APPENDIX 19—VEGETATION TREATMENTS, FOREST PRACTICES, AND RANGE IMPROVEMENTS

DESCRIPTION AND EFFECTS

Standard Operating Procedures

The Bureau of Land Management (BLM) Rawlins Resource Management Plan Planning Area (RMPPA) utilizes a variety of different best management practices (BMP) to manage vegetation communities and achieve multiple use objectives. Maintenance and improvement of the health of various vegetation communities is achieved through management prescriptions, including active treatments such as removing vegetation with fire, chemicals, biological or mechanical methods, planting or seeding vegetation, and grazing by various ungulates. This management focuses on the manipulation of selected components of the rangeland vegetation resource to meet predetermined multiple use landscape objectives. Descriptions of these management practices, including standard operating procedures and the desired effects of particular treatments, are described within this appendix.

Vegetation Treatments

All treatment projects would be subject to appropriate *National Environmental Policy Act* of 1969 (NEPA) compliance review. All prescribed burn projects would be designed with a burn plan and a smoke permit from the State of Wyoming's Department of Environmental Quality (DEQ), Air Quality Division, prior to implementation. Consultation with the interested public that would be affected, as well as an approved environmental analysis, would be required for all new vegetation treatment projects before any would be initiated. Each new vegetation treatment would be evaluated and examined in relation to multiple use objectives, including analysis of pretreatment and/or posttreatment grazing control measures, which would ensure that the management objectives of the project are met.

Pursuant to the policy of Wyoming BLM, prior to any vegetative treatment, a signed plan and/or agreement for grazing management would be in place. As a baseline, Wyoming BLM policy calls for deferment of livestock grazing on treated areas for two complete growing seasons, a period which may be adjusted to a lesser or greater time based on environmental conditions and/or management objectives consistent with Wyoming's *Standards for Healthy Rangelands*. Adjustments would be analyzed as separate alternatives in the original NEPA document prepared for the project and would be compared to the baseline alternative providing for two complete growing seasons of rest. Site-specific variables, such as project objectives, precipitation, soils, and/or plant communities, would be discussed.

Chemical treatments would consist of applying approved chemicals to meet plan objectives. Before chemicals are applied, BLM would comply with Department of the Interior regulations. All chemical applications would be preceded by an approved pesticide use proposal (PUP) and appropriate NEPA review. All applications would be carried out in compliance with label directions and the pesticide laws for Wyoming.

Permanent roads or vehicle routes (utilizing ground-disturbing methods such as blading) to new treatment sites or portions of treatment areas would be constructed only if necessary access does not exist or would not be gained by other project design features. Proposed vegetation treatments that would involve surface disturbance would be inventoried for archeological features that may be affected by the treatment. Any

identified archeological resource that would be adversely affected by the proposed treatment operation would be avoided or mitigated.

Proposed treatments would be inventoried for Special Status Plant or Animal Species. Treatments that would result in adverse impacts to BLM sensitive species would have mitigation measures incorporated into the project design features.

No action would be taken by BLM that would jeopardize the continued existence of any federally listed Threatened, Endangered, or Candidate plant and animal species. BLM would also comply with any state laws applying to animal or plant species identified by the state as being threatened or endangered (in addition to the federally listed species).

Design of Vegetation Treatments

Prescribed Fire Treatment Guidelines

Prescribed burning involves the use of fire under a predetermined set of conditions to change the character of the vegetative community. This technique takes advantage of a variety of parameters, including the relative fire tolerance and expected response of target and desired plant species, fire behavior characteristics, pretreatment and post-treatment grazing management, and climatic patterns to manipulate vegetation toward management objectives and goals. Prescribed burning would be useful in stratifying the overall age and structural class of vegetation; reducing fuel loads overall; inserting vegetational fuel breaks; improving watershed conditions within the project area and/or throughout a larger management block; and removing a dominant fire-sensitive overstory species, such as big sagebrush, thereby opening up the community to the natural response of fire-tolerant species. For more information on how BLM deals with prescribed fire in sagebrush, see Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management.

