be filled through recovery of native vegetation. Any exotics present are not strongly competitive with native vegetation. This general model (**Figure C-2**) may describe historic ecological processes and is still relevant in some areas.

### **PERENNIAL HERBACEOUS STATE**

**Description:** The plant community is dominated by deep-rooted perennial bunchgrasses, perennial forbs, and varying amounts of Wyoming big sagebrush. Sagebrush can dominate the plant community and juniper and/or pinyon pine trees may be present as seedlings, saplings, or very sparse mature trees, as long as the understory remains robust. If the perennial understory is dense and vigorous enough to recover after being released from the competition of woody plants, the vegetation has not crossed a threshold to the shrub or tree state. Descriptions of the ecological sites listed in **Table C-1** provide relative species composition and production data for each ecological site in this perennial herbaceous state.

**Successional trajectories:** Plant community is resilient or cyclic because secondary succession processes and disturbance regimes are functional. Life-form dominance (species composition) is controlled primarily by fire, although aroga moth, or other phenomena can also thin or kill patches of Wyoming big sagebrush. Normal fire frequency is approximately 50 to 100 years (Wright and Bailey 1982). Without periodic woody plant removal, a plant community will transition toward the shrub state or if trees are adjacent to the site, to the tree state. On drier sites, juniper may increase and on more mesic sites, pinyon may increase. Following wildfire sprouting shrubs may dominate but will be gradually replaced by perennial bunchgrasses and sagebrush. If the area is devoid of big sagebrush, it could be restored through time with seeds from surrounding areas and it could be re-established more quickly with seeding and without the need for vegetation control. Poor grazing management of large domestic and/or wild herbivores can diminish the vigor and expression of deep-rooted perennial herbaceous plants leaving primarily sandberg's bluegrass. This makes soil moisture and other site resources more available to competitive shrubs and/or trees and accelerates and increases the likelihood of the transition to the shrub, or tree state. If the perennial

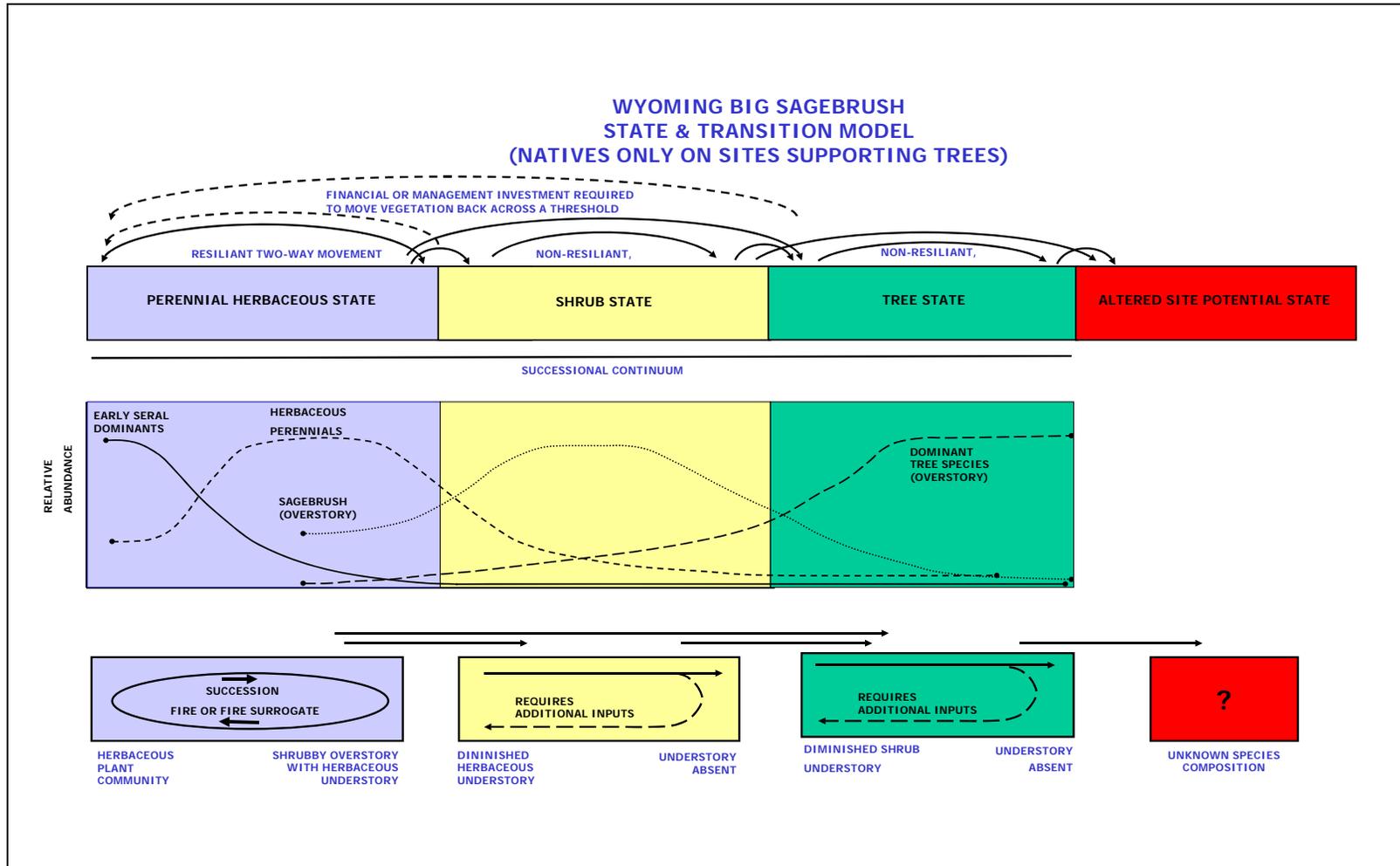


Figure C-2 Each box is shown as a different color to identify that it is a different state. The arrows between boxes are transitions across thresholds. Solid line arrows are irreversible transitions without active restoration of ecological processes, dashed arrows. Middle box shows relative abundance of plant groups and relative sequence of transitions through succession without proactive management.

understory is too sparse or weak to recover quickly after being released by fire or other major disturbance, the vegetation has crossed a threshold to the shrub or tree state. Large fires that remove sagebrush by leaving no islands and/or repeated fires that remove succeeding generations before their reproductive age (about five years) may create large landscape areas with few or no sagebrush plants for extended periods.

**Management strategies:** To maintain the state, limit over-development of shrub or tree cover to what is appropriate for a resilient herbaceous understory on the site. Intervene with prescribed fire, herbicide, mechanical control measures, or prescription grazing. Grazing can be managed to reduce stress to palatable species, especially during the growing season, which slows the advance of woody species. Grazing also can be used to accelerate the process of sagebrush recolonization after a fire. Shrub decrease can be fostered by relatively intense winter grazing by shrub-consuming herbivores. Concentration of livestock at feeding sites can reduce shrub density through mechanical damage to sagebrush, especially when these shrubs are frozen or dry and brittle. Grazing prescriptions should strive to maintain the vigor of the herbaceous community. Management to maintain the perennial herbaceous state is often much more cost effective than management to return to this state once a threshold has been crossed.

## **SHRUB STATE**

**Description:** Herbaceous understory cover has decreased below a threshold level. Shrub cover has, or will soon, increase above a threshold level. Wyoming big sagebrush and/or unpalatable sprouting shrubs dominate the plant community. Spiny hop sage and other palatable shrubs are usually absent or rare in the shrub state. Perennial understory vegetation, especially deep-rooted bunchgrasses, is not capable of recovery after fire.

**Successional trajectories:** Native herbaceous understory declines substantially from perennial herbaceous state levels and trends toward absence when sagebrush cover reaches its maximum. If trees are present and not controlled, a plant community will transition to tree state. Because a threshold has been crossed, transition to the seeded perennial herbaceous state requires fire or other shrub control measures, reseeding operations, and follow-up management. Removal of grazing pressure alone may not restore the native herbaceous understory characteristic of the perennial herbaceous state or reduce shrub abundance. Burning or other shrub or tree control measures alone will not return the mix of deep-rooted bunchgrasses and other perennial herbaceous plants largely because the seed bank and seed source has been depleted. Woody plant removal will release fire-adapted shrubs and create open areas for early seral species, sagebrush, and invasive species, and/or accelerate erosion.

**Management strategies:** To maintain sagebrush stands, prevent wildfires but control junipers and/or pinyon pines as needed. To transition to the seeded perennial herbaceous state, apply shrub control measures in conjunction with reseeding. Shrub control measures could include prescribed fire, herbicide, mechanical, or shrub consuming herbivores. Because one or more thresholds have been crossed, reseeding is essential after wildfire. Reseeding, with appropriate seedbed preparation, planting date, and other methods should include a mix of adapted desired (native or nonnative) grass, forb, and shrub species. Where perennial herbaceous understory is weak and shrub cover is still well below maximum, investigate the feasibility of reseeding or adjusting grazing management to improve the vigor and density of desirable

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species in the understory several growing seasons prior to controlling shrubs. The goal of re-establishing a desired herbaceous component may require a multi-step approach through many years or decades.

### TREE STATE

**Description:** Juniper and/or pinyon pine has established on the area due to extended fire return interval. Although trees generally establish under shrub canopies, they can invade both the perennial herbaceous and shrub states. The understory (herbaceous and shrub) has decreased below a threshold level because tree cover has increased above a threshold level. Trees dominate the plant community, with leaf biomass and fuel buildup often 7 to 11 times the level of the perennial herbaceous or shrub states. However, canopy cover is concentrated, leaving large bare interspaces where rills can erode soil. The depleted perennial understory can no longer respond to fire or other tree-removing disturbances because seed banks and seed sources have been depleted.

**Successional trajectories:** The perennial herbaceous and/or shrub understory declines from previous state levels to almost absent as trees attain their mature height at normal density. Shrub cover declines to approximately 20 to 25 percent of potential when tree cover approaches 50 percent of maximum potential for the site (Tausch and West 1995; Miller et al. 2000). Each 1 percent increase in tree cover can lead to approximately a 5 percent decline in understory production. Post fire vegetation is dominated by early seral species and the limited number of species that survived tree dominance and fire or other tree removal. Because one or more thresholds have been crossed, transition to the seeded perennial herbaceous state requires shrub and/or tree control and reseeding. If native perennial understory is absent, fire or other tree control measures alone will not increase most herbaceous/shrub understory species to levels found in the perennial herbaceous state. Removing the trees will create open areas susceptible to invasive species, sagebrush and fire-tolerant shrubs and/or accelerated erosion. After large and/or hot fires, major soil erosion from severe wind or major precipitation events on moderate or steeper slopes, can trigger a transition to an altered site potential state. Accelerated soil erosion can also occur in large bare interspaces where rills can develop and erode soil quickly. This is more common on arid sites.

**Management strategies:** To manage this state for continued tree production, protection from fire is essential. However, as trees grow, fuel accumulates and tree canopies grow closer to each other, increasing the likelihood of a hot crown fire spreading across the landscape. Thinning to reduce crown cover, fuel load, and fuel connectivity, is critical to long-term maintenance of a woodland plant community. Continued net fuel production on this type often increases the risk of fires in neighboring woodland types including areas where trees are much older because fire was historically infrequent or lightning strikes caused only single-tree fires. Management plans should be designed to break up the landscape scale continuity of fuels with firebreaks, greenstrips, or imposed differences in vegetation structure.

To transition to the seeded perennial herbaceous state, apply tree control measures in conjunction with reseeding. Tree control measures could include prescribed fire, herbicide, or mechanical treatments. Reseeding should include adapted grass, forb, and shrub species and appropriate seedbed preparation, planting date, and follow-up grazing management and weed control where needed. Because one or more thresholds have been crossed, reseeding is essential after wildfire.

## ALTERED SITE POTENTIAL STATE

**Description:** Accelerated erosion has thinned or eliminated the topsoil, altered hydrologic characteristics, and lowered water and nutrient holding capacity. These changes alter the ecological potential of the site. Thereafter, reduced vegetation cover and infiltration rate cause increased erosion that continues to diminish site potential until a new equilibrium is established.

**Successional trajectories:** The new site potential, the possible plant species for revegetation, and subsequent successional trajectories greatly depend on the soil remaining. For very shallow soils, plants survive by tolerating extended periods without available soil moisture or by sending roots deep into rock fissures. On sites where clayey subsoil becomes exposed at the surface after topsoil has been eroded away, roots must tolerate any shrink-swell characteristics of a clayey soil during germination. Their roots must be able to penetrate a heavy soil and they must be able to persist with less available soil moisture than within the intact non-eroded soil.

**Management strategies:** Because topsoil or even subsoil has been lost, return of the native perennial herbs and shrubs characteristic of the perennial herbaceous state depends on soil forming processes that are very slow under most conditions. The area should now be managed under the guidance provided by the state and transition model and ecological site description most similar to the altered site. It is expected that the species composition and limited productivity of the vegetation established on the altered site will have low resilience and minimal utility.

## CONCLUSION

This state and transition model and management key is designed to help managers recognize opportunities to influence vegetation in a positive manner. It can be used for analysis at the site-specific or the landscape scale. Management opportunities are identified by determining the state and successional trajectory by examining the vegetation. Pathways toward thresholds indicate a need for action to prevent a transition to an unwanted state. Thus, the model and management key helps set short-term or long-term management objectives. Usually these objectives call for restoring resilience by encouraging natural processes. Management actions are less risky, less expensive, and more satisfying when or where important biological diversity remains and before difficult species, dangerous fuels, or accelerated soil erosion dominate ecological processes. That is, before crossing a threshold.

Across a landscape, the model helps focus attention on the highest priorities, those areas where an important management action or change has become urgent. Across most landscapes, there are hot spots where site specific management is urgently needed. There are other areas where the vegetation will remain resilient into the future and areas where the threshold has been crossed. Once the threshold is crossed and one state has transitioned into another, much resilience has been lost and the cost for vegetation treatments escalates. Management action may no longer be urgent or economically justified unless the new state puts neighboring areas at risk with invasive weed seeds or accumulating fuels.

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In general the risk of losing the perennial herbaceous state is the highest priority. This state cycles among a variety of native plant communities to which many wildlife and other species have adapted, including the many sagebrush-dependent species. In addition, many other resource values are produced in one or more of the seral phases of this state. Its natural resistance to transitioning across a threshold due to its resilience following natural disturbances, makes this state a low-cost management objective. However, after the introduction of exotic invasive weeds and a century of altered fire regimes, this state is often at risk. Its increasing scarcity, and the presence of invasive weeds that can more easily dominate after transitioning to the shrub state, elevates its value and its priority for management. Where it no longer remains, the seeded perennial herbaceous state is its closest alternative.

Management does not equal preservation without disturbance. This state is maintained by periodic disturbance. The focus of land management in the Wyoming sagebrush type is to use management tools to simulate natural disturbances at the right times and with the right combination of other actions.

## **LANDFIRE AND FIRE REGIME CONDITION CLASS**

LANDFIRE is a 5-year, multi-partner wildland fire, ecosystem, and wildland fuel mapping project that will generate consistent, comprehensive maps and data describing vegetation, fire, and fuel characteristics across the United States. These maps can assist in prioritizing and planning hazardous fuel reduction and ecosystem restoration efforts. The consistent and comprehensive nature of LANDFIRE methods ensures that data will be nationally relevant, while the 30-meter grid resolution ensures that data can be locally applicable. LANDFIRE meets agency, partner, and stakeholder needs for data to support landscape fire management planning, prioritization of fuel treatments, collaboration, community and firefighter protection, and effective resource allocation.

The objective of LANDFIRE is to provide consistent, nationwide data describing wildland fuel, existing vegetation composition and structure, historical vegetation conditions, and historical fire regimes to:

- Identify areas at risk due to accumulation of hazardous fuel
- Prioritize hazardous fuel reduction projects
- Improve coordination between agencies with regard to fire and other resource management
- Model real-time fire behavior to support tactical decisions to ensure sufficient wildland firefighting capacity and safety
- Model potential fire behavior and effects to strategically plan projects for hazardous fuel reduction and the restoration of ecosystem integrity on fire-adapted landscapes

Further information on LANDFIRE can be found at [www.landfire.gov](http://www.landfire.gov).

Fire Regime Condition Class is a standardized, interagency tool for determining the degree to which current landscape conditions have departed from historical reference condition vegetation, fuel, and disturbance regimes. Assessing Fire Regime Condition Class can help guide management objectives and assist in setting priorities for hazardous fuel treatments and ecological restoration.

Information on Fire Regime Condition Class can be found at [www.frcc.org](http://www.frcc.org). An expanded definition for Fire Regime Condition Class is also included below.

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### FIRE REGIME CONDITION CLASS DEFINITION

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

I – 0 to 35 year frequency and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced);

II – 0 to 35 year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);

III – 35 to 100+ year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced);

IV – 35 to 100+ year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced); and

V – 200+ year frequency and high (stand replacement) severity.

As scale of application becomes finer, these five classes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained.

A fire regime condition class is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale fire regime condition classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and diseased mortality, grazing, and drought). There are no wildland vegetation and fuel conditions or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (fire regime condition class I), moderate (fire regime condition class II), and high (fire regime condition class III) departure from the central tendency of the natural (historical) regime (Hann and Bunnell 2001), Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural

disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historic) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g., weeds, insects, and diseases), “high graded” forest composition and structure (e.g., large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity, and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class. A simplified description of the fire regime condition classes and associated potential risks follow.

Fire Regime Condition Class	Description	Potential Risks
Condition Class I	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances	<p>Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics.</p> <p>Composition and structure of vegetation and fuels are similar to the natural (historical) regime.</p> <p>Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) are low.</p>
Condition Class II	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances.	<p>Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are moderately altered.</p> <p>Uncharacteristic conditions range from low to moderate.</p> <p>Risk of loss of key ecosystem components are moderate.</p>
Condition Class III	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances.	<p>Fire behavior, effects, and other associated disturbances are highly departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are highly altered.</p> <p>Uncharacteristic conditions range from moderate to high.</p> <p>Risk of loss of key ecosystem components are high.</p>

More detailed descriptions of the fire regime condition classes and associated attributes are provided in the following table.

Examples of Key Ecosystem Component Susceptibility to Changing Fire Regime Condition Classes						
Condition Class	Fire Regime	Example Management Options	Species Composition and Structure	Invasion by Nonnative Species	Smoke Production Hydrology and Soils	Insects and Disease
Condition Class I	Fire regimes are within the natural (historical) range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition, structure, and pattern) are intact and functioning within the natural (historical) range.	Where appropriate, these areas can be maintained within the natural (historical) fire regime by treatments such as fire use.	Species composition and structure are functioning within their natural (historical) range at both patch and landscape scales.	Nonnative species are currently not present or present in limited extent. Through time or following disturbance, sites are potentially vulnerable to invasion by nonnative species.	Functioning within their natural (historical) range.	Insect and disease populations functioning within their natural (historical) range.
Condition Class II	Fire regimes have been moderately altered from their natural (historical) range. Risk of losing key ecosystem components is moderate. Fire frequencies have departed from natural frequencies by one or more return intervals (either increased or decreased). This result in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation and fuel attributes have been moderately altered from their natural (historical) range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to natural fire regime.	Species composition and structure have been moderately altered from their historical range at patch and landscape scales. For example: <u>Grasslands</u> – Moderate encroachment of shrubs and trees and/or invasive exotic species. <u>Shrublands</u> – Moderate encroachment of trees, increased shrubs, or invasive exotic species. <u>Forestland/Woodland</u> – Moderate increases in density, encroachment of shade tolerant tree species, or moderate loss of shade tolerant tree species caused by fire exclusion, logging, or exotic insects or disease. Replacement of surface shrub/grass with woody fuels and litter.	Populations of nonnative invasive species may have increased, thereby increasing the potential risk for these populations to expand following disturbances, such as wildfires.	Have been moderately altered from their natural (historical) range. Water flow typically less. Smoke and soil erosion following fire typically greater.	Insect and disease population have been moderately altered from their natural (historical) range. Typically higher mortality or defoliation.
Condition Class III	Fire regimes have been substantially altered from their natural (historical) range. The risk of losing key ecosystem components is high. Fire frequencies have departed from natural frequencies by multiple return intervals. Dramatic changes occur to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been substantially altered from their natural (historical) range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the natural fire regime.	Species composition and structure have been substantially altered from their historical range at patch and landscape scales. For example: <u>Grasslands</u> – High encroachment and establishment of shrubs, trees, or invasive exotic species. <u>Shrublands</u> – High encroachment and establishment of trees, increased shrubs, or invasive exotic species. <u>Forestland/Woodland</u> – High increases in density, encroachment of shade tolerant tree species, or high loss of shade tolerant tree species caused by fire exclusion, logging, or exotic insects or disease.	Invasive species may be common and, in some cases, the dominant species on the landscape. Any disturbance will likely increase both the dominance and geographic extent of these invasive species.	Have been substantially altered from their historical range.	Insect and disease population have been substantially altered from their natural (historical) range. Typically higher mortality or defoliation.

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**APPENDIX D**  
**AREAS OF CRITICAL ENVIRONMENTAL CONCERN**

## **APPENDIX D AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACECs)**

The ACEC designation is an administrative designation used by the BLM that is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The Federal Land Policy and Management Act states that the BLM will give priority to the designation and protection of ACECs in the development and revision of land use plans.

BLM regulations (43 Code of Federal Regulations part 1610) define an ACEC as an area “within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.” Private lands and lands administered by other agencies are not included in the boundaries of ACECs. ACECs differ from other special management designations such as wilderness study areas in that designation by itself does not automatically prohibit or restrict other uses in the area (with the exception that wind energy is prohibited and a mining plan of operation is required for any proposed mining activity within a designated ACEC). Specific management direction will be provided in the proposed plan, however, in order to be designated, special management beyond standard provisions established by the plan must be required to protect the relevant and important values.

### **RELEVANCE AND IMPORTANCE CRITERIA**

#### **Relevance**

An area meets the relevance criteria if it contains one or more of the following:

- A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to American Indians).
- A fish and wildlife resource (including but not limited to habitat for threatened, endangered, or sensitive species, or habitat essential for maintaining species diversity).
- A natural process or system (including but not limited to threatened, endangered, or sensitive plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geological features).
- Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the RMP process that it has become part of a natural process.

#### **Importance**

The value, resource, system, process, or hazard described in the relevance section must have substantial significance and values to meet the importance criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

- Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
- Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.

## APPENDIX D

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- Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of Federal Land Policy and Management Act.
- Has qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare.
- Poses a substantial threat to human life and safety or to property.

### SUMMARY

A total of 128 nominations, including 3 existing ACECs, were considered as part of the Ely land use planning process. Several of these nominations pertained to the same areas and, therefore, were combined for a total of 100 nominated areas. The work of an internal review group is summarized in **Table D-1**. This table displays the nominated areas and explains why 77 of these areas met relevance and importance. **Table D-1** summarizes how relevant and important resources within these areas are protected by the different alternatives and if ACEC designation is needed.

After nomination, the boundaries and acreages for some nominated areas were adjusted to more closely reflect the values of the relevant and important resource. Therefore, the acreage of the final proposed ACEC may not match the acreage presented in **Table D-1**.

The 3 existing and 22 new potential ACECs are described in this appendix and shown on **Maps D-1** through **D-4**. Legal descriptions for the potential ACECs are presented in **Table D-2**.

**Table D-1  
Determination of Relevance and Importance of Nominated ACECs**

Nomination	Acres/Miles	Primary Resource Values	Met Relevance	Met Importance	Rationale for not Designating
ACECs should be established to protect the largest old growth of pinyon-juniper forests and their habitats	Unknown	Old growth pinyon-juniper	No	No	N/A
Alamo Pictograph Site (Pahranagat Rock Art)	480 acres	Rock art	Yes	Yes	1,3
All remaining sage grouse and pygmy rabbit habitats	Approximately 5.0 million acres	Sage grouse and pygmy rabbit habitats	Yes	Yes	1
All riparian areas should be inventoried for their potential or historic status as fisheries. They should have special management to achieve and maintain this potential.	Unknown	Riparian habitats	No	No	N/A
Andy's Mine Trilobites	100 acres	Trilobites	Yes	Yes	1
Ash Springs (Pahranagat Rock Art)	160 acres	Rock art	Yes	Yes	1
Baker Archaeological Site	80 acres	Freemont habitation site	Yes	Yes	ACEC
Baking Powder Flat	13,012 acres	<i>Baking Powder Flat Blue butterfly</i>	Yes	Yes	ACEC
Beaver Dam Slope ACEC	36,900 acres	Critical desert tortoise habitat	Yes	Yes	ACEC
Bennett Springs	520 acres	Earliest settlement in district. Lost 49ers Trail passed through the area.	Yes	Yes	1,3
Black Canyon (Pahranagat Rock Art)	400 acres	Rock art	Yes	Yes	1,3
Blue Mass Scenic Area	950 acres	Scenic pastoral setting with rock art	Yes	Yes	ACEC
Bristol Wells	400 acres	Historic mining town, cemetery, and charcoal kilns	Yes	Yes	1
Carbonari sites	21,279 acres	Historic charcoal production sites	Yes	Yes	1,3
Cave Valley Cave Geologic Area	40 acres	Cave resources	Yes	Yes	1
Chisolm Mine Trilobite Area	160 acres	Trilobite area	Yes	Yes	1
Christmas Wash (Snake Range Rock Art)	1,920 acres	Rock art	Yes	Yes	1,2,3
Condor Canyon	6,900 acres	Riparian habitat and scenic canyon	Yes	Yes	ACEC
"The Crack"	5 miles	Earthquake upheaval that snakes over floor of Dry Lake Valley	No	No	N/A
Crystal Wash (Pahranagat Rock Art)	1,440 acres	Rock art	Yes	Yes	1
Currant/Lund Route	35 miles	Historic emigrant and teamster road with remnants	No	No	N/A
Delamar	4,160 acres	Historic mining town and cemetery	Yes	Yes	1
Delamar Mountain Range	90,000 acres	Aid in management of desert bighorn sheep	No	No	N/A
Evergreen Flat (Pahranagat Rock Art)	960 acres	Rock art	Yes	Yes	1
Flat Spring	42 acres	Cold spring system for the <i>Pyrgulopsis cruciglans</i> (snail)	Yes	Yes	1
Frenchy Flat (Pahranagat Rock Art)	220 acres	Rock art	Yes	Yes	1,3
Garnet Hill	1,210 acres	Rock hounding area	Yes	Yes	ACEC
Garrison Archaeological Site	160 acres	Freemont village site	Yes	Yes	1,3
George Keil Memorial Botanical Area	464 acres	Gigantic limestone monolith, ancient and rejuvenated bristlecone pines, Sonoran cactus, virgin Engelmann spruce	No	No	N/A
Gleason Canyon and Panaca Charcoal Kilns	4,000 acres	Region of sandstone shelters, and side canyons, with tall scattered ponderosa pines and pioneer charcoal kilns	Yes	Yes	1
Golden Gate Range	Unknown	Archaeologic and scenic values	No	No	N/A
Goshute Lake	18,360 acres	Paleo-Indian site	Yes	Yes	1,3
Hampton Creek	½ mile on public land	Nomination stated creek was inhabited by the state endangered Utah cutthroat trout (correctly named the Bonneville cutthroat trout)	Yes	Yes	1
Hell's Half Acre (Pahranagat Rock Art)	320 acres	Rock art	Yes	Yes	1,3
Hendry's Creek	0.3 mile on public land	Nomination stated creek was inhabited by the state endangered Utah cutthroat trout (correctly named the Bonneville cutthroat trout)	Yes	Yes	1
Hendry's Creek/Rock Animal Corral	3,300 acres	Archaeological site	Yes	Yes	ACEC
Highland Range, including Highland Peak and Anderson Canyon	11,962 acres	Ancient bristlecone pines, <i>Hypaurotis crysalus intermedia</i> , <i>Satyrium saepium</i> , <i>latilnea</i> , intermountain bristlecone pine woodland, montane	Yes	Yes	ACEC

