

United States Department of the Interior

Bureau of Land Management

Colorado State Office

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To: All Deputy State Directors and Field Managers

From: State Director, Colorado

Subject: Fire and Restoration Projects - Processes and Concepts for Addressing Standards for Public Land Health

We are receiving significant budget increases in the areas of fire restoration and fuels management designed to restore lands that were burned last year to treat vegetation in order to prevent large uncontrolled fires in the future and restore the landscape to a more natural fire regime. Much of this funding will go into projects, such as prescribed burns and mechanical and chemical treatments to manipulate fuels. We need to take an orderly approach to preparing for these projects, and ensure that we protect and enhance the health of the public lands.

As we design projects in the future, we should determine the objectives for the areas to be treated. These objectives should meet the needs of the fire program, as well as those of other programs, and take positive steps to protect and enhance the five public land health standards. The results from Land Health Assessments should be used as a factor to identify the need or objectives for each project.

Projects should document the objectives in an appropriate NEPA document that must be done for each project. The analysis needs to ensure that the public land health standards are addressed and describe how the projects will impact land health in both the short term and the long term. Care must be taken to ensure that there is an adequate consideration and documentation of cumulative impacts. Section 7 consultations relative to endangered specie and cultural clearances and Section 106 consultations must be made when and where appropriate. The environmental assessment (EA) should analyze a suitable and reasonable range of alternatives. Alternatives that are eliminated from detailed study should be identified with a brief discussion of the reasons for eliminating them.

Attachment 1 is a copy of the Public Land Health Standards and Indicators for the Administration of BLM lands in Colorado. Attachment 2 is a listing of concepts that should be considered in future project designs in order to ensure that project maintain or improve the health of the public lands. The concepts are not intended to be a check list. They are the kinds of things you should look at when looking at alternatives for achieving needed vegetative treatments.

This is interim guidance. Please share your experiences so that we can incorporate them into the final guidance to be issued after this field season. During this initial period, please provide a copy of each new EA done for these vegetative fuels treatment projects to Dennis Zachman (CO-931). This will establish an information base that can be used by all field offices to help our statewide consistency.

Signed by
Ann J. Morgan
State Director

Authenticated by
Don Snow
EMS Operator

Attachments

**PUBLIC LAND HEALTH STANDARDS AND INDICATORS
FOR
BUREAU OF LAND MANAGEMENT ADMINISTERED LANDS IN COLORADO**

Standard 1: Upland Soils

- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.

Indicators:

- Expression of rills, soil pedestals is minimal.
- Evidence of actively-eroding gullies (incised channels) is minimal.
- Canopy and ground cover are appropriate.
- There is litter accumulating in place and is not sorted by normal overland water flow.
- There is appropriate organic matter in soil.
- There is diversity of plant species with a variety of root depths.
- Upland swales have vegetation cover or density greater than that of adjacent uplands.
- There are vigorous, desirable plants.

Standard 2: Riparian Systems

- Riparian Systems associated with both running and standing water, function properly and have the ability to recover from major disturbance, such as fire, severe grazing, or 100-year floods. Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.

Indicators:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Stream bank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high stream flow events.
- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (e.g., no headcutting, no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.

- Vegetation colonizes point bars with a range of age classes and successional stages.
- An active flood plain is present.
- Residual flood plain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels with size and meander pattern appropriate for the stream's position in the landscape, and parent materials.
- Woody debris contributes to the character of the stream channel morphology.

Standard 3: *Healthy, Productive Plant and Animal Communities*

- Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.

Indicators:

- Noxious weeds and undesirable species are minimal in the overall plant community.
- Native plant and animal communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants and animals are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant and animal species are in balance with habitat/landscape potential and exhibit resilience to human activities.
- Appropriate plant litter accumulates and is evenly distributed across the landscape.
- Landscapes composed of several plant communities that may be in a variety of successional stages and patterns.

Standard 4: *Special Status, Threatened and Endangered Species*

Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Indicators:

- All the indicators associated with the plant and animal communities standard apply.
- There are stable and increasing populations of endemic and protected

- species in suitable habitat.
- Suitable habitat is available for recovery of endemic and protected species.

Standard 5: Water Quality

- The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the water quality standards established by the State of Colorado. Water quality standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under state law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

Indicators:

- Appropriate populations of macroinvertebrates, vertebrates, and algae are present.
- Surface and ground waters only contain substances (e.g., sediment, scum, floating debris, odor, heavy metal precipitates on channel substrate) attributable to humans within the amounts, concentrations, or combinations as directed by the water quality standards established by the State of Colorado (5 CCR 1002-8).

