

## **APPENDIX D**

# TYPICAL MANAGEMENT ACTIONS AND BEST MANAGEMENT PRACTICES

## Vegetation Treatments (Including Fire Management Activities)

The following chemical, mechanical, manual, biological, and fire treatment methods would be used to achieve vegetation management objectives in the Planning Area.

### A. Chemical

BLM would use EPA-approved herbicides in accordance with EPA's Endangered Species Pesticide Program covered in the BLM's *Vegetation Treatment Using Herbicides on BLM Lands in Seventeen Western States Draft PEIS* (DOI BLM 2005b). These herbicides are: Atrazine; Bromacil; Bromacil + Diuron;; 2,4-D, 2,4-DP, Dicamba; Dicamba +2,4\_D; Diuron; Glyphosate; Glyphosate + 2,4-D; Hexazinone; Fosamine, Imazapyr;; Picloram; Picloram + 2,4-D; Simazine;; Tebuthiuron; and Triclopyr.

Buffer zones would be used adjacent to dwellings, domestic water sources, agriculture land, streams, lakes and ponds. A minimum buffer zone of 100 feet wide would be provided for aerial application, 25 feet for vehicle application and 10 feet for hand application. Any deviations must be in accordance with the label for the herbicide. Herbicides would be hand wiped on individual plants within 10 feet of water where application is critical. Additionally, in order to protect listed, proposed, and candidate species, these buffer strips would be used.

BLM would work closely with the USFWS to ensure that herbicide applications would not affect listed or proposed, threatened, and endangered species on a project-level basis. If adverse effects are anticipated during informal consultation, BLM would formally consult on these projects. If USFWS develops herbicide guidance for particular species that improves protection beyond the current BLM design features, BLM would consider and incorporate that guidance as it consults with USFWS on a project-level basis.

The chemicals can be applied by many different methods, and the selected technique depends on a number of variables. Some of these are: (1) the treatment objective (removal or reduction); (2) the accessibility, topography, and size of the treatment area; (3) the characteristics of the target species and the desired vegetation; (4) the location of sensitive areas in the immediate vicinity (potential environmental impacts); (5) the anticipated costs and equipment limitations; and (6) the meteorological and vegetative conditions of the treatment area at the time of treatment.

Herbicides are applied in several ways, depending upon the treatment objective, topography of the treatment area, target species, expected costs, equipment limitations, and potential environmental impacts. Herbicide applications would be timed to have the least impact on non-target plants and animals consistent with the objectives of the vegetation management program.

The chemicals would be applied aerially with helicopters or fixed-wing aircraft, or on the ground using vehicles or manual application devices. Helicopters are more expensive to use than fixed-wing aircraft, but they are more maneuverable and effective in areas with irregular terrain and in treating specific target vegetation in areas with many vegetation types. Manual applications are used only for treating small areas or those inaccessible by vehicle.

Rates of herbicide application would depend on the target species, other vegetation present, soil type, depth of the ground water table, and presence of other water sources. When target species occur in riparian areas, the application rate would be reduced to reduce injury to non-target species.

During aerial applications, nozzles to reduce drift would be used for all liquid applications. Liquid herbicides would not be applied when wind speeds exceed 5 miles per hour, and granular herbicides would not be applied when wind speeds exceed 10 miles per hour (mph). Herbicides would not be applied when conditions stated on the herbicide label cannot be met and when air turbulence significantly affects the desired spray pattern. Buffer zones to protect water resources would be provided according to individual state regulations and guidelines and herbicide labels.

Vehicle-mounted sprayer (hand gun or boom) applications would be mainly used in open areas that are readily accessible by vehicle. The boom would be used only where feasible to treat concentrated weed infestations. The hand gun would be used for spot treatment of weeds and only up to the high water line near water bodies. Neither hand guns nor booms would be used in riparian areas where weeds are closely intermingled with shrubs and trees. Under both hand gun and boom methods, sprays would be applied in a manner that gives the best possible coverage with the least amount of drift, and only when wind velocity is below 8 mph, except in riparian areas where treatment would be applied only at wind velocities below 5 mph. Boom sprayers would not be used within 25 feet of water bodies.