There are both direct and indirect impacts to vegetation from prescribed burns. These impacts center around first- and second-order fire effects (the obvious removal of vegetation [woody species and herbaceous cover] due to the fire, and recovery of certain vegetative species after fire) and the tertiary responses that are expected to occur to both riparian areas and uplands as a result of changes in ungulate grazing patterns expected after treatment. Depending on the type of vegetation targeted, the season and timing of the treatment, and the method of implementation, varying amounts of vegetation within the project area are removed by the treatment. Removal can range from virtually complete in the case of light herbaceous vegetation, to limited scorching in the case of heavy live fuels where varying degrees of "thinning" are desired. These same factors, as well as additional environmental parameters, influence what, where, and how much vegetation reestablishes after treatment, and what period of time would occur before the vegetation in the treatment unit returns to pretreatment conditions. Although the immediate effects of a prescribed burn are to reduce ground cover, wildlife habitat, and livestock forage, generally the long-term effects to vegetation include increased productivity, palatability, and species diversity (including type, amounts, and age classes).

Usually spring season prescribed burns are desirable when a lower ratio of burned/unburned vegetation and more of a broken mosaic pattern are preferred, such as treatments proposed in stands of critical seasonal wildlife habitat. Spring season prescribed burns would also be desirable to mitigate operational restrictions, such as the need for remaining snowbanks at higher elevations to control the perimeter of the project. Because of predominant climatic conditions within the RMPPA, spring cool season prescribed burns are designed with a much broader latitude of prescription parameters to achieve desired objectives, but because of the unpredictability of spring weather, the actual implementation window is usually a much shorter time period.

Late summer and fall season prescribed burns are usually undertaken in the RMPPA when objectives center around the removal of a larger amount and/or proportion of the target vegetation, or the treatment involves vegetation (such as aspen stands) that would most likely be untreatable during cooler and wetter periods. Because of more extreme environmental conditions during the late summer and early fall, there is less room for error when conducting and controlling these burn projects, therefore more constrictive prescription parameters are usually developed for these projects. The weather and environmental conditions are usually more stable and constant during the late summer/early fall season in the RMPPA, allowing for much wider operational periods than are found during the spring. Fall treatments usually require much more stringent control and holding measures than do those in the spring; in many cases they use artificial control lines and larger implementation crews. Constraints to implementation for fall season prescribed burns usually center around other land use activities (which tend to increase through the summer) and the lack of operational assets (as seasonal wildland fires consume resources, and personnel and equipment dwindle) rather than environmental restraints.

On a relatively limited basis, the RMPPA would engage in prescribed burn treatments which are independent of seasonality. These include the burning of slash piles from logging operations and/or mechanical treatment activities, usually prepared throughout the year (depending on accessibility) and implemented in the winter (when surrounded by snow), and also include broadcast burns in vegetation, where treatment objectives are independent of fire intensity. Broadcast burns take place throughout the year and mainly are dependent on operational resource availability.

Reseeding would be a viable technique to establish a more desirable plant community following treatment, however in most cases the techniques used and sites chosen would be those that lend themselves to natural regeneration wherever possible.

Unplanned wildland fires that occur in areas with an approved prescribed fire proposal and burn plan, including an approved Finding of No Significant Impact Decision Record (FONSI/DR), would be allowed to burn as long as they remain within the prescriptions and meet land use objectives.

Each alternative has identified the number of acres suitable for prescribed fire to achieve management objectives. Development of Allotment Management Plans (AMP) and other activity plans would further refine the acreage values according to livestock grazing, wildlife, and other resource objectives. Acreages of prescribed burns may increase or decrease on certain allotments depending on rangeland management needs as addressed in AMPs and other activity plans.

Chemical and Biological Treatment Guidelines

Chemical treatments involve the use of ground or aerially applied herbicides on target species to reduce their competitive effect on more desirable species. Many classes of herbicides exist, and all vary in action, selectivity, and persistence. However relatively few compounds are approved for use in broadcast-scale vegetation treatments on public lands. These compounds are usually selective for broadleaf vegetation, leaving only grasses, tolerant forbs, and shrub species after treatment. Chemical treatment and applications would be used only where control would be exercised to prevent unwanted loss of desirable flora or fauna and to prevent transportation of chemicals to other areas by water or air movement. Specific methods of application would be used for the control of noxious and invasive weeds, and for the manipulation of vegetation stands, to achieve management objectives. Methods of chemical treatment of vegetation near Special Status plant populations would be determined by BLM.

Noxious and invasive weeds would be treated in accordance with the Rawlins Field Office (RFO) Biological Noxious Weed Control EA (WY-037-EA6-123), Chemical Noxious Weed Control and Commercial Site Vegetation Control EA (WY-037-EA6-122) and Vegetation Treatment on BLM Lands

in Thirteen Western States (BLM, 1991). The grantee or lessee would be responsible for the control of all noxious and invasive weed infestations on surface disturbances within the limits of the disturbed areas.

