DECISION RECORD
Southern Bighorn Mountains Curl-leaf Mahogany Restoration
Within Crucial Mule Deer Winter Range
ENVIRONMENTAL ASSESSMENT – WY-070-EA10-372
Buffalo Field Office, Bureau of Land Management

DECISION: The BLM approves the proposal sponsored, led, and largely financed by the Wyoming Game and Fish Department (WGFD) to approve the treatment of encroaching conifers in curl-leaf mountain mahogany (*Cercocarpus ledifloius*) (hereinafter "mahogany" or "curl-leaf mahogany") stands to provide for long-term viability of the stands, enhance crucial mule deer winter range, and the population, as described in the environmental assessment (EA) WY-070-EA10-372. The approval for this project and is for the life of the project which may last, but is not limited to, 5 years from this approval.

Compliance. This decision complies with:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701) (see Section 201).
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- Endangered Species Act of 1974 (16 USC 1531).
- Buffalo and Powder River Basin (PRB) Final Environmental Impact Statement (FEIS), 1985, 2003.
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003.
- Interior Department Order 3310; BLM Manuals 6301, 6302, and 6303.
- Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (EIS); Record of Decision (ROD), BLM, 2007.
- Invasive Species Management, WY-070-EA09-099, BFO, 2010.
- BLM Manual 6840, Special Status Species Management (SSS), 2008.
- BLM Wyoming Sensitive Species Policy and List, Mar 2010.
- Memorandum of Understanding, WY BLM and WY Game and Fish Department, Mar 1990.

A summary of the details of the approval follows. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is included in the EA. Treatments will involve removal of small age classes of selected conifer species from curl-leaf mahogany stands using mechanical treatments and burning of individual trees from up to 7 units. Mitigation measures will include the following:

- Prior to treatment, all trees should be visually inspected to ensure the absence of an occupied migratory bird nest.
- To protect nesting raptors, occupied nests would be subject to a seasonal timing restriction.
- If any items of cultural value are observed during the development of this project, they will be left intact and the BLM authorized officer would be notified. The BLM authorized officer will conduct an evaluation of the cultural value to establish suitable mitigation or salvage.
- The area will be monitored annually for the presence of noxious or invasive weeds. Any infestations would be handled using an integrated pest management approach.
- Burning will be accomplished in the winter months during periods with greater than 20% snow cover, in order to minimize treatment impacts and maximize control.
- The public lands within the Middle Fork Management Area/Red Wall/Hole-in-the-Wall region and valley of the Middle Fork Canyon but not the rims, are closed to vehicles to reduce unnecessary resource damage such as soil disturbance, loss of vegetation and disturbance of wildlife.

Limitations: No cutting of whitebark pine, if in the rare event any are found.

In no case will live healthy limber pine of any size be cut, girdled, or removed. Any exceptions to this would be completed in accordance with IM No. WY-2011-003 (Five Needle Pine Management Guidelines for Wyoming BLM; refer to (page 22- 23, Appendix 2) and BLM Manual 6840 (Special Status Species Management). However, limber pine within the project area is not known to occur at density (greater than 5%) that would warrant thinning of healthy limber pine. Where limber pine may be removed within the treatment units, the guidelines for ponderosa pine, Douglas-fir, and juniper would be followed.

There will be no impairment of wilderness characteristics (with the exception of temporary chainsaw noise). Vehicles may use established roads and ways and not making new trails or ruts. There will be no mechanical creation or maintenance of roads in Units 1, 2, 3, 4, 6, and 7. Treatments in Units 1, 2, 3, 4, 6, and 7 will leave no lasting surface disturbance, which includes but is not limited to, no tracked vehicles, no temporary structures in place for more than 14 days, etc. Any surface disturbance need will be requested in writing from the Field Manager 2 weeks prior to the anticipated disturbance. This decision does not constitute or commit BLM funds for this project.

THE FINDING OF NO SIGNIFICANT ACTION. Analysis of Alternative B of the EA, WY-070-EA10-372, and the FONSI found the project will have no significant impacts on the human environment, beyond those described in the Buffalo and PRB FEISs (1985, 2003), thus an EIS is not required.

COMMENT OR NEW INFORMATION SUMMARY. Since development of the proposal BFO received a new Interior Department policy on wilderness (see FLPMA, Sections 201, and 202), the WY BLM changed the status of limber pine to a special status species (SSS), and the U.S. Fish and Wildlife Service (FWS) published a 90-day finding that whitebark pine scientific evidence supporting consideration to determine whether the whitebark pine warrants listing as an endangered or threatened species and whether to designate critical habitat. Project development included cooperation with the Wyoming Game and Fish Department, Wyoming Office of State Lands and Investments, Wyoming Wildlife and Natural Resource Trust, Rocky Mountain Elk Foundation, and Mule Deer Foundation. The holders of the grazing allotments also coordinated with the project's development, see Table 3, EA, WY-070-EA10-372.

DECISION RATIONALE. The approval of this project is because:

1. Mitigation measures will reduce environmental impacts while meeting the project's need and support the long-term conservation of the special status species, limber pine.

2. The selected alternative will not result in any undue or unnecessary environmental degradation. There are no anticipated surface disturbances; no mechanically maintained roads or the creation of new roads will not occur. There are no conflicts anticipated or demonstrated with current uses.

3. Approval of this project is in conformance with the terms and the conditions of the 1985 Buffalo RMP (BLM 1985) and subsequent updates (BLM 2001) and amendment (BLM 2003). The proposed action is also in conformance with the South Bighorns Habitat Management Plan (BLM 1986) and the Middle Fork Powder River Habitat Management Plan (BLM 1980).

4. The approval of the selected alternative is because conifer species are encroaching into curl-leaf mahogany stands. Curl-leaf mahogany is shade-intolerant, and selected conifer encroachment decreases their viability. Curl-leaf mahogany stands have been shown to be critical for wintering mule deer and all treatment areas are located in crucial mule deer winter range. Ensuring the viability of these stands should improve the long-term viability of mule deer in the southern Bighorns and should do the treatments in manners supporting the genetic diversity and infection resistance of limber pine.