Hand applications could involve backpack spraying, hand wiping application, and cyclone broadcast spreading (granular formulations). Backpack sprayers are operated at low pressure and low volume and release herbicide through a single nozzle held from 0.5 to 2.5 feet above the ground when wind velocities do not exceed 8 mph. Near water, wind velocities cannot exceed 5 mph. Contact systemic herbicides, such as glyphosate, wiped on individual plants, would be used up to the existing high water line. Granular formulations would be applied through broadcast spreaders at about 3.5 feet above the

ground and no closer than 10 feet from the high water line of streams and other water bodies.

Herbicide applications are scheduled and designed to minimize potential impacts on non-target plants and animals, while remaining consistent with the objective of the vegetation treatment program. The rates of application depend on the target species, presence, and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, and the requirements of the label.

In many circumstances, the herbicide chosen, time of treatment, and rate of application of the herbicide are different than the most ideal herbicide application for maximum control of the target plant species in order to minimize damage to the non-target plant species and to ensure minimum risk to human health and safety.

## **B. Mechanical**

Mechanical methods of vegetation treatment employ several different types of equipment to suppress, inhibit, or control herbaceous and woody vegetation (Vallentine 1980). The goal of mechanical treatments is to kill or reduce the cover of undesirable vegetation and thus encourage the growth of desirable plants. BLM uses wheel tractors, crawler-type tractors, mowers, or specially designed vehicles with attached implements for mechanical vegetation treatments. The use of mechanical equipment to reduce fuel hazards would be conducted in accordance with BLM established procedures. Re-seeding after a mechanical treatment has been applied is important to help ensure that desirable plants would become established on the site and not invasive species. The mechanical treatment and re-seeding should occur at a time to best control the undesirable vegetation and encourage the establishment of desirable vegetation. The best mechanical method for treating undesired plants in a particular location depends on the following factors:

- Characteristics of the undesired species present such as plant density, stem size, woodiness, brittleness, and re-sprouting ability
- Need for seedbed preparation, re-vegetation, and improve water infiltration rates
- Topography and terrain
- Soil characteristics such as type, depth, amount and size of rocks, erosion potential, and susceptibility to compaction
- Climatic and seasonal conditions
- Potential cost of improvement as compared to expected results

Bulldozing is conducted with a wheeled or crawler tractor with a heavy hydraulic controlled blade. Vegetation is pushed over and uprooted, and then left in windrows or piles. Bulldozing is best adapted to removing scattered stands of large brushes or trees. There are several different kinds of blades available depending on the type of vegetation and goals of the project. The disadvantage of bulldozing is soil disturbance and damage to non-target plant species.

Disk plowing in its various forms can be used for removing shallow-rooted herbaceous and woody plants. Disk plows should only be used where all of the vegetation is intended to be killed. There are several different kinds of root plows that are specific for certain types of vegetation. In addition to killing vegetation, disk plowing is effective in loosening the soil surface to prepare it for seeding and to improve the rate of water infiltration. The disadvantage of disk plowing is that it may be expensive and usually kills all species. Also, plowing is usually not practicable on steep slopes (greater than a 35- to 45-percent slope) or rocky soil. Plant species that sprout from roots may survive.

Chaining and cabling is accomplished by dragging heavy anchor chains or steel cables hooked behind tractors in a U-shape, half circle or J-shaped manner. Chaining and cabling is effective on rocky soils and steep slopes. Chaining and cabling is best used to control non-sprouting woody vegetation such as small trees and shrubs. However, desirable shrubs may be damaged in the process. Herbaceous vegetation is normally not injured by this control method. This control method is cost effective, as large areas can be readily treated. The chains or cables also scarify the soil surface in anticipation of seeding desirable species. The disadvantage is that weedy herbaceous vegetation can survive this treatment.

There are various tractor attachments that are used for mowing, beating, crushing, chopping, or shredding vegetation depending on the nature of the plant stand and goals of the project. The advantage in using this type of equipment is that selective plants may be targeted to achieve specific goals. For example, mowing is effective in reducing plant height to a desirable condition and it usually does not kill vegetation. Mowing is more effective on herbaceous than woody vegetation. On the other hand, a rolling cutter can kill woody non-sprouting vegetation by breaking stems at ground level but leave herbaceous vegetation. Mowing, beating, crushing, chopping, or shredding usually does not disturb the soil. Rocky soil and steep slopes may limit this use of equipment.