**APPENDIX D**

**Table D-1 (Continued)**

Nomination	Acres/Miles	Primary Resource Values	Met Relevance	Met Importance	Rationale for not Designating
		shrublands, butterfly diversity			
Hiko Canyon (Pahranagat Rock Art)	15 acres	Rock art	Yes	Yes	1,3
Hiko Mountain Range	21,000	Aid in management of desert bighorn sheep	No	No	N/A
Honeymoon Hill/City of Rocks	3,900 to 5,900 acres	Rock art	Yes	Yes	ACEC
Jake's Valley Paleo Shoreline	19,209 acres	Paleo-Indian site	Yes	Yes	1,3
Kane Springs ACEC	57,190 acres	Critical desert tortoise habitat	Yes	Yes	ACEC
Kious Springs Scenic Area	40 acres	Scenic monolith and flora area	No	No	N/A
Kixmiller Ranch	10 acres	Historic charcoal kilns		Kilns are located on private land	N/A
Leviathan Cave Geologic Area	160 acres	"Picture window" cave entrance with huge interior room and wondrous speleothems	Yes	Yes	1,2
Lote's Canyon	Unknown	Scenic cultural values and rock art	No	No	N/A
Lower Meadow Valley Wash	39,000 acres	Biological resources (endangered, threatened, and candidate species)	Yes	Yes	ACEC
Magnolia and Boundary Canyons and North Creek	Unknown	Unique natural arches		Could not determine their location and the nominator did not respond to requests for information.	N/A
Mahoney Canyon Jasperoid Source	200 acres	Tool stone quarry	Yes	Yes	1,3
Meadow Valley Mountain Range	165,000 acres	Aid in management of desert bighorn sheep	No	No	N/A
Meteor Crater	1 acre	Reported meteor impact site	No	No	N/A
Modena Obsidian Source	13,260 acres	Obsidian source	Yes	Yes	1,3
Mojave/Utah Yucca Natural Area	Unknown	Farthest known northern occurrence of yucca cactus	No	No	N/A
Moriah Site (Pahranagat Rock Art)	640 acres	Rock art	Yes	Yes	1,3
Mormon Barrel Cactus	45,772 acres	Scenic quality of barrel cactus	No	No	N/A
Mormon Mesa ACEC	109,700 acres	Critical desert tortoise habitat	Yes	Yes	ACEC
Mormon Mountain Range	90,000 acres	Aid in the management of desert bighorn sheep	No	No	N/A
Mormon Peak Caves, Mormon Mountains and Mormon Peak	123,000 acres	Agave roasting pits, rock shelters and caves	Yes	Yes	1,2,3
Mount Irish	26,200 acres	Rock art	Yes	Yes	ACEC
Negro Creek (Snake Range Rock Art)	560 acres	Rock art	Yes	Yes	1,3
Oak Spring Summit Trilobite Trail	40 acres	Trilobites	Yes	Yes	1
Oak Spring Summit, Delamar Joshua Tree Forest	2,400 acres	Joshua tree forest and fossils	No	No	N/A
Osceola and Osceola Ditch	14,600 acres	Historic townsite and ditch	Yes	Yes	ACEC
Pahroc Rock Art	3,200 acres	Rock art and rock shelters	Yes	Yes	ACEC
Park Range Aboriginal Sites	42,154 acres	High altitude aboriginal sites	Yes	Yes	1,2
Park Range Pristine Meadows	1,280 acres	Pristine meadows	Yes	Yes	1,2
Pennsylvania Canyon	15,000 acres	Geological sight-seeing	No	No	N/A
Pine (Ridge) Creek	2.5 miles	Nomination stated that the creek was inhabited by the state endangered Utah cutthroat trout (correctly named the Bonneville cutthroat trout)	Yes	Yes	1
Pony Springs Open Space Reserve	39,100 acres	Pinyon pine and juniper area	No	No	N/A
Pygmy Sage Research Natural Area	160 acres	Pygmy sage habitat	Yes	Yes	ACEC
Quaking Aspen Spring	40 acres	Recreation	No	No	N/A
Rainbow Canyon	45,827 acres	Scenic volcanic gorge and rock art	Yes	Yes	1,2
Rose Guano Bat Cave	40 acres	Historic guano mine and cave	Yes	Yes	ACEC
Ruin Wash and Klondyke Gap	160 acres	Fossils	Yes	Yes	1
Sawmill Canyon	9,920 acres	Historic timber operations and rock art	Yes	Yes	1,3
Scarlet Buckwheat-White Rock	642 acres	<i>Eriogonum Phoenicium</i>	Yes	Yes	1
Schlesser Pincushion	6,468 acres	Schlesser Pincushion cactus	Yes	Yes	ACEC
Shooting Gallery	20,700 acres	Rock art	Yes	Yes	ACEC
Shoshone Ponds Natural Area	1,240 acres	Rocky Mountain juniper trees living in hostile alkali valley soils. Spring-fed pools containing rare and endangered Pahrump killifish and Relic Steptoe Dace.	Yes	Yes	ACEC

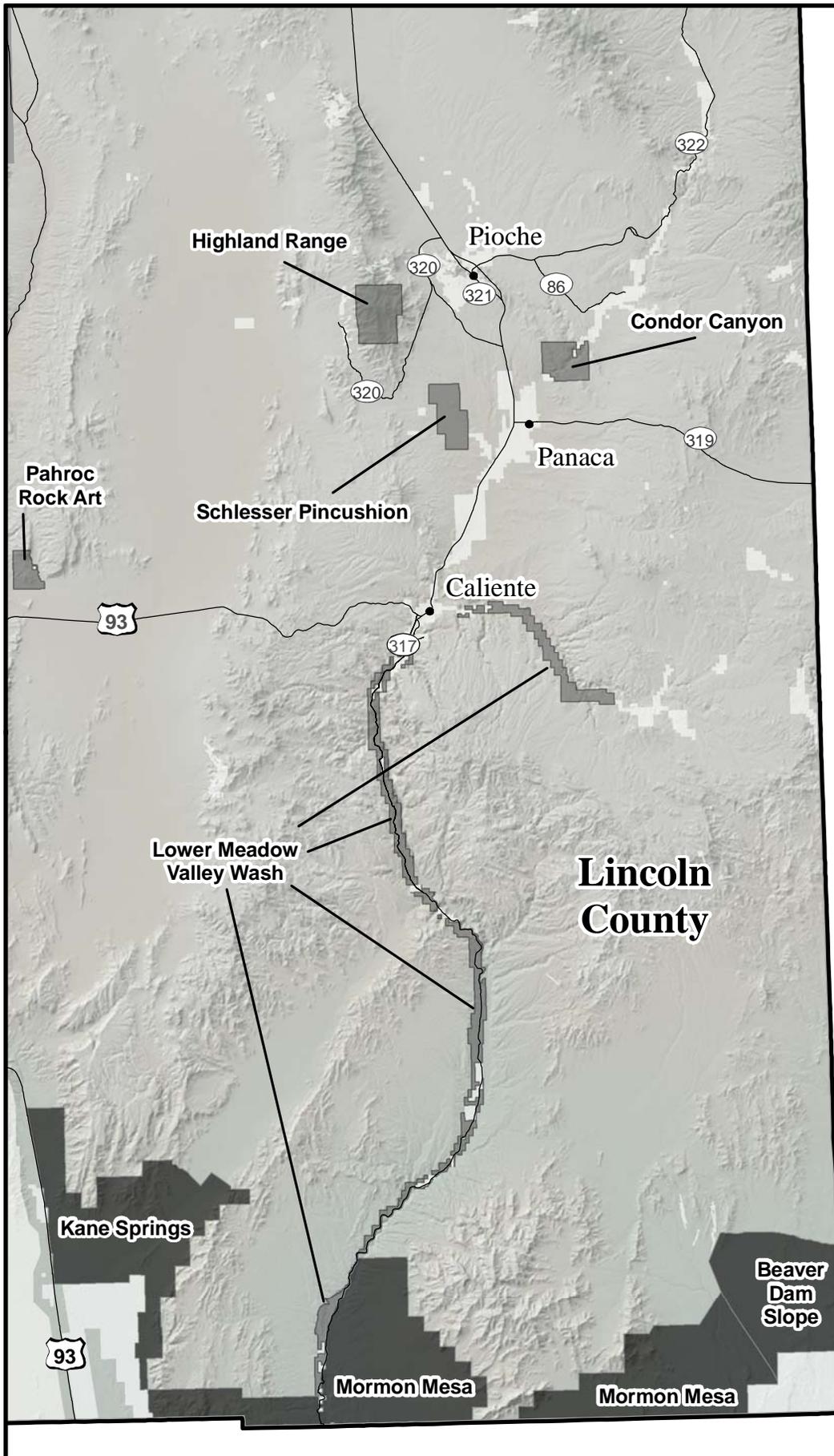
Table D-1 (Continued)

Nomination	Acres/Miles	Primary Resource Values	Met Relevance	Met Importance	Rationale for not Designating
Six Mile Flat (Pahranagat Rock Art)	2,160 acres	Rock art	Yes	Yes	1,3
Snake Creek Indian Burial Cave	40 acres	Archaeological resource and cave	Yes	Yes	ACEC
South Pahroc Range	28,395 acres	Geologic sight-seeing and desert bighorn sheep habitat	No	No	N/A
Spring Valley Waterfowl Area	9,733 acres	Natural wildlife resource system	No	No	N/A
Stateline Canyon Graveyard (Rice Family Cemetery)	10 acres	Historic graveyard	Yes	Yes	1
Steptoe Valley Crescent spot	1,937 acres	Sensitive status species of butterfly and its habitat	Yes	Yes	1,3
Sunshine Locality National Register District	34,540 acres	Paleo-Indian site	Yes	Yes	1,3
Swamp Cedar Natural Area	3,200 acres	Rocky Mountain juniper trees living in alkali valley soils. Battlefield of the Goshute War of 1863.	Yes	Yes	ACEC
Tempiute Obsidian Source	29,767 acres	Obsidian source	Yes	Yes	1,3
Tepee Rocks	160 acres	Geologic sight-seeing	No	No	N/A
Tri-county Paleo Site	19,967 acres	Paleo-Indian site	Yes	Yes	1,3
Tunnel Canyon	200 acres	Fremont pictographs	Yes	Yes	1,3
Turnley Spring	41 acres	Cold spring system of the <i>Pyrgulopsis peculiaris</i> (snail)	Yes	Yes	1
Tybo/Duckwater Route	60 miles	Historic emigrant, stage and teamster route	No	No	N/A
Upper Meadow Valley Archaeological Zone	980 acres	Prehistoric campsites and rock art	Yes	Yes	1,3
Ward Mining District	2,500 to 11,000 acres	Historic mining area	Yes	Yes	ACEC
Weaver Creek Scenic Area	½ mile of public land	Nomination stated the creek was inhabited by the state endangered Utah cutthroat trout (correctly named the Bonneville cutthroat trout).		Nevada Department of Wildlife cannot establish a Bonneville cutthroat trout fishery because water levels are not dependable.	N/A
Weepah Spring (Pahranagat Rock Art)	5,120 acres	Rock art	Yes	Yes	1,2,3
Whipple Cave Geologic Area	160 acres	Cave resources	Yes	Yes	1,2
White River Narrows (Pahranagat Rock Art)	8,960 acres	Rock art	Yes	Yes	1
White River Valley	15,556 acres	<i>Frasera gypsicola</i> , <i>Cryptantha welshii</i> , <i>Lepidium nanum</i> , <i>Mentzelia tiehmii</i> , <i>Asclepias Rastwoodiana</i> , <i>Phacelia parishii</i> , <i>Townsendia jonesii</i> var, <i>tumulosa</i> , pygmy sagebrush dwarf shrublands (sensitive plants)	Yes	Yes	ACEC
Worthington Peak, Golden Gates, Mount Wilson and Scottie's Cabin	Unknown	Ponderosa pine groves	No	No	N/A
Yucca Gardens	Unknown	Unique suspect succulent cactus hybrid ecology		Field visit to the area did not reveal the unique suspect succulent cactus hybrid ecology identified in the nomination.	N/A

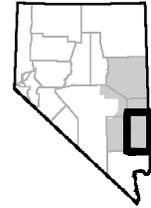
<sup>1</sup> Special management attention is not required to protect the potential ACEC because standard or routine management prescriptions are sufficient to protect the resource or value from risks or threats of damage/degradation. (That is, the same management prescriptions would have been provided for the area in the absence of the important and relevant values.)

<sup>2</sup> The area is being proposed for designation under another statutory authority, e.g., designated wilderness, and requires no management attention differing from that afforded the entire designation.

<sup>3</sup> The manager has concluded that no special management attention is justified either because exposure to risks of damage or threats to safety is greater if the area is designated or there are not reasonable special management actions which can be taken to protect the resource from irreparable damage or the restore it to a viable condition.



**Regional View**



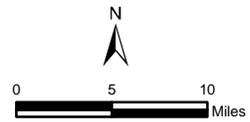
0 100 200 Miles

**Legend**

- Cities and towns
- Roads
- Non-BLM-administered land\*
- Proposed ACEC
- Existing ACEC

**Note:**

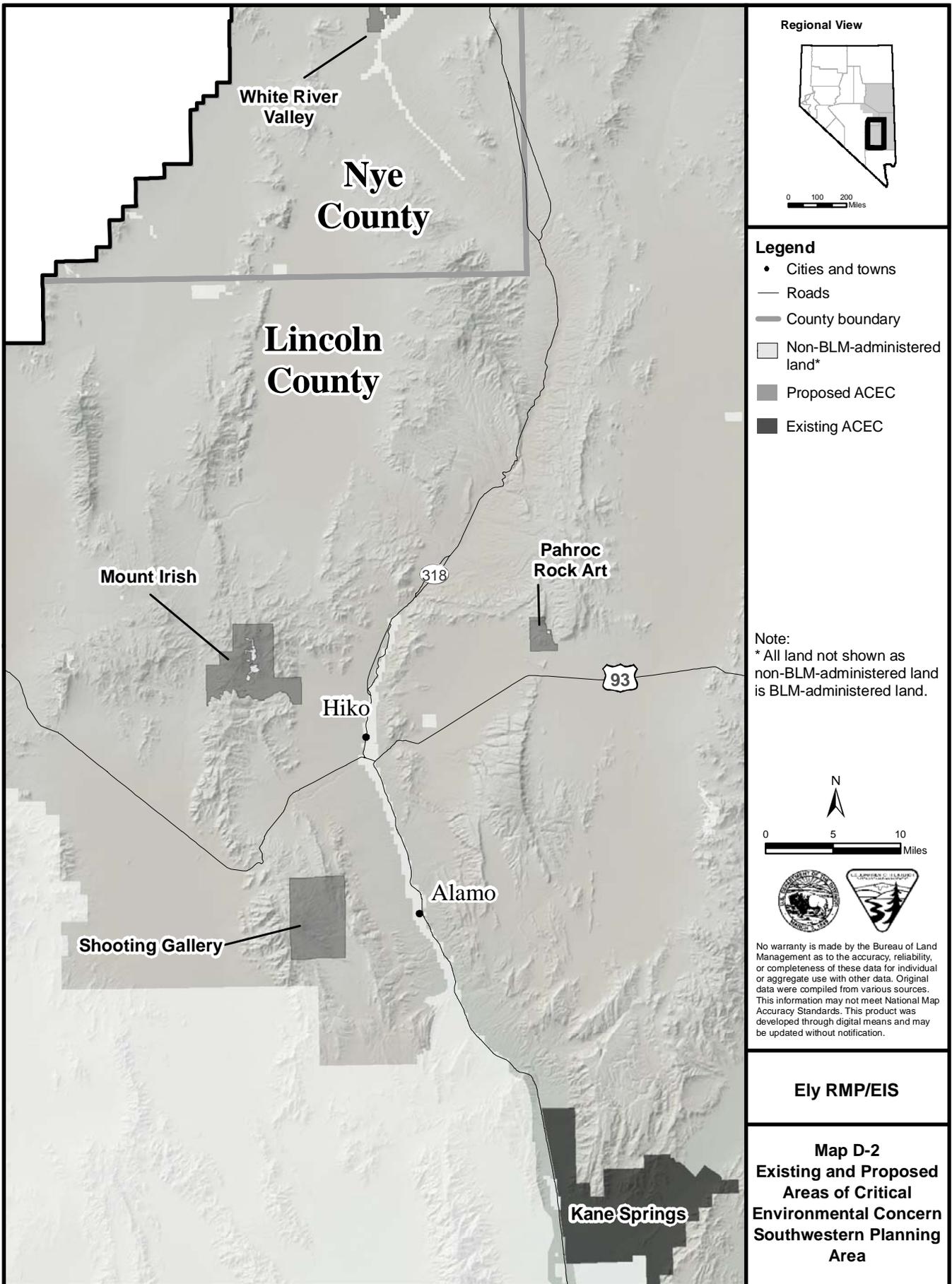
\* All land not shown as non-BLM-administered land is BLM-administered land.



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**Ely RMP/EIS**

**Map D-1  
Existing and Proposed  
Areas of Critical  
Environmental Concern  
Southeastern Planning  
Area**



**Regional View**

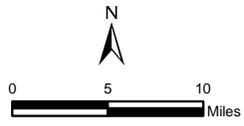


0 100 200 Miles

**Legend**

- Cities and towns
- Roads
- County boundary
- Non-BLM-administered land\*
- Proposed ACEC
- Existing ACEC

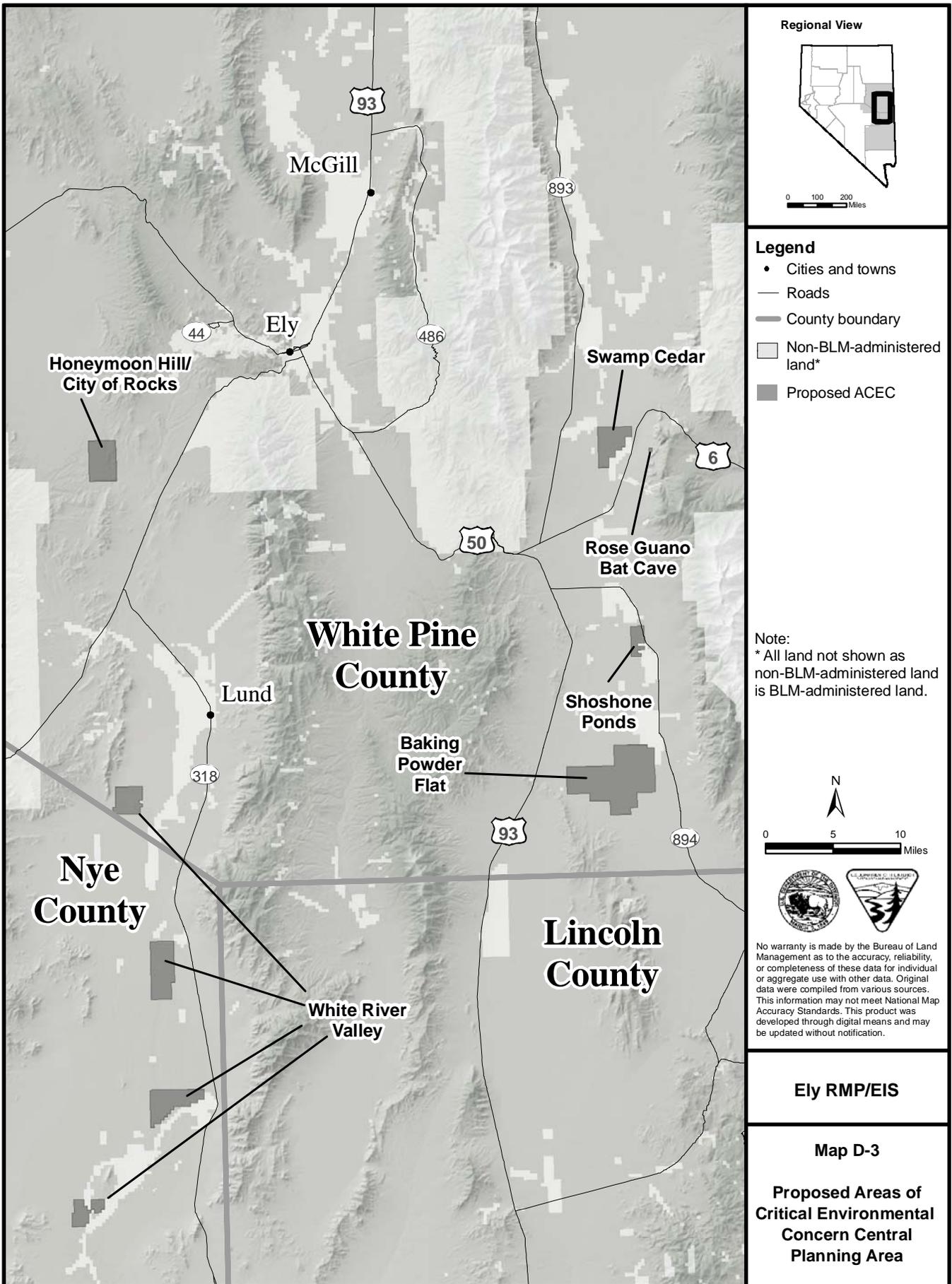
Note:  
\* All land not shown as non-BLM-administered land is BLM-administered land.



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**Ely RMP/EIS**

**Map D-2  
Existing and Proposed  
Areas of Critical  
Environmental Concern  
Southwestern Planning  
Area**



**Regional View**

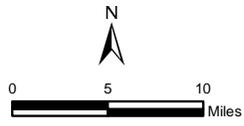


0 100 200 Miles

**Legend**

- Cities and towns
- Roads
- County boundary
- Non-BLM-administered land\*
- Proposed ACEC

Note:  
\* All land not shown as non-BLM-administered land is BLM-administered land.

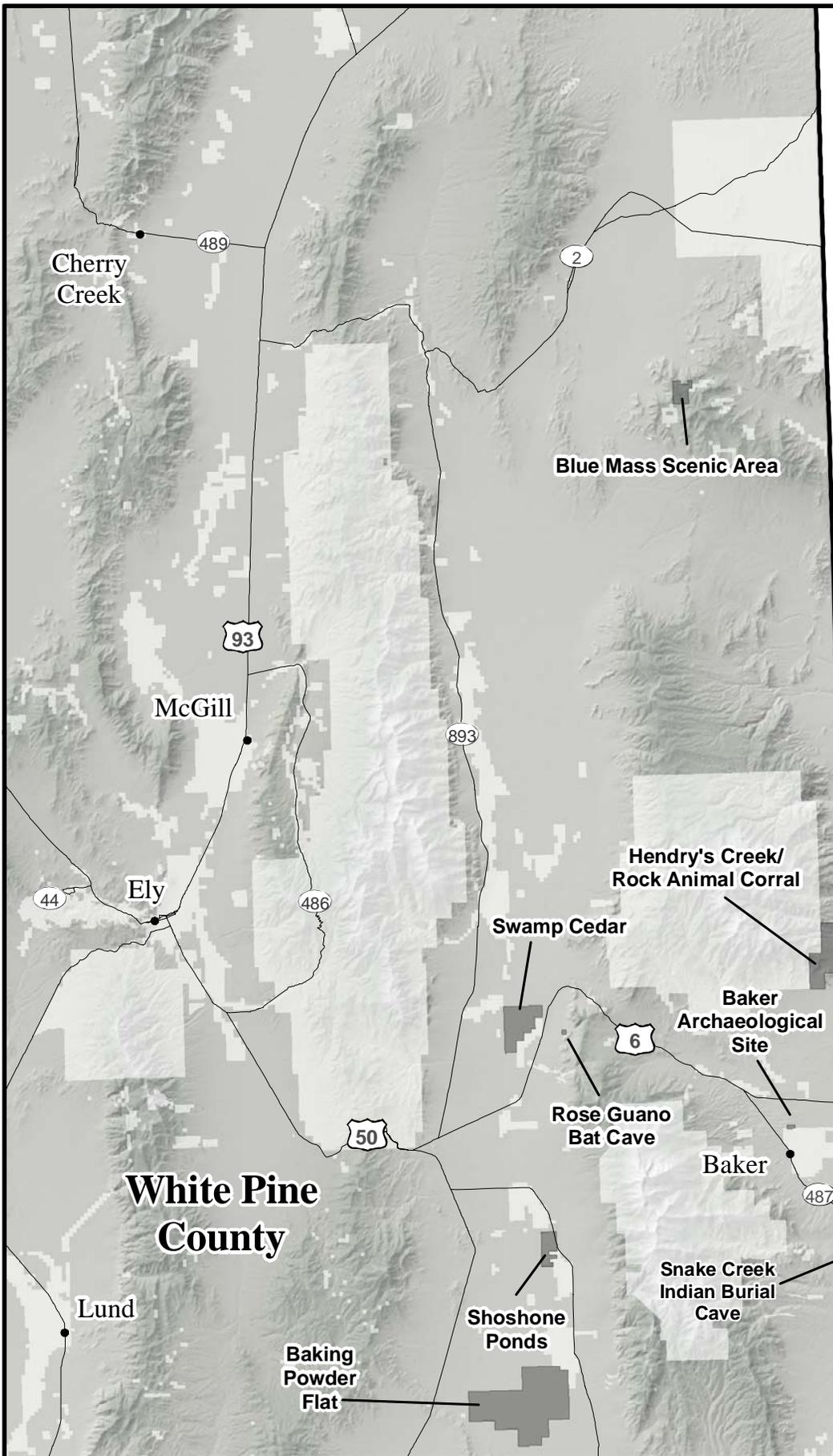


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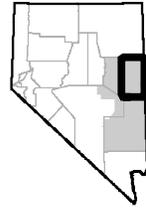
**Ely RMP/EIS**

**Map D-3**

**Proposed Areas of Critical Environmental Concern Central Planning Area**



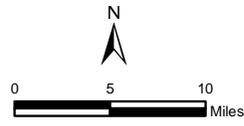
**Regional View**



**Legend**

- Cities and towns
- Roads
- Non-BLM-administered land\*
- Proposed ACEC

Note:  
\* All land not shown as non-BLM-administered land is BLM-administered land.