CONCEPTS FOR PROJECT DESIGNS TO ASSURE MEETING LAND HEALTH STANDARDS

Prescribed Fire:

Prescribed fires should not be allowed to kill root crowns of fire tolerant species, unless that is the specific objective. Manage prescribed fires to avoid intense burns which would kill the root crowns of sprouting species. Consider seeding with quickly establishing species or some other means of soil stabilization to reduce soil erosion in the first years following the burn if the burned vegetation is incapable of returning within the first 1-2 years. Revegetation of the burn should be compatible with establishing a diverse plant community. Consider the need to manage activities on the burn to promote revegetation (control grazing, recreation, etc. to allow plants to fully establish). As an example, grazing of the burn in following years should not remove excessive amounts of plant canopy or litter.

Hot fires may be managed if the objective is to kill the seeds of certain plant species in the seed bank (e.g., cheatgrass) or to create an early successional vegetation type. Use caution when revegetating with non-native vegetative species. Choose ones that stay on the sites where they are used, and that tend to diminish fairly soon as the native community develops.

Standard 1 : Upland Soils

- Develop fire prescriptions to minimize soil heating and avoid unnecessary overheating/scorching soils. Consider:
 - Fuel loading, fuel moisture content, fuel distribution, rate of combustion
 - Soil texture: Coarser textured soils are subject to more severe impacts
 - Soil moisture:
 - Dry soils are subject to more severe impacts from ash chemistry
 - Wet soils are subject to biological impacts due to steam killing organisms
 - Soil organic matter: Soils with less than 2% organic matter are subject to severe impacts
 - Soil depth: Soils of less than 20 inches are subject to severe impacts
 - Slopes: Soils on greater than 60% slope are subject to severe impacts
- Most soil fungi and bacteria are killed at temperatures of only 100 to 150 degrees C.; therefore; wet soils experiencing prolonged heating, such as slash pile burning, can cause a steaming effect killing soil organisms
- Potential for wind, water, or gravity (especially dry ravel) erosion should be given strong consideration in the timing (i.e., fall vs. spring) of prescribed fires.

Standard 2: Riparian Systems

- When prescribed burning, leave unburned strips of vegetation along riparian areas to serve as slope stability buffers, and decrease the potential for stream sedimentation.
- Riparian areas should be burned, if necessary, in spring when conditions are favorable for rapid recovery of adjacent vegetation. Caution must be used with such timing because of the potential of stream temperatures increasing due to the removal of overhead protective

- vegetation. Elevated stream temperatures are detrimental to most cold water fish species.
- On erosive soils and/or steep slopes, restrict the location of holding lines that lead directly into water courses. Rehabilitate any lines as soon as possible.
- Avoid burning too much of a riparian area so that natural regeneration is possible from adjacent unburned riparian vegetation
- Consider the effect on degraded riparian areas where channel changes (e.g., downcutting) or flow controls makes return to native riparian vegetation unlikely
- Avoid burning at times when flood events are likely before vegetation has had a chance to regrow

Standard 3: *Healthy, Productive Plant and Animal Communities*

- The inherent ability of plants to respond to fire depends partially on the fire regime to which the plant community has adapted. For example, a community may characteristically have been subject to frequent, low intensity, low severity understory fires, or the site may have experience infrequent high intensity fires that killed all standing vegetation. Knowing the “natural” role of fire on a site gives an indication of the type of plant adaptations to fire that may be present.
- For some plant communities in poor condition or dominated by undesired species, it may be necessary to artificially reseed the area after burning because natural revegetation by desired species is unlikely to occur. Tradeoffs are made in prescribed burning. Short-term undesirable effects on preferred species have to be accepted to obtain the desired results on target species. If undesirable species that respond positively to prescribed fire are present on the site, it may be possible to choose a prescription for burning that will favor other species. In some situations, a better choice may be to avoid burning that site and select another treatment method that will produce optimal desired effects.
- Avoid prescribed fire during critical reproductive seasons, when loss of cover would be critical to wildlife.
- Consider how do current structural conditions compare with the perceived optimum for a featured species or management for species richness. The aerial extent, shape, height, age, density, and orientation of structural components and the necessary linkages between and among those components should be addressed. If structural conditions are at or near the perceived optimum and in a healthy condition, fire may not be of benefit.
- Consider how adequate are structural conditions adjacent to the proposed burn. A number of species more readily use burned areas if their cover requirements are met in close proximity to the burn area.
- All prescribed fires subject to noxious plant invasion should be closely evaluated.
- Burns are an attraction to many animals and livestock are no exception. Livestock can easily influence potential wildlife values of a burned area by altering plant responses, reducing herbaceous habitat structure, removing forage, and merely by their presence. Control and management of livestock is essential after a prescribed fire.
- Prescribed fires should follow the regional natural disturbance regime for the vegetative type within which it occurs (i.e., frequency, patch size and shape, and intensity).