Debris management after a mechanical control treatment application is critical in fuel reduction projects. Vegetation material that is left onsite would dry and become more hazardous than before the treatment. Herbaceous material is usually not a problem, because it would decompose relatively fast depending on soil moisture, ambient humidity, and temperature. Woody vegetation should be piled and burned under acceptable fire management practices.

Efforts repeated every 21 days during the growing season can deplete the underground food supply of some perennials. This method would be required for at least a 3-year period to attain satisfactory control and would be considered only in areas where slope is less than 10 percent and where a small percentage of the vegetation consists of shrubs. This method would also weaken non-target species in treated areas.

## **C. Manual**

Hand-operated power tools and hand tools are used in manual vegetation treatment to cut, clear, or prune herbaceous and woody species. In manual treatments, workers would cut plants above ground level; pull, grub, or dig out plant root systems to prevent subsequent sprouting and re-growth; scalp at ground level or remove competing plants around desired vegetation; or place mulch around desired vegetation to limit the growth of competing vegetation. Hand tools such as the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock (combination of axe and grubbing hoe), brush hook, and hand clippers are used in manual treatments. Axes, shovels, grubbing hoes, and mattocks can dig up and cut below the surface to remove the main root of plants such as prickly pear and mesquite that have roots that can quickly resprout in response to surface cutting or clearing. Workers also may use power tools such as chain saws and power brush saws.

Manual methods are highly labor intensive, requiring periodic retreatment, ranging from every three weeks during the growing season to annually, depending on the target species. These methods have been successful in controlling annuals and biennials, but are ineffective in controlling creeping perennials.

## **D. Biological**

Biological methods of vegetation treatment could employ grazing by cattle, sheep or goats, but would not include the use of invertebrates or microorganisms. BLM would only use cattle, sheep, or goats when grazing, which would not adversely affect listed, proposed, or candidate species. The use of grazing as a biological control agent would be conducted in accordance with BLM procedures in the Use of Biological Control Agents of Pests on Public Lands (DOI BLM 1990). Grazing cattle, sheep, or goats would control few plant species.

Biological control methods using cattle, sheep, or goats would avoid erosion hazard areas, areas of compactable soils, riparian areas susceptible to bank damage, and steep erodible slopes.

Biological control methods using cattle, sheep, or goats would be applied to treat areas for short periods. When considering the use of grazing animals as an effective biological control measure, several factors would be taken into consideration including:

- Target plant species present
- Size of the infestation of target plant species
- Other plant species present
- Stage of growth of both target and other plant species
- Palatability of all plant species present
- Selectivity of all plant species present by the grazing animal species that is being considered for use as a biological agent
- Availability of the grazing animal within the treatment site area
- Type of management program that is logical and realistic for the specific treatment site.

These factors would be some of the options taken when developing the individual treatment for a specific site.

Although discussed as biological agents, cattle, sheep, and goats are not truly biological agents, but are domestic animals used to control only the top growth of certain noxious weeds. The following are some advantages of using domestic animals, mainly sheep or goats, for noxious weed control: (1) they use weeds as a food source, (2) following a brief adjustment period, they sometimes consume as much as 50 percent of their daily diet of this species, (3) average daily gains of offspring grazing certain weed-infested pastures can sometimes be significantly higher than average daily gains of offspring grazing grass pastures, and (4) sheep or goats can be used in combination with herbicides.

Some of the disadvantages of using domestic animals are: (1) they also use non-target plants as food sources, (2) the use of domestic animals, like sheep or goats, requires a herder or temporary fencing, (3) the animals may be killed by predators such as coyotes, (4) heavy grazing of some weed species, such as leafy spurge, tends to loosen the stool of the grazing animals, (5) most weed species are less palatable than desirable vegetation and would cause overgrazing, (6) they may accelerate movement of nonnative plants through seed ingestion and excretion, and (7) domestic livestock may transmit parasites and/or pathogens to resident native wildlife species.