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**Ely RMP/EIS**

**Map D-4**

**Proposed Areas of Critical Environmental Concern Northern Planning Area**

**APPENDIX D**

**Table D-2  
Legal Descriptions for Potential ACECs**

Township	Range	Section	
<b>Baker Archeological Site</b>			
14 N	70 E	33	LOT 7, SE¼SE¼SE¼
<b>Baking Powder Flat</b>			
11N	66E	25	ALL
		36	ALL
10N	67E	2	W½
		3	ALL
		4	SE¼N½
		5	N½
		9	NE¼
		10	N½
11N	67E	13	S½SW¼
		14	S½
		15	S½
		16	SE¼
		21	E½
		22	ALL
		23	ALL
		24	W½
		25	W½
		26	ALL
		27	ALL
		28	ALL
		29	ALL
		30	ALL
		31	ALL
		32	ALL
		33	ALL
		34	ALL
		35	ALL
		36	W½
<b>Blue Mass Scenic Area</b>			
21N	68E	1	LOTS 1 & 2, SW¼NE¼, SE¼NE¼
21N	69E	6	NW¼
22N	68E	36	E½
22N	69E	31	LOTS 2-4, E½SW¼, SE¼NW¼, W½NE¼
<b>Condor Canyon</b>			
1S	68E	13	LOTS 1-7, SW¼NW¼
		14	LOTS 1-8, S½NW¼, S½NE¼
		15	SE¼, SW¼, S½NW¼, S½NE¼
		22	ALL
		23	ALL
		24	LOTS 1-15
		25	LOTS 1-12
		26	N½SE¼, N½SW¼, N½
		27	NE¼SE¼, N½NW¼, NE¼
<b>Garnet Hill</b>			
17N	62E	1	ALL
		2	LOTS 1, 2, S½NE¼, NE¼SW¼ (PORTIONS), SE¼ (PORTIONS)
		12	LOT 1, LOTS 2, 3, 4, 7, 8 (PORTIONS)
<b>Hendry's Creek/Rock Animal Corral</b>			
15N	70E	1	ALL
		2	ALL
		11	ALL
		12	ALL
		14	ALL
16N	70E	26	ALL
		35	ALL

Table D-2 (Continued)

Township	Range	Section	
<b>Highland Range</b>			
1N	66E	26	ALL
		27	ALL
		28	ALL
		33	ALL
		34	ALL
		35	ALL
1S	66E	1	W½
		2	ALL
		3	ALL
		10	ALL
		11	ALL
		12	W½
<b>Honeymoon Hill/City of Rocks</b>			
15N	61E	19	ALL
		20	ALL
		29	ALL
		30	ALL
		31	ALL
		32	ALL
<b>Lower Meadow Valley Wash</b>			
11S	65E	25	SE¼, SE¼SW¼, NE¼ (WITHIN)
		36	WITHIN
11½S	65E	36	WITHIN
12½ S	65E	1	LOTS 3 & 4, LOT 2 (WITHIN), W½SE (WITHIN), W½SW¼, S½NW¼, W½SW¼NE¼
		11	E½SE¼
		12	SE¼SW¼ (WITHIN), N½SW¼, NW¼, W½SW¼NE¼, W½NW¼NE¼
		13	W½SW¼, SE¼NW¼ (WITHIN ALL)
		23	E½SE¼, E½NE¼
		24	S½SW¼, SW¼NW¼
4S	66E	25	SW¼SE, E½SE¼, W½NW¼, E½NE¼
		26	S½SE¼
		34	SE¼
		35	SW¼, NW¼, NW¼NE¼
5S	66E	2	LOTS 3 & 4, NE¼SW¼, SE¼NW¼
		3	LOTS 1 & 2, SE¼SE¼, E½SW¼, SW¼NE¼
		10	SE¼, E½SW¼, E½NW¼, SW¼NE¼, E½NE¼
		15	SE¼, E½SW¼, E½NW¼, NE¼
		22	SE¼, E½SW¼, E½NW¼, NE¼
		26	SE¼, W½NW¼
		27	E½SE, E½NW, NE¼
		34	E½SE¼, E½NE¼
6S	66E	2	LOTS 3-5, W½SE¼, S½SW¼, NW¼SW¼, S½NW¼
		3	LOT 1, SE¼NE¼
		11	SE¼, E½SW¼, NW¼, W½NE¼
		13	W½SW¼, W½NW¼
		14	SE¼, NE¼
		23	SE¼, NE¼
		24	W½SW¼, W½NW¼
		25	SW¼, NW¼
		26	E½SE, E½NE¼
		35	NE¼NE¼
		36	SE¼, E½SW¼, NW¼, W½NE¼
		7S	66E
12	NE¼		

**APPENDIX D**

**Table D-2 (Continued)**

Township	Range	Section	
10S	66E	24	SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$ (WITHIN ALL)
		25	NW $\frac{1}{4}$ (WITHIN)
		26	N $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$ (WITHIN ALL)
		27	S $\frac{1}{2}$ SE $\frac{1}{4}$
		34	W $\frac{1}{2}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ (WITHIN ALL)
10 $\frac{1}{2}$ S	66 E	33	SE $\frac{1}{4}$ (WITHIN), E $\frac{1}{2}$ SW $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$ (WITHIN)
11S	66E	4	SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ (WITHIN ALL)
		5	SE $\frac{1}{4}$ (WITHIN)
		8	S $\frac{1}{4}$ , SW $\frac{1}{4}$ , NE $\frac{1}{4}$ (WITHIN ALL)
		17	SW $\frac{1}{4}$ , NW $\frac{1}{4}$ (WITHIN)
		19	WITHIN
		30	W $\frac{1}{2}$ (WITHIN)
		31	NW $\frac{1}{4}$ NW $\frac{1}{4}$ (WITHIN)
4S	67E	10	SW $\frac{1}{4}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$
		11	NW $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$
		12	N $\frac{1}{2}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$
7S	67E	7	LOTS 1 & 2, S $\frac{1}{2}$ SE $\frac{1}{4}$
		17	SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ (WITHIN), SW $\frac{1}{4}$ , NW $\frac{1}{4}$
		18	N $\frac{1}{2}$ SE, N $\frac{1}{2}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$
		20	NW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$
		21	SW $\frac{1}{4}$ SW $\frac{1}{4}$
		27	S $\frac{1}{2}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$
		28	SE $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$
		34	SW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$
		35	SE $\frac{1}{4}$ SW $\frac{1}{4}$ (WITHIN), SE $\frac{1}{4}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$
8S	67E	2	LOT 4, W $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$
		3	LOTS 1 & 2, SE $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$
		10	E $\frac{1}{2}$ SE, E $\frac{1}{2}$ NE $\frac{1}{4}$
		11	W $\frac{1}{2}$ (WITHIN)
		14	SW $\frac{1}{4}$ , NW $\frac{1}{4}$ (WITHIN)
		15	E $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		22	E $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		23	SW $\frac{1}{4}$ , NW $\frac{1}{4}$
		26	W $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$
		27	S $\frac{1}{2}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SE
		28	SE $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$
		34	E $\frac{1}{2}$ , SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$
		35	W $\frac{1}{2}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$
9S	67E	2	LOTS 3 & 4, SW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$
		3	LOT 1, E $\frac{1}{2}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$
		10	E $\frac{1}{4}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		14	NW $\frac{1}{4}$ SW $\frac{1}{4}$
		15	E $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		22	E $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$
		27	W $\frac{1}{2}$ SW $\frac{1}{4}$
34	W $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$		
10S	67E	3	LOTS 3 & 4, W $\frac{1}{2}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$
		4	LOT 1 SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$
		8	S $\frac{1}{2}$ SE $\frac{1}{4}$
		9	W $\frac{1}{2}$ SW $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$
		17	NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ (WITHIN), NE $\frac{1}{4}$ SW $\frac{1}{4}$ (WITHIN), S $\frac{1}{2}$ NW $\frac{1}{4}$ (WITHIN), NE $\frac{1}{4}$ (WITHIN)
		18	LOT 4, NW $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$
19	NE $\frac{1}{4}$ NE $\frac{1}{4}$ (WITHIN)		

Table D-2 (Continued)

Township	Range	Section			
4S	68E	7	LOTS 2 & 3, SE¼, NE¼SW¼, S½NE¼		
		8	W½SE¼, SW¼		
		16	SW¼		
		17	SE¼, E½NW¼, NE¼		
		21	SE¼, E½SW¼, NW¼, W½NE¼		
		27	SW¼, W½NW¼		
		28	E½		
		34	SE¼, E½SW¼, NW¼, W½NE¼		
5S	68E	2	SE¼, SW¼, NW¼		
		11	N½SE¼, N½SW¼, NW¼, NE¼		
		12	N½SE¼, N½SW¼, NW¼NE¼		
5S	69E	7	LOTS 1-3		
		8	SW¼, S½NW¼		
<b>Mount Irish</b>					
4S	58E	36	ALL		
3S	59E	19	LOTS 1-4, SE¼, E½SW¼, E½NW¼, NE¼		
		20	ALL		
		21	SE¼SW¼NW¼, N½SW¼NW¼, SE¼NW¼, SW¼SW¼NW¼ (WITHIN), N½NW¼, NE¼		
		28	ALL		
		29	WITHIN		
		30	LOTS 1-4, SE (WITHIN), E½SW¼, E½NW¼, NE¼ (WITHIN)		
		31	LOTS 1-4, SE¼, E½SW¼, E½NW¼, NE¼ (WITHIN)		
		32	WITHIN		
		33	ALL		
		4S	59E	4	ALL
				5	WITHIN
6	WITHIN				
7	LOTS 1-3, LOT 4 (WITHIN), SE¼ (WITHIN), E½SW¼, E½NW¼, NE¼				
8	ALL				
9	ALL				
10	ALL				
11	ALL				
14	SE¼, SW¼ (WITHIN), NE¼				
15	N½NW¼, N½NE¼ (WITHIN ALL)				
16	N½, N½SW¼ (WITHIN ALL)				
17	N½SE¼ (WITHIN), NE¼NE¼SW¼ (WITHIN), NW¼ (WITHIN), NE¼				
18	E½NW¼, NE¼ (WITHIN)				
<b>Osceola and Osceola Ditch</b>					
13N	67E	1	LOTS 2-4, S½NW¼, SW¼, SE¼		
		2	LOT 1, SE¼NE¼, E½SE¼		
		11	E½NE¼, E½SE¼		
		12	ALL		
		13	ALL		
		14	E½NE¼, E½SE¼		
13N	68E	6	LOTS 5-7, SE¼NW¼, E½SW¼		
		7	W½		
		18	W½		
14N	67E	11	E½SE¼		
		12	W½SW¼		
		13	S½NE¼, NW¼NW¼, SW¼, SE¼		
		14	E½NE¼, E½SE¼		
		23	E½NE¼, E½SE¼		
		24	ALL PUBLIC LANDS WITHIN		
		25	ALL PUBLIC LANDS WITHIN		
		35	E½NE¼, E½SE¼		
36	ALL				

**APPENDIX D**

**Table D-2 (Continued)**

Township	Range	Section	
14N	68E	7	LOTS 8, 9, SE $\frac{1}{4}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		8	S $\frac{1}{2}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		9	S $\frac{1}{2}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		10	S $\frac{1}{2}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		11	S $\frac{1}{2}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		12	S $\frac{1}{2}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		16	ALL
		17	ALL
		18	ALL
		19	ALL
		20	ALL
		29	ALL
		30	ALL
31	ALL		
32	ALL		
<b><i>Pahroc Rock Art</i></b>			
4S	62E	23	ALL
		24	SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$
		25	SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ WITHIN, W $\frac{1}{2}$ SE $\frac{1}{4}$ WITHIN, SW $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ WITHIN, W $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$
		35	N $\frac{1}{2}$
36	N $\frac{1}{2}$ WITHIN		
<b><i>Pygmy Sage</i></b>			
14N	67E	33	SW $\frac{1}{4}$
<b><i>Rose Guano Bat Cave</i></b>			
15N	67E	25	SE $\frac{1}{4}$ SE $\frac{1}{4}$
<b><i>Schlesser Pincushion</i></b>			
1S	67E	27	S $\frac{1}{2}$ SW $\frac{1}{4}$
		28	S $\frac{1}{2}$ SE, S $\frac{1}{2}$ SW $\frac{1}{4}$
		29	S $\frac{1}{2}$ SE $\frac{1}{4}$
		32	SE $\frac{1}{4}$ , NE $\frac{1}{4}$
		33	ALL
		34	SW $\frac{1}{4}$ , NW $\frac{1}{4}$
2S	67E	3	LOTS 3 & 4, SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$
		4	ALL
		9	ALL
		10	ALL
		15	ALL
		16	SE $\frac{1}{4}$ , NE $\frac{1}{4}$
<b><i>Shooting Gallery</i></b>			
6S	59E	25	ALL
		26	ALL
		35	ALL
		36	ALL
7S	59E	1	ALL
		2	ALL
		11	ALL
		12	ALL
		13	ALL
		14	ALL
		23	ALL
		24	ALL
6S	60E	29	ALL
		30	ALL
		31	ALL
		32	ALL

Table D-2 (Continued)

Township	Range	Section	
7S	60E	5	ALL
		6	ALL
		7	ALL
		8	ALL
		17	ALL
		18	ALL
		19	ALL
		20	ALL
<b>Shoshone Ponds</b>			
12N	67E	2	ALL
		11	SW $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$
13N	67E	35	S $\frac{1}{2}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$
<b>Snake Creek Indian Burial Cave</b>			
12N	70E	13	SE $\frac{1}{4}$ NW $\frac{1}{4}$
<b>Swamp Cedar Natural Area</b>			
15N	67E	21	ALL
		22	ALL
		23	N $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$
		27	NW $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , NE $\frac{1}{4}$
		33	W $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$
<b>Ward Mining District</b>			
14N	63E	9	ALL PUBLIC LAND WITHIN
		10	ALL PUBLIC LAND WITHIN
		11	ALL
		12	ALL
		13	ALL PUBLIC LAND WITHIN
		14	ALL PUBLIC LAND WITHIN
		15	ALL PUBLIC LAND WITHIN
		16	W $\frac{1}{2}$
		21	ALL
		22	ALL
		23	S $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		24	NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		25	NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$
		33	ALL
34	ALL		
35	NW $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$		
36	E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$		
<b>White River Valley</b>			
5N	60E	1	Lot 4, SW $\frac{1}{4}$ NW $\frac{1}{4}$
		2	Lots 1-4, S $\frac{1}{2}$ NE, S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$
6N	60E	35	W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$
		36	NE $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$
6N	61E	31	Lots 1,2
7N	61E	22	E $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		23	ALL
		24	ALL
		25	NW $\frac{1}{4}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$
		26	ALL
		27	E $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		34	NE $\frac{1}{4}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$
		35	NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$
8N	61E	1	W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$
		2	ALL
		11	ALL
		12	NW $\frac{1}{4}$ , SW $\frac{1}{4}$
		13	N $\frac{1}{2}$ NW $\frac{1}{4}$
		14	N $\frac{1}{2}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$

**APPENDIX D**

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**Table D-2 (Continued)**

<b>Township</b>	<b>Range</b>	<b>Section</b>	
9N	61E	25	W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$
		26	ALL
		35	ALL
		36	W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$
10N	61E	3	LOTS 3 & 4, S $\frac{1}{2}$ NW $\frac{1}{4}$
		4	LOTS 1-4, S $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$
		5	LOTS 1&2, S $\frac{1}{2}$ NE $\frac{1}{4}$
11N	61E	27	SW $\frac{1}{4}$
		28	SE $\frac{1}{4}$ , SW $\frac{1}{4}$
		29	SE $\frac{1}{4}$
		32	SE $\frac{1}{4}$ , NE $\frac{1}{4}$
		33	ALL
		34	S $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$
7N	62E	19	ALL
		20	W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$
		30	LOT 1, NW $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$

**DETAILED DESCRIPTIONS OF EXISTING AND PROPOSED ACECs****Existing ACECs****Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs**

The Beaver Dam Slope ACEC is located in southeast Lincoln County east of the Mormon Mesa ACEC and west of the Nevada/Arizona/Utah border. The ACEC extends north from the Lincoln/Clark County line and northwest of the city of St. George, Utah. The Kane Springs ACEC is located in southwestern Lincoln County, west of the Mormon Mesa ACEC. The ACEC extends north along U.S. Highway 93 towards Alamo from the Lincoln/Clark County border. The Mormon Mesa ACEC is located in south central Lincoln County west of the Kane Springs ACEC and east of the Beaver Dam Slope ACEC. The ACEC extends north from the Lincoln/Clark County line and the cities of Mesquite and Moapa, Nevada, near the Mormon Mountain Range.

These ACECs offer several relevant and important features and encompass important desert tortoise and hot desert wildlife habitats in Lincoln County. The Mormon Mesa ACEC also includes riparian habitats on BLM-administered land along the Lower Meadow Valley Wash for several other sensitive or listed Mojave species including the federally threatened southwestern willow flycatcher and federal candidate yellow-billed cuckoo.

The current condition and trend of the relevant and important values of these ACECs are byproducts of historic human uses, present human uses, and unnatural and reoccurring fire regimes. The area is composed of a mixture of Mojave vegetative communities, including northern and southern desert shrub and annual grasslands. In some areas native shrubs, cactus, yuccas, and Joshua trees composition has been replaced with non-native red brome and native annual grasses due to increased fire frequency and intensity. Previous grazing use by domestic cattle and sheep and wild horses and burros, have additionally altered the vegetative state and composition of the Mojave habitats within the ACECs. Development in adjoining non-ACEC designated areas is increasing near the communities of Las Vegas, Mesquite, Moapa, and Alamo. The ACECs also are receiving tremendous increases in recreational utilization and off-highway vehicle use due to an ever increasing demand placed on these resources from the growing populations of the greater Las Vegas area. Desert tortoise populations in the northeastern Mojave remain relatively low, but mostly stable.

**Threats**

The current threats and risks to the wildlife and critical Mojave Desert wildlife habitats of Kane Springs, Mormon Mesa, and Beaver Dam Slope ACECs include: conversion of Mojave shrub habitats to annual grassland from altered fire regimes, habitat fragmentation from past development/actions within ACECs and current development and habitat loss adjacent to ACECs, direct mortality and indirect alteration of habitat from vehicles and off-highway vehicle use, and increased predation rates due to habitat fragmentation and increased predator abundance and distribution resulting from human activity and actions.

## **APPENDIX D**

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### **Proposed ACECs**

#### **Baker Archaeological Site**

The Baker Archaeological Site is located in White Pine County, Nevada, about 1.5 to 2 miles northwest of Baker, Nevada. This ACEC, in Snake Valley, is located on the eastern edge of the planning area.

This area is a potential ACEC based on the prehistoric values it contains. The Baker Archaeological Site is a Fremont habitation site containing foundations of several structures. The positioning of the structures indicates the inhabitants' use of the sun to aid them in determining seasons. Evidence of agriculture was found during the excavations. To date, this site is the furthest west and north Fremont site in the U.S.

#### **Threats**

Threats to the historic resources include livestock grazing, visitor use, weathering, the potential for the designation of rights-of-way, and mineral development. Several lands and realty actions have occurred immediately adjacent to or within the Baker Archaeological Site. The Baker Archaeological Site occurs within the Baker Creek grazing allotment.

#### **Baking Powder Flat**

Baking Powder Flat ACEC is located in Spring Valley in White Pine County about 12 miles south of Highway 50 and lies in the valley east of Lake Valley Summit. The valley bottoms in the area have sandy soils and low sand dunes that provide exemplary habitat for the rare, endemic Baking Powder Flat blue butterfly (*Euphilotes bernardino minuta*) a BLM sensitive status species. Six of seven separate occurrences on public lands within the planning area were located in Spring Valley. Baking Powder Flat ACEC harbors four occurrences and is the largest contiguous habitat for the blue butterfly.

This area is a potential ACEC to protect the habitat essential for maintaining the Baking Powder Flat Blue butterfly. Its host plant, Shockley buckwheat (*Eriogonum shockleyi* var. *shockleyi*) is a common mound-forming plant often found on fine-textured substrates. This plant reaches exceptional diameters at this location and is the predominant plant in the valley bottom land.

#### **Threats**

Threats to the continued existence of this butterfly include limited habitat and potential damage to Shockley buckwheat by permitted cattle and wild horse grazing. Additional threats include habitat damage from off-highway vehicles, construction of new roads, land sales, and rights-of-way designation.

#### **Blue Mass Scenic Area**

Blue Mass Scenic Area is located in northern White Pine County approximately 9 miles from the Utah border in the Kern Mountains. The geology of the area is mostly granitic. The area is made up of a winding canyon and many rock hoodoos (a column, pinnacle, or pillar of rock produced by differential weathering.) with Blue Mass creek flowing through.

This area is a potential ACEC for the preservation of the high scenic values and unusual geology.

**Threats**

Threats and risks to the scenic qualities of Blue Mass include increased recreation and visitation resulting in an increase in off-highway vehicle use, vehicle route proliferation, and an increase in the number of informal campsites.

**Condor Canyon**

Condor Canyon is a steeply confined and isolated canyon located within the Meadow Valley Wash of Lincoln County, Nevada, 4 miles north of Panaca. The canyon encompasses 4 miles of perennial stream reach, which is moderately to deeply entrenched by 10-foot sandy high-flow walls and a man-made railroad levee. Condor Canyon is comprised only of BLM-administered lands.

This area is a potential ACEC for the protection of significant historic, cultural, archaeological, and scenic values and critical terrestrial and aquatic wildlife habitats. Features include numerous prehistoric lithic/ceramic scatters, rock shelters and overhangs, and rock art locations encompassing hundreds of panels of both pictograph and petroglyphs. In addition, remnants of mill foundations, dugouts, trails, and artifact scatters exist within the canyon. Both the Pioche-Bullionville Narrow Gauge Railroad (Circa 1870) and Union Pacific Pioche/Caliente Railroad (Circa 1900) remain evident within the canyon. Condor Canyon contains designated critical habitat (50 Federal Register 12298) for Big Spring spinedace (*Lepidomeda mollispinis pratensis*) and harbors the only known population of this federally threatened species. Additionally, the U.S. Fish and Wildlife Service Species of Concern and Nevada State Sensitive, Meadow Valley Wash desert sucker (*Catostomus clarki* ssp.) and Meadow Valley Wash speckled dace (*Rhinichthys osculus* ssp.) occur within Condor Canyon.

**Threats**

Several threats and risks exist to the critical wildlife habitats and cultural resources of Condor Canyon. Pre-historic pictograph and petroglyph rock art panels are highly susceptible to intense heat and subsequent rock exfoliation from reoccurring wildfires. Additionally, fish species of Condor Canyon are extremely vulnerable to catastrophic events, habitat modification, or loss and associated habitat fragmentation from natural and human induced biotic and abiotic impacts. Increased recreation and visitation to the canyon have brought increased off-highway vehicle and impacts to the terrestrial and aquatic habitats during all periods of the year and has increased the likelihood of the spread or introduction of nonnative species, vandalism or removal of historic artifacts and resources, and toxic or unwanted substance releases into the stream.

**Garnet Hill**

Garnet Fields rock hound area (Garnet Hill) is located in White Pine County approximately 6 miles west of Ely.

This area is a potential ACEC for the protection of Garnet Hill, a nationally-known rock hound area that is famous for dark red garnets.

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### **Threats**

Several threats and risks to the resource include the potential for commercial mining activity as well as illegal collecting of garnets for commercial sale. An increase in recreation in the Ely area has led to increased visitation and vandalism at the Garnet Hill site.

### **Hendry's Creek/Rock Animal Corral Archaeological Site**

The proposed Hendry's Creek/Rock Animal Corral ACEC is located in White Pine County, Nevada, about 15 miles north of Baker, Nevada. This proposed ACEC, in the Snake Range, is located along the eastern border of the planning area.

This area is a potential ACEC for the protection of the prehistoric values it contains including several rockshelters, pictographs, lithic scatters, and the rock animal corral itself."

### **Threats**

Several threats and risks exist that may affect the relevant and important values in the proposed Hendry's Creek/Rock Animal Corral ACEC. These threats and risks include decorative stone removal, off-highway vehicle use, and visitor use.

### **Highland Range**

The Highland Range is located in Lincoln County approximately 6 miles west of Pioche.

This area is a potential ACEC for the protection of the habitat for several populations of globally rare butterflies including the intermediate Colorado hairstreak (*Hypaurotis crysalus intermedia*), and broadlined saepium hairstreak (*Satyrium saepium latilinea*) and habitat for basin waxflower (*Jamesia tetrapetala*) a BLM sensitive status species that commonly grows in association with bristlecone pine.

### **Threats**

Threats to this habitat include wildland fire, mineral development, off-highway vehicle use, and rights-of-way designation.

### **Honeymoon Hill/City of Rocks**

The proposed Honeymoon Hill/City of Rocks ACEC is located in White Pine County, Nevada, about 25 to 30 miles southwest of Ely, Nevada. This area, in Jakes Wash, is located in the central portion of the planning area.

This area is a potential ACEC based on the prehistoric values and geologic scenic values it contains. The Honeymoon Hill archaeological site is a part of a much larger archaeological site complex known as the City of Rocks. It includes an extensive prehistoric chert quarry, a large, upland Paleo-Indian site, later Archaic occupation, numerous rock shelters exhibiting red pictographs, and scattered shards of brown ware pottery, presumably of Numic origin. Honeymoon Hill is the only identified petroglyph location within this complex.

**Threats**

Threats and risks that could affect the relevant and important values in the Honeymoon Hill/City of Rocks area are off-highway vehicle use, visitor use, rights-of-way designation, and mineral exploration and development. Disposal of land within the ACEC also could threaten the resources being protected.

**Lower Meadow Valley Wash ACEC**

The Lower Meadow Valley Wash is an 80-mile perennial stream stretch of the historic Meadow Valley Wash. The Lower Meadow Valley Wash begins 2 miles east of Barclay, Nevada near the Utah/Nevada State Line, at the Big Springs in the Clover Creek drainage, flows west-by-northwest through Caliente, then south through Elgin, Carp, and Rox Nevada toward the Lincoln Clark County Line. It includes the perennial inflows of Ash and Pine Creek from the Clover Mountains. The Lower Meadow Valley wash feeds into the Muddy River and Virgin River drainage of the Lower Colorado River System.

This area is a potential ACEC for the protection of federally endangered, threatened, and candidate species, as well as Nevada State protected species and BLM Sensitive species. Some of the more prominent terrestrial and aquatic species include southwestern willow flycatcher (endangered), desert tortoise (threatened), yellow-billed cuckoo (candidate), Meadow Valley Wash desert sucker and speckled dace (sensitive), Arizona toad (sensitive), and chuckwalla (sensitive).

**Threats**

Threats to habitat potential for terrestrial and aquatic wildlife species include poorly managed grazing, railroad and state highway right-of-way alteration of hydrologic regimes, damming and channelization of the stream flow, re-direction/diversions of stream flows, habitat removal/fragmentation, non-native weed (salt cedar, tall whitetop, etc.) monotypic dominance, loss of terrestrial understory, decreased native vegetative resiliency, increased fire and flood frequency, increased fire and flood impacts from sedimentation and down cutting, and degraded water quality.

**Mount Irish**

The proposed Mount Irish ACEC is located in Lincoln County, Nevada, about 8 miles west of Hiko, Nevada in the southwest portion of the planning area.

This area is a potential ACEC for the protection of the prehistoric and historic values it contains. The area includes the Mount Irish Archaeological District, as well as two historic sites; remnants of the Pahrnatag Mining District, Crescent Mill, and Logan City. Crescent Mill is located on public land in a drainage area on the west side of Mt. Irish. Thousands of petroglyphs have been located on Mount Irish, but the entire archaeological district has not been fully explored. Petroglyph panels are associated with other cultural features including lithic scatters, pottery scatters, rockshelters with deposits, and an occasional pictograph. The Mount Irish rock art is particularly important because of its research potential. Crescent Mill and Logan City are part of Nevada's earliest mining era. They also are part of the Pahrnatag mining district, which was organized in 1865, and Crescent Mill is a remnant of Southern Nevada's first major mining booms. Logan City is located in the hills south of Mount Irish on the east side of the range at the base of a cliff with dramatic horizontal strata of water deposited volcanic ash. The Pahrnatag Mining District is on Mount Irish in the Pahrnatag Range about 10 miles northwest of Hiko.

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### **Threats**

Threats that could impact the relevant and important values in the proposed Mount Irish ACEC include off-highway vehicle use, visitor use, locatable mineral development, livestock grazing, and land disposals.

### **Osceola and Osceola Ditch**

The proposed Osceola/Osceola Ditch ACEC is located in White Pine County, Nevada, about 35 miles east of Ely, Nevada. This area, in the Snake Range, is located in the eastern central portion of the planning area.

This area is a potential ACEC for the protection of the historic values it contains.

### **Osceola**

The Osceola district was organized in October 1872 after placer gold was discovered the previous summer. Osceola has gained at least three distinctions: its pioneering use of hydraulic hoses in the 1880s, a massive gold nugget (probably Nevada's largest) that was found in 1877 reportedly weighed over 20 pounds and was valued at approximately \$6,000, and most important, it survived longer than any other placer camp in Nevada. (All information about Osceola from Paher 1970 – Nevada Ghost Towns and Mining Camps.)