Standard 4: *Special Status, Threatened and Endangered Species*

- All BLM actions will be evaluated for potential effects on state and federally listed or endangered species. If the evaluation indicates a “no effect” situation through the normal NEPA process, the action may proceed.
- If the evaluation indicates a “may affect” situation (may affect includes both

beneficial and adverse impacts) on a federally listed species and the adverse impacts cannot be eliminated through informal consultation, Section 7 formal consultation with the U.S. Fish and Wildlife Service must be conducted. BLM does not have the authority to make a “no affect” finding if a “may affect” situation exists.

- For federally proposed species, a Section 7 conference will be conducted.
- BLM policy requires that federal candidate species and BLM sensitive be managed to eliminate the need for listing. Appropriate clearances should be documented through the NEPA process.
- BLM will consult with appropriate state agencies for adverse impacts to state-listed species.
- Be careful in using prescribed fire to treat significant portions of existing threatened and endangered species habitat, where a fire escape could burn too much habitat

Standard 5: Water Quality

- Prescribed fire may increase stream nutrients, stormflows, and sediment loads, at least in the short term. In general the amount of increase depends on fire severity. Slash burns may produce minor increases in concentrations of some nitrogen compounds and cations; however drinking-water standards should not be exceeded even by severe burns. Moderate slash burns may increase annual storm flows and peak flows by reducing the amount of vegetation available to utilize water. Severe burns greatly increase the potential for severe erosion by exposing mineral soil and promoting surface runoff.
- Consider mitigation measures for sediment yields from larger prescribed fires on moderate(8-20%) and steep (37-60%) slopes. The average sediment yield is less than .01 tons per acre during the first six months after burning from level sites, but is about ten-fold greater on moderate slopes and 100-fold greater on steep slopes.

Mechanical Treatments

Time mechanical treatments to avoid unnecessary disturbance and compaction of soils.

Treatments should minimize destruction of perennial herbaceous plant crowns, unless that is the specific objective. Mechanical methods used should spread litter and woody debris evenly across soil to protect the soil surface

Choose a pattern of treatment that minimizes soil movement by water and wind (patches should orient perpendicular to slope and wind direction where erosion likely). Seeding with quickly establishing species or some other means of soil stabilization should be conducted to reduce soil erosion if the remaining herbaceous vegetation is incapable of quickly covering the bare soil revegetation of the treated area should be compatible with establishing a diverse plant community. Select the mechanical tool appropriate to the existing vegetation and desired habitat (e.g., it is unlikely that rollerchop will kill young pinyon-juniper)

Manage activities on the treated area to promote re-vegetation (control grazing, recreation, etc to allow plants to fully establish). As an example, grazing of the treated area in following years should not remove excessive amounts of plant canopy or litter.

Standard 1: Upland Soils

- Effects of mechanical treatments must be evaluated with respect to the effects of the treatment on total vegetation cover compared to nontreated rangeland.

- Some rangeland soils have pronounced vesicular (small cavity) crusts in the interspaces between tree, shrub and grass plants. These crusts have poor structure and much lower infiltration rates than the well-aggregated soils under the shrub or trees. Mechanical treatment disturbance of these and other crusted soils could be expected to increase infiltration for a while, but unless soil vegetation cover, organic matter, soil aggregation, and porosity are increased in association with vegetation response to the treatment, the crust will reform and infiltration will continue to be low. Thus effects of mechanical treatment on crusted soils are highly dependent on vegetation response after treatment.
- Cutting and mowing methods, such as roller chopping, result in minimal physical soil disturbance and may produce soil protecting mulch. The soil disturbance produced by grubbing, bulldozing, and chaining/cabling increases with increased density of the woody target species.
- Mechanical treatments have severe adverse impacts to soils when:
 - Organic matter is less than 2%
 - Slopes are over 30%; however, erosion hazards is greatest on slopes greater than 20%.
 - Soil moisture is high
 - Soil depth is less than 20 inches
 - Infiltration is reduced by 30% or bulk density is increased by 15%