Aerial application of chemicals would not be allowed within 1/4- mile of Special Status plant locations. An unsprayed buffer zone of 100 feet would be maintained near live or still water. Aerial spraying in riparian areas would not be allowed without prior approval of the authorized officer.

All chemical treatment sites for noxious and invasive weeds on rangelands would be reevaluated to ascertain the effectiveness of the treatment program. If retreatment is necessary, County Weed and Pest Supervisors, in cooperation with the BLM RFO would develop a retreatment program. All chemical treatment sites for noxious and invasive weeds on leases and rights-of-way (ROW) would be reevaluated by the lease/ROW holders or their contractor and the BLM Authorized Officer to ascertain the effectiveness of the treatment program.

Vehicle-mounted boom sprayers and hand sprayers would be used in nonriparian zones. Near water, a boom sprayer would be used only where feasible.

BLM would consider the invasion of noxious and invasive weeds in the design and implementation of grazing systems. Chemical treatment would minimize loss of desirable flora and fauna and avoid transportation of the chemicals off-site.

Biological treatment (insects, grazing animals) would be considered for weakening and limiting reproduction of target vegetation in critical riparian areas or areas with sensitive plants and animals, where application of chemicals or the use of fire is not feasible or desirable. Any insects or grazing animals used for vegetation treatment will have been carefully tested for host specificity, thereby reducing or eliminating possible adverse effects on nontarget vegetation. In addition, the use of biological treatments would be evaluated for compatibility with other multiple use objectives for the management area.

Mechanical Treatment Guidelines

As with prescribed fire and chemical or biological vegetation treatment, mechanical vegetation treatment will be considered for vegetation throughout the RMPPA to alter existing vegetation.

Mechanical treatments involve the use of mechanized equipment and/or some forms of manual labor to remove target vegetation or to consume the entire community and leave a suitable seedbed. Techniques and implements are highly variable, but all share the disadvantage of high cost. Mechanical treatment procedures range from use of machinery to remove and mulch large, coarse vegetation material (such as juniper, aspen, or heavy brush) to the use of chainsaws to remove noncommercial stands of overstory trees either partially (where thinning of target vegetation is desired) or completely by removing the target species from the project area in a stand replacement-type project. Mechanical treatment also includes mowing weedy species to prevent seed production. Small-scaled types of mechanical treatments, such as thinning target vegetation by means of chainsaw, usually require some type of follow-up treatment in the area to remove debris left from the operations. Follow-up treatments include stacking and removing commercial or otherwise usable materials, piling and subsequently burning slash materials, or broadcast burning of material on the ground to remove it from a desired seedbed. In addition, the use of agricultural mechanical equipment, such as towed brush-hog type machinery or plows, would be employed to treat suitable vegetation, where topography and finances allow.

An additional use of mechanical vegetation treatment centers around preparation for other treatments, primarily prescribed burning. Use of brush-hog or brush-beating equipment; tractors with plows; crews

with chainsaws removing high, above-ground fuels; or crews digging control lines to mineral soil by hand, are employed on a regular basis to make control of prescribed burns practical during the season of the project. These methods can be used to provide control lines independent of other operations or to provide a base-line from which "black-line," or control lines of burned vegetation, can be produced. When coupled with other treatment projects, these actions would involve site-specific environmental analysis and coordination with affected interests, completed during the NEPA analysis of the parent improvement project.

Grazing Management Prescriptions

Rangelands in the RMPPA are open to grazing by domestic livestock as per the *Taylor Grazing Act*, and therefore removal of portions of rangeland vegetation by grazing ungulates can be used as a vegetation management tool. Through AMPs, cooperative management plans, grazing agreements, and the permitted grazing preference in an allotment, the type, timing, seasonality, and duration of grazing use to rangeland vegetation can be managed. Primary tools center around managing livestock use on desirable rangeland species during their prime growth period. Summer cattle use (the predominant grazing use within the RMPPA) is the primary candidate for managed use patterns, as it tends to concentrate vegetation removal both during and after the growth stages of most forage species. Annual rotation, deferred rotation, rest rotation, split season, and dormant season grazing schedules remove pressure on the plants during at least a portion of their growth stage, and provide for uninterrupted growth and/or recovery periods.