### **Osceola Ditch**

The Osceola (east) Ditch was constructed in 1889-1890 by the Osceola Gravel Mining Company. It consists of the east ditch, a wooden flume, and a rock dam that was used for transporting water for hydraulic mining operations at Osceola.

### **Threats**

Several threats and risks exist that may affect the relevant and important values in the proposed Osceola/Osceola Ditch ACEC. These threats and risks are locatable mineral development, visitor use, off-highway vehicle use, natural deterioration of the ditch and cemetery, and trespass/unauthorized use.

### **Pahroc Rock Art**

The proposed Pahroc Rock Art ACEC is located in Lincoln County, Nevada, about 35 miles west of Caliente, Nevada. This area, in the North Pahroc Range, is located in the south central portion of the planning area.

This area is a potential ACEC for the protection of the prehistoric values it contains. These prehistoric values include several petroglyphs, rock shelters, and other artifacts indicating ongoing use in this area.

### **Threats**

Threats to the relevant and important values in the proposed Pahroc Rock Art ACEC include recreational bouldering, livestock grazing, unrestricted off-highway vehicle use, and visitor use/vandalism. In addition, land disposals and rights-of-way designations could negatively impact the prehistoric values.

### **Pygmy Sage Research Natural Area**

The Pygmy Sage Research Natural Area is located in White Pine County in Spring Valley, northwest of Wheeler Peak.

This area is a potential ACEC based on its designation as a research natural area to assist in the preservation of an example of a pygmy sage (*Artemesia pygmaea*) ecosystem for comparison with other ecosystems influenced by humans.

#### **Threats**

Threats to the unusual vegetation include increased recreation and visitation resulting in increased off-highway vehicle use and vehicle route proliferation. An increase in the spread of noxious and invasive weeds also could impact the area as could the permitted livestock grazing in the area.

### **Rose Guano Bat Cave**

The proposed Rose Guano Bat Cave ACEC is located in White Pine County, Nevada, about 40 miles east of Ely, Nevada, on U.S. Highway 50. This Snake Range area is located in the east central portion of the planning area.

This area is a potential ACEC for the protection of historic values and sensitive species.

Rose Guano Bat Cave was mined for phosphate rock and bat guano and is home to a large roosting summer population of Mexican (or Brazilian) free-tailed bats (*Tadarida brasiliensis*) and winter use by a smaller population of Townsend's big eared bats (*Plecotus townsendii pallenscens*), a Nevada BLM sensitive species.

#### **Threats**

Threats and risks that may affect the relevant and important values in the Bat Cave include visitor use/visitor safety and wildlife protection.

### **Schlesser Pincushion**

The proposed Schlesser Pincushion ACEC is located in the Bennett Springs Wash area, 3 miles southwest of Cathedral Gorge State Park in Lincoln County.

This area is a potential ACEC for the protection of populations of the globally-rare Schlesser pincushion (*Sclerocactus schlesseri*). The cactus is a BLM sensitive status species and is a local endemic restricted to the Central Mountains section of the Great Basin ecoregion. It is currently known from seventeen occurrences and the proposed Schlesser Pincushion ACEC harbors ten of them.

#### **Threats**

Threats to the Schlesser pincushion include diminished quality of the habitat caused by disturbance of soil crusts and vegetative cover, increased recreation and proliferation of off-highway vehicle use, uncontrolled grazing, wild horse grazing, and mineral development.

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### **Shooting Gallery**

The proposed Shooting Gallery ACEC is located in Lincoln County, Nevada, about 7 miles west of Alamo, Nevada. This area, between the Pahranaagat Range and the East Pahranaagat Range, is located in the southwest portion of the planning area.

This area is a potential ACEC based on the prehistoric values it contains including the Shooting Gallery Game Drive District—a multi-component cultural landscape consisting of a large complex of scattered rock art sites (seven sites, approximately 200 to 300 panels) in association with several well-developed habitation areas. There also are at least five areas of stacked rocks, upright rock slabs, and small rock circles likely to have functioned as a game-drive complex used for hunting large game (bighorn sheep, deer, or pronghorn antelope).

Threats to relevant and important values in the proposed Shooting Gallery ACEC include off-highway vehicle use, visitor use, and vandalism.

### **Shoshone Ponds**

Shoshone Ponds are located in White Pine County in Spring Valley, just west of the Snake Range.

This area is a potential ACEC for the protection of significant habitat for endangered species, as well as important vegetation communities such as valley bottom Rocky Mountain Junipers. Three ponds designed to hold endangered fish are within the area. The endangered fish include the Pahrump poolfish and the Relic Steptoe dace. The original ponds were built by the Civilian Conservation Corp in the 1930s and remnants of the Civilian Conservation Corp camp are located within the Natural Area. These ponds also represent an important water source for the Brazilian free-tailed bats found in the Rose Guano Bat Cave and Guano Mine Historic Area. The Pahrump poolfish is found nowhere else in the world.

Threats and risks to Shoshone Ponds include drought and a decrease in the natural runoff necessary for the plant communities' health, increasing off-highway vehicle use, the spread of noxious and invasive weeds, and livestock grazing and trampling around the ponds. Drought and increased recreational use also could impact the endangered fish found in the ponds. Active grazing occurs within the Bastian Creek allotment and several roads and fence lines cross the area.

### **Snake Creek Indian Burial Cave**

The proposed Snake Creek Indian Burial Cave ACEC is located in White Pine County, Nevada, about 7 miles southeast of Baker, Nevada. This proposed ACEC, in western Snake Valley, is located on the eastern edge of the planning area.

This area is a potential ACEC for the protection of the prehistoric archaeological, geological, and zooarchaeological values it contains. The prehistoric archaeological values include recovery of an extinct camel (*Camelops* sp) and horse of late Pleistocene age (*Equus* spp.) and identification of eight mustelid species including three species not previously reported from the late Rancholabrean of the Great Basin:

black footed ferret (*Mustela nigripes*), least weasel (*Mustela nivalis*), and wolverine (*Gulo gulo*). Geological values include examples of moonmilk folia and at a lower level, an interesting sedimentation sequence. The form of the cave is unusual because of the sinkhole entrance, the entrance drop, the different levels and rooms, and the opportunity to observe a variety of speleothems. The cave has been severely vandalized over a period of many decades with little or no record of the actual materials recovered. According to the native residents of Baker, Nevada, and Garrison, Utah, artifacts and remains of what were considered Indians have been taken from the cave since early pioneer days. Human remains (portions of a human pelvis and cranium) were reported to be visible on the cave floor in 1980 and more human remains reported in 1987.

### **Threats**

Threats that may affect the relevant and important values in the proposed Snake Creek Indian Burial Cave ACEC include visitor use, public safety, and vandalism.

### **Swamp Cedar Natural Area**

The Swamp Cedar Natural Area is located in central Spring Valley in White Pine County, Nevada.

This natural area is a potential ACEC for the protection of habitat for endangered, sensitive, or threatened species, habitat essential for maintaining species diversity, and rare and endemic plant communities. In addition, the Swamp Cedar Natural Area is a significant historical site containing the battlefield of the Goshute War of 1863.

The Swamp Cedar Natural Area is the largest of three known occurrences of a valley bottom ecotype of Rocky Mountain juniper woodlands. Although they are locally called swamp cedars, they are described by the national vegetation classification system as Rocky Mountain juniper (*Juniperus scopulorum*) temporarily flooded woodland. In addition to the rare plant community, the Spring Valley Swamp Cedars site provides habitat for slender thelypody (*Thelypodium sagittatum* ssp. *ovalifolium*), a rare plant endemic to the Great Basin ecoregion.

### **Threats**

Threats and risks to the Swamp Cedar Natural Area include drought and a decrease in the natural runoff necessary for the plant communities' health, increasing off-highway vehicle use, and the spread of noxious and invasive weeds.

### **Ward Mining District**

The proposed Ward Mining District ACEC is located in the Egan Range in White Pine County, Nevada, about 17 miles south of Ely, Nevada, in the center of the planning area.

This area is a potential ACEC for protection of the historic values it contains. Silver ore was discovered around what is now Ward Gulch. The town site of Ward contained two smelters and a twenty-stamp mill with three furnaces connected to the mines by a tramway. The beehive-shaped charcoal ovens are spectacular examples of stone architecture and masonry craftsmanship.

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### Threats

Threats and risks exist that may affect the relevant and important values in the proposed Ward Mining District ACEC include visitor use, right-of-way access, off-highway vehicle use, locatable mineral development, vandalism, harvest of forestry/woodland products, and wildland fire.

### **White River Valley**

White River Valley ACEC contains four separate polygons located in White River Valley in Nye County. This area is a potential ACEC for protection of the numerous sensitive plant and animal species and unique badland soil types. The predominant plant community in which most of these plant populations occur is pygmy sagebrush (*Artemisia pygmaea*) dwarf shrub lands which are restricted to the Great Basin and adjacent ecoregions. Pygmy sagebrush dwarf shrub lands are plant communities considered rare and local throughout its range by NatureServe.

Sensitive status species in White River ACEC include:

Nevada State Protected (BLM manages as if Federal candidate species)

Sunnyside green gentian, (*Frasera gypsicola*)

BLM Sensitive Status species

Eastwood milkweed (*Asclepias eastwoodiana*)

White River catseye, (*Cryptantha welshii*)

Tiehm blazingstar, (*Mentzelia tiehmii*)

Parish phacelia, (*Phacelia parishii*)

Charleston grounddaisy, (*Townsendia jonesii* var. *tumulosa*)

White River wood nymph (*Cercyonis pegala pluvialis*)

White River Valley skipper (*Hesperia uncas*)

Rare Species tracked by the Nevada Natural Heritage Program

Southwestern peppergrass, (*Lepidium nanum*)

Rayless tansy aster (*Machaeranthera grindelioides* var. *depressa*)

The gypsum soils formed as springmounds also are extremely rare.

### Threats

Threats to the important qualities of the White River Valley ACEC include any action which disrupts soil surfaces and vegetation cover such as off-highway vehicle use and road maintenance or construction. The introduction of invasive and nonnative plants to the area, oil and gas exploration, and mineral material removal all constitute a threat to the protected resources.

**APPENDIX E**  
**SPECIAL STATUS SPECIES**

**Table E-1  
Special Status Species Table**

Common Name <sup>1,2,3,4,5</sup>	Scientific Name	Habitat Type	Special Status Species		Potential for Occurrence within the Planning Area		
			U.S. Fish and Wildlife Service <sup>6</sup>	BLM Sensitive Species	Lincoln County	White Pine County	Nye County
<b>MAMMALS</b>							
Pallid bat	<i>Antrozous pallidus</i>	All		X	X	X	X
Pygmy rabbit	<i>Brachylagus idahoensis</i>	SB; MDV		X	X	X	X
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	All		X	X	X	X
Big brown bat	<i>Eptesicus fuscus</i>	All		X	X	X	X
Spotted bat	<i>Euderma maculatum</i>	All		X	X	X	X
Silver-haired bat	<i>Lasionycteris noctivagans</i>	R-W; PJ; MC/A		X	X	X	X
Hoary bat	<i>Lasiurus cinereus</i>	R-W; PJ; MC/A		X	X	X	X
Desert Valley kangaroo mouse	<i>Microdipodops megacephalus albiventer</i>	SB; MDV		X	X		
Pahranagat Valley montane vole	<i>Microtus montanus fucosus</i>	R-W; MDV		X	X		
California myotis	<i>Myotis californicus</i>	All		X	X	X	X
Small-footed myotis	<i>Myotis ciliolabrum</i>	All		X	X	X	X
Long-eared myotis	<i>Myotis evotis</i>	All		X	X	X	X
Little brown myotis	<i>Myotis lucifugus</i>	All		X	X	X	X
Fringed myotis	<i>Myotis thysanodes</i>	All		X	X	X	X
Long-legged myotis	<i>Myotis volans</i>	PJ; MC/A		X	X	X	X
Yuma myotis	<i>Myotis yumanensis</i>	All		X	X	X	X
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	MM		X	X	X	X
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	All		X	X	X	X
Brazilian free-tailed bat	<i>Tadarida brazilliensis</i>	All		X	X	X	X
<b>BIRDS</b>							
Northern goshawk	<i>Accipiter gentiles</i>	MC/A; R-W; SB		X	X	X	X
Golden eagle	<i>Aquila chrysaetos</i>	All		X	X	X	X
Short-eared owl	<i>Asio flammeus</i>	R-W		X	X	X	X
Long-eared owl	<i>Asio otus</i>	R-W; MC; MDV		X	X	X	X
Western burrowing owl	<i>Athene cunicularia hypugea</i>	SB; MDV		X	X	X	X
Juniper titmouse	<i>Baeolophus griseus</i>	MC; SB; MDV		X	X	X	X
Ferruginous hawk	<i>Buteo regalis</i>	PJ; R-W; MDV; SB		X	X	X	X
Swainson's hawk	<i>Buteo swainsoni</i>	PJ; MDV; SB		X	X	X	X
Greater sage grouse	<i>Centrocercus urophasianus</i>	R-W; SB		X	X	X	X
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	R-W		X	X	X	X
Black tern	<i>Chlidonias niger</i>	R-W		X		X	X
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	R-W; PJ	C		X		
Southwestern willow flycatcher	<i>Epidonax tralii extimus</i>	R-W; PJ	LE		X		
Prairie falcon	<i>Falco mexicanus</i>	MDV		X	X	X	X
Sandhill Crane	<i>Grus canadensis</i>	R-W		X	X	X	X

Table E-1 (Continued)

Common Name <sup>1,2,3,4,5</sup>	Scientific Name	Habitat Type	Special Status Species		Potential for Occurrence within the Planning Area		
			U.S. Fish and Wildlife Service <sup>8</sup>	BLM Sensitive Species	Lincoln County	White Pine County	Nye County
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	R-W; MC; MDV		X	X	X	X
Bald eagle	<i>Haliaeetus leucocephalus</i>	R-W			X	X	X
Yellow-breasted chat	<i>Icteria virens</i>	R-W		X	X	X	X
Least bittern	<i>Ixobrychus exilis</i>	R-W		X	X	X	X
Loggerhead Shrike	<i>Lanius ludovicianus</i>	PJ; SB		X	X	X	X
Black rosy-finch	<i>Leucosticte atrata</i>	SB		X	X	X	X
Lewis's woodpecker	<i>Melanerpes lewis</i>	R-W		X	X	X	X
Long-billed curlew	<i>Numerius americanus</i>	R-W		X	X	X	X
Flammulated owl	<i>Otus flammeolus</i>	PJ; MC/A		X	X	X	X
Phainopepla	<i>Phainopepla nitens</i>	MDV; PJ		X	X		X
Vesper sparrow	<i>Pooecetes gramineus</i>	SB; MDV; PJ		X	X	X	X
Yuma clapper rail <sup>7</sup>	<i>Rallus longirostris yumanensis</i>	R-W	LE				
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>	MC; R-W		X	X	X	X
Crissal thrasher	<i>Toxostoma crissale</i>	MDV; R-W; PJ		X	X		X
Lucy's warbler	<i>Vermivora luciae</i>	R-W; MDV; SB		X	X		X
Gray vireo	<i>Vireo vicinior</i>	PJ; WC; MDV; SB		X	X		X
<b>REPTILES</b>							
Desert tortoise	<i>Gopherus agassizii</i>	MDV	LT		X		
Banded gila monster	<i>Heloderma supectum cinctum</i>	R-W; MDV		X	X		X
Sonoran mountain kingsnake	<i>Lampropeltis pyromelana</i>	PJ; MM; R-W; MC; SB		X	X	X	
Short-horned lizard	<i>Phrynosoma douglassii</i>	SB; MDV		X		X	X
Chuckwalla	<i>Sauromalus obesus</i>	MDV		X	X		X
<b>AMPHIBIANS</b>							
Columbia Spotted Frog	<i>Rana luteiventris</i>	R-W		X	g	g	g
Southwestern toad, Arizona toad	<i>Bufo microscaphus microscaphus</i>	R-W		X	X		
Northern leopard frog	<i>Rana pipens</i>	R-W		X	X	X	X
<b>FISH</b>							
White River desert sucker	<i>Catostomus clarki intermedius</i>	R-W		X	X	X	X
Meadow Valley Wash desert sucker	<i>Catostomus clarki</i> ssp.	R-W		X	X		
Preston White River springfish	<i>Crenichthys baileyi albivallis</i>	R-W		X		X	
White River springfish	<i>Crenichthys baileyi baileyi</i>	R-W	LE		X		
Hiko White River springfish	<i>Crenichthys baileyi grandis</i>	R-W	LE		X		
Moorman White River springfish	<i>Crenichthys baileyi thermophilus</i>	R-W		X			X

Table E-1 (Continued)

Common Name <sup>1,2,3,4,5</sup>	Scientific Name	Habitat Type	Special Status Species		Potential for Occurrence within the Planning Area		
			U.S. Fish and Wildlife Service <sup>6</sup>	BLM Sensitive Species	Lincoln County	White Pine County	Nye County
Railroad Valley springfish	<i>Crenichthys nevadae</i>	R-W	LT				X
Pahrump poolfish	<i>Empetrichthys latos</i>	R-W	LE			X	
Newark Valley tui chub	<i>Gila bicolor newarkensis</i>	R-W		X		X	
Big Smoky Valley tui chub	<i>Gila bicolor ssp.</i>	R-W		X			X
Hot Creek Valley tui chub	<i>Gila bicolor ssp.</i>	R-W		X			X
Railroad Valley tui chub	<i>Gila bicolor ssp.</i>	R-W		X		X	X
Pahranagat roundtail chub	<i>Gila robusta jordani</i>	R-W	LE		X		
Virgin River chub	<i>Gila seminuda</i>	R-W	LE	X	X		
White River spinedace	<i>Lepidomeda albivallis</i>	R-W	LE			X	X
Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>	R-W		X	X		
Big Spring spinedace	<i>Lepidomeda mollispinis pratensis</i>	R-W	LT		X		
Bonneville cutthroat trout	<i>Oncorhynchus clarki utah</i>	R-W		X		X	
Woundfin	<i>Plageopterus argentissimus</i>	R-W	LE				
Relict dace	<i>Relictus solitarius</i>	R-W		X		X	
Big Smoky Valley speckled dace	<i>Rhinichthys osculus lariversi*</i>	R-W		X			X
Meadow Valley Wash speckled dace	<i>Rhinichthys osculus ssp.</i>	R-W		X	X		
Monitor Valley speckled dace	<i>Rhinichthys osculus ssp.*</i>	R-W		X			X
Oasis Valley speckled dace	<i>Rhinichthys osculus ssp.*</i>	R-W		X			X
White River speckled dace	<i>Rhinichthys osculus ssp.</i>	R-W		X		X	X
Pahranagat speckled dace	<i>Rhinichthys osculus velifer</i>	R-W		X	X		
<b>INVERTEBRATES</b>							
White River wood nymph	<i>Cercyonis pegala pluvialis</i>	R-W		X	X	X	X
Baking Powder Flat blue	<i>Euphilotes bernadino minuta</i>	MDV		X		X	
Koret's checkerspot	<i>Euphydryas editha koreti</i>	MC/A		X		X	
Railroad Valley uncas skipper	<i>Hesperia uncas fulvapalla</i>	MDV		X			X
White River uncas skipper	<i>Hesperia uncas grandiosa</i>	R-W		X		X	
Schell Creek mountainsnail	<i>Oreohelix nevadensis</i>	R-W		X		X	
Pahranagat nauconid bug	<i>Pelocoris shoshone shoshone</i>	R-W		X	X		
Steptoe Valley crescent spot	<i>Phyciodes pascoensis arenacolor</i>	R-W		X		X	
Duckwater pyrg	<i>Pyrgulopsis aloba</i>	R-W		X			X
Southern duckwater pyrg	<i>Pyrgulopsis anatine</i>	R-W		X			X
Transverse gland pyrg	<i>Pyrgulopsis cruciglans</i>	R-W		X		X	
Spring Mountains pyrg	<i>Pyrgulopsis deaconi</i>	R-W		X		X	
Landyes pyrg	<i>Pyrgulopsis landeyi</i>	R-W		X		X	
Sub-globose Steptoe Ranch pyrg	<i>Pyrgulopsis orbiculata</i>	R-W		X		X	
Big Warm Spring pyrg	<i>Pyrgulopsis papillata</i>	R-W		X			X

Table E-1 (Continued)

Common Name <sup>1,2,3,4,5</sup>	Scientific Name	Habitat Type	Special Status Species		Potential for Occurrence within the Planning Area		
			U.S. Fish and Wildlife Service <sup>8</sup>	BLM Sensitive Species	Lincoln County	White Pine County	Nye County
Bifid duct pyrg	<i>Pyrgulopsis peculiaris</i>	R-W		X		X	
Southern Steptoe pyrg	<i>Pyrgulopsis sulcata</i>	R-W		X		X	
Duckwater warm springs pyrg	<i>Pyrgulopsis villacampae</i>	R-W		X			X
Grated tryonia	<i>Tryonia clathrata</i>	R-W		X	X		X
<b>PLANTS</b>							
White bearpoppy; Merriam bearpoppy	<i>Arctomecon merriamii</i>	MG; MDV		X	X		X
Eastwood milkweed	<i>Asclepias eastwoodiana</i>	PJ; SB; MDV; MC		X	X	X	X
Sheep Mountain milkvetch; crescent milkvetch	<i>Astragalus amphioxys</i> var. <i>musimonum</i>	MDV		X	X		
Needle Mountains milkvetch; Peck Station milkvetch	<i>Astragalus eurylobus</i>	MDV		X	X		X
Black woollypod; Funeral milkvetch; black milkvetch; Rhyolite milkvetch	<i>Astragalus funereus</i>	MDV; SB		X	X		X
Gilman milkvetch	<i>Astragalus gilmanii</i>	PJ		X	X		
Halfring milkvetch	<i>Astragalus mohavensis</i> var. <i>hemigyus</i>	MDV		X	X		X
Long-calyx eggvetch; pink eggvetch	<i>Astragalus oophorus</i> var. <i>lonchocalyx</i>	PJ; MC/A		X	X		
Currant milkvetch	<i>Astragalus uncialis</i>	MDV		X			X
Cane Spring evening-primrose; suncup	<i>Camissonia megalantha</i>	MDV		X	X		X
Remote rabbitbrush; Pintwater rabbitbrush	<i>Chrysothamnus eremobius</i>	PJ; MM		X	X		
White River catseye; Welsh catseye	<i>Cryptantha welshii</i>	PJ		X	X	X	X
Sanicle biscuitroot; Ripley biscuitroot	<i>Cymopterus ripleyi</i> var. <i>saniculoides</i>	PJ; MDV		X	X		X
Nevada willowherb	<i>Epilobium nevadense</i>	PJ; MC/A		X	X		
Sheep fleabane	<i>Erigeron ovinus</i>	PJ; MC/A		X	X		
Clokey buckwheat	<i>Eriogonum heermannii</i> var. <i>clokeyi</i>	MDV		X	X		X
Scarlet buckwheat	<i>Eriogonum phoeniceum</i>	PJ		X	X		
Sunnyside green gentian <sup>6</sup>	<i>Frasera gypsicola</i>	MDV		X			X
Rock purpusia	<i>Ivesia arizonica</i> var. <i>saxosa</i>	PJ; SB		X	X		X
Waxflower	<i>Jamesia tetrapetala</i>	MM		X	X	X	X
Pioche blazingstar	<i>Mentzelia argillicola</i>	SB; MDV		X	X		
Tiehm blazingstar	<i>Mentzelia tiehmii</i>	SB; MDV		X	X		X
Tunnel Springs beardtongue	<i>Penstemon concinnus</i>	PJ		X	X	X	
Beatley scorpion plant	<i>Phacelia beatleyae</i>	MDV		X	X		X
Overlooked phacelia; Clarke phacelia	<i>Phacelia filiae</i>	MDV		X	X		X
Parish phacelia; playa phacelia	<i>Phacelia parishii</i>	MDV		X	X	X	X
Pygmy poreleaf	<i>Porophyllum pygmaeum</i>	PJ; MDV		X	X		
Schlesser pincushion; Schlesser fishhook cactus	<i>Sclerocactus schlesseri</i>	MDV		X	X		
Jan's catchfly; Nachlinger catchfly	<i>Silene nachlingerae</i>	MC/A		X		X	X

Table E-1 (Continued)

Common Name <sup>1,2,3,4,5</sup>	Scientific Name	Habitat Type	Special Status Species		Potential for Occurrence within the Planning Area		
			U.S. Fish and Wildlife Service <sup>8</sup>	BLM Sensitive Species	Lincoln County	White Pine County	Nye County
Railroad Valley globemallow; Jones globemallow	<i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i>	PJ; MG		X			X
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	R-W	LT		X		
Charleston grounddaisy	<i>Townsendia jonesii</i> var. <i>tumulosa</i>	PJ; MDV; SB		X			X
Currant Summit clover	<i>Trifolium andinum</i> var. <i>podocephalum</i>	PJ		X	X		X
Rock violet	<i>Viola lithion</i>	MC/A		X		X	X

Sources:

<sup>1</sup> BLM Nevada Sensitive Species list, July 29, 2003; Nevada Department of Wildlife 2005a.

<sup>2</sup> Nevada Heritage Program shape files, 2004.

<sup>3</sup> U.S. Fish and Wildlife Service species list, 2004. The Ely Field Office is maintaining ongoing coordination with the U.S. Fish and Wildlife Service offices in Reno and Las Vegas to ensure that any additions, deletions, or changes in species status will be updated in the RMP/EIS.

<sup>4</sup> Nevada Natural Heritage Program Detailed Rare Plant and Animal Species list, March 18, 2004.

<sup>5</sup> Nevada Natural Heritage Program Rare Plant Atlas, June 2001.

<sup>6</sup> Because this species is on the U.S. Fish and Wildlife Service species list as a Species of Concern, it is being retained.

<sup>7</sup> This species does not occur within the planning area boundary, but has been documented along the Virgin River.

<sup>8</sup> U.S. Fish and Wildlife Service Status:

LE – Federally listed as endangered.

LT – Federally listed as threatened.

C – Federal candidate species.

<sup>9</sup> No documented occurrences within the planning area.

Habitat Type

PJ – Pinyon-Juniper Woodlands

A – Aspen

C – High-elevation Conifer

R-W – Riparian-Wetlands

MM – Mountain Mahogany

SB – Sagebrush

SDS – Salt Desert Shrub

MDV – Mojave Desert Vegetation

NNS – Non-native Seedings

MC – Mixed Conifer

MG – Mixed Grasses

**APPENDIX F**  
**RESOURCE PROGRAM BEST MANAGEMENT PRACTICES**

**APPENDIX F  
RESOURCE PROGRAM BEST MANAGEMENT PRACTICES**

Best management practices are management actions that have been developed by agency, industry, scientific, and/or working groups as methods for reducing environmental impacts to certain resources associated with certain kinds of activity. Appendix F in the Proposed Resource Management Plan (RMP)/Final Environmental Impact Statement (EIS) presents the best management practices for the Proposed RMP. They have been organized in this appendix by the source of the best management practice. Section 1 and Section 2 have been developed by the Ely Field Office specifically to guide management in the decision area. Section 3 contains the Wind Energy EIS best management practices, which was developed by the BLM Washington Office and is applied nationally.

Best management practices typically are implemented at the discretion of the BLM Authorized Officer (the Field Manager or his/her designee) at the activity plan or project-specific level. The impact analysis in any project-specific National Environmental Policy Act (NEPA) document would be based on the reduction of impacts afforded by the application of those best management practices that are appropriate for the specific project under review. Best management practices may be added, deleted, or modified through plan maintenance as new and better information dictates.