5. This project approval is applicable on BLM-surface land and private lands where landowners volunteer for the treatments, as generally depicted on the map, Appendix 1, WY-070-EA10-372, incorporated here by reference. The project is also contingent in most BLM units of private landowners allowing access to the BLM units. The project is approved with full knowledge that wilderness inventories are in planning and implementation process for BLM managed lands contingent to and including Units 1, 2, 3, 4, 6, and 7; see FLPMA, Sections 201 and 202.

6. The project on Unit 5, Appendix 1, WY-070-EA-372, is clearly lacking in wilderness characteristics because Unit 5 is contiguous with BLM lands smaller than 5,000 acres, see FLPMA, Section 201.

7. The project on Units 1, 2, 3, 4, 6, and 7 on BLM managed lands are not clearly lacking in wilderness characteristics and is approved with measures to minimize impacts on wilderness characteristics and leave no impairment to wilderness characteristics. The project on these units is contingent upon closely following the mitigation measures in WY-070-EA10-372 and the guidelines in Appendix 2 of the EA, *Whitebark and Limber Pine (Five Needle Pine) Management Guidelines for Wyoming BLM*; both of which are incorporated here by reference; and see FLPMA, Section 201.

ADMINISTRATIVE REVIEW AND APPEAL. This decision is issued under 43 CFR 4190.1 and/or 43 CFR 5003.1(b) and is effective immediately. The BLM made the determination that vegetation, soil, or other resources on the public lands are at substantial risk of wildfire due to drought, fuels buildup, or other reasons, or at immediate risk of erosion or other damage due to wildfire. Thus, notwithstanding the provisions of 43 CFR 4.21(a)(1), filing a notice of appeal under 43 CFR Part 4 does not automatically suspend the effect of the decision . Appeal of this decision may be made to the Interior Board of Land Appeals in accordance with 43 CFR 4.410. The Interior Board of Land Appeals must decide an appeal of this decision within 60 days after all pleadings have been filed, and within 180 days after the appeal was filed as contained in 43 CFR 4.416.

Field Manager: Duane M. Spencer Date: 6/22/11

FINDING OF NO SIGNIFICANT IMPACT
Southern Bighorn Mountains Curl-leaf Mahogany Restoration
Within Crucial Mule Deer Winter Range
ENVIRONMENTAL ASSESSMENT – WY-070-EA10-372
Bureau of Land Management, Buffalo Field Office

FINDING OF NO SIGNIFICANT IMPACT: On the basis of the information in the environmental assessment (EA) WY-070-EA10-372, which is incorporated here by reference, and all other information available to me, it is my finding that: (1) the implementation of the proposed project will not have significant environmental impacts; (2) the treatment project conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) and subsequent updates (BLM 1985, 2001, 2003) and other planning documents; and (3) the treatment does not constitute a major federal action having a significant effect on the human environment. Therefore an environmental impact statement (EIS) is not required. This finding is based on consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA, and in consideration of FLPMA, Sections 201 and 202.

CONTEXT: The Wyoming Game and Fish Department (WGFD) identified crucial mule deer winter range in the southern Bighorns that includes BLM lands. BFO identified management goals for mule deer in its South Bighorns Habitat Management Plan (BLM 1986) and the Middle Fork Powder River Habitat Management Plan (BLM 1980) that included maintaining and improving habitat conditions for deer in the treatment area. This is a 5-year project as described in EA, WY-070-EA10-372.

INTENSITY: The treatment does not pose a significant risk to public health and safety. Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their emerging conclusions on environmental effects of curl-leaf mountain mahogany, (*Cercocarpus ledifloius*) (hereinafter "mahogany" or "curl-leaf mahogany"), habitat rehabilitation, white pine blister rust, mountain pine beetles, dwarf mistletoe, and the population decreases of limber pines. Emerging research on the nature of the environmental effects of mahogany rehabilitation are not highly controversial, highly uncertain, or involve unique or unknown risks.

There are no cultural or historical resources present that will be adversely affected by the project. The proposed project in Unit 5, Appendix 1, of the incorporated EA, is clearly lacking in wilderness characteristics as the site is smaller than 5,000 acres. The proposed project in Units 1, 2, 3, 4, 6, and 7 can be accomplished with measures to minimize impacts and preclude impairment of wilderness characteristics. The project will not adversely affect species listed under the Endangered Species Act (ESA) or their designated critical habitat. Limber pine is special status species. The anticipated project effects will not threaten a violation of federal, state, or local law.

ADMINISTRATIVE REVIEW OR APPEAL OPPORTUNITIES: This finding is issued under 43 CFR 4190.1 and/or 43 CFR 5003.1(b) and is effective immediately. The BLM determined that vegetation, soil, or other resources on the public lands are at substantial risk of wildfire due to drought, fuels buildup, or other reasons, or at immediate risk of erosion or other damage due to wildfire. Thus, notwithstanding the provisions of 43 CFR 4.21(a)(1), filing a notice of appeal under 43 CFR Part 4 does not automatically suspend the effect of the decision. Appeal of this decision may be made to the Interior Board of Land Appeals in accordance with 43 CFR 4.410. The Interior Board of Land Appeals must decide an appeal of this decision within 60 days after all pleadings have been filed, and within 180 days after the appeal was filed as contained in 43 CFR 4.416.

Field Manager: _____ Date: 6/22/11

BUREAU OF LAND MANAGEMENT, BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA10-372
Southern Bighorn Mountains Curl-leaf Mahogany Restoration
Within Crucial Mule Deer Winter Range

1. Introduction

1.1. Background

The Bureau of Land Management (BLM), Buffalo Field Office (BFO) proposed a vegetative treatment project in coordination and partnership with the Wyoming Game and Fish Department (WGFD), Wyoming Governor's Big Game License Coalition, Wyoming Wildlife and Natural Resource Trust, Rocky Mountain Elk Foundation, and the Mule Deer Foundation. The vegetative treatment design provides for mid-term viability of curl-leaf mountain mahogany (*Cercocarpus ledifloius*) (hereinafter “mahogany” or “curl-leaf mahogany”) stands to enhance crucial mule deer winter range and the declining deer population.