## **E. Prescribed Burning**

Prescribed burning is the planned application of fire to wild land fuels in their natural or modified state, under specific conditions of fuels, weather, and other variables to allow

the fire to remain in a predetermined area and to achieve site-specific fire and resource management objectives.

Management objectives of prescribed burning include the control of certain species; enhancement of growth, reproduction, or vigor of certain species, management of fuel loads, and maintenance of vegetation community types that best meet multiple-use management objectives. Treatments would be implemented in accordance with BLM procedures in Fire Planning (DOI BLM 1987c), Prescribed Fire Management (DOI BLM 1988b), and Fire Training and Qualifications (DOI BLM 1987d).

Prior to conducting a prescribed burn, a written plan must be prepared that takes into consideration existing conditions (amount of fuel, fuel moisture, temperatures, terrain, weather forecasts, etc.) and identifies people responsible for overseeing the fire. Natural fire that is allowed to burn also needs to be carefully monitored to ensure that it would not threaten communities, other values to be protected, and ecosystems. This may require special expertise such as the fire use management teams that have been developed to support the overall fire management program. Planning and implementation for a specific prescribed fire project entails the following four phases:

**Phase 1.** The Information/Assessment Phase includes identifying the area to be treated, inventorying and assessing site specific conditions (live and dead vegetation densities, dead down woody fuels loadings, soil types, etc.), analyzing historic and present fire management, identifying resource objectives from Land Use Plans, and analyzing and complying with NEPA.

**Phase 2.** The Prescribed Fire Plan Development Phase includes developing site specific prescribed fire plan to BLM Standards. It also includes reviews of the plan and obtaining plan approval from local BLM field office administrators.

**Phase 3.** The Implementation Phase includes ignition of the fire according to the plan's prescribed parameters. Implementation includes prescribed fire boundary area preparation to ensure that the fire remains in prescribed boundaries. Site preparation may take place in the form of fire line construction, road improvements, wildlife and stock trails, tree limbing, and debris clearing.

**Phase 4.** The Monitoring and Evaluation Phase includes assessment and long-term monitoring of the fire treatment to ensure that the prescribed fire has met the objectives of the approved prescribed fire plan. BLM fire monitoring policy is described in the BLM prescribed Fire Management Handbook, October 2003, Chapter 2 and Appendix 7. This policy applies to prescribed fire and wildland fire use.



## **F. Cultural Resources**

Should cultural and/or paleontological resources be encountered during project ground-disturbing activities, work will cease in the area of the discovery, and the BLM will be notified immediately. Work may not resume until written authorization to proceed is issued by BLM.

The management of cultural resources on BLM land must be in compliance with several federal laws, including the Antiquities Act of 1906; the NHPA of 1966, as amended; the NEPA of 1969; EO 11593, "Protection and Enhancement of the Cultural Environment," the FLPMA of 1976; the American Indian Religious Freedom Act of 1978; the ARPA of 1979; the NAGRPA of 1990; EO 13007, "Indian Sacred Sites," and EO 13287, "Preserve America". In addition, the BLM manages its cultural resources according to BLM Manual 8100, "Fundamentals for Managing the Cultural Program," and Arizona BLM Handbooks 8110-H, "Guidelines for Identifying Cultural Resources," and 8120-H, "Guidelines for Protecting Cultural Resources."

Restrict public information about the locations of sites that are not allocated to public use, as allowed by law and regulation.

Ensure that all proposed undertakings and authorizations are reviewed and conducted in compliance with applicable federal laws including Section 106 of the National Historic Preservation Act.

Complete consultations with the California SHPOs prior to project implementation, as necessary.

Ensure that information on Native American religious and cultural issues receives good faith consideration during decision making and that government-to-government consultation procedures are carried out as appropriate for each proposed action.

## **G. Paleontological Resources**

If vertebrate or noteworthy occurrences of invertebrate or plant fossils are discovered, the user/operator shall suspend all operations that further disturb such materials and immediately contact the authorized officer. User/operators shall not resume until written authorization to proceed is issued by the authorized officer. The authorized officer would evaluate the discovery and inform the operator of actions that would be necessary to prevent loss of significant scientific values. The user/operator shall be responsible for the cost of any mitigation required by the authorized officer. Upon verification from the authorized officer that the required mitigation has been completed, the operator shall be allowed to resume operations.