**APPENDIX F, SECTION 1**  
**RESOURCE PROGRAM BEST MANAGEMENT PRACTICES**

**APPENDIX F, SECTION 1  
RESOURCE PROGRAM BEST MANAGEMENT PRACTICES**

**1.1 Introduction**

Section 1 contains best management practices developed by the Ely Field Office. They have been organized by the primary resource the best management practices would benefit or protect. Each best management practice could actually be implemented by a number of resource programs within the Field Office. Between the Draft RMP/EIS and the Proposed RMP/Final EIS, certain best management practices have been incorporated into Chapter 2.0 as management actions, edited for clarity, or deleted because they are no longer appropriate. Best management practices would be implemented at the discretion of the Ely Field Office on a project-specific basis, depending on the specific characteristics of the project area and the types of disturbance being proposed. They may not be appropriate to implement in all cases. It has been assumed for impact analysis that best management practices would be implemented wherever appropriate.

## **APPENDIX F, SECTION 1**

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### **1.2 Air Resources**

- 1.2.1 Use dust abatement techniques on unpaved, unvegetated surfaces to minimize airborne dust.
- 1.2.2 Post and enforce speed limits (e.g., 25 miles per hour) to reduce airborne fugitive dust.
- 1.2.3 Cover construction materials and stockpiled soils if they are a source of fugitive dust.
- 1.2.4 Use dust abatement techniques before and during surface clearing, excavation, or blasting activities.

### **1.3 Water Resources**

- 1.3.1 Avoid the application of fire retardant or foam within 300 feet of a stream channel or waterway, when possible, except for the protection of life and property. Aerial application and use of retardants and foams would be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.
- 1.3.2 Fire engines that have surfactant foam mixes in tanks must be fitted with an anti-siphon (back flow protection valve) if filled directly from a stream channel.
- 1.3.3 Construct a containment barrier around all pumps and fuel containers utilized within 100 feet (30.5 meters) of a stream channel. The containment barrier would be of sufficient size to contain all fuel being stored or used on site.
- 1.3.4 Prior to use on lands administered by the Ely Field Office, all fire suppression equipment from outside the planning area utilized to extract water from lakes, streams, ponds, or spring sources (e.g., helicopter buckets, draft hoses, and screens) will be thoroughly rinsed to remove mud and debris and then disinfected to prevent the spread of invasive aquatic species. Rinsing equipment with disinfectant solution will not occur within 100 feet of natural water sources (i.e., lakes, streams, or springs). Ely suppression equipment utilized to extract water from water sources known to be contaminated with invasive aquatic species, as identified by the U.S. Fish and Wildlife Service and Nevada Department of Wildlife, also will be disinfected prior to use elsewhere on lands administered by the Ely Field Office.
- 1.3.5 Do not dump surfactant foam mixes from fire engines within 600 feet of a stream channel.
- 1.3.6 Do not conduct fire retardant mixing operations within 600 feet of a stream channel.
- 1.3.7 Remove all modifications made to impound or divert stream flow by mechanical or other means to facilitate extraction of water from a stream for fire suppression efforts when suppression efforts are completed.

- 1.3.8 When drafting or dipping water during fire operations, continuously monitor water levels at the site that water is being removed from. Do not allow water extraction to exceed the ability of the recharge inflow to maintain the water levels that exist at the time initial attack efforts began. If the water level drops below this predetermined level, all water removal would cease immediately until water levels are recharged.
- 1.3.8 When possible, do not cross or terminate fire control lines at the stream channel. Terminate control lines at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.
- 1.3.10 Construct access roads and fords that cross stream channels to BLM road standards.
- 1.3.11 Do not construct new roads or mechanical fire control lines or improve existing roads within 300 feet of a stream channel unless authorized by the BLM Field Manager or Authorized Officer.
- 1.3.12 Limit stream crossings on travel routes and trails to the minimal number necessary to minimize sedimentation and compaction. The BLM Authorized Officer will determine if any impacts need to be rehabilitated by the permittee.
- 1.3.13 Conduct mixing of herbicides and rinsing of herbicide containers and spray equipment only in areas that are a safe distance from environmentally sensitive areas and points of entry to bodies of water (storm drains, irrigation ditches, streams, lakes, or wells).
- 1.3.14 A water well may be accepted by the BLM Ely Field Office upon completion of operations. The BLM authorized officer will make the determination whether to accept the well based upon the submission of the well completion forms and relevant hydrogeologic data reports. The well must be installed by drillers licensed by the state of Nevada according to specifications in Nevada Revised Statutes Title 48, Chapter 534.

#### **1.4 Soil Resources**

- 1.4.1 Require the use of specialized low-surface impact equipment (e.g., balloon tired vehicles) or helicopters, as determined by the BLM Authorized Officer, for activities in off-road areas where it is deemed necessary to protect fragile soils and other resource values.
- 1.4.2 During periods of adverse soil moisture conditions caused by climatic factors such as thawing, heavy rains, snow, flooding, or drought, suspend activities on existing roads that could create excessive surface rutting. When adverse conditions exist, the operator would contact the BLM Authorized Officer for an evaluation and decision based on soil types, soil moisture, slope, vegetation, and cover.
- 1.4.3 When preparing the site for reclamation, include contour furrowing, terracing, reduction of steep cut and fill slopes, and the installation of water bars, as determined appropriate for site-specific conditions.

## **APPENDIX F, SECTION 1**

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1.4.4 Upon completion or temporary suspension of mining operations, backfill all holes and trenches and re-contour the pit to the natural slope, if possible, with pit walls greater than 3 feet in height knocked down and sloped at 3 horizontal to 1 vertical or to the original topography, whichever is less.

1.4.5 Restoration requirements include reshaping, re-contouring, and/or resurfacing with topsoil, installation of water bars, and seeding on the contour. Removal of structures such as culverts, concrete pads, cattle guards, and signs would usually be required. Fertilization and/or fencing of the disturbance may be required. Additional erosion control measures (e.g., fiber matting and barriers) to discourage road travel may be required.

### **1.5 Vegetation Resources**

1.5.1 Where seeding is required, use appropriate seed mixture and seeding techniques approved by the BLM Authorized Officer.

1.5.2 The BLM Authorized Officer will specify required special handling and recovery techniques for Joshua trees, yucca, and some cactus in the southern part of the planning area on a site-specific basis.

1.5.3 Keep removal and disturbance of vegetation to a minimum through construction site management (e.g., using previously disturbed areas and existing easements, limiting equipment/materials storage and staging area sites, etc.).

1.5.4 Generally, conduct reclamation with native seeds that are representative of the indigenous species present in the adjacent habitat. Document rationale for potential seeding with selected nonnative species. Possible exceptions would include use of nonnative species for a temporary cover crop to out-complete weeds. In all cases, ensure seed mixes are approved by the BLM Authorized Officer prior to planting.

1.5.5 Certify that all interim and final seed mixes, hay, straw, and hay/straw products are free of plant species listed on the Nevada noxious weed list.

1.5.6 An area is considered to be satisfactorily reclaimed when all disturbed areas have been recontoured to blend with the natural topography, erosion has been stabilized, and an acceptable vegetative cover has been established. Use the Nevada Guidelines for Successful Revegetation prepared by the Nevada Division of Environmental Protection, the BLM, and the U.S. Department of Agriculture Forest Service (or most current revision or replacement of this document) to determine if revegetation is successful.

1.5.7 Reclamation bond release criteria would include the following:

The perennial plant cover of the reclaimed area would equal or exceed perennial cover of selected comparison areas (normally adjacent habitat). If the adjacent habitat is severely disturbed, an ecological site description may be used as a cover standard. Cover is normally crown cover as estimated by the point intercept method. Selected cover can be determined using a method as described in Sampling Vegetation Attributes, Interagency Technical Reference, 1996, BLM/RS/ST-96/002+1730. The reclamation plan for the area project would identify the site-specific release criteria and associated statistical methods in the reclamation plan or permit.

1.5.8 Utility companies will manage vegetation in their rights-of-way for safe and reliable operation while maintaining vegetation and wildlife habitat.

1.5.9 Respread weed-free vegetation removed from the right-of-way to provide protection, nutrient recycling, and seed source.

**1.6 Fish and Wildlife**

1.6.1 Install wildlife escape ramps in all watering troughs, including temporary water haul facilities, and open storage tanks. Pipe the overflow away from the last water trough on an open system to provide water at ground level.

1.6.2 As appropriate, mark certain trees on BLM-administered lands for protection as wildlife trees.

1.6.3 Consider seasonal distribution of large wildlife species when determining methods used to accomplish weed and insect control objectives.

1.6.4 Protect active raptor nests in undisturbed areas within 0.25 mile of areas proposed for vegetation conversion using species-specific protection measures. Inventory areas containing suitable nesting habitat for active raptor nests prior to the initiation of any project.

1.6.5 When used to pump water from any pond or stream, screen the intake end of the draft hose to prevent fish from being ingested. Screen opening size would be a maximum of 3/16 inch (4.7 millimeters).

1.6.6 Special recreation use permittees will take action to ensure that race participants and spectators do not harass wildlife.

**1.7 Special Status Species**

1.7.1 Avoid line-of-sight views between the power poles along powerlines and sage grouse leks, whenever feasible.

## **APPENDIX F, SECTION 1**

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- 1.7.2 Use current science, guidelines, and methodologies (Avian Power Line Interaction Committee 1994, 1996, 2005) for all new and existing powerlines to minimize raptor and other bird electrocution and collision potential.
- 1.7.3 When managing weeds in areas of special status species, carefully consider the impacts of the treatment on such species. Wherever possible, hand spraying of herbicides is preferred over other methods.
- 1.7.4 Do not conduct noxious and invasive weed control within 0.5 mile of nesting and brood rearing areas for special status species during the nesting and brood rearing season.
- 1.7.5 To the greatest extent possible, survey all mine adits and shafts slated for closure for bat presence and use prior to being closed. Minimize impacts to bat roosts and bat habitat through the use of current science, guidelines, and methodologies when closing and abandoning mine adits.
- 1.7.6 Develop grazing systems to minimize conflicts with special status species habitat.
- 1.7.7 For streams currently occupied by any special status species, do not allow extraction of water from ponds or pools if stream inflow is minimal (i.e., during drought situations) and extraction of water would lower the existing pond or pool level.
- 1.7.8 When new spring developments are constructed on BLM lands and BLM has the authority to design the project, the source and surrounding riparian area will be fenced, the spring will be developed in a manner that leaves surface water at the source and maintains the associated riparian area, water will be provided outside the enclosure in a manner that provides drinking water for large ungulates, wild horses, and/or livestock so they are less likely to break into the enclosure.
- 1.7.9 Salt and mineral supplements:
- Base placement of salt and mineral supplements on site-specific assessment.
  - Normally place salt and mineral supplements at least 0.5 mile away from riparian areas, sensitive sites, populations of special status plant species, cultural resource sites.
  - Place salt at least 0.5 mile from any water source including troughs.
  - Place salt and mineral supplements at least 1 mile from sage grouse leks.

**1.7.9 Water hauling:**

- Place water haul sites at least 0.5 mile away from riparian areas, cultural sites, and special status species locations.
- Limit water hauling to existing roads when possible.

**1.8 Wild Horses**

1.8.1 To protect wild horses and wildlife flag all new fences every 16 feet with white flagging that is at least 1 inch wide and has at least 12 inches hanging free from the top wire of the fence.

1.8.2 If a project involves heavy or sustained traffic, require road signs for safety and protection of wild horses and wildlife.

**1.9 Cultural Resources**

1.9.1 Ensure that all activities associated with the undertaking, within 100 meters of the discovery, are halted and the discovery is appropriately protected, until the BLM authorized officer issues a Notice to Proceed. A Notice to Proceed may be issued by the BLM under any of the following conditions:

- Evaluation of potentially eligible resource(s) results in a determination that the resource(s) are not eligible;
- The fieldwork phase of the treatment option has been completed; and
- The BLM has accepted a summary description of the fieldwork performed and a reporting schedule for that work.

1.9.2 The operator will inform all persons associated with the project that knowingly disturbing cultural resources (historic or archaeological) or collecting artifacts is illegal.

1.9.3 The BLM may approve cross-country operations of seismic trucks and support vehicles on bare frozen ground or over sufficient snow depth (vehicle traffic does not reveal the ground) so as to prevent surface disturbance.

1.9.4 Perform viewshed reclamation when the setting of a site contributes to the significance of the property.

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### **1.10 Paleontological Resources**

- 1.10.1 When paleontological resources of potential scientific interest are encountered (including all vertebrate fossils and deposits of petrified wood), leave them intact and immediately bring them to the attention of the BLM Authorized Officer.

### **1.11 Visual Resources**

- 1.11.1 On industrial facilities authorized by the Ely Field Office, utilize anti-glare light fixtures to limit light pollution.
- 1.11.2 During the implementation of vegetation treatments, create irregular margins around treatment areas to better maintain the existing scenic character of the landscape.
- 1.11.3 When feasible, bury utility lines on public land when in the viewshed of residential or community development.

### **1.12 Travel Management and Off-highway Vehicle Use**

- 1.12.1 Design access roads requiring construction with cut and fill to minimize surface disturbance and take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material would be deposited, resource concerns, and visual contrast. Avoid construction of access roads on steep hillsides and near watercourses where alternate routes provide adequate access.
- 1.12.2 Where adverse impacts or safety considerations warrant, limit or prohibit public access when authorizing specific routes to areas or sites under permit or lease.

### **1.13 Recreation**

- 1.13.1 Do not allow surface or underground disturbance to occur within 100 yards (horizontally or vertically) of known cave resources.
- 1.13.2 Where appropriate, do not allow ground disturbing activities within 100 yards of cave entrances, drainage areas, subsurface passages, and developed recreation sites. Do not dispose of waste material or chemicals in sinkholes or gates by cave entrances. If during construction activities any sinkholes or cave openings are discovered, cease construction activities and notify the BLM authorized officer.

## 1.14 Livestock Grazing

### 1.14.1 Water troughs

- Place troughs connected with spring developments outside of riparian and wetland habitats to reduce livestock trampling damage to wet areas.
- Control trough overflow at springs with float valves or deliver the overflow back into the native channel.

### 1.14.2 Based on allotment situations and circumstances associated with livestock grazing and multiple use management, implement any or all of the following appropriate management practices on winterfat dominated ecological sites.

- Develop grazing systems to control or rest grazing use on winterfat sites after March 1 or when the critical growing season begins. Allow spring grazing use during the critical growing period if a grazing rotation system that provides rest from grazing during the critical growing period at least every other year for all areas is in place. Utilization during the critical growth period should not exceed 35 percent under any circumstances.
- Place salt and supplements at least 0.5 mile away from winterfat dominated sites. Base placement on site-specific assessment and characteristics such as riparian, topography, cultural, special status species, etc.
- Locate sheep bedding grounds and camps at least 0.5 mile away from winterfat dominated sites. Base placement on site-specific assessment and characteristics such as riparian, topography, cultural, special status species, etc.
- Locate water haul sites at least 0.5 mile away from winterfat dominated sites. Base placement on site-specific assessment and characteristics such as riparian, topography, cultural, special status species, etc.
- Construct livestock reservoirs away from winterfat dominated sites. Base placement on site-specific assessment and characteristics such as riparian, topography, cultural, special status species, etc.
- If water wells are approved to be drilled in winterfat dominated sites, strive to pipe the water at least 0.5 mile away from winterfat dominated sites. Base placement on site-specific assessment and characteristics such as riparian, topography, cultural, special status species, etc.

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### **1.15 Mineral Extraction**

- 1.15.1 Applications for permit to drill would follow the best management practices as outlined in the BLM oil and gas Gold Book ([http://www.blm.gov/wo/st/en/prog/energy/oil\\_and\\_gas/best\\_management\\_practices/gold\\_book.html](http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/gold_book.html)), as well as on-shore regulations, individual surface use plans, and conditions of approval that may be part of the Record of Decision for EISs or Decision Records for environmental assessments/Findings of No Significant Impacts, Documentation of NEPA Adequacy, and Categorical Exclusions prepared for site-specific projects.
- 1.15.2 Do not permit blasting if it would be detrimental to the significant characteristics of archeological or historical values, recreation areas, known caves, water wells, or springs.
- 1.15.3 Notify the BLM authorized officer within 5 days of completion of reclamation work so that timely compliance inspections can be completed.

### **1.16 Watershed Management**

- 1.16.1 Manage activities, uses, and authorizations on burned areas to best meet resource management objectives established for the area in specific stabilization, restoration, or activity plans. The BLM authorized officer may open areas to livestock grazing based upon those considerations.

### **1.17 Fire Management**

- 1.17.1 Notify valid existing land users (such as mine claimants, holders of rights-of-way, and livestock permittees) prior to implementation of prescribed fires that may affect their investments.
- 1.17.2 Remove vegetation, where appropriate, to protect facilities (e.g., range improvements, communication sites, and recreation sites).
- 1.17.3 Within the area of operation, every effort will be made to prevent, control, or suppress any fire. Fire-fighting equipment may be required to be on site while operations are in progress, depending on hazards inherent in the type of operation and fire hazard levels. Report uncontrolled fires immediately to the BLM Ely Field Office Manager or Authorized Officer. The BLM Fire Dispatch telephone number is (775) 289-1925 or 1-800-633-6092. After working hours, call 911 or the White Pine County Sheriff's Office at (775) 289-8801, the Lincoln County Sheriff's Office at (775) 962-5151, or the Nye County Sheriff's Office at (775) 482-8101.

### **1.18 Noxious and Invasive Weed Management**

- 1.18.1 Control or restrict the timing of livestock movement to minimize the transport of livestock-borne noxious weed seeds, roots, or rhizomes between weed-infested and weed-free areas.
- 1.18.2 When maintaining unpaved roads on BLM-administered lands, avoid the unnecessary disturbance of adjacent native vegetation and the spread of weeds. Grade road shoulders or barrow ditches

only when necessary to provide for adequate drainage. Minimize the width of grading operations. The BLM Authorized Officer will meet with equipment operators to ensure that they understand this objective.

### **1.19 Health and Safety**

- 1.19.1 Consider nozzle type, nozzle size, boom pressure, and adjuvant use and take appropriate measures for each herbicide application project to reduce the chance of chemical drift.
- 1.19.2 All applications of approved pesticides will be conducted only by certified pesticide applicators or by personnel under the direct supervision of a certified applicator.
- 1.19.3 Prior to commencing any chemical control program, and on a daily basis for the duration of the project, the certified applicator will provide a suitable safety briefing to all personnel working with or in the vicinity of the herbicide application. This briefing will include safe handling, spill prevention, cleanup, and first aid procedures.
- 1.19.4 Store all pesticides in areas where access can be controlled to prevent unauthorized/untrained people from gaining access to the chemicals.
- 1.19.5 Do not apply pesticides within 440 yards (0.25 mile) of residences without prior notification of the resident.
- 1.19.6 Areas treated with pesticides will be adequately posted to notify the public of the activity and of safe re-entry dates, if a public notification requirement is specified on the label of the product applied. The public notice signs will be at least 8 1/2" x 11" in size and will contain the date of application and the date of safe re-entry.
- 1.19.7 The recreation permittee will post warning signs at all known mine shafts and other hazardous areas that occur within 100 feet of a race course or pit/spectator area and will verbally inform race participants of all hazards at the pre-race meeting.
- 1.19.8 The recreation permittee will assume liability for and clean up of any and all releases of hazardous substances or oil (more than one quart) disposed on public land as defined in the National Oil and Hazardous Substances Contingency Plan (Title 40 Code of Federal Regulations Subpart 300). The permittee will immediately notify the BLM Authorized Officer of any and all releases of hazardous substances or oil (more than one quart) on public land.
- 1.19.9 Properly dispose of all tailings, dumps, and deleterious materials or substances. Take measures to isolate, control, and properly dispose of toxic and hazardous materials.
- 1.19.10 Remove and properly dispose of all trash, garbage, debris, and foreign matter. Maintain the disposal site and leave it in a clean and safe condition. Do not allow burning at the site.

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- 1.19.11 Do not drain oil or lubricants onto the ground surface. Immediately clean up any spills under 25 gallons; clean up spills over 25 gallons as soon as possible and report the incident to the BLM Authorized Officer and Nevada Division of Environmental Protection.
- 1.19.12 The operator will work with the BLM Authorized Officer on the containment of drilling fluids and drill hole cuttings. Adequately fence, post, or cover mud and separation pits, and hazardous material storage areas.
- 1.19.13 Locate powder magazines at least 0.25 mile from traveled roads. Attend loaded shot holes and charges at all times. Use explosives according to applicable federal and state regulations.
- 1.19.14 Containerize petroleum products such as gasoline, diesel fuel, helicopter fuel, and lubricants in approved containers. Properly store hazardous materials in separate containers to prevent mixing, drainage, or accidents.

**APPENDIX F, SECTION 2  
FLUID MINERALS LEASE NOTICES AND STIPULATIONS**

APPENDIX F, SECTION 2  
FLUID MINERALS LEASE NOTICES AND STIPULATIONS

**LEASE NOTICES**

**Cultural Sites**

Lands within this lease contain areas of known high potential for cultural resources. Properties known at the time of lease announcement that are listed on or eligible for the National Register of Historic Places will be avoided, where possible, by means of lease exclusions or by limits on surface use. The preferred avoidance option is to exclude areas containing National Register of Historic Places eligible sites from leasing and all forms of surface disturbance. Cultural sites not avoided may require consultation with State Historic Preservation Officer and treatment plans.

**Historic Sites**

Lands within this lease are in proximity to or contain portions of the Pony Express National Historic Trail, the Hastings Cutoff, the Lincoln Highway, or the Osceola Ditch. Oil and gas exploration and development activities within 1 mile of these sites must undergo a visual assessment in conjunction with environmental review to determine if the activity will adversely affect the visual integrity. Appropriate mitigation will take place as necessary to maintain the management corridor in as natural a condition as possible.

**Desert Tortoise Habitat**

Lands within this lease will require Section 7 consultation prior to any surface disturbance in desert tortoise habitat. The BLM must ensure that the impacts from the operation do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. The operator, U.S. Fish and Wildlife Service, and the BLM also must reach concurrence that the proposed actions are below the jeopardy or adverse modification threshold. If it is determined that through the review of the plan of operation and the use of mitigation measures that the operation is not below the jeopardy or adverse modification threshold, the project would not go forward.

**LEASE TIMING STIPULATIONS**

**Resource:** Desert Tortoise Habitat

**Stipulation:** Timing Limitation. No surface activity would be allowed within desert tortoise habitat from March 1 through October 31.

**Objective:** To protect desert tortoise during the most active period to maintain desert tortoise populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with U.S. Fish and Wildlife Service, if the operator submits a plan that demonstrates that impacts from the proposed action would not adversely affect desert tortoise habitat.

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**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with U.S. Fish and Wildlife Service, determines that portions of the area can be occupied without adversely affecting desert tortoise. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with U.S. Fish and Wildlife Service, determines that the entire leasehold is no longer occupied by desert tortoise.

**Resource:** **Sage Grouse Nesting Habitat Associated with Leks**

**Stipulation:** Timing Limitation. No surface activity would be allowed within two miles of a sage grouse lek from March 1 through May 15 (June 15).

**Objective:** To protect sage grouse nesting activities associated with leks to maintain sage grouse populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be occupied without adversely affecting sage grouse nesting activity. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold no longer contains nesting habitat for sage grouse.

**Resource:** **Sage Grouse Winter Range**

**Stipulation:** Timing Limitation. No surface activity would be allowed within winter range for sage grouse from November 1 through March 31.

**Objective:** To protect sage grouse from disturbance during the crucial winter period to maintain sage grouse populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area no longer contain sage grouse winter habitat. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold no longer contains winter range for sage grouse.

**Resource:** **Raptor Nest Sites**

**Stipulation:** Timing Limitation. No surface activity would be allowed from May 1 through July 15 within 0.5 mile of a raptor nest site which has been active within the past five years.

**Objective:** To protect raptor nesting activities to maintain existing populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be occupied without adversely affecting raptor nesting activity. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold no longer contains raptor nest sites.

**Resource:** **Big Game Calving/Fawning/Kidding/Lambing Grounds**

**Stipulation:** Timing Limitation. No surface activity would be allowed within big game calving/fawning/kidding/lambing grounds from April 15 through June 30.

**Objective:** To protect elk, mule deer, pronghorn antelope, and Rocky Mountain bighorn sheep from disturbance during calving, fawning, kidding, and lambing to maintain wildlife populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be

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occupied without adversely affecting big game calving, fawning, kidding, and lambing. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold no longer contains big game calving/fawning/kidding/lambing grounds.

**Resource:** **Big Game Crucial Winter Range**

**Stipulation:** Timing Limitation. No surface activity would be allowed within big game crucial winter range from November 1 through March 31.

**Objective:** To protect elk, mule deer, and pronghorn antelope from disturbance during the crucial winter period to maintain wildlife populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area no longer contain winter habitat. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold no longer contains crucial winter range for big game.

**Resource:** **Desert Bighorn Sheep Habitat**

**Stipulation:** Timing Limitation. No surface activity would be allowed within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.

**Objective:** To protect desert bighorn sheep from disturbance during lambing and the crucial hot summer months to maintain existing populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be occupied without adversely affecting desert bighorn sheep. The dates for the timing

restriction may be modified if new information indicates the dates are not valid for the leasehold.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the entire leasehold is no longer occupied by desert bighorn sheep.

**LEASE – NO SURFACE OCCUPANCY STIPULATIONS**

**Resource:** Desert Tortoise ACEC

**Stipulation:** No surface occupancy would be allowed within the Beaver Dam Slope ACEC or the Mormon Mesa ACEC.

**Purpose:** These areas encompass the habitat which has been determined to be critical to the survival of the desert tortoise population. The desert tortoise is a listed species under the Endangered Species Act.

**Exception:** The authorized officer may grant an exception (allow surface occupancy) upon completion of formal consultation with the U.S. Fish and Wildlife Service that yields a no-jeopardy opinion if a plan of development is submitted that does not significantly impact tortoise habitats or populations. The plan of development must demonstrate no significant impact will occur through mitigation of impacts, compensation (in accordance with BLM policy), and restoration of the land to pre-disturbance condition.

**Modification:** None

**Waiver:** None

**Resource:** Sage Grouse Leks

**Stipulation:** No surface occupancy. No surface use would be allowed within 0.25 mile of a sage grouse lek.

**Objective:** To protect sage grouse breeding activities and the integrity of the habitat associated with sage grouse leks to maintain sage grouse populations.

**Exception:** An exception to this stipulation may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the operator submits a plan that demonstrates that impacts from the proposed action would not affect breeding activity nor degrade the integrity of the habitat associated with the sage grouse lek.

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**Modification:** The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be occupied without adversely affecting the sage grouse lek.

**Waiver:** The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife, determines that the lek has been inactive for at least five consecutive years or the habitat has changed such that there is no likelihood the lek would become active.

**Resource:** **Threatened and Endangered and Sensitive Species Sites**

**Stipulation:** No ground disturbance activities would be allowed within the boundaries of areas known to contain unusually high concentrations of threatened, endangered, or BLM or State sensitive species. No surface occupancy would be allowed within the:

Baking Powder Flat Proposed ACEC  
Condor Canyon Proposed ACEC  
Highland Range Proposed ACEC  
Lower Meadow Valley Wash Proposed ACEC  
Schlesser Pincushion Proposed ACEC  
Shoshone Ponds Proposed ACEC  
Swamp Cedar Proposed ACEC  
White River Valley Proposed ACEC

**Purpose:** To protect threatened and endangered and sensitive species.  
Avoid BLM-approved activities that contribute to a need to list a species or its habitat as threatened or endangered.