The project area is along the eastern foothills of the southern Bighorn Mountains, near Barnum, in southern Johnson County. The town of Kaycee is approximately 17 miles to the east. The project area includes seven treatment units totaling 1,165 acres within Township 41 North, Range 84 West, sections 2, 3, and 4; Township 42 North, Range 84 West, sections 3, 4, 21, 28, 29, 30, 34 and 35; and Township 43 North, Range 84 West, sections 7, 8, 9, 16, 17, 18, 28, 29, 30, 31, 31 and 32. The project area includes BLM and private land along portions of the Barnum Mountain Road, Beaver Creek Slope, Blue Creek, Poker Creek, Slope, Slope/Mountain, and Willow Creek grazing allotments. (See Appendix 1 for a project area map). Treatments would occur over a 5-year time period. With 2 exceptions access to the treatment blocks is across private lands, and requires permission from the various landowners prior to treatments occurring.

1.2. Need of Proposed Action

The need for this project is to remove smaller age classes of selected conifers (primarily ponderosa pine, Douglas-fir, and juniper), and diseased, dead, or over-represented limber pine from curl-leaf mahogany communities that occur within crucial mule deer winter ranges in the southern Bighorn Mountains to assist with stabilizing or increasing the mule deer population. Mule deer populations are in decline in the area, and generally across the state and west. Selected conifer species are encroaching into mahogany stands in these areas, and they will eventually out-compete mahogany plants, which are important for mule deer survival in the region. In a study performed by WGFD in 1997 (Jellison et al 1997), mahogany was shown to comprise up to 75% of discerned fragments from mule deer fecal samples taken from the area. Ponderosa pine, Douglas-fir, and junipers exhibit a faster rate of growth than mahogany, and as they mature and their canopy closure increases, they begin to overshadow and choke out mahogany. Most conifers lacking the natural control of fire out-compete mahogany, and likely contribute to reducing the mule deer carrying capacity in the region.

Wildfire is another persistent threat to mahogany stands in the project area. The 2006 Outlaw Cave wildfire burned 815 acres of mahogany in the project area which accounted for about 8 percent of the mahogany on crucial winter ranges. The ever present fire threat demonstrates the need to maximize the quality and availability of habitat that remains. Removing selected conifers in proximity to mahogany stands will reduce the volume of standing fuels and serve as a means to buffer these shrub communities from potential wildfire by reducing fire intensity and frequency within the treatment areas.

The encroachment of selected conifers in the region will be a constant threat to the long-term viability of

mahogany stands. Although the proposed action will not remove this threat it should prove sufficient to preserve the stands. Future treatments may be necessary if conifers re-establish post-treatment.

Decision to be made: The BLM will decide whether to pursue removal of selected conifers from mahogany stands in mule deer crucial winter range in 7 Units in the southern Bighorn Mountains, and, if so, under what terms and conditions.

1.3. Scoping and Issues

The BFO in cooperation with the WGFD, Sheridan Regional Office, and the BLM's CFO, developed this project. Scoping also included the Wyoming Office of State Lands and Investments concerning treatments on any adjacent state trust lands. Scoping included the grazing lessees for the allotments shown on Table 3. Project funding commitments came from the Wyoming Wildlife and Natural Resource Trust and the Mule Deer Foundation.

Through the process of internal scoping, BFO staff identified the following issues for analysis:
What impacts will the project have on vegetation, soils, wildlife, livestock grazing management, special status species (SSS) or invasive species?

The following elements are not present and not analyzed:

Air quality
Areas of critical environmental concern (ACEC)
Environmental Justice
Prime or unique farmlands
Flood plains
Hazardous or solid wastes
Mineral resources
Native American cultural concerns
Paleontology
Traditional cultural properties
Water quality and prime or sole source of drinking water
Wetlands and riparian zones
Wild and scenic rivers

2. Alternatives Including the Proposed Action

2.1. Description of the Proposed Action

The proposed action is to remove smaller classes of ponderosa pine, Douglas-fir, juniper, and selected limber pine from mountain mahogany communities that occur within crucial mule deer winter ranges in the southern Bighorn Mountains. Removal is by hand methods through mechanical treatments or by prescribed burning of individual trees. Prescribed burning will target individual selected conifer trees rather than mahogany stands because mahogany exhibits mixed tolerance to fire and uneven regeneration after burning. Individual trees may be burned under appropriate conditions, subject to a burn plan.

Live ponderosa pine, Douglas-fir, and juniper that are less than 8-inches in diameter at breast height (dbh) will be girdled and left standing, or removed and scattered in place. Larger trees will be girdled and left standing. Trees that are to be left untreated will be identified as leave trees and flagged if necessary. All trees would be visually inspected prior to treatment to ensure the absence of any migratory bird nest to prevent a taking under the Migratory Bird Treaty Act. In no case will live healthy limber pine of any size be cut, girdled, or removed. Any exceptions to this would be completed in accordance with IM No. WY-2011-003 (Five Needle Pine Management Guidelines for Wyoming BLM; refer to (page 22- 23, Appendix 2) and BLM Manual 6840 (Special Status Species Management). However, limber pine within the project sites is not known to occur at density (greater than 5%) that would warrant thinning of healthy limber pine. Where limber pine may be removed within the treatment units, the guidelines for ponderosa pine, Douglas-fir, and juniper would be followed.

Treatments would begin in late summer 2011 and would continue as funding allows through 2016, at which time BFO may re-evaluate the project and its EA.

2.2. Description of Alternatives to the Proposed Action Analyzed in Detail

2.2.1. No Action Alternative

The no action alternative will continue present management and use. BLM would not authorize any additional management actions in mahogany stands under this alternative. Conifer encroachment would continue to occur, mahogany may eventually be outcompeted by conifer species, and a reduction of mahogany stands may result. Without this critical food and cover source mule deer carrying capacity in the southern Bighorns may decrease, as mahogany is the major source of winter forage for mule deer. Current management should not result in impacts to cultural resources. No changes to livestock grazing management would occur. This would not alter the spread of invasive species. An extensive analysis from the FEISs (1985 and 2003) is incorporated here by reference and precludes further analysis of this alternative. For details refer to: FEIS (1985), pp.8-14, 61-64, ROD, p. 11; FEIS (2003), pp. 2-54 to 2-65, 4-63, 4-69, 4-77, 4-127, 4-129, 4-134, 4-150, 4-152, 4-163 to 4-171, 4-178, 4-246, 4-286, 4-295 to 4-296, 4-301, 4-313, 4-327, 4-370, 4-376, and 4-386.