## H. Special Designation Areas

Guidelines and operating procedures for all management activities in WAs are provided in BLM Manual 8560, *Management of Designated Wilderness Areas*, and in Wilderness Management Plans, where completed for specific WAs.

Management guidance for WSAs is provided in BLM Manual 8550, *Interim Management Policy and Guidelines for Lands under Wilderness Review*. Approved land use plans specify management procedures for areas identified in the land use plan to be managed for wilderness characteristics.

Management activities along NSTs would be conducted to assure that no adverse effects occur to those resources and values identified in the legislation designating the trail.

ACECs are established through the land use planning process. The desired conditions and management prescriptions for these special areas would be considered in implementing management activities.

## Wildland Fire Management

### A. Appropriate Management Response

The appropriate management response concept represents a range of available management responses to wildland fires. Responses range from full fire suppression to managing fires for resource benefits (fire use). Management responses applied to a fire would be identified in the fire management plans and would be based on objectives derived from the land use allocations; relative risk to resources, the public and fire fighters; potential complexity; and the ability to defend management boundaries. Any wildland fire can be aggressively suppressed, and any fire that occurs in an area designated for fire use can be managed for resource benefits if it meets the prescribed criteria from an approved fire management plan.

### B. Fire Suppression Actions

Suppression tactics would be utilized that limit damage or disturbance to the habitat and landscape. No heavy equipment would be used (such as dozers), unless approved by the Field Office Manager.

Use of fire retardants or chemicals adjacent to waterways would be accomplished in accordance to the "Environmental Guidelines for Delivery of Retardant or Foam Near Waterways" (Interagency Standards for Fire and Aviation Operations 2003, pages 8-13).

In Wilderness Areas, Wilderness Study Areas, and areas being managed for wilderness characteristics according to LUPs, when suppression actions are required, minimum impact suppression tactics (Interagency Standards for Fire and Aviation Operations, 2003) would be utilized and coordinated with Wilderness Area management objectives and guidelines.

The general and species-specific Conservation Measures listed in Appendix D would be implemented to the extent possible to minimize adverse effects to federally listed, proposed, or candidate species occurring within the action area.

For fire suppression activities, a protocol for consultation would be developed as a part of the Biological Opinion (BO). This programmatic consultation would contain conservation measures and prescriptions for use in fire suppression activities. Emergency consultation should only be needed in the future, if suppression actions fall outside of these prescriptions/measures. The BO would outline coordination needs for emergency response actions that may affect a listed/proposed species and/or critical habitat. The following protocol would apply: BLM would contact the appropriate USFWS biologist as soon as practical once a wildfire starts and a determination is made that a federally protected species and/or its habitat could be affected by the fire and/or fire suppression activities. USFWS would work with BLM during the emergency response to apply the appropriate Conservation Measures. When Conservation Measures cannot be applied during the suppression activities, BLM would, after the fact, need to consult on any suppression actions that may have affected the federally protected species or its habitat. If Conservation Measures are adhered to, BLM would report on the actions taken and effects to the species and its habitat following the fire, but no further consultation on that incident would be required.

In WAs, WSAs, and areas being managed for wilderness characteristics, minimum impact suppression tactics (MIST) would be applied and coordinated with WA management objectives and guidelines when fire suppression actions are required (Interagency Standards for Fire Operations 2003).

## **C. Cultural Resources**

All known cultural resources would be protected from disturbance.

Should cultural resources be encountered during wildland suppression ground-disturbing activities, the BLM will be notified immediately.

The management of cultural resources on BLM land must be in compliance with several federal laws, including the Antiquities Act of 1906; the NHPA of 1966, as amended; the NEPA of 1969; EO 11593, "Protection and Enhancement of the Cultural Environment," the FLPMA of 1976; the American Indian Religious Freedom Act of 1978; the ARPA of 1979; the NAGPRA of 1990; Executive Order 13007, "Indian Sacred Sites," and EO

13287, "Preserve America". In addition, the BLM manages its cultural resources according to BLM Manual 8100 through 8170, and in accordance with the statewide protocol from the California SHPO and other guidelines from the SHPO.