**Exception:** None

**Modification:** None

**Waiver:** None

**Resource:** **Cultural Sites**

**Stipulation:** No ground disturbance activities would be allowed within the boundaries of cultural properties and archaeological/historic districts determined to be eligible or potentially eligible to the National Register of Historic Places. No surface occupancy would be allowed within the:

Baker Archeological Site Proposed ACEC  
Hendry's Creek/Rock Animal Corral Proposed ACEC  
Honeymoon Hill/City of Rocks Proposed ACEC

Mount Irish Proposed ACEC  
Pahroc Rock Art Proposed ACEC  
Rose Guano Bat Cave Proposed ACEC  
Shooting Gallery Proposed ACEC  
Snake Creek Indian Burial Cave Proposed ACEC  
Sunshine Locality National Register District  
White River Archeological District

**Purpose:** To protect significant cultural properties and archaeological districts and their settings.

**Exception:** None.

**Modification:** None.

**Waiver:** None.

**Resource:** **Paleontological Sites**

**Stipulation:** No ground disturbance activities would be allowed within the boundaries of areas of known paleontological sites/locales. No surface occupancy would be allowed within the:

Andies Mine Trilobite Site

**Purpose:** To preserve and protect significant vertebrate fossils and paleontological sites.

**Exception:** None

**Modification:** None

**Waiver:** None

**Resource:** **Natural, Scenic, and Recreation Sites**

**Stipulation:** No ground disturbance activities would be allowed within the boundaries of areas that exhibit exceptional natural, scenic, or recreational values. No Surface Occupancy would be allowed within the:

Ash Springs Proposed Withdrawal  
Blue Mass Scenic Area Proposed ACEC  
Cleve Creek Recreation Site  
Egan Crest Trailhead  
Garnet Hill  
Illipah Reservoir  
Kirch Wildlife Management Area

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Sacramento Pass Recreation Site  
Ward Mountain Recreation Site  
White Pine County Shooting Range

**Purpose:** To protect the public's opportunity for quality recreation experiences at those sites developed for those purposes.  
To prevent user conflicts and incompatible uses in areas with high recreational values and significant amounts of recreational activity.  
To control the visual impacts of activities and facilities within acceptable levels.

**Exception:** None

**Modification:** None

**Waiver:** A waiver may be granted for a site if it is moved or eliminated.

**Resource:** **BLM Facilities**

**Stipulation:** No surface occupancy would be allowed within the areas proposed for withdrawal at:

Caliente Field Station  
Pony Springs Fire Station

**Purpose:** To protect the operation and maintenance of the BLM's facilities.

**Exception:** None

**Modification:** None

**Waiver:** None

**APPENDIX F, SECTION 3  
BLM WIND ENERGY DEVELOPMENT PROGRAM POLICIES AND  
BEST MANAGEMENT PRACTICES**

## **BLM WIND ENERGY DEVELOPMENT PROGRAM POLICIES AND BEST MANAGEMENT PRACTICES (BMPS)**

The BLM's Wind Energy Development Program will establish a number of policies and BMPs, provided below, regarding the development of wind energy resources on BLM-administered public lands. The policies and BMPs will be applicable to all wind energy development projects on BLM-administered public lands. The policies address the administration of wind energy development activities, and the BMPs identify required mitigation measures that would need to be incorporated into project-specific Plans of Development (PODs) and right-of-way (ROW) authorization stipulations. Additional mitigation measures will be applied to individual projects, in the form of stipulations in the ROW authorization as appropriate, to address site-specific and species-specific issues.

These policies and BMPs were formulated through preparation of the Final Wind Energy PEIS (BLM 2005). The PEIS included detailed, comprehensive analysis of the potential impacts of wind energy development and relevant mitigation measures; reviews of existing, relevant mitigation guidance; and reviews of comments received during scoping and public review of the Draft PEIS.

### **A.1 Policies**

- The BLM will not issue ROW authorizations for wind energy development on lands on which wind energy development is incompatible with specific resource values. Lands that will be excluded from wind energy site monitoring and testing and development include designated areas that are part of the National Landscape Conservation System (NLCS) (e.g., Wilderness Areas, Wilderness Study Areas, National Monuments, NCAs,<sup>1</sup> Wild and Scenic Rivers, and National Historic and Scenic Trails) and Areas of Critical Environmental Concern (ACECs).<sup>2</sup> Additional areas of land may be excluded from wind energy development on the basis of findings of resource impacts that cannot be mitigated and/or conflict with existing and planned multiple-use activities or land use plans.
- To the extent possible, wind energy projects shall be developed in a manner that will not prevent other land uses, including minerals extraction, livestock grazing, recreational use, and other ROW uses.

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<sup>1</sup> Wind energy development is permitted in one NCA, the California Desert Conservation Area (CDCA), in accordance with the provisions of the *California Desert Conservation Area Plan 1980, as Amended* (BLM 1999).

<sup>2</sup> Although the MPDS developed for this PEIS (Section 2.2.1 and Appendix B) did not exclude all of these lands at the screening level, they will be excluded from wind energy development.

- Entities seeking to develop a wind energy project on BLM-administered lands shall consult with appropriate federal, state, and local agencies regarding specific projects as early in the planning process as appropriate to ensure that all potential construction, operation, and decommissioning issues and concerns are identified and adequately addressed.
- The BLM will initiate government-to-government consultation with Indian Tribal governments whose interests might be directly and substantially affected by activities on BLM-administered lands as early in the planning process as appropriate to ensure that construction, operation, and decommissioning issues and concerns are identified and adequately addressed.
- Entities seeking to develop a wind energy project on BLM-administered lands, in conjunction with BLM Washington Office (WO) and Field Office (FO) staff, shall consult with the U.S. Department of Defense (DoD) regarding the location of wind power projects and turbine siting as early in the planning process as appropriate. This consultation shall occur concurrently at both the installation/field level and the Pentagon/BLM WO level. An interagency protocol agreement is being developed to establish a consultation process and to identify the scope of issues for consultation. Lands withdrawn for military purposes are under the administrative jurisdiction of the DoD or a military service and are not available for issuance of wind energy authorizations by the BLM.
- The BLM will consult with the U.S. Fish and Wildlife Service (USFWS) as required by Section 7 of the Endangered Species Act of 1973 (ESA). The specific consultation requirements will be determined on a project-by-project basis.
- The BLM will consult with the State Historic Preservation Office (SHPO) as required by Section 106 of the National Historic Preservation Act of 1966 (NHPA). The specific consultation requirements will be determined on a project-by-project basis. If programmatic Section 106 consultations have been conducted and are adequate to cover a proposed project, additional consultation may not be needed.
- Existing land use plans will be amended, as appropriate, to (1) adopt provisions of the BLM's Wind Energy Development Program, (2) identify land considered to be available for wind energy development, and (3) identify land that will not be available for wind energy development.
- The level of environmental analysis to be required under NEPA for individual wind power projects will be determined at the FO level. For many projects, it may be determined that a tiered environmental assessment (EA) is appropriate in lieu of an EIS. To the extent that the PEIS addresses anticipated issues and

concerns associated with an individual project, including potential cumulative impacts, the BLM will tier off of the decisions embedded in the PEIS and limit the scope of additional project-specific NEPA analyses. The site-specific NEPA analyses will include analyses of project site configuration and micrositing considerations, monitoring program requirements, and appropriate mitigation measures. In particular, the mitigation measures discussed in Chapter 5 of the PEIS may be consulted in determining site-specific requirements. Public involvement will be incorporated into all wind energy development projects to ensure that all concerns and issues are identified and adequately addressed. In general, the scope of the NEPA analyses will be limited to the proposed action on BLM-administered public lands; however, if access to proposed development on adjacent non-BLM-administered lands is entirely dependent on obtaining ROW access across BLM-administered public lands and there are no alternatives to that access, the NEPA analysis for the proposed ROW may need to assess the environmental effects from that proposed development. The BLM's analyses of ROW access projects may tier off of the PEIS to the extent that the proposed project falls within the scope of the PEIS analyses.

- Site-specific environmental analyses will tier from the PEIS and identify and assess any cumulative impacts that are beyond the scope of the cumulative impacts addressed in the PEIS.
- The Categorical Exclusion (CX) applicable to the issuance of short-term ROWs or land use authorizations may be applicable to some site monitoring and testing activities. The relevant CX, established for the BLM in the DOI Departmental Manual 516, Chapter 11, Sec. 11.5, E(19) (DOI 2004), encompasses “issuance of short-term (3 years or less) rights-of-way or land use authorizations for such uses as storage sites, apiary sites, and construction sites where the proposal includes rehabilitation to restore the land to its natural or original condition.”
- The BLM will require financial bonds for all wind energy development projects on BLM-administered public lands to ensure compliance with the terms and conditions of the rights-of-way authorization and the requirements of applicable regulatory requirements, including reclamation costs. The amount of the required bond will be determined during the rights-of-way authorization process on the basis of site-specific and project-specific factors. The BLM may also require financial bonds for site monitoring and testing authorizations.
- Entities seeking to develop a wind energy project on BLM-administered public lands shall develop a project-specific Plan of Development (POD) that incorporates all BMPs and, as appropriate, the requirements of other existing and relevant BLM mitigation guidance, including the BLM's interim off-site mitigation guidance (BLM 2005a). Additional mitigation measures will be

incorporated into the POD and into the ROW authorization as project stipulations, as needed, to address site-specific and species-specific issues. The POD will include a site plan showing the locations of turbines, roads, power lines, other infrastructure, and other areas of short- and long-term disturbance.

- The BLM will incorporate management goals and objectives specific to habitat conservation for species of concern (e.g., sage-grouse), as appropriate, into the POD for proposed wind energy projects.
- The BLM will consider the visual resource values of the public lands involved in proposed wind energy development projects, consistent with BLM Visual Resource Management (VRM) policies and guidance. The BLM will work with the ROW applicant to incorporate visual design considerations into the planning and design of the project to minimize potential visual impacts of the proposal and to meet the VRM objectives of the area.
- Operators of wind power facilities on BLM-administered public lands shall consult with the BLM and other appropriate federal, state, and local agencies regarding any planned upgrades or changes to the wind facility design or operation. Proposed changes of this nature may require additional environmental analysis and/or revision of the POD.
- The BLM's Wind Energy Development Program will incorporate adaptive management strategies to ensure that potential adverse impacts of wind energy development are avoided (if possible), minimized, or mitigated to acceptable levels. The programmatic policies and BMPs will be updated and revised as new data regarding the impacts of wind power projects become available. At the project-level, operators will be required to develop monitoring programs to evaluate the environmental conditions at the site through all phases of development, to establish metrics against which monitoring observations can be measured, to identify potential mitigation measures, and to establish protocols for incorporating monitoring observations and additional mitigation measures into standard operating procedures and project-specific stipulations.

## **A.2 Best Management Practices (BMPs)**

The BMPs will be adopted as required elements of project-specific PODs and/or as ROW authorization stipulations. They are categorized by development activity: site monitoring and testing, development of the POD, construction, operation, and decommissioning. The BMPs for development of the POD identify required elements of the POD needed to address potential impacts associated with subsequent phases of development.

### **A.2.1 Site Monitoring and Testing**

- The area disturbed by installation of meteorological towers (i.e., footprint) shall be kept to a minimum.
- Existing roads shall be used to the maximum extent feasible. If new roads are necessary, they shall be designed and constructed to the appropriate standard.
- Meteorological towers shall not be located in sensitive habitats or in areas where ecological resources known to be sensitive to human activities (e.g., prairie grouse) are present. Installation of towers shall be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors.
- Meteorological towers installed for site monitoring and testing shall be inspected periodically for structural integrity.

### **A.2.2 Plan of Development Preparation**

#### *General*

- The BLM and operators shall contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and issues, rules that govern wind energy development locally, and land use concerns specific to the region.
- Available information describing the environmental and sociocultural conditions in the vicinity of the proposed project shall be collected and reviewed as needed to predict potential impacts of the project.
- The Federal Aviation Administration (FAA)-required notice of proposed construction shall be made as early as possible to identify any air safety measures that would be required.
- To plan for efficient use of the land, necessary infrastructure requirements shall be consolidated wherever possible, and current transmission and market access shall be evaluated carefully.
- The project shall be planned to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of new roads, lay-down areas, and borrow areas.
- A monitoring program shall be developed to ensure that environmental conditions are monitored during the construction, operation, and

decommissioning phases. The monitoring program requirements, including adaptive management strategies, shall be established at the project level to ensure that potential adverse impacts of wind energy development are mitigated. The monitoring program shall identify the monitoring requirements for each environmental resource present at the site, establish metrics against which monitoring observations can be measured, identify potential mitigation measures, and establish protocols for incorporating monitoring observations and additional mitigation measures into standard operating procedures and BMPs.

- “Good housekeeping” procedures shall be developed to ensure that during operation the site will be kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards.

### ***Wildlife and Other Ecological Resources***

- Operators shall review existing information on species and habitats in the vicinity of the project area to identify potential concerns.
- Operators shall conduct surveys for federal and/or state-protected species and other species of concern (including special status plant and animal species) within the project area and design the project to avoid (if possible), minimize, or mitigate impacts to these resources.
- Operators shall identify important, sensitive, or unique habitats in the vicinity of the project and design the project to avoid (if possible), minimize, or mitigate impacts to these habitats (e.g., locate the turbines, roads, and ancillary facilities in the least environmentally sensitive areas; i.e., away from riparian habitats, streams, wetlands, drainages, or critical wildlife habitats).
- The BLM will prohibit the disturbance of any population of federal listed plant species.
- Operators shall evaluate avian and bat use of the project area and design the project to minimize or mitigate the potential for bird and bat strikes (e.g., development shall not occur in riparian habitats and wetlands). Scientifically rigorous avian and bat use surveys shall be conducted; the amount and extent of ecological baseline data required shall be determined on a project basis.
- Turbines shall be configured to avoid landscape features known to attract raptors, if site studies show that placing turbines there would pose a significant risk to raptors.

- Operators shall determine the presence of bat colonies and avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies; in known migration corridors; or in known flight paths between colonies and feeding areas.
- Operators shall determine the presence of active raptor nests (i.e., raptor nests used during the breeding season). Measures to reduce raptor use at a project site (e.g., minimize road cuts, maintain either no vegetation or nonattractive plant species around the turbines) shall be considered.
- A habitat restoration plan shall be developed to avoid (if possible), minimize, or mitigate negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. The plan shall identify revegetation, soil stabilization, and erosion reduction measures that shall be implemented to ensure that all temporary use areas are restored. The plan shall require that restoration occur as soon as possible after completion of activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
- Procedures shall be developed to mitigate potential impacts to special status species. Such measures could include avoidance, relocation of project facilities or lay-down areas, and/or relocation of biota.
- Facilities shall be designed to discourage their use as perching or nesting substrates by birds. For example, power lines and poles shall be configured to minimize raptor electrocutions and discourage raptor and raven nesting and perching.

### ***Visual Resources***

- The public shall be involved and informed about the visual site design elements of the proposed wind energy facilities. Possible approaches include conducting public forums for disseminating information, offering organized tours of operating wind developments, and using computer simulation and visualization techniques in public presentations.
- Turbine arrays and turbine design shall be integrated with the surrounding landscape. Design elements to be addressed include visual uniformity, use of tubular towers, proportion and color of turbines, nonreflective paints, and prohibition of commercial messages on turbines.
- Other site design elements shall be integrated with the surrounding landscape. Elements to address include minimizing the profile of the ancillary structures, burial of cables, prohibition of commercial symbols, and lighting. Regarding

lighting, efforts shall be made to minimize the need for and amount of lighting on ancillary structures.

### ***Roads***

- An access road siting and management plan shall be prepared incorporating existing BLM standards regarding road design, construction, and maintenance such as those described in the BLM 9113 Manual (BLM 1985) and the *Surface Operating Standards for Oil and Gas Exploration and Development* (RMRCC 1989) (i.e., the Gold Book).

### ***Ground Transportation***

- A transportation plan shall be developed, particularly for the transport of turbine components, main assembly cranes, and other large pieces of equipment. The plan shall consider specific object sizes, weights, origin, destination, and unique handling requirements and shall evaluate alternative transportation approaches. In addition, the process to be used to comply with unique state requirements and to obtain all necessary permits shall be clearly identified.
- A traffic management plan shall be prepared for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan shall incorporate measures such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configuration.

### ***Noise***

- Proponents of a wind energy development project shall take measurements to assess the existing background noise levels at a given site and compare them with the anticipated noise levels associated with the proposed project.

### ***Noxious Weeds and Pesticides***

- Operators shall develop a plan for control of noxious weeds and invasive species, which could occur as a result of new surface disturbance activities at the site. The plan shall address monitoring, education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. The use of certified weed-free mulching shall be required. If trucks and construction equipment are arriving from locations with known

invasive vegetation problems, a controlled inspection and cleaning area shall be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces.

- If pesticides are used on the site, an integrated pest management plan shall be developed to ensure that applications would be conducted within the framework of BLM and DOI policies and entail only the use of EPA-registered pesticides. Pesticide use shall be limited to nonpersistent, immobile pesticides and shall only be applied in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.

### ***Cultural/Historic Resources***

- The BLM will consult with Indian Tribal governments early in the planning process to identify issues regarding the proposed wind energy development, including issues related to the presence of cultural properties, access rights, disruption to traditional cultural practices, and impacts to visual resources important to the Tribe(s).
- The presence of archaeological sites and historic properties in the area of potential effect shall be determined on the basis of a records search of recorded sites and properties in the area and/or, depending on the extent and reliability of existing information, an archaeological survey. Archaeological sites and historic properties present in the area of potential effect shall be reviewed to determine whether they meet the criteria of eligibility for listing on the *National Register of Historic Places* (NRHP).
- When any rights-of-way application includes remnants of a National Historic Trail, is located within the viewshed of a National Historic Trail's designated centerline, or includes or is within the viewshed of a trail eligible for listing on the NRHP, the operator shall evaluate the potential visual impacts to the trail associated with the proposed project and identify appropriate mitigation measures for inclusion as stipulations in the POD.
- If cultural resources are present at the site, or if areas with a high potential to contain cultural material have been identified, a cultural resources management plan (CRMP) shall be developed. This plan shall address mitigation activities to be taken for cultural resources found at the site. Avoidance of the area is always the preferred mitigation option. Other mitigation options include archaeological survey and excavation (as warranted) and monitoring. If an area exhibits a high potential, but no artifacts were observed during an archaeological survey, monitoring by a qualified archaeologist could be required during all excavation and

earthmoving in the high-potential area. A report shall be prepared documenting these activities. The CRMP also shall (1) establish a monitoring program, (2) identify measures to prevent potential looting/vandalism or erosion impacts, and (3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of artifacts and destruction of property on public land.

### ***Paleontological Resources***

- Operators shall determine whether paleontological resources exist in a project area on the basis of the sedimentary context of the area, a records search for past paleontological finds in the area, and/or, depending on the extent of existing information, a paleontological survey.
- If paleontological resources are present at the site, or if areas with a high potential to contain paleontological material have been identified, a paleontological resources management plan shall be developed. This plan shall include a mitigation plan for collection of the fossils; mitigation could include avoidance, removal of fossils, or monitoring. If an area exhibits a high potential but no fossils were observed during survey, monitoring by a qualified paleontologist could be required during all excavation and earthmoving in the sensitive area. A report shall be prepared documenting these activities. The paleontological resources management plan also shall (1) establish a monitoring program, (2) identify measures to prevent potential looting/vandalism or erosion impacts, and (3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of fossils on public land.

### ***Hazardous Materials and Waste Management***

- Operators shall develop a hazardous materials management plan addressing storage, use, transportation, and disposal of each hazardous material anticipated to be used at the site. The plan shall identify all hazardous materials that would be used, stored, or transported at the site. It shall establish inspection procedures, storage requirements, storage quantity limits, inventory control, nonhazardous product substitutes, and disposition of excess materials. The plan shall also identify requirements for notices to federal and local emergency response authorities and include emergency response plans.
- Operators shall develop a waste management plan identifying the waste streams that are expected to be generated at the site and addressing hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements, inspection procedures, and waste

minimization procedures. This plan shall address all solid and liquid wastes that may be generated at the site.

- Operators shall develop a spill prevention and response plan identifying where hazardous materials and wastes are stored on site, spill prevention measures to be implemented, training requirements, appropriate spill response actions for each material or waste, the locations of spill response kits on site, a procedure for ensuring that the spill response kits are adequately stocked at all times, and procedures for making timely notifications to authorities.

### ***Storm Water***

- Operators shall develop a storm water management plan for the site to ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion.

### ***Human Health and Safety***

- A safety assessment shall be conducted to describe potential safety issues and the means that would be taken to mitigate them, including issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control.
- A health and safety program shall be developed to protect both workers and the general public during construction, operation, and decommissioning of a wind energy project. Regarding occupational health and safety, the program shall identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; Occupational Safety and Health Administration [OSHA] standard practices for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic fields [EMF] exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning protection standards). The program shall include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies shall be established.
- Regarding public health and safety, the health and safety program shall establish a safety zone or setback for wind turbine generators from residences and occupied buildings, roads, rights-of-ways, and other public access areas that is sufficient to prevent accidents resulting from the operation of wind turbine generators. It shall identify requirements for temporary fencing

around staging areas, storage yards, and excavations during construction or decommissioning activities. It shall also identify measures to be taken during the operation phase to limit public access to hazardous facilities (e.g., permanent fencing would be installed only around electrical substations, and turbine tower access doors would be locked).

- Operators shall consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) shall be identified and addressed in the traffic management plan.
- If operation of the wind turbines is expected to cause significant adverse impacts to nearby residences and occupied buildings from shadow flicker, low-frequency sound, or EMF, site-specific recommendations for addressing these concerns shall be incorporated into the project design (e.g., establishing a sufficient setback from turbines).
- The project shall be planned to minimize electromagnetic interference (EMI) (e.g., impacts to radar, microwave, television, and radio transmissions) and comply with Federal Communications Commission [FCC] regulations. Signal strength studies shall be conducted when proposed locations have the potential to impact transmissions. Potential interference with public safety communication systems (e.g., radio traffic related to emergency activities) shall be avoided.
- The project shall be planned to comply with FAA regulations, including lighting regulations, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.
- Operators shall develop a fire management strategy to implement measures to minimize the potential for a human-caused fire.

### **A.2.3 Construction**

#### ***General***

- All control and mitigation measures established for the project in the POD and the resource-specific management plans that are part of the POD shall be maintained and implemented throughout the construction phase, as appropriate.
- The area disturbed by construction and operation of a wind energy development project (i.e., footprint) shall be kept to a minimum.

- The number and size/length of roads, temporary fences, lay-down areas, and borrow areas shall be minimized.
- Topsoil from all excavations and construction activities shall be salvaged and reapplied during reclamation.
- All areas of disturbed soil shall be reclaimed using weed-free native grasses, forbs, and shrubs. Reclamation activities shall be undertaken as early as possible on disturbed areas.
- All electrical collector lines shall be buried in a manner that minimizes additional surface disturbance (e.g., along roads or other paths of surface disturbance). Overhead lines may be used in cases where burial of lines would result in further habitat disturbance.
- Operators shall identify unstable slopes and local factors that can induce slope instability (such as groundwater conditions, precipitation, earthquake activities, slope angles, and the dip angles of geologic strata). Operators also shall avoid creating excessive slopes during excavation and blasting operations. Special construction techniques shall be used where applicable in areas of steep slopes, erodible soil, and stream channel crossings.
- Erosion controls that comply with county, state, and federal standards shall be applied. Practices such as jute netting, silt fences, and check dams shall be applied near disturbed areas.

### ***Wildlife***

- Guy wires on permanent meteorological towers shall be avoided, however, may be necessary on temporary meteorological towers installed during site monitoring and testing.
- In accordance with the habitat restoration plan, restoration shall be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
- All construction employees shall be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, pets shall not be permitted on site during construction.

### ***Visual Resources***

- Operators shall reduce visual impacts during construction by minimizing areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soils as closely as possible to their original contour and vegetation.

### ***Roads***

- Existing roads shall be used, but only if in safe and environmentally sound locations. If new roads are necessary, they shall be designed and constructed to the appropriate standard and be no higher than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Excessive grades on roads, road embankments, ditches, and drainages shall be avoided, especially in areas with erodible soils. Special construction techniques shall be used, where applicable. Abandoned roads and roads that are no longer needed shall be recontoured and revegetated.
- Access roads and on-site roads shall be surfaced with aggregate materials, wherever appropriate.
- Access roads shall be located to follow natural contours and minimize side hill cuts.
- Roads shall be located away from drainage bottoms and avoid wetlands, if practicable.
- Roads shall be designed so that changes to surface water runoff are avoided and erosion is not initiated.
- Access roads shall be located to minimize stream crossings. All structures crossing streams shall be located and constructed so that they do not decrease channel stability or increase water velocity. Operators shall obtain all applicable federal and state permits.
- Existing drainage systems shall not be altered, especially in sensitive areas such as erodible soils or steep slopes. Potential soil erosion shall be controlled at culvert outlets with appropriate structures. Catch basins, roadway ditches, and culverts shall be cleaned and maintained regularly.

### ***Ground Transportation***

- Project personnel and contractors shall be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types,

and site-specific conditions, to ensure safe and efficient traffic flow and to reduce wildlife collisions and disturbance and airborne dust.

- Traffic shall be restricted to the roads developed for the project. Use of other unimproved roads shall be restricted to emergency situations.
- Signs shall be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local commuters, consideration shall be given to limiting construction vehicles traveling on public roadways during the morning and late afternoon commute time.

### ***Air Emissions***

- Dust abatement techniques shall be used on unpaved, unvegetated surfaces to minimize airborne dust.
- Speed limits (e.g., 25 mph [40 km/h]) shall be posted and enforced to reduce airborne fugitive dust.
- Construction materials and stockpiled soils shall be covered if they are a source of fugitive dust.
- Dust abatement techniques shall be used before and during surface clearing, excavation, or blasting activities.

### ***Excavation and Blasting Activities***

- Operators shall gain a clear understanding of the local hydrogeology. Areas of groundwater discharge and recharge and their potential relationships with surface water bodies shall be identified.
- Operators shall avoid creating hydrologic conduits between two aquifers during foundation excavation and other activities.
- Foundations and trenches shall be backfilled with originally excavated material as much as possible. Excess excavation materials shall be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.
- Borrow material shall be obtained only from authorized and permitted sites. Existing sites shall be used in preference to new sites.

- Explosives shall be used only within specified times and at specified distances from sensitive wildlife or streams and lakes, as established by the BLM or other federal and state agencies.

### *Noise*

- Noisy construction activities (including blasting) shall be limited to the least noise-sensitive times of day (i.e., daytime only between 7 a.m. and 10 p.m.) and weekdays.
- All equipment shall have sound-control devices no less effective than those provided on the original equipment. All construction equipment used shall be adequately muffled and maintained.
- All stationary construction equipment (i.e., compressors and generators) shall be located as far as practicable from nearby residences.
- If blasting or other noisy activities are required during the construction period, nearby residents shall be notified in advance.

### *Cultural and Paleontological Resources*

- Unexpected discovery of cultural or paleontological resources during construction shall be brought to the attention of the responsible BLM authorized officer immediately. Work shall be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed.

### *Hazardous Materials and Waste Management*

- Secondary containment shall be provided for all on-site hazardous materials and waste storage, including fuel. In particular, fuel storage (for construction vehicles and equipment) shall be a temporary activity occurring only for as long as is needed to support construction activities.
- Wastes shall be properly containerized and removed periodically for disposal at appropriate off-site permitted disposal facilities.
- In the event of an accidental release to the environment, the operator shall document the event, including a root cause analysis, appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event shall be provided to the BLM authorized officer and other federal and state agencies, as required.

- Any wastewater generated in association with temporary, portable sanitary facilities shall be periodically removed by a licensed hauler and introduced into an existing municipal sewage treatment facility. Temporary, portable sanitary facilities provided for construction crews shall be adequate to support expected on-site personnel and shall be removed at completion of construction activities.