2.2.1. Other Alternatives

Other treatment methods considered include broadcast prescribed fire and herbicide application. Other than individual juniper ignitions, prescribed fire was not analyzed as an alternative as most literature suggests that curl-leaf mahogany responds negatively to fire. Similarly herbicide was not analyzed as an alternative for fear of unintentionally killing curl-leaf mahogany and other non-target species.

2.3. Conformance

The proposed action conforms to the terms and the conditions of the 1985 Buffalo Resource Management Plan (RMP) (BLM 1985) and updates (BLM 2001, 2003). This proposal conforms to the Endangered Species Act (ESA), the Interior Department and BLM policy on special status species (SSS), and the Memorandum of Understanding between the WY BLM and the WGFD. The proposed action also conforms to the South Bighorns Habitat Management Plan (BLM 1986), the Middle Fork Powder River Habitat Management Plan (BLM 1980) and Section 201 of the Federal Land Policy and Management Act (FLPMA), [Interior Department Order 3310]. Specific guidelines from some of these plans follows.

<u>1985 Buffalo RMP Record of Decision (ROD):</u>
The 1985 Buffalo RMP lists management decisions proposed for being carried out for each program. The forest management and wildlife habitat management objectives relevant to the proposed action are:

- ***FOM-2*** *- Implement forest thinning and planting projects. Forest development projects are used as management tools to enhance the growing conditions on forestlands*.
- ***WHM-6*** *- Develop HMPs to improve and protect wildlife habitat in the following priority areas: South Big Horns HMP (1985), including a portion or all of the Gardner Mountain and North Fork WSAs; Wetlands and Aquatic HMP (1986); and Powder River Breaks HMP (1987).*

<u>1986 South Bighorns Habitat Management Plan</u>
The rationale for developing the South Big Horns HMP was summarized in the plan as the following:

- Crucial winter and yearlong habitat for elk and deer in the south Big Horns is limited by the availability of forage, cover, and water. Implementation of the HMP will improve these habitat

conditions and limit habitat degradation from timber harvesting, mineral development, livestock grazing, and recreational pursuits. The ultimate goal of the plan is to maintain and improve habitat conditions for all wildlife through ecosystem management.

The HMP then listed several actions proposed to meet the stated goal:

- Habitat management will be aimed at maintaining or improving seasonal big game habitat in accordance with the goals of the Wyoming Game and Fish Department strategic plan. Planned actions include water development and vegetation manipulation.
- A goal of this plan is to use ecosystem management practices to improve habitat condition or to maintain existing favorable habitat conditions for wildlife in the South Bighorns HMP area.
- As monitoring is conducted and new information obtained, the [planned] "actions" will be added to, updated, and adjusted over time and as needed.

Management Objective 1 is relevant to the proposed action. It states that BFO will do the following:

- Provide forage, cover, and water to support of 900 elk, 7,000 mule deer, 700 antelope, and limited white-tailed deer habitat in the HMP area and increase their use on public land.

1980 Middle Fork Powder River Habitat Management Plan

This HMP also encompasses portions of the project area. Management Area Objective A.1 is relevant to the proposed action and states that BFO will:

- Improve the the area's mule deer habitat to provide for an annual population of 1,000 animals

2003 RMP Amendment: Goals, Objectives, and Management Actions (ROD 2003)

BLM will take necessary actions to meet the policies set forth in sensitive species [a.k.a. special status species (SSS)] policy . . . for all sensitive species . . . To help ensure BLM's actions do not contribute to the listing . . . as a threatened or endangered species . . . .

A closely related project EA on a site just south of this project's location is: Bureau of Land Management, 2010d. *Lost Creek Vegetation Treatment*, Environmental Assessment DOI-BLM-WY-P060-2010-97-EA, Casper Field Office (CFO).

Section 201, Inventory and Identification, Federal Land Policy and Management Act (FLPMA): *The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including, but not limited to, outdoor recreation and scenic values), giving priority to areas of critical environmental concern. This inventory shall be kept current so as to reflect changes in conditions and to identify new and emerging resource and other values. The preparation and maintenance of such inventory or the identification of such areas shall not, of itself, change or prevent change of the management or use of public lands.*

3. Affected Environment

3.1. Soils and Vegetation

The treatment sites are mostly on in the Shallow Clayey ecological site in the 10-14 inch Northern Plains precipitation/vegetation zone (NP). Small areas also occur in the Coarse Upland ecological site in the 15-19 inch NP and in the Loamy ecological site in the 10-14 inch NP. The character of the treatment units is mountain foothills shrub communities.

Table 1. Ecological sites present in the treatment areas and acreages affected

Ecological Site	Acres	Percent
Shallow Clayey (10-14 NP)	914	78%
Coarse Upland (15-19NP)	21	2%
Loamy (10-14NP)	14	1%
Unclassified	216	19%
Total	**1,165**	**100%**

Vegetation consists predominantly of curl-leaf mahogany with scattered conifer species, which include Douglas-fir, ponderosa pine, limber pine, (Jellison et al 1997) and juniper (Proposal). Conifer trees present in the treatment areas are generally less than 4"“dbh. (Such small limber pines may carry some genetic resistance to blister rust, see below.) Major grasses dominating the understory include rhizomatous wheatgrasses, green needlegrass, and bluebunch wheatgrass. The treatment sites are adjacent to mid-elevation conifer and grassland communities.