Standard 2: Riparian Systems

- Mechanical treatment of undesirable species such as Tamarisk in riparian areas has proven successful over time when coupled with chemical injection.
- Riparian systems, historically (long term) have had a low potential to carry wildfire; however, recent history has shown with long and short term drought, riparian fuels can spread wildfire and may be considered for treatment especially in Urban Interface situations. Selective mechanical or manual treatment in these areas would produce the minimum disturbance of all the other treatment methods.
- Mechanical treatment may be appropriate where there are objectives to reduce undesirable species or where needed to create small-scale wetlands/riparian improvements. Avoid treating so much of a riparian area that the amount of unprotected banks is likely to cause extensive bank erosion and channel alteration
- Where large portions of a watershed are treated, avoid treating vegetation in the riparian zone to maintain its sediment capture capabilities.

Standard 3: Healthy, Productive Plant and Animal Communities

- Brush beating or shredding cause little damage to herbaceous species; however, these methods may release associated undesirable shrubs that sprout, such as rabbitbrush, horsebrush, and greasewood. In addition, herbaceous weeds, such as cheatgrass, russian thistle, and medusahead may be released in absence of desirable species when these species are removed during sagebrush control.
- Management after treatment is as important as the treatment itself to insure that treatment objectives are met in the long term. Post treatment management should be addressed in local land use plans and activity plans, such as habitat management plans, allotment management plans, watershed plans, and coordinated resource management plans.
- Mechanical treatments should follow the regional natural disturbance regime for the vegetative type within which it occurs (i.e., frequency, patch size and shape, and intensity).
- If wild ungulate populations are high, treat patches large enough or treat enough patches to keep from concentrating these animals on small areas and destroying their values in a

few years.

- When seeding treatments, species selected and rates used should complement on-site seed sources to create amounts of diversity, forage, and ground cover appropriate for the ecological site.

Standard 4: *Special Status, Threatened and Endangered Species*

- All BLM actions will be evaluated for potential effects on state and federally listed or endangered species. If the evaluation indicates a “no effect” situation through the normal NEPA process, the action may proceed.
- If the evaluation indicates a “may affect” situation (may affect includes both beneficial and adverse impacts) on a federally listed species and the adverse impacts cannot be eliminated through informal consultation, Section 7 formal consultation with the U.S. Fish and Wildlife Service must be conducted. BLM does not have the authority to make a “no affect” finding if a “may affect” situation exists.
- For federally proposed species, a Section 7 conference will be conducted.
- BLM policy requires that federal candidate species and BLM sensitive be managed to eliminate the need for listing. Appropriate clearances should be documented through the NEPA process.
- BLM will consult with appropriate state agencies for adverse impacts to state-listed species

Standard 5: *Water Quality*

- Direct impacts on surface water associated with mechanical disturbance will be highly site and treatment specific, but negative effects would most likely be expected on fine-textured soils lacking organic matter and soil structure with low aggregate stability and a tendency to form a crust.
- The hydrologic response to mechanical fuels treatment is greatly dependent on the success of revegetation. Conversion from woody to herbaceous vegetation would not necessarily increase water yields from rangeland watersheds depending on timing and extent of revegetation.

Chemical Treatments:

Chemical treatment may be appropriate where there are objectives to reduce undesirable species, or where needed to create small-scale wetland/riparian improvements

Avoid chemicals that have long term activity in the soil (e.g., longer than the transition time between successional stages). Avoid chemicals that will prevent the establishment of a diverse vegetation community or will eliminate over the long term any plant functional group. Manage activities on the treated area to promote revegetation (control grazing, recreation, etc to allow plants to fully establish and recover). As an example, grazing of the treated area in following years should not remove excessive amounts of plant canopy or litter.