### ***Public Health and Safety***

- Temporary fencing shall be installed around staging areas, storage yards, and excavations during construction to limit public access.

## **A.2.4 Operation**

### ***General***

- All control and mitigation measures established for the project in the POD and the resource-specific management plans that are part of the POD shall be maintained and implemented throughout the operational phase, as appropriate. These control and mitigation measures shall be reviewed and revised, as needed, to address changing conditions or requirements at the site, throughout the operational phase. This adaptive management approach would help ensure that impacts from operations are kept to a minimum.
- Inoperative turbines shall be repaired, replaced, or removed in a timely manner. Requirements to do so shall be incorporated into the due diligence provisions of the rights-of-way authorization. Operators will be required to demonstrate due diligence in the repair, replacement, or removal of turbines; failure to do so could result in termination of the rights-of-way authorization.

### ***Wildlife***

- Employees, contractors, and site visitors shall be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, any pets shall be controlled to avoid harassment and disturbance of wildlife.
- Observations of potential wildlife problems, including wildlife mortality, shall be reported to the BLM authorized officer immediately.

### ***Ground Transportation***

- Ongoing ground transportation planning shall be conducted to evaluate road use, minimize traffic volume, and ensure that roads are maintained adequately to minimize associated impacts.

### ***Monitoring Program***

- Site monitoring protocols defined in the POD shall be implemented. These will incorporate monitoring program observations and additional mitigation measures into standard operating procedures and BMPs to minimize future environmental impacts.
- Results of monitoring program efforts shall be provided to the BLM authorized officer.

### ***Public Health and Safety***

- Permanent fencing shall be installed and maintained around electrical substations, and turbine tower access doors shall be locked to limit public access.
- In the event an installed wind energy development project results in EMI, the operator shall work with the owner of the impacted communications system to resolve the problem. Additional warning information may also need to be conveyed to aircraft with onboard radar systems so that echoes from wind turbines can be quickly recognized.

## **A.2.5 Decommissioning**

### ***General***

- Prior to the termination of the rights-of-way authorization, a decommissioning plan shall be developed and approved by the BLM. The decommissioning plan shall include a site reclamation plan and monitoring program.
- All management plans, BMPs, and stipulations developed for the construction phase shall be applied to similar activities during the decommissioning phase.
- All turbines and ancillary structures shall be removed from the site.

- Topsoil from all decommissioning activities shall be salvaged and reapplied during final reclamation.
- All areas of disturbed soil shall be reclaimed using weed-free native shrubs, grasses, and forbs.
- The vegetation cover, composition, and diversity shall be restored to values commensurate with the ecological setting.

**APPENDIX G**  
**TOOLS AND TECHNIQUES AND PROGRAMMATIC**  
**EMERGENCY STABILIZATION AND REHABILITATION PLAN**

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TOOLS AND TECHNIQUES AND PROGRAMMATIC  
EMERGENCY STABILIZATION AND REHABILITATION PLAN**

**Introduction**

Typical tools and techniques that may be used to manage resources, watersheds, and ecological systems within the planning area are described in this appendix. For discussion and general evaluations, these management aids have been grouped into several categories based on similarity in the types of effects they would have. Vegetation treatment for the restoration of watersheds is a primary management action outlined in the Proposed RMP. Therefore, the first step has been to group similar tools and techniques used for vegetation treatment into categories. These are presented below. Obviously many of the typical tools and techniques listed in this appendix overlap into two or more of these broad categories. Professional judgment was used to identify the best fit with the inherent nature of the tool or technique itself.

For any particular resource or resource use, potential impacts may be driven by only a few primary tools and techniques within a category. Where substantial impacts may occur on other resources from a typical tool or technique, these are described in Chapter 4.0. Potential impact assessments generally focus on vegetation, soils, water resources, wildlife resources, and other resources as appropriate. Typical tools and techniques do not vary by alternative, so their potential impacts are discussed at the beginning of each resource program under consideration.

**Typical Tools and Techniques**

## Vegetation Treatment Tools and Techniques

## Fire Treatments

- Wildland fire use – Natural fires started by lightning or other natural causes would be managed to achieve restoration goals.
- Prescribed fire – Management fires ignited by available devices.
- Heavy equipment – Heavy equipment such as bulldozers is used to clear fire lines.
- Hand tools – Typically, crews dig hand lines around small fires with chainsaws, pulaskis, and shovels to provide a fuel break for containing them. Fire fighting also includes "mop-up" methods to extinguish embers. Methods include turning over soil and logs and spraying water on the hottest spots.
- Aircraft – Helicopters and slurry bombers (single-engine and multi-engine) are primarily used for fire detection, management, and suppression. Smoke jumpers and helitack crews often are deployed from helicopters and other aircraft to perform initial attack on wildfires.
- Fire retardant – Aerial applications of slurry to suppress or influence wildfire behavior. In some areas, retardant in the form of foam is used to protect sensitive resources.
- Pile burning – Woody debris is piled together and subsequently burned on site.

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- Burn out – Setting fire inside a control line to widen it or to consume fuel between the edge of the fire and the control line.
- Fire rehabilitation – Procedures for stabilizing and rehabilitating burned areas are included in the Normal Year Fire Rehabilitation Plan.

### Mechanical Treatments

- Chaining/brush rolling – Steel chain (60 to 120 pound links totaling 200 to 300 feet in length), with or without rails welded to each link, spanned between two bulldozers to uproot trees. Rails are 18 to 24 inches in length and made from 70- to 90-pound rail. Two passes of the chain in opposite directions is required.
- Mowing/brush beating – Mowing is sometimes used for noxious weed management.
- Machine cutting and piling – Heavy machinery is used to cut and push woody vegetation into piles.
- Disc plowing – A farming disc or brush-land plow is pulled by a tractor to turn over the soil for several types of vegetation treatment, including reseeding.
- Green-stripping – Remove flammable fuels by brush beating, mowing, or other methods in strategic locations and replace with less flammable species, such as forage kochia or crested wheatgrass in order to influence fire behavior.
- Hand cutting – Woody vegetation is cut using chainsaws, hydraulic axes, or other hand tools.
- Pulling – Where noxious weed infestations are small and conditions are conducive, manual pulling of weeds can be an effective non-invasive method of weed management. May also be used where other methods are prohibited.
- Lopping and scattering – Woody biomass that results from vegetation clearing is cut into specified dimensions and scattered.
- Chipping – Residual biomass created as a result of tree removal is turned into small wood chips. Wood chippers are typically small mobile machines transported to and used on site. Chips are distributed by mechanical spreading.
- Pitting and scalping – The ground surface is mechanically pitted or scalped to increase water retention.
- Biomass use – Biomass in the form of trees and shrubs may be generated through vegetation clearing for watershed restoration and for fuel reduction in wildland urban interface areas. Such biomass could be utilized in a number of ways depending on the proposed project size and location and the economic conditions at the time the project is implemented. Biomass uses could include fuel for small electric generating plants (green energy) and raw material for consumer products. BLM would approve such uses of biomass on a case-by-case basis.

### Chemical Treatments

- Selective and non-selective herbicides

As of 2004, the following herbicides were approved for use on BLM lands. It is anticipated that this list will be modified over time. As herbicides gain or lose BLM approval, their use on Ely Field Office lands will reflect BLM approval. All herbicide use will be according to label directions. The

Ely Field Office will use the least toxic or lowest amount of herbicide that will achieve the desired result.

Atrazine	Dicamba	Imazapyr + Diuron	Tebuthiuron
Bromacil	Dicamba + 2,4-D Diuron	Mefluidide	Tebuthiuron + Diuron
Bromacil + Diuron	Glyphosate	Metsulfuron	Triclopyr
Chlorsulfuron	Glyphosate + 2,4-D	Picloram	Triclopyr + 2,4-D
Clopyralid	Glyphosate + Dicamba	Picloram + 2,4-D	Triclopyr + Clopyralid
Clopyralid + 2,4-D	Hexazinone	Simazine	
2,4-D	Imazapyr	Sulfometuron	

<sup>1</sup> BLM Information Bulletin No. 2004-030.

#### Biological Treatments – Grazing Management

- Type of livestock – Use livestock including sheep and goats to remove unwanted vegetation or to facilitate changes in vegetative composition.
- Season of use – Livestock authorizations include season of use by allotment and/or pasture. Allotments are either yearlong or seasonal in permitted use. Rest-rotation, deferred rotation provide rest from grazing under different types of schedules.
- Stocking rate – Permitted stocking levels (animal numbers) can be adjusted to achieve vegetation objectives.
- Allowable use – Identified for allotments, pastures or other specified areas based on the physiology, phenology, density, vigor and condition of key forage species. Monitoring is required on a periodic basis to determine if allowable use is exceeded and what actions should be taken.
- Water haul facilities – Moveable water tanks may be used to control livestock distribution. Avoid tank locations on or adjacent to steep erodible soils or near other sensitive resources.
- Salt/mineral/supplement blocks – Salt/mineral/supplement block placement locations can be used to control livestock distribution. Avoid salt placement on or adjacent to transportation routes, on steep erodible soils, or near other sensitive resources.

#### Biological Treatments – Other Management

- Seeding/interseeding – Aerial- or terrestrial-based seeding of grasses, forbs, and shrubs to revegetate disturbed areas. Range drills. Plows. Seed spreaders. Seed rollers and drums.
- Planting – Plant seedlings or cuttings of woody species such as willows or cottonwoods to accelerate the recovery of riparian areas and attain proper functioning condition.
- Biological control – Where appropriate, agents (such as insects, bacteria, or pheromones) that feed, infect, disrupt, or compete with noxious or invasive species to their detriment may be released for management purposes.

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### Other Tools and Techniques

#### Structural Tools

- Heavy equipment – Bulldozers, road graders, and other equipment are used to maintain roads, mine minerals, construct campgrounds, etc.
- Light and medium duty equipment – Cars and trucks used to access sites for all types of administrative work or permitted activities.
- Water bars – Constructed mounds typically on closed roads designed to slow overland flow and soil erosion on steep slopes.
- Straw bales – Straw bales are strategically placed and anchored to minimize soil loss on recently disturbed or revegetated sites especially on slopes.
- Stream structures – Logs, gabions, and other stream structures may be used to catch sediment or create fish pools.
- Bat gates – Metal gates are installed at the entrances of caves or abandoned mines to protect important bat habitats, such as maternity roosts, and to protect cave resources from human use.
- Big game crossing passes – Used to facilitate big game crossing at highways and other high traffic zones.
- Water development – Water developments increase the density and availability of water for wildlife and livestock. Developments vary from piped springs to trickle tanks and galloway guzzlers that capture rainwater and store it in cisterns while allowing controlled use. Water pipelines traversing little watered areas are sometimes used to provide water at intervals along their length.
- Water escape ramps – Provide escape ladders or other devices to allow small mammals and herptiles to escape man made waterbodies that may trap them.
- Livestock fencing – Primarily used to control livestock distribution. Protect vulnerable areas such as riparian zones by excluding grazing animals.
- Gates – Gates are installed to control access on a seasonal or permanent basis.

#### Administrative or Regulatory Tools

- Permits – Permits are provided for personal and commercial use of materials such as gravel, fuelwood, and pinyon pine nuts. Other activities requiring a permit include some special recreation events and collecting materials for research of caves in the planning area.
- Fees – Fees are collected to aid in the tracking and management of various uses of federal lands and resources.
- Visitor signs – Signs are used to instruct or inform visitors to the public lands regarding health and safety issues, unique vistas or resources, land use restrictions, or general interest items. They may be used to direct activities away from sensitive areas and to concentrate impacts in other areas. Signs also may be used for visitor outreach to make visitors aware of recreation opportunities such as trails, roads, and recreation sites.
- Temporary or permanent closure – Close sensitive areas to recreational, development, treatment, and other permitted activities during sensitive periods.

- Road closures – Temporary or permanent road closures in order to facilitate achievement of land health standards.
- Law enforcement – Law enforcement is a tool to monitor public uses on public lands from assistance during hunting season to fuelwood collection.
- Stewardship contracting – In February 2004, the BLM approved guidelines for developing and entering stewardship agreements as part of the Healthy Forests Initiative. Stewardship contracts allow private entities to retain forest products in exchange for services such as thinning trees and cutting brush. Stewardship projects are primarily focused on restoration and expected to benefit fuels, wildlife and fish, forest, rangeland, and riparian resources. As defined in IM 2004-081 (1/16/04), stewardship opportunities are those that would achieve land management goals as well as meet local and rural community needs. Stewardship contracts and agreements are by definition long-term, giving contractors the ability to invest in equipment and infrastructure.
- Wild horse gathers – Gathers may be conducted by horseback or with helicopter. Temporary traps and pens may be constructed for holding animals.
- Wild horse fertility control - Artificial fertility control measures (e.g., implanted or oral contraceptives) may be applied to control population birth rate and recruitment rate.

#### Research Tools

- Stream gauges – Used to measure stream flows at permanent sites.
- Flow meters – Used to take spot measurements of stream flow.
- Monitoring of wildlife or vegetation species populations – Monitoring is conducted to establish trends in population locations and numbers.
- Telemetry – Telemetry involves the use of radio transmitters and receivers primarily to monitor animal movements.
- Wild horse fertility control measures – Used to reduce the number of new foals born in existing herds.
- Vegetation exclosures – As appropriate for monitoring, existing vegetation exclosures would be maintained and new exclosures would be constructed. Vegetation exclosures exclude livestock, wild horses, and wildlife from reference areas to assess the effects of grazing on vegetation.

**APPENDIX G (Continued)**  
**PROGRAMMATIC EMERGENCY STABILIZATION AND REHABILITATION PLAN**

**Introduction**

The purpose and need for the Normal Year Fire Rehabilitation Plan is to create a framework for the Ely Emergency Stabilization and Rehabilitation program that will streamline Emergency Stabilization and Rehabilitation procedures and allow for the completion of on-the-ground treatments within a timeframe consistent with the urgent nature of fire rehabilitation. In addition, this document will enable the Ely Field Office to initiate Emergency Stabilization and Rehabilitation proposals that reduce the adverse effects of wildfire on soil, vegetation, crucial wildlife habitat, property, water quality, and other resources.

Emergency Stabilization and Rehabilitation activities are funded separately. Thus, depending on the conditions of the burned area, an Emergency Stabilization and/or a Rehabilitation Plan may be written following a wildfire. In some instances, neither plan may be written.

Currently, emergency stabilization plans address:

- Minimizing threats to life, property, and critical cultural and natural resources resulting from the effects of a fire;
- Promptly stabilizing and preventing further degradation to affected resources on lands within the fire perimeter or areas affected directly by wind or water erosion from burned areas; and
- Repairing damages caused by fire suppression operations.

Currently, rehabilitation plans address:

- Mitigating actual and potential long-term post-fire impacts to critical cultural and natural resources and treating those areas unlikely to recover naturally from severe wildland fire damage by emulating historic or pre-fire ecosystem structure, function, diversity, and dynamics;
- Restoring or establishing healthy, stable ecosystems in the burned area, even if these ecosystems cannot fully emulate historic or pre-fire conditions; and
- Repairing or replacing fire damage of minor operating facilities.

In the future, Emergency Stabilization and Rehabilitation plans may address different objectives as determined and stated in future department manuals or documents.

As stated in the Department of the Interior 620 Department Manual 3, funding for Emergency Stabilization treatments and activities is provided for no more than one year following containment of a wildland fire, except that Emergency Stabilization funding may be used to repair or replace Emergency Stabilization

structures or treatments for up to three years following containment of a wildland fire where failure to do so would imperil watershed functionality or result in serious loss of downstream values and for monitoring. Funding for rehabilitation treatments is provided in 1-year increments for no more than 3 years following containment of a wildland fire.

Emergency Stabilization and Rehabilitation funds may not be used for prescribed fire projects in which fire behavior was within prescription. Rehabilitation actions may be planned and funded only for projects that were declared wildfires or where fire behavior exceeded prescription. Wildland fires for resource benefits are not eligible for rehabilitation funds. Furthermore, Emergency Stabilization and Rehabilitation funds are not to be used for rehabilitation caused by wildland fire suppression actions. Costs for rehabilitating wildland fire suppression actions will be funded by the appropriate fire suppression subactivity. Nonetheless, in the future, what is allowed under Emergency Stabilization and Rehabilitation funding may change, and the Emergency Stabilization and Rehabilitation program will assign funding dollars accordingly.

The process for implementing emergency fire rehabilitation activities through a site-specific plan development process is described in the following paragraphs. However, the implementation process may be revised as the needs and regulations of the Emergency Stabilization and Rehabilitation program evolve.

1. Prior to fire containment, an interdisciplinary team will determine if Emergency Stabilization and/or Rehabilitation will be needed in a burned area. If Emergency Stabilization and/or Rehabilitation will be needed, an interdisciplinary team assesses the Emergency Stabilization and Rehabilitation needs of the burn and selects the necessary Emergency Stabilization or Rehabilitation prescription from the Normal Year Fire Rehabilitation Plan. (If the necessary prescription does not fall under the scope of this plan, refer to the Department of the Interior 620 Department Manual 3 for guidance.) Generally, rehabilitation efforts not covered in this plan would require an environmental assessment and approval by the State Director unless the action falls under a categorical exclusion.
2. An interdisciplinary team will then proceed to write both an Emergency Stabilization and a Rehabilitation plan that tier to the Normal Year Fire Rehabilitation Plan. As needed and determined appropriate by the interdisciplinary team, the plans may incorporate any or all of the following prescriptions: seed mixture (unless the prescribed seed mixture does not meet unique needs of the burned area), application rates, planting/seeding methods, costs, erosion control structures, protection fencing, and grazing adjustments beyond the normally prescribed minimum two growing seasons rest period.
3. In determining the Emergency Stabilization and/or Rehabilitation needs of a burn, the interdisciplinary team will keep in mind that natural recovery by native plant species is preferable to planting or seeding, either of natives or non-natives. If planting or seeding is necessary, the use of native species is preferable. To the extent permitted by law and Executive Order 13112, Invasive Species, dated February 3, 1999, introduction of exotic species into natural ecosystems will be restricted unless the Secretary of the Interior finds that such introduction will not have an adverse effect on natural ecosystems.

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4. Once appropriate treatments are determined, a budget is created that summarizes the Emergency Stabilization and Rehabilitation costs by fiscal year. This budget is sent to the State Director for funding approval, or the Washington Office if the budget is over \$100,000.
5. Cultural and threatened and endangered species clearances will be completed prior to project implementation. Known populations of threatened and endangered plants will be marked and that area restricted from heavy equipment use. Emergency Stabilization and/or Rehabilitation activities that involve mechanized surface disturbance greater than 10 centimeters in depth will require a cultural survey. Any archaeological resources discovered will be marked and avoided by ground disturbing equipment or will be relocated.

Rehabilitation actions outlined in the rehabilitation plan may fall under the categorical exclusion for rehabilitation activities for lands and infrastructure impacted by fires or fire suppression. The rehabilitation categorical exclusion does not cover Emergency Stabilization. In order to ensure that public concerns/interests are addressed, "the responsible officials will consider, on a project-by-project basis whether or not any of the Department of the Interior's exceptions apply. [Furthermore], the responsible official will prepare a decision memo that will be available for public review."

The rehabilitation activities eligible for categorical exclusion and the conditions they must be performed under are listed in the following paragraphs as stated in the Notice for the National Environmental Protection Act (NEPA) Determination Needed for Fire Management Activities; Categorical Exclusions:

- Post-fire rehabilitation activities not exceeding 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire.
- Activities (such as reseeding or planting, fence construction, culvert repair, installation of erosion control device and repair of roads and trails) necessary for rehabilitation of habitat, watersheds, historical, archeological, and cultural sites and infrastructure impacted by wildfire and/ wildfire suppression.

The preceding activities shall be conducted consistent with agency and departmental procedures and applicable land and resource management plans; shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and shall be completed within 3 years following a wildland fire. Categorical exclusions that apply to the Emergency Stabilization and Rehabilitation program may be revised or added to the department manual and/or other government document(s); consequently, the NEPA process for Emergency Stabilization and Rehabilitation plans may change.

In order to facilitate effective Emergency Stabilization and Rehabilitation treatments, one or more of the following treatments should be considered following a wildfire.

## Site Protection

### 1. Grazing Closure

All revegetated areas as well as areas that have been burned but not revegetated may be closed to grazing until resource objectives are achieved or another course of action is determined if objectives are not met. The grazing closure must be initiated the growing season following the season in which the wildfire burned. Monitoring data will determine when a closed area is reopened for grazing. Grazing closures following a wildfire may be necessary in order to allow for vegetation recovery of both seeded and non-seeded species as well as to protect soil, water and other range resources. However, grazing may be allowed and not closed if it is determined that grazing would have beneficial impacts in reducing annual grasses, etc. A site-specific plan would be developed to guide these actions. See Early Livestock Grazing, page G-11. Recovery objectives should be established for each Emergency Stabilization and Rehabilitation Plan. Annual assessments of the burn area should be established when the grazing closure is initiated and an interdisciplinary team should evaluate the burn area at the end of each growing season to determine if recovery objectives have been met. If objectives have not been met, it may be necessary to extend the grazing closure and continue annual evaluations to determine when recovery objectives have been met, at which point normal grazing may resume. The following methods of grazing closures should be evaluated on a case-by-case basis to determine which method, or combination of methods, is/are suitable for an Emergency Stabilization or Rehabilitation Plan.

- a. Repair of existing fence(s) for resource protection. Repair to fences damaged in the wildfire may be necessary in order to protect resources from grazing following a wildfire. Fences that may require repair in order to meet recovery objectives include, but are not limited to, exclosures for riparian area protection, designated study sites, wilderness study areas, allotment boundary, and pasture fences.
- b. Construction of new fence(s) for resource protection. A new protective fence may be constructed to protect a burned area and its resources from grazing. Protective fences may be either permanent management fences or temporary. Temporary fences should be constructed in rangeland areas that require rest from grazing during the vegetation establishment period following the wildfire, but will not require further grazing management to maintain and protect resources following the rehabilitation process. It should be stated in the Emergency Stabilization or Rehabilitation Plan whether the constructed fence is intended to be permanent or temporary.
- c. Grazing deferment without repair or construction of fence(s). In certain cases fencing may not be necessary in order to achieve grazing closure. A grazing deferment may be achieved in some locations by changing water supply for wildlife or changing grazing rotations for livestock. This method should be evaluated on a case-by-case to determine whether or not it will achieve an effective grazing closure and allow for vegetation recovery.

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### **2. Wild Horse Haze**

Where grazing by wild horses may affect seedling growth, it is desirable to remove horses from the burn area. Horse hazing may be sufficient to relocate horses on areas that are not fenced. Hazing may also be necessary prior to fencing the burn area so that no horses remain within the fenced area.

### **3. Wild Horse Gather**

A wild horse gather may be required if it is determined that wild horse removal from the burn area is necessary and hazing is not a suitable option. Wild horse removal may be necessary not only by the need to protect establishing seedlings, but also to relieve grazing pressures outside the burn area where there is inadequate forage to support horses and big game wildlife.

## **Site Stabilization**

### **1. Natural Revegetation**

In some cases, natural revegetation may allow for successful establishment of native or previously seeded rangeland species. Natural revegetation may be used following wildfires that do not completely destroy the existing perennial vegetation, where there is a desirable and viable post-fire seedbank, or where there is a desirable root mass present. Natural revegetation may also be used where seeding is not possible due to topography, precipitation, or soil type. To determine if natural revegetation is a feasible treatment, an Emergency Stabilization and Rehabilitation team will assess the burned area and determine whether or not natural revegetation will allow for enough vegetation establishment within the first two post-fire growing seasons to prevent watershed degradation.

### **2. Seeding**

Seeding may be necessary in order to stabilize soils or reestablish a desirable perennial plant community within a reasonable time frame. Seeding may also be used to prevent spread of non-native invasive weeds within the fire area by providing competing vegetation. If seeding is determined as a suitable treatment, the following steps should be evaluated and initiated as needed

#### **a. Site preparation.**

- Herbicide use prior to seeding

Where invasive, non-native plant species become established prior to seeding, herbicides may be used to reduce their cover and density. Reducing invasive species allows for better establishment of seeded species by reducing competition. Direct treatment of invasive species is allowable as part of emergency stabilization plans when action is determined necessary and when standard, validated, treatments are used.

- Disking

Disking may be used prior to seeding to create a suitable seedbed where vegetation and topography allows. Disking breaks up surface debris by lifting and turning over the top layer of soil. This creates germination microclimates for applied seed and also creates small soil pockets that can trap moisture. Disking may also reduce competition from invasive species such as *Bromus tectorum* that may have rapid establishment following a wildfire.

- Early livestock grazing

Early (spring) livestock grazing may be used to reduce the establishment of invasive species such as *Bromus tectorum* that exhibit growth early in the spring. Early grazing can reduce the number of seed heads that reach maturity later in the season as well as allowing for higher levels of establishment of seeded and native perennial species by reducing competition.

b. Seed Mixes.

- Native and introduced species

Seed mixes should be created on a site-specific basis taking into account the pre-fire vegetation community, probability of success, wildlife needs, the presence or absence of invasive species, and site characteristics on a watershed scale. A mixture of native and introduced species may be used for site stabilization or rehabilitation. This mixture is most useful when rapid establishment is necessary for site (soil) stabilization as it is often the perennial grasses that will become established first. For emergency stabilization seed mixes, only species that will be effective within three years should be used.

c. Seeding Techniques.

- Drill

Drill seeding uses a rangeland drill to seed selected species at a desired depth. This method of seeding is successful in both seed application and incorporation and is a preferred method for establishing a post-fire perennial plant community. Rangeland drills cannot be used at sites that are too steep, do not have suitable soil, or have dense, burned, tree stands. Under these circumstances aerial seeding should be considered for seed application.

- Aerial

Aerial seeding involves the spread of seed from a helicopter or fixed-wing aircraft. This method of seeding is most effective for large areas where a rangeland drill cannot be used. Aerial seeding may be more effective if followed by a seed incorporation treatment such as chaining.

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- On ground broadcast

For small burn areas requiring seeding, seed mixes may be spread by hand or from an all-terrain vehicle, tractor, or truck-mounted spreader. With the exception of hand spreading, this method can only be used in areas that are easily accessible, with low topographical gradients, and where the presence of rock and trees is minimal to non-existent.

d. Seed incorporation.

- Chain

An Ely chain can be used following an aerial seed application to help incorporate the seed into the soil and create favorable microclimates for germination/establishment. By disturbing the soil surface, chaining also helps create small pockets in which water is trapping, increasing surface soil moisture and further creating favorable conditions for seed germination and establishment. Chaining disturbs the soil surface by direct contact as well as by uprooting and dragging trees for a minimal distance. Both one-way and two-way chaining may be used.

- Roller chop

A roller chopper may also be used for seed incorporation in areas where tree stands are too dense for a rangeland drill. A roller chopper incorporates seed and cuts up organic debris to create a favorable environment for seed germination and reduce erosion on mild slopes or where soil is highly susceptible to erosion. Seeding can be done behind the tractor (in front of the chopper), or can be applied aurally prior to the roller chopper treatment.

- Livestock

Livestock such as cows or goats may be used in smaller treatment areas for seed incorporation. If livestock are kept moving, their hoof action breaks up the soil surface and incorporates seed into the soil. The livestock also add organic matter to the site while they are working the soil.

- Harrow

A harrow device can be used to cover seed at some sites, allowing for better seed germination and establishment. A harrow can only be used where machinery such as a tractor can access a site, where there is minimal slope, acceptable soil, and no dense stands of trees. Harrowing is primarily useable in previously cultivated rangelands, perennial grass communities, or perennial grass-sagebrush communities. A harrow can be used when disking by dragging the harrow behind the disk and using an on-ground-broadcast for the seed mix where the seed is applied between the disk and the harrow. This method allows for site preparation, seed application, and seed incorporation with one pass of a tractor.