There is a gap in knowledge of the vegetative community types on the 7 BLM units proposed for this project (1,165 acres). Some scientific documentation exists for the vegetative community types in the larger, Middle Fork Management Analysis (MFMA) consisting of about 197,500 acres, of which 57% is under BLM’s administration (Jellison et al 1997). The MFMA study classified 188,080 acres using spectral analysis using LANDSAT Tm data circa 1992-1996 (Jellison et al 1997). There is no scientific basis allowing a valid comparison or transference of the dated MFNA vegetative study to 2011 vegetative conditions on the 7 BLM units. Yet the MFNA findings are instructive for background information. The MFNA found land cover classifications for mahogany at 5.4% (10,160 acres), Douglas-fir and limber pine at 3.0% (MFNA did not break these out), and ponderosa pine 1.8%. Preponderant land cover classifications were herbaceous rangeland 45.6%, mixed shrub (sagebrushes) 21.4%, and big sagebrush 12.5% (Jellison et al 1997).

Recent observations from the MFMA include a description of the results of the 2006 Outlaw Cave fire that burned 11,574 acres. 815 acres were mahogany – a loss of about 8% of the mahogany, computed using the 1997 study of mahogany acres as baseline (Jellison et al 1997).

The findings and recommendations from the WGFD’s Middle Fork Powder River Big Game Winter Range Analysis Study point to prescribed burns as the primary management recommendation to rehabilitate climate mahogany stands and to treat mahogany stands from conifer encroachment. The study offered no analysis, finding, or recommendation on whether cutting encroaching conifers might achieve the same end (Jellison et al 1997). Other studies argue the potential of fire in mahogany management regimes has limits, but note mahogany regeneration after fire, and those decisions to use fire should on a case-by-case basis (Elliott et al 1997). Yet others found that logging of competing species is beneficial where mahogany represents an intermediate stage in ecological succession (Elliott et al 1997).

A generalized succession is grasses and forbs, shrubs (mahogany and others) limber pine, juniper, ponderosa, and Douglas-fir. Douglas-fir, ponderosa pine, and juniper appear to be encroaching into the mahogany stands and threatening their long-term viability. This is because conifers exhibit greater growth rates; eventually overcoming curl-leaf mahogany stands in height. Mature mahogany is shade-intolerant; and as such, their competitive ability is lost and they become senescent (Schultz et al 1990). Yet one study in the region showed that mahogany was more than 112% of the pines’ representation of vegetative cover – implying that succession in the vegetation community is incomplete (Jellison et al 1997).

Fire may reinvigorate mahogany where conifer encroachment eliminated mahogany seedling recruitment and establishing over decades (Elliott et al 1997, Jellison et al 1997). On the other hand climax

communities of mahogany produce plentiful seed irregularly so are not biologically inclined to self-perpetuate a climax community of mahogany. Mahogany production increases using good pruning techniques (Elliott et al 1997). Since pruning is manpower intensive and immediately reduces browse, prescribed fire may be the better effective treatment for stand regeneration (Jellison et al 1997).

Limber pine is a BLM special status species (SSS) in Wyoming (and Idaho) due to threats from white pine blister rust, mountain pine beetle, dwarf mistletoe, climate change, and their synergistic effects. There is mortality in the project area from white pine blister rust, but the limber pine remains well-represented in those sites and is expanding into most of the shrub communities. In this lower elevation setting, multi-sized limber pine occupies areas in and adjacent to treatment units and will provide seed and genetic source for the surrounding area (BLM 2010a, b). [The Institute of Forest Genetics, U.S. Forest Service, described the challenging nature of blister rust. Blister rust alternates between white pines (subgenus *strobus*, section *strobus*), and currants and gooseberries in the genus *Ribes*. Five different spore stages are necessary to complete the life cycle; two are on pine, and three on *Ribes*.] The discovery of blister rust in the Bighorn Mountains was in 1959 and in the Medicine Bow in 1969 (Burns et al 2007). Blister rust may take 25 years to kill a mature limber pine, but saplings succumb in 5 years (BLM 2010c).

SSS listings flow from the statutory authority of the ESA. The ESA and SSS policies, and Department and Bureau manuals, charge the government to take proactive conservation steps for the listed species to preclude the species' later listing as threatened or endangered. Limber pine and whitebark pine are 5-needle pines which favor high-altitude habitats, see Table 2. They are slow growing, long lived; often taking 50 years to produce a cone crop. "Small size is a poor indicator of recent establishment," (BLM 2010c). (The status of the whitebark pine population is more at risk – as evidenced by the U.S. Fish and Wildlife Service's (FWS) recent positive 90-day finding on a petition to activity study whether it merits listing as threatened or endangered, 75 FR 42033-42040, July 20, 2010. There are no known whitebark pine populations or habitat in this project area so there is no further analysis of the species in this EA.) (BLM 2010b.) Limber pine has large elevation gradient and a wide latitudinal range (BLM 2010c).

While never abundant, limber pine is well represented in Wyoming. Yet limber pine's presence in Wyoming belies the fact that it is less well represented in all other states, Table 2, Figure 1, and this likely leads to its casual dismissal by some Wyoming residents as perhaps they take it for granted. Wyoming hosts 38% of the limber pine in the U.S., Table 2.

Most limber pine research focused on high-altitude, treeline hugging populations. Recent research is working to close the knowledge gap on limber pine populations of the lower treeline systems and isolated mountain ranges that occur in most BLM lands, to include those on this project. These populations are ecologically distinct systems acting as seed refugia between continuous populations in the northern and central Rocky Mountains, and they serve as a seed source between mountain ranges – essentially providing a function to tie broader landscapes together. Researchers think these populations are vulnerable to climate change. Research on lower elevation limber pine focused almost exclusively on isolated populations, such as those found in North and South Dakota, Nebraska, etc., until recently. Thus the knowledge gap, and concurrent management gap, concerning limber pine populations and communities are largest for the low-mountain populations such as those that exist in this project area (BLM 2009, 2010c). WY BLM is working with researchers to develop Stand Density Index (SDI) chart for limber pine. In the meantime a draft limber pine SDI maximum is 493 (forested settings), based on an analysis of values for plots with 80% or more of the target species, (BLM 2010c, citing http://web.wy.blm.gov/930/forestry/SDI/index.htm).

Table 2. Estimated area (acres) of whitebark and limber pine habitats on Bureau of Land Management administered lands in 9 states.