Restrict public information about the locations of sites that are not allocated to public use, as allowed by law and regulation.

Ensure that all proposed undertakings and authorizations are reviewed and conducted in compliance with applicable federal laws including Section 106 of the NHPA.

Complete consultations with the California SHPOs prior to project implementation, as necessary.

Ensure that information on Native American religious and cultural issues receives good faith consideration during decision making and that government-to-government consultation procedures are carried out as appropriate for each proposed action.

## **D. Paleontological Resources**

If vertebrate or noteworthy occurrences of invertebrate or plant fossils are discovered, the user/operator shall immediately contact the authorized officer.

## **Discretionary Construction Activities**

The following measures would reduce fugitive dust impacts:

1. All unpaved construction areas shall be sprinkled with water or other acceptable San Diego APCD dust control agents during dust-generating activities to reduce dust emissions. Additional watering or acceptable APCD dust control agents shall be applied during dry weather or windy days until dust emissions are not visible.
2. Trucks hauling dirt and debris shall be covered to reduce windblown dust and spills.
3. On dry days, dirt or debris spilled onto paved surfaces shall be swept up immediately to reduce resuspension of particulate matter caused by vehicle movement. Approach routes to construction sites shall be cleaned daily of construction-related dirt in dry weather.
4. On-site stockpiles of excavated material shall be covered or watered.
5. Water rock materials undergoing rock-crushing processing at sufficient frequency. Automatic water or mist or sprinkler system should be installed in areas of rock crushing and conveyor belt systems.

6. Use low pollutant-emitting construction equipment.
7. Equip construction equipment with prechamber diesel engines (or equivalent) together with proper maintenance and operation to reduce emissions of nitrogen oxide, to the extent available and feasible.
8. Use electrical construction equipment, to the extent feasible.

## **A. Cultural Resources**

All known cultural resources would be protected from disturbance.

Should cultural resources be encountered during project ground-disturbing activities, work will cease in the area of the discovery, and the BLM will be notified immediately. Work may not resume until written authorization to proceed is issued by BLM.

The management of cultural resources on BLM land must be in compliance with several federal laws, including the Antiquities Act of 1906; the NHPA of 1966, as amended; the NEPA of 1969; EO 11593, "Protection and Enhancement of the Cultural Environment," the Federal Land Policy and Management Act of 1976; the American Indian Religious Freedom Act of 1978; the ARPA of 1979; the NAGPRA of 1990; EO 13007, "Indian Sacred Sites," and EO 13287, "Preserve America". In addition, the BLM manages its cultural resources according to BLM Manual 8100 through 8170, and in accordance with the statewide protocol from the California SHPO and other guidelines from the SHPO.

Restrict public information about the locations of sites that are not allocated to public use, as allowed by law and regulation.

Ensure that all proposed undertakings and authorizations are reviewed and conducted in compliance with applicable federal laws including Section 106 of the NHPA.

Complete consultations with the California SHPOs prior to project implementation, as necessary.

Ensure that information on Native American religious and cultural issues receives good faith consideration during decision making and that government-to-government consultation procedures are carried out as appropriate for each proposed action.

## **B. Paleontological Resources**

If vertebrate or noteworthy occurrences of invertebrate or plant fossils are discovered, the user/operator shall suspend all operations that further disturb such materials and immediately contact the authorized officer. User/operators shall not resume until written authorization to proceed is issued by the authorized officer. The authorized officer would

evaluate the discovery and inform the operator of actions that would be necessary to prevent loss of significant scientific values. The user/operator shall be responsible for the cost of any mitigation required by the authorized officer. Upon verification from the authorized officer that the required mitigation has been completed, the operator shall be allowed to resume operations.

## C. Special Designation Areas

Guidelines and operating procedures for all management activities in WAs are provided in BLM Manual 8560, *Management of Designated Wilderness Areas*, and in Wilderness Management Plans, where completed for specific WAs.