The type of livestock permitted on specific rangelands can also be utilized to concentrate use on target species or, alternately, to remove all or a portion of grazing pressure from desirable species, depending on management objectives. Sheep use during the fall and winter, although including a significant portion of dormant herbaceous forage (when available), also includes a significant amount of rougher, woody, browse species, significantly more so than would be found with cattle use during the same period or with sheep use during other parts of the year. The use of sheep or goats during the early spring period, when target vegetation species are beginning to green up, can be utilized to increase the grazing pressure on certain weedy species, similar to the use of biological weed treatments. Such grazing treatments would be short-term and used on an annual basis, so as to pressure target species while leaving desirable species intact.

New grazing management techniques using alternate livestock types, grazing periods, and/or seasons of use, if different than the existing permitted use, would be examined on a case-by-case basis in relation to multiple use objectives, including site-specific environmental analysis and coordination with affected interests. If the type of proposed livestock and season of use is consistent with the existing grazing use permit or lease, no new NEPA analysis would be necessary.

Plantings of Vegetation

Live native vegetation common to a project site would be planted, usually in relatively smaller-scale projects. This type of treatment is utilized to stabilize soils and watersheds, particularly along stream banks or within lentic-type water systems. In many cases this type of treatment is applied to smaller-scale riparian area improvement projects, usually on sites that previously contained the target vegetation, which for one reason or another currently lack it. Riparian woody and grass-like species are procured from adjacent sites or from an outside source, transported to the specific project site, and planted by hand or with machinery. Subsequently the plantings are "encouraged" by allowing them to proliferate, free of season-long grazing pressure by livestock, wild horses, or wildlife. This can be accomplished through the use of exclosures to keep selected animals from the project; by utilizing rotational, shorter-duration, and/or seasonal grazing patterns with permitted livestock; or placing the plantings in less accessible sites.

When coupled with rangeland improvement projects (such as the construction of a dam or the development of a spring), these actions would be examined on a case-by-case basis in relation to multiple use objectives and would involve site-specific environmental analysis and coordination with affected interests, in most cases completed during the NEPA analysis of the parent improvement project.

Seedings of Vegetation

Used on a relatively limited basis within the RMPPA, native vegetation can be established (or reestablished) from seed in a variety of sites and situations. Usually employed to more quickly revegetate upland sites, this technique can be utilized on disturbed sites where vegetation has been mechanically removed, including reclamation projects such as well pads, pipelines, roads, and abandoned reservoirs, or in instances where vegetation has been lost as a result of a natural event, such as a wildland fire or flood. In addition, vegetation treatment projects, including prescribed fire, chemical treatments, and mechanical vegetation removal, can include reseeding of native upland plants following implementation, depending on a variety of factors (including environmental parameters, project objectives, or the nature/severity of the treatment). In most cases where more desirable vegetation is sought on a large-scale basis (such as watershed or sub-basin), other vegetation manipulation methods, described above, are the primary and most practical choice.

Seeding of upland vegetation can be accomplished through a variety of methods, including application by fixed- or rotary-winged aircraft, all-terrain vehicles, towed agricultural equipment (such as a rangeland drill), or manual labor. The method of application is totally site- and project-dependent, influenced by cost, terrain and topography, land use and/or political restrictions, and management objectives.

All the previously described vegetation manipulation techniques can be used to prepare a seedbed suitable for artificial reseeding. Where needed, reseeding is a viable technique to establish a more desirable plant community. However seed and application costs can be high and are sometimes difficult to prove cost-effective. As noted previously in the Prescribed Fire section, BLM in the RMPPA strives to design vegetation treatments that will not require reseeding of native vegetation. However, reseeding can be a viable alternative in specific situations, depending on management and/or project objectives. Prescribed fire projects can be useful in preparing a seedbed for artificial seeding, although the nature of the project and the type of burn utilized will influence the need or practicality of subsequent seeding operations. Although chemical treatments can have less total initial impact to the project site than burning or mechanical treatments, the seedbed resulting from a chemical treatment is usually not as suitable for reseeding because of the amount of standing litter. Mechanical treatments, especially those resulting in a high degree of surface disturbance, such as chaining or plowing, usually produce a highly receptive seedbed. Manually applied mechanical treatments, such as thinning or stand-replacing projects, can require some type of intermediate treatment, such as burning of slash piles prior to applying seed mixtures.