State	Limber pine Acres (%)	Whitebark Pine Acres (%)
Idaho	**145,617 (7)**	**11,968 (70)**
Montana	**475,319 (23)**	**4,023 (23)**
Wyoming	**786,389 (38)**	**228 (1)**
Nevada	**338,148 (16)**	**189 (1)**
California	**198 (<1)**	**12 (<1)**
Colorado	**258,625 (12)**	**Not known**
Oregon	**Not known**	**723 (4)**
New Mexico	**93 (<1)**	**Not known**
Utah	**84,975 (4)**	**Not known**
Total	**2, 089, 364**	**17,143**

(Perkins & DeArmond 2009), citing (Rehfeldt, 2006).

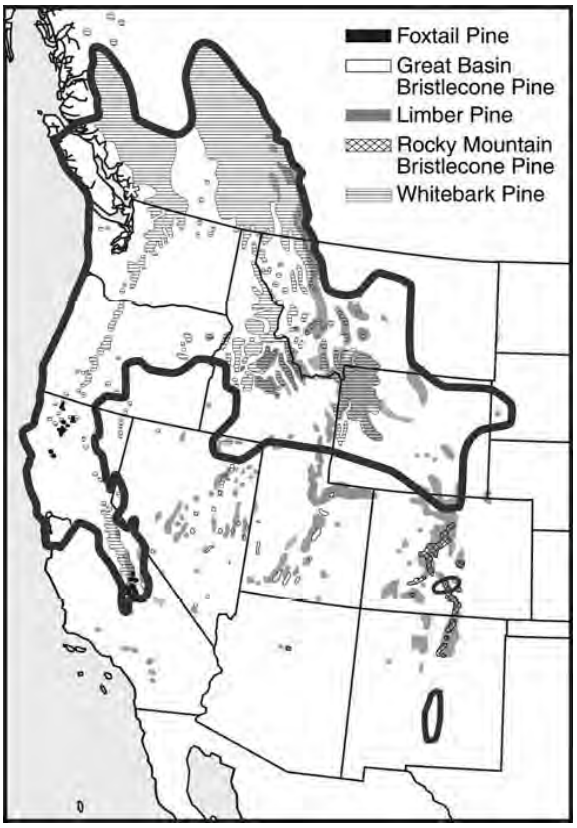

Figure 1, (right), The 2003 infection front of white pine blister rust (bold line; adapted from Samman et al. 2003) and the distribution of the noncommercial high elevation 5-needle pines. Note that many but not all stands within the infection areas are infected. The white asterisk marks the location of the one and only introduction of blister rust into western North America, which occurred in 1910. (Schoettle et al. 2007)

The listing of limber pine as an SSS summarizes an aspect of its scientific standing:

- Inclusion under criterion number 1a [downward population trends]
- Declining throughout significant portion of historic range (50% of stands dead or dying)
- Threats and reasons for decline: white pine blister rust, dwarf mistletoe species, increases in mountain pine beetle, and their synergistic effects
- No defense to pine beetle (unlike other related species)
- Listed as endangered species in Canada (BLM 2010b)

Limber pine's recent population declines include:

- In northwest Montana mortality is 42% and 75% of remaining trees have blister rust;
- Blister rust infection rates range from 41% to 100% in Montana, Idaho, and Colorado;
- Mountain pine beetles contribute to heavy mortality as limber pine is among the favored hosts, second only to whitebark pine. Over the past 5 years beetles killed over 6 million 5-needle pines in the 9 western states (BLM 2009)
- In one 3-year study limber pine mortality due to rust was 75%, infection rates were 98-100%
- A Wyoming and Colorado study showed rust infection rates of 82% below 8,500 feet
- When limber pine populations are lost from rust the pine becomes functionally extinct in the local area for hundreds of year until rust-resistant types emerge.
- Plots in valleys had higher infection incidence than those at summit or mid-slope (BLM 2010c).

Limber pine, like curl-leaf mahogany, is sensitive to fire as it is a thin-barked species. High intensity fires set conditions for regeneration in newly opened areas. Several researchers found that limber pine serves as

a nurse tree facilitating tree and shrub growth underneath as well as on the lee side for multiple species that include curl leaf curl-leaf mahogany (BLM 2010c).

Current management of lower-elevation limber pine often treated the pine as if its ecotone fluctuations were “invading” more desirable sagebrush, grass, and shrub vegetation types. Part of this management is fixed in a static information view - not allowing for movement of vegetation in response to climatic fluctuations; while other parts of the management regime are responding to attempts to increase grazing forage for cattle or wildlife (BLM 2009, 2010c). Current management of limber pine and areas it inhabits has no thresholds beyond its listing as a SSS.

Extinction of limber pine is not imminent but local extinctions will impact genetic diversity, gene flow, adaptive trait distribution, and some ecosystem functions (Schoettle et al 2007). Management that maximizes population size is important since resistance processes may only occur in 1 out of 10,000 individuals. Managing only for mature age class trees likely has fleeting results as it does not increase the number of trees in a region that have resistance and can result in adverse ecosystem impacts. Diversifying the limber pine age class by stimulating regrowth is able to provide a larger population size and fosters greater resistance selection simultaneously in the old and new growth (Schoettle et al 2007). The results from one whitebark pine study showed that fewer than 1% of offspring were blister-free, but over 40% of the survivers of the population that suffered over 90% mortality were blister free (Schoettle et al 2007).

The FWS determined that 2 plant species listed under the ESA may occur in the BFO region: blowout penstemon and Ute ladies’-tresses orchid. The treatment units do not contain habitat that would support these species, they are unlikely to occur in the project area, and receive no further analysis in this EA.

3.2. Invasive Species

BFO completed inventories for invasive, non-native, or noxious plant species within or adjacent to the proposed project area. Field visits did not identify any major infestations however cheat grass and Canada thistle are present.

3.3. Wildlife

Mule deer populations are declining and are 83% of their population objective in the project region. The treatment sites are in mule deer crucial winter yearlong range, as identified by WGFD. Crucial range is that habitat component documented as the determining factor in a population’s ability to maintain itself at a certain level over the long term. Winter yearlong range refers to an area that a population of a portion of a population of animals makes general use of on a annual basis. During winter months, winter yearlong range experiences a significant influx of additional animals from other seasonal ranges. The treatment sites occur in the WGFD Upper Powder River Herd Unit (322). The South Bighorn HMP area is approximately 51.7% of the 878,048 acres herd unit and lies entirely within its boundary. However, only 2.4% of the herd unit area is crucial winter yearlong range which lies entirely within the South Bighorn HMP area. The recent Job Completion Report from WGFD is the latest population estimate for this mule deer herd (15,000 individuals) was below population objective (18,000 individuals) (WGFD 2007).