Management guidance for Wilderness Study Areas is provided in BLM Manual 8550, *Interim Management Policy and Guidelines for Lands under Wilderness Review*. Approved land use plans specify management procedures for areas identified in the land use plan to be managed for wilderness characteristics.

Management activities along NSTs would be conducted to assure that no adverse effects occur to those resources and values identified in the legislation designating the trail.

ACECs are established through the land use planning process. The desired conditions and management prescriptions for these special areas would be considered in implementing management activities.

## D. Visual Resources

There are numerous design techniques for Visual Resources that can be used to reduce the visual impacts from surface-disturbing projects. These techniques should be used in conjunction with BLM's visual resource contrast rating process wherein both the existing landscape and the proposed development or activity are analyzed for their basic elements of form, line, color, and texture. Design techniques are discussed in the BLM VRM Manual (MS 8400) in terms of fundamentals and strategies. The fundamentals and strategies are all interrelated, and when used together, can help resolve visual impacts from proposed activities or developments.

**Design fundamentals** are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying these three fundamentals will help solve most visual design problems:

- Proper siting or location
- Reducing unnecessary disturbance

- Repeating the elements of form, line, color, and texture

**Design strategies** are more specific activities that can be applied to address visual design problems. Not all of these strategies will be applicable to every proposed project or activity:

- Color selection
- Earthwork
- Vegetative manipulation
- Structures
- Reclamation/restoration
- Linear alignment design considerations

## **Livestock Grazing and Wildlife Habitat Activities**

### **A. Typical Range or Habitat Improvements**

Following is a discussion of typical design features, construction practices, and implementation procedures for range or habitat improvements that could be constructed following approval of the RMP/Record of Decision (ROD). The extent, location, and timing of such actions would be based on allotment-specific management objectives adopted through the evaluation process, interdisciplinary development and analysis of proposed actions, and funding.

**Fences:** All new fences would be built to BLM manual specifications. Fences would normally be constructed to provide exterior allotment boundaries, divide allotments in pastures, protect streams, and control livestock. Most fences would be three-wire or four-strand with steel posts spaced 16.5 feet apart with intermediate wire stays. Existing fences that create wildlife movement problems would be modified. Proposed fence lines would usually not be bladed or scraped. Gates or cattle guards would be installed where fences cross existing roads.

All new or reconstructed fences in big game habitat, including bighorn sheep habitat, would meet specifications in BLM Handbook 1741-1 or be designed to allow for the movement of big game, including bighorn sheep. BLM would consult with CDFG on the design and location of new fences.

**Pipelines:** Wherever possible, water pipelines would be buried. The trench would be excavated by a backhoe, ditch witch, or similar equipment. Plastic pipe would be placed

in the trench and the excavated material would be used to backfill. Most pipelines would have water tanks spaced as needed to achieve proper livestock distribution.

**Wildlife Waters and Reservoirs:** Stock pond sites would be selected based on available watershed and hydrologic information. All applicable state laws and regulations would be followed. Water developments would include design features to ensure safety and accessibility to water by desirable wildlife. These features will include ramps to allow wildlife to escape, should they become trapped. Also, waters built in areas adjacent or in Peninsular bighorn sheep habitat will be designed to preclude shallow, vegetated edges that provide breeding habitat for *Culicoides* midges, an invertebrate disease vector for bluetongue virus.

**Wells:** Well sites would be selected based on geologic reports that predict the depth to reliable aquifers. All applicable state laws and regulations that apply to groundwater would be observed.

## **B. Supplemental Feedings**

Supplemental feed must be authorized in advance. Supplemental feed means a feed that supplements the forage available from the public lands and is provided to improve livestock nutrition or rangeland management.

If used, salt must be placed at least 0.25 mile from water sources to disperse impacts.

## **Mining Activities**

### **A. Reasonable Foreseeable Development**

This appendix provides a summary of the exploration history, current lease status, and 20-year projections for reasonable foreseeable development (RFD) of leasable, locatable, and salable minerals in the Planning Area.

Three factors of analysis are considered when making mineral determinations in RMPs: (1) the potential for occurrence and development of mineral resources, (2) immediate and cumulative impacts due to RFD of mineral resources, and (3) the need to apply constraints or restrictions, known as stipulations, to the determination (DOI BLM 1985). The first factor, mineral resource potential, is discussed in the MRPR. The second factor, RFD, is discussed in this appendix. The third factor, stipulations, will be analyzed and considered in the RMP.