Standard 1: *Upland Soils*

- Although herbicides would not alter the physical properties of the soil, there may be indirect effects on soil microorganism. Soil microorganisms can metabolize herbicides and often are reported to be responsible for herbicide decomposition. However, certain herbicides may inhibit microorganism growth or may produce more toxic effects and increase microorganism mortality rates.
- Chemical treatments have several adverse impacts to soils when:
 - Soil textures are coarse
 - Soil moisture is dry

- Organic matter is less than 2%
- Soil depth is less than 20 inches
- Slopes are greater than 60%

Standard 2: Riparian Systems

- Near riparian areas, using chemicals to control vegetation can increase sedimentation, which can reduce or eliminate suitable spawning habitat, however, if the appropriate buffer width of existing vegetation exists within the treated area, there should be no significant erosion sedimentation occurring.
- Most riparian areas are crucial habitat for wildlife and no major treatments should be proposed. The primary practice will be for riparian areas to be buffered and protected from any impacts. Recommended buffers are the larger of the herbicide label recommendation or 25 horizontal feet for vehicle spraying and 100 horizontal feet for aerial spraying. Additional mitigation measures for aerial spraying include the use of maximum drift control nozzle (microfoil boom type) for the greatest possible control of the herbicide being applied, and avoiding applications during critical seasons for the fisheries resources.
- Because of the short exposure and the usual proposed application rates, herbicides are not expected to significantly affect fish or their habitat. However, due to the highly significant and sensitive nature of this resource, it is important to consider suggested mitigation and design features to ensure protection of these resources from all potential impacts of vegetation treatment.
- Avoid treating so much of a riparian area so that the amount of unprotected banks is likely to cause extensive bank erosion and channel alteration.
- Where large portions of a watershed are treated, avoid treating vegetation in the riparian zone to maintain its sediment capture capabilities.
- Use chemicals that are approved for use near or over water.

Standard 3: Healthy, Productive Plant and Animal Communities

- Determinations about whether chemical or any treatment method will increase or decrease wildlife populations must be made on a site-specific basis, taking into account specific information about vegetation and animals. Treatments will affect some change in the existing wildlife communities, including amphibians, reptiles, and invertebrates. These changes must be analyzed in the pretreatment evaluation, and the project would not be recommended if the effects are unacceptable.
- The magnitude of impact on the plant and animal communities depends on the amount of acreage treated and the degree of kill. The larger the area treated and the greater the kill, the more detrimental it will be to most animals. Caution should be taken to consider possible damage to non-target plant species, especially forbes and other sensitive plants. There are usually many unknown side effects, such as reduction in insect populations, so that other types of treatment (fire, beating, dixie harrow) are preferred over spraying of chemicals to reduce shrub canopy coverage.

Standard 4: Special Status, Threatened and Endangered Species

- All BLM actions will be evaluated for potential effects on state and federally listed or endangered species. If the evaluation indicates a “no effect” situation through the normal NEPA process, the action may proceed.
- If the evaluation indicates a “may affect” situation (may affect includes both

beneficial and adverse impacts) on a federally listed species and the adverse impacts cannot be eliminated through informal consultation, Section 7 formal consultation with the U.S. Fish and Wildlife Service must be conducted. BLM does not have the authority to make a “no affect” finding if a “may affect” situation exists.

- For federally proposed species, a Section 7 conference will be conducted.
- BLM policy requires that federal candidate species and BLM sensitive be managed to eliminate the need for listing and that inventory of the project area take place before the treatment begins (as well as public participation in the decision to use chemicals). Appropriate clearances should be documented through the NEPA process.
- BLM will consult with appropriate state agencies for adverse impacts to state-listed species.

Standard 5: Water Quality

- Special mitigation measures must be taken to protect water quality(surface and ground) when chemicals are used as a fuels treatment tool. These mitigation measures should be incorporated in the project design features. Some specific examples of project design features include the following:
 - Application operations will typically be suspended when any of the following conditions exist on the treatment area:
 - Wind velocity exceeds 6 miles per hour for the application of liquids or 15 miles per hour for the application of granular herbicides, or as specified on the label (which ever is less).
 - Snow or ice covers the target foliage.
 - Precipitation is occurring or is imminent.
 - Air turbulence (for example, thermal updrafts) is sufficient to affect the normal chemical distribution.
 - Equipment will be designed to deliver a median droplet diameter of 200 to 800 microns. This droplet size is large enough to avoid excessive drift while providing adequate coverage of target vegetation.
 - Herbicides with high health and safety risks would be limited in use. Other herbicides and other types of treatment that are viable alternatives would be used. Whenever possible, less than maximum application rates will be used that will still meet the needs to effectively control or eradicate target species.
 - Select herbicides with minimum toxicity to significantly affected fish and wildlife species in the potentially affected treatment area, while maintaining adequate toxicity to the target plant species.
 - Protective buffer zones will be provided along important riparian habitat not designed to be treated and along streams, rivers, lakes, wetlands, and along important dry water courses.