- Hand rake

Hand raking may be used for seed incorporation for small areas where it is more cost effective than bringing in machinery or in areas that are inaccessible to machinery due to terrain, soil, or tree density. Hand raking may also be considered in desert scrub communities where the use of machinery might potentially create an unacceptable amount of fugitive dust.

### 3. Planting

Shrub and tree seedlings can be planted separately or in combination with a seeding treatment. Seedlings are used to reestablish native tree species lost in a wildfire, prevent the establishment of invasive plant species, and restore habitat in crucial wildlife habitat, fish habitat, riparian areas, or wilderness study areas. The planting of seedlings would help mitigate changes in forest, shrub land, or riparian ecosystems and restore them to the natural, pre-fire conditions. The planting of native seedlings is preferred.

### 4. Initial Overland Flow Erosion Control

Erosion control and sediment trapping features may be necessary on burned areas where there is high risk of erosion, sediment run-off, or flood waters. Erosion control structures are suggested, but not limited to areas requiring immediate short term stabilization. Primary areas of concern are where there is the possibility of damage to property and critical resources. This may include areas where ephemeral or perennial streambeds cannot adequately transport increases in water run-off and bedloads, steep slopes, and areas with hydrophobic or highly erosive soils. If erosion or sediment control structures are determined to be necessary, the following options should be considered.

- a. Contour felled logs. Where there is anticipated water and sediment runoff following a wildfire, contour felled logs may be used. The primary function of contour felled logs is to divert and break up high volume water flows, reduce water velocity, and create a rough terrain, thereby reducing the ease of water runoff. Secondly, contour felled logs retain sediment.
- b. Mulch. Organic matter (mulch) may be spread over a burned area in order to reduce rain impact and reduce soil erosion. Mulch also retains moisture creating favorable conditions in hot dry areas for seed germination. However, if mulch is spread too thick, it can inhibit the establishment of seeded as well as non-seeded species. Mulch should primarily be used in areas where high levels of erosion are anticipated. Use of mulch is not recommended in areas with sensitive or rare plants. All mulch should be certified weed free prior to use. The following mulch treatments should be evaluated if mulch is desired following a wildfire.

- Mulch blankets

Mulch blankets are made with materials such as straw or wood fibers and are usually stitched together with photodegradable plastic netting. Mulch blankets provide a uniform cover for vegetation establishment while preventing erosion on moderate to steep slopes. Areas where mulch blankets

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should be considered include, but are not limited to, along roads and where erosion from burned slopes may harm critical habitat or physical structures.

- Weed-free straw

Certified weed-free straw can be purchased and spread by hand, mechanically, or in remote areas, by helicopter or fixed-wing aircraft. Straw mulch provides soil stabilization and retains soil moisture, increasing seed germination and establishment.

- Hydromulch

Hydromulch may be applied mechanically on the ground along road sides or at accessible sites, or aerially in more remote areas. Hydromulch aids in site stabilization by reducing soil erosion through providing ground cover. Hydromulch also provides and retains soil moisture, enhancing seedling germination and establishment. Hydromulch may be applied after a burned area is seeded or seed may be incorporated into the hydromulch slurry allowing seed and mulch to be applied in one treatment.

- c. Silt fences. Silt fences are primarily useful in swales, small seasonal streambeds, and on hillsides where other sediment traps cannot be used. Silt fences are most effective on shallower slopes where they will not experience high sediment loads. Silt fences must be well anchored and monitored to prevent failure, which could cause a high volume sediment release.
- d. Straw bale check dams/other gabions. Dams made out of materials such as straw or rock can be used to reduce sediment in perennial streams following wildfires. The dams detain water long enough for coarse sediment to be deposited on the up-stream side of the dam. Dams also reduce water velocity and can be used to replace woody debris that may have been burned during the wildfire.
- e. Sand, soil, and gravel bags. Sand, soil, and gravel bags can be used on slopes and in channels to interrupt overland water flow and reduce soil erosion by trapping sediment runoff. Bags can be placed in rows similar to contour felled logs in order to promote surface water infiltration.

### **Cultural Resources Site Stabilization and Protection**

Under emergency stabilization and rehabilitation funding, assessments of significant heritage and cultural sites in areas affected by treatments may be conducted. Critical heritage resources affected by wildfire may also be stabilized and looting may be prevented by patrolling, camouflaging, or burying significant heritage sites.

### **Hazardous Waste Stabilization**

Hazardous wastes should be assessed on a case-by-case basis when located within a burned area. Proper actions should be taken to treat or remove hazardous wastes in a timely manner.

### **Invasive and Non-native Weed Control**

Seeding may be used to prevent the establishment of invasive species. Direct treatment such as the use of herbicides may also be used to reduce the spread of invasive species. This may be done under emergency stabilization funding when immediate action is required and validated techniques are used. In addition, chemical, manual, and mechanical treatments of invasive species as well as planting of native and non-native species may be accomplished under rehabilitation funding in order to re-establish a functioning ecosystem even where pre-fire conditions cannot be immediately restored.

### **Road/Facility Repair**

Emergency Stabilization treatments include increasing road drainage for post-fire runoff and replacing or repairing minor facilities where they are essential to public health and safety. In addition, treatments allowable under rehabilitation funding include the replacement or repair of minor operating facilities. These facilities could include, but are not limited to, campgrounds, shade shelters, fences, wildlife guzzlers, and interpretive signs. When repair or reconstruction of roads is necessary for Emergency Stabilization purposes, one or more of the following treatments may be implemented.

#### **1. Out Sloping**

In some cases surface water control on roads may be accomplished by shaping the road surface to deflect water runoff perpendicular to the direction of travel on the road. This may prevent rilling and gullyng caused by concentrated water flow.

#### **2. Culvert Upgrades**

Following a wildfire, there is often an increased level of surface water runoff. Existing culverts may be replaced with larger diameter culverts to prevent damage to a road. Upgraded culverts should be installed before the first major rains following a wildfire. Armoring of culvert inlets and outlets should be considered to prevent culvert and road damage.

#### **3. Rolling Dips/Water Bars/Cross Drains/Culvert Overflows/Bypasses**

Road repair and upgrade may be necessary following a fire to control high levels of surface water runoff. Most road water control treatments can be completed with a road grader, dozer, rocks, or logs. These treatments are a combination of ditches and berms that run perpendicular or at an angle to a road or trail. They may be used to control and drain surface water on the road or the ditch on the downhill side of the road when culverts are not expected to handle predicted levels of surface water. Depending on site specific purpose, and water control method chosen, some treatments may prevent use of a road.

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### **Wilderness Study Area Guidelines for Emergency Stabilization and Rehabilitation**

Emergency Stabilization and Rehabilitation actions following a wildfire in a wilderness study area will be in conformance with the guidelines described in the Interim Management Plan for Lands Under Wilderness Review (H-8550-1). If a fire occurs within both wilderness study area and non-wilderness study area lands the Emergency Stabilization and Rehabilitation actions will follow the Interim Management Plan for the area within the wilderness study area and follow the Normal Year Fire Rehabilitation Plan for lands burned outside the wilderness study area. If the conditions of the fire permit i.e., no mechanical treatments or non-native species seeding, etc., are deemed crucial, the non-wilderness study area land may be treated the same as the wilderness study area land.

Interested parties will be allowed a 30-day comment period on the proposed treatment in wilderness study areas unless it is not possible to do so because of emergency conditions (i.e., the 30-day comment period would result in missing the optimum period for treatment). If a full 30-day period is not allowed due to time constraints, the necessary parties would be contacted for immediate comment, and a follow-up copy of the proposed action would be forwarded.

Any fire suppression activities that are determined to have negatively affected the wilderness values of the wilderness study area will be rehabilitated prior to the release of fire crew support. These suppression rehabilitation activities will be funded by the appropriate suppression subactivity.

All Emergency Stabilization and Rehabilitation actions must maintain or enhance the wilderness values of the area. Thus, the minimum tool concept will be applied to all emergency and rehabilitation activities to ensure the proposed action is necessary and does not damage the area. Hand or aerial seeding and planting of native species may be done to restore natural vegetation. Generally, seed will be aurally applied unless the fire is small and hand application will not harm the area's wilderness suitability. Seedings and plantings will be staggered or irregular so as to avoid a straight-line plantation appearance. Cross-country use of motorized equipment will be minimal. Each wildfire will be evaluated on a case-by-case basis to ensure that species seeded and the methods for seeding are in compliance with the guidelines set forth in the Interim Management Plan.

**APPENDIX H**  
**LEGAL DESCRIPTIONS FOR POTENTIAL LAND DISPOSAL**

**APPENDIX H  
LEGAL DESCRIPTIONS FOR POTENTIAL LAND DISPOSAL**

<b>POTENTIAL LAND DISPOSAL AREAS PROPOSED RMP</b>				
<b>Township</b>	<b>Range</b>	<b>Section</b>	<b>Legal Description</b>	<b>Acres</b>
<b>LINCOLN COUNTY POTENTIAL LAND DISPOSAL AREAS</b>				
<b>FEDERAL LAND TRANSACTION FACILITATION ACT LANDS</b>				
None because Lincoln County Conservation Recreation and Development Act supersedes Federal Land Transaction Facilitation Act				
3 S	55 E	26	All Public Lands south of Highway 375	798
		35	SW $\frac{1}{4}$ SW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$	
		36	S $\frac{1}{2}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ , All Public Lands south of Highway 375 in SE $\frac{1}{4}$ NE $\frac{1}{4}$	
4 S	55 E	1	LOTS 1-4, S $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	894
		2	LOT 4, S $\frac{1}{2}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$	
3 S	56 E	31	All Public Lands south of Highway 375	107
4 S	56 E	6	LOTS 1-5, SE $\frac{1}{4}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	316
6 S	57 E	25	NW $\frac{1}{4}$ NW $\frac{1}{4}$	40
3 S	60 E	24	SE $\frac{1}{4}$ SW $\frac{1}{4}$ All Public Lands east of Highway 318	330
		25	W $\frac{1}{2}$ All Public Lands east of Highway 318	
		35	E $\frac{1}{2}$ All Public Lands east of Highway 318	
4 S	60 E	1	SW $\frac{1}{4}$ SW $\frac{1}{4}$	560
		2	All Public Lands east of Highway 318	
		11	All Public Lands east of Highway 318	
		14	N $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NE $\frac{1}{4}$	
6 S	61 E	6	Lots 9 and 10	1,859
		7	NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$	
		29	SE $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , NE $\frac{1}{4}$	
		30	LOTS 3 and 4, E $\frac{1}{2}$ SW $\frac{1}{4}$	
		31	LOTS 1-4, S $\frac{1}{2}$ SE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$	
		32	N $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$	
		33	SW $\frac{1}{4}$ , NW $\frac{1}{4}$	
7 S	61 E	4	ALL	2,662
		5	NE $\frac{1}{4}$ SE $\frac{1}{4}$	
		6	LOTS 1 and 2, N $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	
		7	E $\frac{1}{2}$ ,	
		8	S $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$	
		9	ALL	
		16	NE $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$	
		17	SE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$	
3 S	66 E	23	ALL	3,811
		24	ALL	
		25	ALL	
		26	ALL	
		35	ALL	
		36	ALL	
4 S	66 E	1	LOTS 5-12, SW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$	3,539
		2	ALL	
		11	ALL	
		12	N $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$	
		13	NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$	
		14	ALL	

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POTENTIAL LAND DISPOSAL AREAS PROPOSED RMP				
Township	Range	Section	Legal Description	Acres
2 S	67 E	11	S½	4,160
		12	ALL	
		13	SE¼, NE¼SW¼, N½	
		14	S½NW¼ SW¼ W½SE¼	
		23	SE¼, SW¼, NW¼, W½NE¼, NE¼NE¼	
		24	S½SW¼, NW¼SW¼	
		25	NW¼NW¼	
		26	NW¼SE¼, SW¼, NW¼, NE¼	
		35	W½SW¼, NE¼, NW¼NE¼	
		36	SE, E½SW¼, SW¼SW¼, E½NW¼, S½NE¼, NW¼NE¼	
3 S	67 E	1	ALL	11,995
		4	ALL	
		9	ALL	
		12	ALL	
		13	ALL	
		16	ALL	
		19	ALL	
		20	ALL	
		21	W½NE¼, NW¼, SW¼, N½SW¼SE¼, NW¼SE¼	
		23	ALL	
		24	ALL	
		28	W½NW¼, S½SW¼, SE¼	
		29	NE¼, NW¼, SW¼, N½SE¼	
		30	ALL	
		31	ALL	
		32	E½NE¼, NW¼, N½SW¼, SW¼SW¼, E½SE¼	
		33	ALL	
		34	ALL	
35	ALL			
36	ALL			
4 S	67 E	1	ALL	7,253
		2	ALL	
		3	ALL	
		4	ALL	
		5	LOTS 1, 4, SE¼NE¼, SW¼NW¼, SW¼SW¼, NE¼SE¼, S½SE¼	
		6	ALL	
		7	LOTS 1, 2, 5, 6, NE¼NW¼	
		8	S½SE¼	
		9	N½NE¼, N½NW¼, SW¼, W½NE¼SE¼, SW¼SE¼NE¼SE¼, NW¼SE¼, S½SE¼	
		10	N½NE, E½NW¼, NW¼NW¼, SW¼SW¼SW¼NW¼	
		13	ALL	
		14	ALL	
		15	ALL	
		16	ALL	
17	NE¼			

POTENTIAL LAND DISPOSAL AREAS PROPOSED RMP				
Township	Range	Section	Legal Description	Acres
2S	68E	4	E½SE¼	1,716
		6	LOTS 6 and 7, E½SE¼SE¼SW¼, W½SW¼SE¼SW¼, N½SW¼, NE¼SW¼, W½SE¼	
		7	W½N¼	
		9	S½SE¼, NE¼SE¼, SE¼SW¼, E½SE¼NE¼, E½NW¼NE¼, NE¼NE¼	
		10	All Public Lands south of Highway 25	
		16	E½SW¼	
		19	SE¼SE¼	
		20	SE¼NE,	
		21	SE¼, SW¼, S½NW¼, NE¼	
4 S	68 E	6	ALL	1,272
		18	ALL	
11 S	69 E	36	ALL	640
3 S	70 E	25	SE¼, E½SW¼, NW¼, NE¼	2,440
		26	N½NE¼	
		35	S½	
		36	NW¼SW¼, S½SW¼, NE¼NW¼, NE¼	
4 S	70 E	1	LOTS 3 and 4, S½NW¼	480
		2	LOTS 1-4, S½ NW¼, S½NE¼	
3 S	71 E	30	S½	880
		31	SE¼SE¼, N½SE¼, SW¼SW¼, N½SW¼, NW¼, NE¼	
2 N	66 E	24	ALL	1,280
		25	ALL	
1 N	67 E	4	ALL	6,326
		5	ALL	
		6	ALL	
		8	All Public Lands within	
		9	ALL	
		10	W½SW¼, NE¼SW¼, N½	
		11	W½	
		12	N½NW¼SE¼, N½NE¼SE¼, N½SW¼NE¼SW¼, NW¼NE¼SW¼, NE¼NE¼SW¼, W½SW¼, W½NW¼	
		13	S½, S½SW¼NW¼, S½SE¼NW¼, N½N½SE¼NE¼, N½N½SW¼NE¼, S½SW¼NE¼	
		15	N½NW¼	
		16	All Public Lands within	
		17	All Public Lands within	
		20	All Public Lands within NE¼	
		21	All Public Lands within	
		22	SE¼NW¼, SW¼NW¼, NW¼NW¼, SW¼NE¼NW¼, E½NE¼NW¼, All Public Lands within NW¼SW¼	
23	All Public Lands within			
26	All Public Lands within N½			
2 N	67 E	19	LOTS 1-4, E½SW¼, E½NW¼, NE¼	2,846
		29	SE¼, SE¼SW¼, N½SW¼, NW¼, NE¼	
		30	LOTS 3, 4, 6, 7, SE¼SE¼SE¼SW¼, W½SE¼SE¼SW¼, W½SE¼SW¼, SW¼NE¼SE¼SW¼, W½SW¼NE¼SW¼	
		31	ALL	
		32	NE¼, NE¼NW¼, S½NW¼, SW¼, S¼	
		33	ALL	
4 N	67 E	3	LOTS 12-19, S½NW¼, S½NE¼	409
5 N	67 E	34	SW¼SE¼, N½SW¼, NW¼, W½NE¼, NE¼NE¼	400
4 N	69 E	3	LOTS 7,8,9,12	26
		10	LOTS 2,4	
<b>Lincoln County Total</b>				<b>57,039</b>

**APPENDIX H**

POTENTIAL LAND DISPOSAL AREAS PROPOSED RMP				
Township	Range	Section	Legal Description	Acres
<b>WHITE PINE COUNTY POTENTIAL LAND DISPOSAL AREAS</b>				
FEDERAL LAND TRANSACTION FACILITATION ACT LANDS				
None because Lincoln County Conservation Recreation and Development Act supersedes Federal Land Transaction Facilitation Act				
17 N	55 E	6	LOTS 12, 13	10
23 N	55 E	13	SE $\frac{1}{4}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$	120
13 N	61 E	9	E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$	3
17 N	61 E	23	SE $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$	480
		24	SW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$	
11 N	62 E	3	LOT 6	43
12 N	62 E	27	W $\frac{1}{2}$ W $\frac{1}{2}$	380
		34	N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$	
15 N	63 E	12	W $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	400
		13	N $\frac{1}{2}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$	
16 N	63 E	1	LOTS 1-12, S $\frac{1}{2}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	2,215
		12	SE $\frac{1}{4}$ , NE $\frac{1}{4}$	
		13	SE $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$	
		23	E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$	
		24	W $\frac{1}{2}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$	
		25	W $\frac{1}{2}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$	
		26	NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , Public Lands in SW $\frac{1}{4}$	
		27	E $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ , Public Lands in E $\frac{1}{2}$ SE $\frac{1}{4}$	
		34	W $\frac{1}{2}$ NE $\frac{1}{4}$ , W $\frac{1}{2}$ E $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$	
		35	Public Lands in N $\frac{1}{2}$	
17 N	63 E	15	SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$	1,344
		22	E $\frac{1}{2}$ SE, W $\frac{1}{2}$ SW, E $\frac{1}{2}$ NE	
		23	ALL	
		24	ALL	
		25	W $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NE $\frac{1}{4}$	
		26	NW $\frac{1}{4}$ , NE $\frac{1}{4}$	
		27	SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , NE $\frac{1}{4}$	
		34	LOTS 1-4, E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$	
24 N	63 E	12	S $\frac{1}{2}$ SE $\frac{1}{4}$	2,040
13	SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$			
23	E $\frac{1}{2}$ E $\frac{1}{2}$			
24	W $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$			
25	SW $\frac{1}{4}$ , NW $\frac{1}{4}$			
26	SE $\frac{1}{4}$ , NE $\frac{1}{4}$			
35	N $\frac{1}{2}$ NE $\frac{1}{4}$			
36	NW $\frac{1}{4}$ , NW $\frac{1}{4}$			
15 N	64 E	18	LOT 1, NE $\frac{1}{4}$ NW $\frac{1}{4}$ (Public Lands Within)	64
16 N	64 E	6	LOTS 3-7, SE $\frac{1}{4}$ SW $\frac{1}{4}$ , NE $\frac{1}{4}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$	634
		7	LOTS 1-4, E $\frac{1}{2}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$	

POTENTIAL LAND DISPOSAL AREAS PROPOSED RMP				
Township	Range	Section	Legal Description	Acres
17 N	64 E	5	SE $\frac{1}{4}$	935
		7	E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$	
		8	Lots 1-8, NW $\frac{1}{4}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$	
18 N	64 E	10	ALL	320
		15	NW, N $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$	
		22	NE $\frac{1}{4}$ NW $\frac{1}{4}$	
21 N	64 E	19	LOTS 3 and 4, SE $\frac{1}{4}$ SW $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$	279
		20	S $\frac{1}{2}$ SW $\frac{1}{4}$	
12 N	67 E	12	Lands south of SR 744 in N $\frac{1}{4}$ , NW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , and S $\frac{1}{2}$ SE $\frac{1}{4}$	160
13 N	70 E	1	LOTS 1, 2, SW $\frac{1}{4}$ , SE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	560
		2	SE $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$	
		21	N $\frac{1}{2}$ NE $\frac{1}{4}$	
14 N	70 E	25	ALL	3,200
		26	ALL	
		27	ALL	
		28	ALL	
		36	ALL	
13 N	71 E	6	ALL	303
14 N	71 E	30	LOTS 1-3, 5-7, W $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ SW $\frac{1}{4}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	553
		31	ALL	
			White Pine County Energy Projects	4,500
			<b>White Pine County Total</b>	<b>18,543</b>
			<b>Total</b>	<b>75,582</b>

**APPENDIX I**  
**COMMENTS AND RESPONSES ON THE DRAFT RMP/EIS**

### Introduction to Appendix I

As discussed in Section 5.1.6 of the Proposed RMP/Final EIS, 650 comment letters and emails were received on the Draft RMP/EIS. Six public meetings on the Draft also were held (see Section 5.1.7), and members of the public chose to speak on the record at four of the six. Appendix I includes verbatim copies of the comment letters and emails, as well as transcripts from the four public meetings during which comments were provided. The comments on the Draft RMP/EIS contained within each document have been identified, numbered, and highlighted with brackets. BLM's response is presented opposite each comment.

Comment letters have been organized based on the entity that submitted the letter. For example, letters from federal, state, local, and tribal agencies have been separated into four groups. Each letter has been given a unique identifier that is based on the group prefix and the individual letter number. Letter F6 is the sixth letter from a federal agency, in this case the National Park Service. Within each letter, comments also have been assigned unique numbers. Comment F6-1 would be the first comment from the National Park Service. All comment letters and public meetings are identified on the index that follows. In order to access a specific comment letter, please find it on the following list and then "click" on the letter you wish to review. Hyperlinks from individual entries in the list to the appropriate file will open the letter you have selected.

<b>Business/Industrial</b>			
Letter Number	Last Name	First Name	Affiliation
B-1	Lloyd	Brad	7L Outfitters
B-2	Folks	Casey	Best in the Desert
B-3	Folks	Casey	Best in the Desert
B-4	Carter	Steven	Carter Cattle Company
B-5	Johnson	Fred	Industrial Mineral Developments, Inc.
B-6	Crawford	Eric	LS Power Development
B-7	Dart	Bill	ORBA
B-8	McLain	John	Resource Concepts, Inc.
B-9	Albright	Kenneth	Southern Nevada Water Authority
B-10	Albright	Kenneth	Southern Nevada Water Authority
B-11	Wright	Edward	Tillies, TKO Outfitters
B-12	Brunson	Thomas	Timberline Outfitters Guide Service
B-13	Folks	Daryl	Trac-on
B-14	Folks	Daryl	Trac-on
B-15	Uhalde	John	Uhalde & Company
B-16	Lytle	Shawn	White Rock Outfitters
<b>Federal Government</b>			
Letter Number	Last Name	First Name	Affiliation
F-1	Potts	James	Natural Resource Conservation Service
F-2	Hopper	Eliose	Nellis AFB
F-3	James	Duane	USEPA
F-4	Lanthrum	J. Gary	USDOE
F-5	Williams	Robert	USFWS
F-6	Nielson	Cindy	National Park Service

<b>Individual</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
I-1	Anderson	Paul	
I-2	Anonymous	"Fast Freddy"	
I-3	Baker	Gretchen	
I-4	Boeger	Karen	
I-5	Ehly	Ray, Jr.	
I-6	Gilbert	Sue	
I-7	Heinz	Dan	
I-8	Heizer	Michael & Mary	
I-9	Huggins	William	
I-10	Hughes	Arlin	
I-11	Larrick	Don	
I-12	Livrerri	Anthony Z	
I-13	Martinez	Robert	
I-14	Mullen	Karen	
I-15	Nappe	Tina	
I-16	Roddin	Marc	
I-17	Rollins	Luke	
I-18	Sachau	B.	
I-19	Sachau	B.	
I-20	Sherratt	Russell	
I-21	Spear	Julie	
I-22	Stevenson	Craig and Gretchen	
I-23	Stever	Lyle Shane	
I-24	Vogt	Tim	
I-25	Wade	Darrell	
I-26	Weaver	Mark	
I-27	Williams	Stephen	
I-28	Livrerri	Anthony Z	
<b>Local Government</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
L-1	Gloekner	Pat	Lincoln County Advisory Board of Manage Wildlife
L-2	Miller	William	White Pine County
L-3	Chachas	John	White Pine County Board of County Commissioners
L-4	Rowe	George T.	Lincoln County Commissioners

<b>Non Governmental Organization</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
N-1	Garrett	Jo Anne	Baker Area Citizen Adv. Board
N-2	Wilson	Scott	Bushwhacker Motorcycle Club of MRAN
N-3	Govan	Michael & Mary	DIA Art Foundation
N-4	Netherton	Shaaron	Friends of Nevada Wilderness
N-5	Jensen	Eva	Nevada Archaeological Association
N-6	Watson	Charles	NORA
N-7	McAllister	Elise	Partners in Conservation
N-8	Hiatt	John	Red Rock Audubon Society
N-9	Simon	Mike	Rocky Mountain Elk Foundation
N-10	Bair	Janet	The Nature Conservancy
N-11	Strickland	Rose	Toiyabe Sierra Club
N-12	Meece	Rick	Vegas Valley 4-Wheelers
N-13	Fite	Katie	Western Watersheds Project
N-14	Fite	Katie	Western Watersheds Project
N-15	Fite	Katie	Western Watersheds Project
N-16	Fite	Katie	Western Watersheds Project
N-17	Fite	Katie	Western Watersheds Project
N-18	Belenky	Lisa	Center for Biological Diversity
N-19	Mellington	Steve	Mojave-Southern Great Basin Resource Advisory Council
N-20	Fite	Katie	Western Watersheds Project
N-21	Fite	Katie	Western Watersheds Project
<b>State Government</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
S-1	Canfield	Dan	Division of State Lands
S-2	Kane	Nevan	NDEP
S-3	Lamp	Rory	NDOW
S-4	Loux	Robert	Office of the Governor - Agency for Nuclear Projects
S-5	Rask	Holly	University of Nevada Cooperative Extension
S-6	McCuin	Gary	Department of Agriculture
<b>Tribal Government</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
T-1	Buckner	Diane	Ely Shoshone Tribe
<b>Form Letters</b>			
<b>Letter Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Topic</b>
Form 1	Abrams, et al		Wilderness Protection
Form 2	Moore, et al		
Form 3	Stephens, et al		Off-highway Vehicle Use
Form 4	Jackson, et al		Wildlife

<b>Public Meetings</b>			
<b>Transcript/Comment Number</b>	<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
PM-1—1, 2, 4	Rowe	Tommy	Lincoln County Commissioner
PM-1—3	Clifton	Jack	
PM-2—1-7, 13	Owens	Jim	
PM-2—8	Clay	Don	
PM-2—9	Johnson	Fred	
PM-3—1-3	Hutchings	John	
PM-3—4-9	Freeman	Ken	
PM-3—10-14, PM-3—30-32	Vasconi	Bill	Fraternity of the Desert Bighorn
PM-3—15-23	Livreri	Anthony	Motorcycle Racing Association of Nevada
PM-3—24-26	Wilson	M.	Motorcycle Racing Association of Nevada
PM-3—27-29	Dunn	David	Motorcycle Racing Association of Nevada
PM-3—30-32	Vasconi	Bill	Fraternity of the Desert Bighorn
PM-3—33-35	Albrecht	Michael	Dunes and Trails
PM-4—1-7	Sill	Marjorie	
PM-4—8-9	Nappe	Tina	Sierra Club