In many cases the most economical and feasible seeding mixtures (i.e., those with the most probability of success) involve perennial native grasses and forbs. On special habitat such as mule deer crucial winter range, where disturbance has occurred and reclamation is necessary, or where upland seedings are proposed for specific management objectives, the mixtures could include a variety of high-quality shrub seedlings, such as winterfat, shadscale, four-wing saltbush, and, in certain instances, mountain mahogany and antelope bitterbrush, to complement the usual grass mixture. Shrub mixtures are usually much more expensive, and the success of establishment can be variable—highly dependent on the condition of the seedbed. Exclusion of wild horses and livestock, and possible reseeding operations, may be required in severely unstable watersheds, although the large scale and resulting high expense of this type of management usually makes it prohibitive. Because of terrain irregularities and topographical features,

vegetation treatments are usually irregular in shape, providing for edge effect, cover, and visual aesthetics.

As with other treatment methods, upland seedings would be examined on a case-by-case basis in relation to multiple use objectives and would involve site-specific environmental analysis and coordination with affected interests. In the cases of seeding projects coupled with other projects, including reclamation or rehabilitation projects, the examination is completed during NEPA analysis of the parent development.

Design of Range Improvements

All range improvements will be designed and constructed in a manner to minimize environmental impacts while maximizing function and cost-effectiveness. Prior to the installation of any range improvements, an environmental assessment (EA) will be prepared, analyzing the alternatives for the project. Whenever possible, water will be provided to benefit the seasonal needs for wildlife.

Springs and Seeps

Spring and seep water sources are usually developed by collecting the water using a perforated pipe and/or head box, diverting the water into a drinking trough. The source is usually fenced for protection of the soils and the vegetation around it. During most of the year, spring and seep sources run freely (not through a trough) and maintain the riparian system. When water is run to a trough, the overflow water would be piped back to the original drainage course.

Troughs

Troughs are an integral part of many water developments. They are used in conjunction with spring and seeps, wells, pipelines, and off-site waters below reservoirs. They come in various shapes and sizes, however the most common styles include large tires; Powder River troughs; fiberglass; aluminum; and concrete-bottom, metal-sided tanks. All troughs require some type of escape route for small birds and mammals, with a wire/concrete ramp or rock pile most commonly used. The overflow water would be piped back to the original drainage course.

Wells

Wells are usually drilled in areas where other water sources are unavailable, to provide a reliable water source for livestock and wildlife. Power sources for pumps may include generators, windmills, solar panels, or electrical hookups to power lines. The facility could be designed with a water storage tank at the well or at a location where pipelines would gravity-feed water to other sites. Drinking troughs may be installed near the well and/or at various locations from a pipeline. Well sites will be selected based on geologic well site investigations.

Water Pipelines

Pipelines consist of plastic—usually polyethylene—or steel pipe that is buried by mechanical pipe-laying implements or laid on the soil surface. Pipelines designed for spring through fall use are usually placed 12 to 18 inches below the surface, as compared to winter pipelines that are 5 to 6 feet deep. Pipelines originate at creeks, wells, or spring/seep sources and are used to distribute water to otherwise nonserviced areas. Drinking troughs, and in some cases a storage tank, are situated along the pipeline.

Reservoirs

Reservoirs are constructed across drainages by building a dike to store water, with an overflow pipe and spillway to pass excess streamflow or high-flow events. Pit-style reservoirs are constructed on small side drainages and basins without a pipe, where the spillway directs excess water into a neighboring draw or gentle terrain. The impoundments created are designed to catch temporary runoff or permanent streamflow to provide a more reliable source of water for livestock and wildlife. Design requirements are determined mainly by the nature and amount of source water. Where there are opportunities to create reservoirs of sufficient size and depth to support fisheries, more specific livestock management may occur, including fencing off the reservoir and providing off-site watering facilities (troughs).

Fences

Fences are constructed to provide livestock management boundaries. They provide interior pastures or boundaries for grazing allotments. Because of different management considerations, fence design is highly variable (see BLM Manual Handbook 1741-1, Fencing). Wire may be smooth, barbed, mesh, or a combination, depending on the type of project and/or livestock species involved. Exclosure fences may be built to restrict livestock (and in some cases wildlife) access to sensitive areas. Wooden braces are usually spaced 1/4-to 1/2-mile apart, or closer if necessary. Line posts may be steel, wood, or fiberglass, with spacing based on the fence type, topography, and resource objectives. Electric fences may also be used in some instances. Because of the potential for impact to wildlife movement, portions of historic woven wire fences are identified for modification.