Mule deer populations in the west fluctuated or cycled during the 1900s. Generally those populations are declining since the 1990s though some researchers report that in regions mule deer populations are in decline since the 1960s. Researchers agree that a number of factors could be responsible for declining mule deer populations. “The factors suspected in causing or contributing to population declines includes, but are not limited to habitat loss or change, severe weather (extended drought, deep snow, etc.), starvation, changes in age and sex structure, disease, predation, competition with livestock and wildlife species . . . ,

and interactions between these factors . . . . A selective review of the literature could reinforce almost any view on the role of predation." (MDWG 2004, pp. 12, 6-14.)

Wyoming researchers documented a mule deer population decrease in the MFMA during the 1970s to early 1980s. The science is incomplete, based on the gaps in knowledge, to solely or significantly attribute the mule deer population decline in the project area on an apparent decline in curl-leaf mahogany – though scientific data shows a strong winter browsing preference among mule deer for mahogany. (Jellison et al 1997). Only about 8% of the mahogany decline is substantiated while there is no corresponding scientific substantiation that mahogany declines or succession of conifers is causational for mule deer population declines. It is another gap in our knowledge.

Portions of the treatment sites are in elk crucial winter yearlong range and yearlong range. Yearlong range is an area that animals make general use of on a year-round basis. One of the treatment sites intersects a portion of elk crucial winter yearlong range. The treatment sites occur in the WGFD South Bighorn Herd Unit (322). The recent Job Completion Report from WGFD is the latest elk population estimate for this herd (5,450 individuals) was above population objective (2,900 individuals) (WGFD 2007).

One of the treatment sites intersects the WGFD Ed O. Taylor Wildlife Habitat Management Area (WHMA), which was designated to protect winter range for elk and year-round range for mule deer. The treatment sites intersect winter yearlong and spring, summer, fall pronghorn range. Spring, summer, fall range refers to an area that is used by animals only to the onset of persistent winter conditions. Two pronghorn herd units are affected by the proposed treatments: Upper Powder River (310) and Middle Fork (352). WGFD most recently estimated that the herd units support 6,900 animals, which is above the population objective of 3,000 animals for this herd (WGFD 2007).

The treatment sites are not located in any areas designated as seasonal range for white-tailed deer. A variety of migratory bird species may occur in the treatment sites, including BLM SSS such as Brewer's sparrow, sage sparrow, and northern goshawk, and species of management interest to WGFD such as great gray owl, some hummingbird species, and woodpecker species. Blue grouse is the only gamebird species likely to occur in the treatment areas. There is no expectation of other BLM SSS in the treatment areas.

The field visits found no raptor nests; however, several raptor species may use the treatment areas for nesting and/or foraging. These species may include but are not limited to golden eagle, red-tailed hawk, American kestrel, and peregrine falcon.

Black-footed ferret is the only species listed under the ESA that lives in the BFO area. The treatment units do not contain habitat for this species, and black-footed ferrets are unlikely to occur. Greater sage-grouse, which is a candidate species under the ESA, also occurs in the BFO region. The treatment units do not contain habitats supporting this species, and greater sage-grouse are unlikely to occur; and as is also the case with ferrets, will not receive further analysis in this EA.

3.4. Livestock Grazing

The treatment blocks are within the Barnum Mountain Rd, Beaver Creek Slope, Blue Creek, Poker Creek, Slope, Slope/Mountain, and Willow Creek grazing allotments. Table 3 provides a summary of the size of the allotments, type of livestock grazed, total AUMs of livestock forage, and size of treated areas within the allotments. (Recall that the size of the allotment frequently does not correlate with the present size of the federal land holding.)

Table 3 Allotments that contain portions of treatment blocks, size of allotments, and size of treated areas by ownership

Allotment	Total Acreage	Livestock and season of use	AUMs	Treated Area	
				Ownership	Acreage
Barnum Mountain Rd (02442)	8,588	Cattle 4/1 – 10/30 Horses 6/1 – 10/15	277	BLM	22
				Private	29
Beaver Creek Slope (12157)	15,786	Cattle 5/1 – 2/28	538	BLM	588
				Private	55
Blue Creek (42013)	7,878	Cattle 5/8 – 9/18	224	BLM	42
				Private	154
Poker Creek (02419)	9,759	Cattle 3/1 – 2/28	835	BLM	34
				Private	26
				State	53
Slope (02371)	4,230	Cattle 3/1 – 2/28	1,040	BLM	70
Slope/Mountain (02399)	5,992	Cattle and Sheep 3/1 – 2/28	404	BLM	0.1
Willow Creek (10069)	42,329	Cattle and Horses 3/1 – 2/28	4,412	Private	4

3.5. Cultural Resources

Although the majority of the project area has not been inventoried for cultural resources (55 acres of previous inventory), significant cultural resources are present. Known sites (5 eligible and 14 non-eligible) include rock shelters, stone circles, lithic scatters, and buried prehistoric sites. Most known sites are along or near the rim of Powder River Canyon, although significant sites such as rock shelters may be present throughout the project area

3.6. Recreation and VRM

While the south Bighorns are generally considered an area high in recreational value, the majority of the treatment areas are on lands without legal public access. Only 2 units (T 42 N R 84 W Sections 21, 28-30 and T 42 N R 84 W Sections 34-35/ T 41 N R 84 W Sections 2-4) are within areas with legal public access; these units are also within the Middle Fork Management Area. There are no developed recreation sites or trails within the 7 treatment areas. The project area is designated as a visual resource management (VRM) Class II. BLM Handbook H-8410-1 states that the VRM Class II objective is “to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer.” Additionally, motorized travel on public lands within the region is limited to designated or existing routes to reduce unnecessary resource damage such as soil disturbance, loss of vegetation and disturbance of wildlife.