## **Leasable Minerals**

### **a. Oil and Gas**

There are no documented proven reserves of oil and gas in the Planning Area and currently only minor leasing interest. No drilling activity has occurred. The RFD for fluid mineral development estimates that six exploratory wells would be drilled within the next 15 years.

### **b. Carbon Dioxide and Helium**

Areas having moderate CO<sub>2</sub>/He potential in the Planning Area are assumed to be correlative with areas of moderate oil and gas potential. So far, there has been no CO<sub>2</sub>/He exploration in the Planning Area and no leasing interest. The RFD for CO<sub>2</sub>/He development estimates that no oil and gas exploratory wells drilled in the Planning Area would discover CO<sub>2</sub>/He reserves, and no exclusively CO<sub>2</sub>/He exploratory wells would be drilled. The evaluation process for the RFD assumed that an increase in oil and gas drilling would result in production tests in two oil and gas exploratory wells without recovery of economic concentrations of CO<sub>2</sub>/He. Therefore, there will be no disturbance or impact in the Planning Area from development of a CO<sub>2</sub>/He field.

### **c. Geothermal**

So far, there has been no geothermal exploration in the Planning Area and no leasing interest. There are no geothermal energy leases in the Planning Area and no indications of future leasing activity. The RFD for geothermal resource development in the Planning Area expects that no leasing, exploration, or development would occur in the next 15 years. There is no foreseeable disturbance to public lands from geothermal resource development in the Planning Area in the next 15 years.

### **d. Coal**

There are no coal deposits reported in the Planning Area.

### **e. Sodium**

There has been no development of sodium resources and no indications for future leasing and development activity. The absence of leasing activity for sodium resources in the Planning Area is likely due to the limited demand for sodium resources and the considerable expense to explore and develop them. The RFD for sodium resource development expects that no leasing, exploration, or development will occur in the Planning Area in the next 15 years. There is no foreseeable disturbance to public lands from sodium resource development in the Planning Area in the next 15 years.

## Locatable Minerals

Mineral districts in the Planning Area are regions of known occurrence and high potential of locatable metallic and nonmetallic mineral resources. The location of these mineral districts was identified in the mineral potential maps section of the RMP. There are no active locatable mineral mines currently operating in the Planning Area

The RFD for locatable mineral resources in the Planning Area indicates that some exploration would occur in the next 15 years with two underground locatable mineral deposits being developed. The following assumptions were considered when evaluating the RFD for locatable mineral resources in the Planning Area:

- There would be two new locatable metallic lode discoveries in the next 15 years.
- Each new locatable metallic mineral discovery would include an underground mine, occupy approximately 10 surface acres, and include mining waste rock piles. In addition, these mines would produce between 25,000–50,000 tons of ore per year.
- Each new locatable non-metallic mineral discovery would include a prospecting pit, occupy approximately <1 surface acre, include mining waste rock piles. In addition, these mines would produce less than 100 pounds of gems per year.
- Where applicable, commodity ore would be transported offsite via surface roads for processing.
- The land surface would not be reclaimed during the life of the mine.

There is some foreseeable disturbance due to mining activities on public lands in the Planning Area in the next 15 years. Activities associated with the two new underground mines would impact up to 20 acres, including placement of waste rock piles. Activities associated with a gemstone mine would be small (less than one acre). Disturbance of the land surface would require reclamation at the end of the mine life.

## Salable Minerals

### Aggregate and Stone

Known occurrences (quarries and pits), prospects, and potential locations for salable mineral resources were identified in the mineral potential maps. Most locations are actively used for aggregate for construction operations or in some cases, for decorative stone or rip rap. The following assumptions were considered when evaluating the RFD for salable mineral resources in the Planning Area:

- The demand for salable minerals would increase during the next 15 years as population increases stimulate construction and infrastructure development.

*Appendix D*

- Based on past experience and projected future demand, no new pits / mines would be permitted / contracted in the next 15 years.

Remaining mines would require reclamation at the end of the life of the pits.