Cattleguards

Cattleguards will be installed where fences cross heavily traveled roads or in situations where opened gates would severely compromise management. Cattleguards are generally 8 feet wide, and vary in length depending on traffic needs.

Instream Structures

Instream structures are primarily steel sheet-piling, gabions, or check dams of rock, logs, or concrete and steel placed in streams and ephemeral draws to maintain water tables, slow water flow, and reduce erosion.

FOREST MANAGEMENT

Forestry Program

Overview

This appendix was developed to supplement the discussion of forestry in chapters 1 through 4 by providing more information about forest resources and the forestry program within the RMPPA.

The forestry program within the RMPPA is directed at managing the forested lands in a healthy and productive manner. Forest management activities include timber sales and harvests; site preparation for tree regeneration; forest stand improvement through commercial and precommercial thinnings; forest inventory surveys; tree planting; and forest health improvements through biomass removal, hazardous fire fuels reductions, and close observation of insect and disease problem areas.

Silvicultural Practices

Silvicultural practices are on-the-ground activities used to influence the establishment and/or growth of forest stands. The major silvicultural practices used in the RMPPA are described in the following sections, including their applicability and use.

Regeneration

Regeneration refers to the reforestation process, in which trees in an area are reestablished. The term also can refer to the tree seedlings that become established in the area.

In areas where the existing tree cover has been totally or partially removed by natural or artificial causes, natural or artificial regeneration may be used. In natural regeneration, the area is allowed to reforest itself through the use of seeds left on the site, seeds blown into the site from adjacent forests, or a process called root suckering. Natural regeneration requires proper seedbed preparation, a good seed crop, and cooperating weather. The majority of forest tree species common to the RMPPA are more acceptable of this method of regeneration.

Artificial regeneration is carried out by the forester, who places seeds on or in the ground or plants tree seedlings. Artificial regeneration can be used to reestablish tree growth to an area in a shorter time, to convert a site from one tree species to another, or to provide a means of regeneration if natural regeneration fails. For commercial timber stands after a timber harvest, artificial regeneration can be used to supplement natural regeneration to achieve a desired stocking level or to improve the genetic stock in an area. (This is usually economically unfeasible for the RMPPA.)

Stand Development

The stand development period is the time from which the forest stand was established (regeneration) to the time the forest stand is harvested or dies from natural progression. Silvicultural practices are performed during this period to improve a forest stand's health and growth, to help reduce insect and disease infestations, or to achieve other management objectives if the area is being managed for multiple uses. Common stand development activities are precommercial and commercial thinning.

Thinning is a procedure used to reduce the number of trees per acre so that stagnation of growth is prevented and the overall stand health and growth is improved. This activity leaves a specified number of trees per acre at a desirable spacing. Thinning also can be used to help slow the spread of dwarf mistletoe and outbreaks of mountain pine beetle.

Precommercial thinning is used when a forest stand is in need of thinning at an immature age (from seedling to between 8 and 10 years of age). Little merchantable product can be attained through precommercial thinning. When required, a forest stand may be precommercially thinned through the public sale of Christmas trees (only during December). In most cases, however, BLM will perform the thinning in-house through its BLM Fire Fuels Crew or through hire of a professional contractor. In precommercial thinning, a 10- to 15-foot spacing is left between stand trees to allow for maximum growth production.

Commercial thinning is used when a forest stand has reach a diameter at breast height (DBH) average of 5 to 6 inches and an average height of 25 to 30 feet, or a merchantable post and pole size. In such cases a forest stand may be commercially thinned by the public sale of post and poles. In most cases, however, BLM will sell the materials to a willing individual buyer among the public or to a professional contractor

through a post and pole sale. In commercial thinning, a 15- to 20-foot spacing is left between standing trees to allow for maximum growth production.

Harvesting

Several methods of harvesting are used in the RMPPA.

Clear-cutting

Clear-cutting is a method of harvesting in which all the trees in a designated area are cut down. This method is used for forest stands that require complete removal of the overstory because of poor health; damage from the wind, including blow-down; damage from other natural events, such as wildland fire; or the regeneration requirements of a particular tree species.

Regeneration of clear-cut stands may be accomplished through natural or artificial means. As a general rule, clear-cutting is the harvest method with the lowest logging cost per thousand board feet (MBF); the fewest miles of temporary road used or built per MBF; and potentially the most adverse impacts to the soil, water, wildlife, and visual resources over the long term.

Select Tree Cut

In a select tree cut, trees within a particular stand are individually marked for cut and harvest. Selection criteria can be based on size, species, or individual tree health. This type of cut is commonly used to improve stand health and growth production in mature forest stands. Select tree cutting involves accurate tree felling and minimal skidding, which allows for fewer environmental impacts.

Slash Disposal

Slash comprises the tops, limbs, and other unusable portions of trees, left in an area after harvesting. Two methods of slash treatment are described in the following section.

Lop and Scatter

Lop and scatter is a slash treatment method in which the tops and large branches of trees are cut so that the slash will be at a predetermined height off of the ground. This method is used in areas where the amount of slash is light. It allows for a speedy natural decomposition process.

Pile and Burn

The pile and burn method of slash treatment is used in areas where tree species need an exposed mineral soil seedbed for successful seed germination. The dominate tree species within the RMPPA, lodgepole pine, needs such a seedbed. After harvesting, the slash is pushed up into pile, usually with a bulldozer. This process exposes the mineral soil seedbed needed for successful seed germination of lodgepole pine. Not all the slash is piled however. About 30 percent is left scattered over the area as protection for newly regenerated seedlings. The slash piles are later burned in the winter, when a protective layer of snow allows for safe burning.

The pile and burn method is also used to dispose of undesirable or non-merchantable woody materials collected in forest health projects such as stewardship projects and hazardous fire fuels reduction projects. In addition, it is used to dispose of slash from precommercial and commercial thinnings. These slash piles also are burned in the winter, when a protective layer of snow allows for safe burning.

Management Direction for Forests and Woodlands

Forests and woodlands are categorized as lands available for intensive management of forest products, for restricted management of forest products, for management to enhance other uses, and lands not available for management of forest products. These four categories are described in the following section.

Intensive Management

Lands available for intensive management of forest products are areas where forest management is one of many uses, but where other uses or resource values are not emphasized. These lands are managed to achieve a highly productive forest by implementing forest management activities to enhance overall forest health and growth production. Commercial timber activities are concentrated within these areas.

Lands placed under this category are commercial forestlands that have the least amount of conflicts with other resource programs.

Restricted Management

Lands available for restricted management of forest products are areas where other uses or resource values are emphasized and limited forest management activities are allowed. Forest products in the form of timber can be harvested from such lands, but harvesting methods such as clear-cutting is completely restricted.

Lands in this category are areas with steep slopes and riparian areas located within a forested area.

Enhancing Other Uses

Lands where the forests are managed to enhance other uses are areas where forest management is tailored to benefit other identified resource values or uses. Such management practices are used on the woodland areas within the RMPPA, which contain aspen and other noncommercial tree species. Forest management activities such as the harvesting of small or minor wood products can be carried out on these lands to a limited degree. Management activities would be for the benefit of other resources or to respond to requests from the public—usually for firewood, posts and poles, Christmas trees, and wildlings.

Decadent aspen stands located on these lands may also be manipulated to allow for new vigorous sapling growth to enhance the stand, as well as to provide browse for big game.

Not Available for Forest Management Activities

Lands not available for management of forest products are areas of commercial forestland that have been withdrawn from the lands available for forest management activities. Forest management activities have been excluded from such lands because these lands have been determined to have other resource values of importance, on which severe impacts would result from forest management activities. These areas include Wilderness Study Areas (WSA), historically protected areas, and wild and scenic river areas.

Monitoring

Monitoring of a stand generally begins 1 year after the stand's harvest. Continued monitoring is made on a scheduled basis over the next 3 to 5 years to make sure the stand's regeneration is adequate. Monitoring over the following 20 to 60 years will be performed to establish the suitability for precommercial and

commercial thinning to prepare the stand for possible harvest as a commercial timber product when it reaches maturity.

Monitoring is also performed on individual forest stands to observe forest health conditions to help control the spread of insect and disease outbreaks.

LITERATURE CITED

BLM, 1991. *Vegetation Treatment on BLM Lands in Thirteen Western States*, *Final Environmental Impact Statement*. BLM-WY-ES-91-022-4320. USDI-BLM, Wyoming State Office, Cheyenne, WY.