3.7. Lands with Wilderness Characteristics

Wilderness characteristics include naturalness, outstanding opportunities for solitude and for primitive and unconfined recreation, and other features of the land associated with the concept of wilderness. The BLM administered units within the southern Bighorns meeting the size requirement of 5,000 acres will be

inventoried during the summer of 2011 in order to comply with Section 201, Inventory and Identification, of FLPMA as part of a land use plan revision (Sec. 202, FLPMA). If units meeting the lands with wilderness characteristics criteria exist, a formal decision related to lands with wilderness characteristics will be made in the RMP revision, as per the requirements in Section 202, Land Use Planning, of FLPMA. No decision related to lands with wilderness characteristics will be made in this EA.

The proposed project includes six units that include contiguous blocks of BLM administered lands meeting the size requirement for lands with wilderness characteristics. The portions of the treatment areas that are on state or private lands are not subject to consideration of lands with wilderness characteristics. The remaining treatment area, Unit 5, (T 42 N R 84 W Sections 4 & 5) is within a contiguous BLM managed land that is smaller than 5,000 acres. No road construction or maintenance is associated with the project. The knowledge gap on the status of the inventory and identification of the characteristics of the BLM managed lands in units is an issue for analysis.

4. Environmental Effects

4.1. Direct and Indirect Effects

4.1.1. Soils/ Vegetation

The proposed mechanical treatments should benefit mahogany communities and the associated herbaceous understory. Treatments would primarily target Douglas-fir, ponderosa pine, and juniper trees; however, limber pine may also be treated in accordance with BLM Manual 6840 as prescribed in Appendix 2, which is an extract from IM No.WY-2011-003 (Five Needle Pine Management Guidelines for Wyoming BLM). The selected removal of encroaching conifers would reduce shading and competition between mahogany, herbaceous species, and other conifer species and increase availability of groundwater and soil nutrients to mahogany and herbaceous species. These species would likely see enhanced production realized in the form of increased leader growth and seed production.

Mechanical treatment methods would create the least amount of disturbance to mahogany stands and provide the greatest ability to control where treatments take place. It is documented that logging species that out-compete mahogany may benefit mahogany plants. Where mahogany remained after logging, seedlings became established, especially in areas where the slash was burned (Gruell et al 1985). Vegetative treatments that remove competition and expose bare mineral soil appear to benefit curl-leaf mahogany (Elliott et al 1997). Disturbance to vegetation would be minimal, as all vehicle access is limited to existing roads and trails.

The Five Needle Pine Management Guidelines for Wyoming BLM provide a framework for this project's operations in and around areas with limber pine populations. Where limber pine grows in association with mountain shrub stands (page 22- 23, Appendix 2) the limber pine may be thinned to five percent canopy cover, or to 5-10 percent site density index (SDI); and multi-age limber pine cohorts with apparent blister-rust resistance would be left on site to provide for a seed and genetic source. In addition to these leave trees, potential seed 'plus' trees and nurse trees would be left untreated. The WY BLM's goal in these mountain shrub settings is to maintain an appropriate, multi-aged limber pine component on the current and future landscape. The guidelines provide prescriptions for a variety of stand types, which allow treatments to meet other resource objectives while maintaining limber pine to fulfill ecosystem services (such as nurse trees for shrub establishment, and seeds for wildlife food source) and to provide a seed source for limber pine establishment. It is possible the treatments would benefit limber pine by reducing competition with other conifers and increasing vigor, which in turn may reduce susceptibility to bark beetle attacks.

It is a distant possibility that one limber pine threshold condition that could change that may lead to significant impacts over a long term that is outside the 5-year scope of this EA - is limber pine's continued, major mortality to blister rust, mountain pine beetle, and limber pine dwarf mistletoe may lead to its US listing as threatened or endangered. This possibility is inherent in the pine's SSS listing.

4.1.2. Invasive Species

To reduce the opportunity for future infestations the proposed action is specifically designed to minimize soil disturbance. All vehicular access would remain on the existing two-track trails, and crews would access treatment areas on foot and use hand tools to cut conifers. The area would be monitored annually for the presence of invasive or noxious weeds. Any future noxious weed infestations would be handled using an integrated pest management (IPM) approach.

4.1.3. Wildlife

This vegetative treatment should improve the health and vigor of mahogany stands and therefore the health and vigor of the wildlife that rely on these communities.

Mule deer would benefit because mahogany is a principal winter food source for this species. Mahogany is highly palatable to mule deer, and it is one of the few vegetative species that meet the necessary protein requirements for wintering deer. The Upper Powder River mule deer herd is presently below population objective, and treatment efforts to improve the productivity and viability of critical browse species such as mahogany would directly benefit this deer herd. Big game winter range forage species are generally deficit in 3 primary areas: total digestible nutrients, digestible protein, and calcium and phosphorus. Curl-leaf mahogany rates high in all 3 areas and contained the highest percentage of total digestible nutrients of 14 species investigated. Increasing the density of palatable shrubs by 1 or more techniques can effect dramatic improvement in the nutritive value of range forage (Welch 1981). Elk may also benefit, because mahogany stands provide important calving habitat in the Bighorn Mountains (Despain 1973).

Treatments would occur during the summer and fall when big game are least sensitive to habitat disturbance and most able to disperse throughout their available habitats. Pronghorn may avoid mahogany stands and impacts to this species are likely to be minimal.

Wildlife occurring near areas of active treatment would be temporarily displaced; however, wildlife would be expected to return to these areas once treatment activities ceased. Because treatments are planned to occur over a 5-year period, impacts at any given time would be confined to relatively small treatment blocks.

The loss of ponderosa pine, juniper, and Douglas-fir species in these stands is not expected to negatively impact migratory birds and/or raptors. Conifer stands are abundant throughout the region, and individuals that use these trees will readily disperse to nearby stands. All trees would be visually inspected prior to treatment to ensure the absence of any migratory bird nest to prevent a violation of the Migratory Bird Treaty Act. Raptors that use the area for foraging may benefit from prey being more easily located and decreased necessity for maneuvering around conifer trees to capture prey. Species that rely on mahogany communities will benefit from increased health and vigor of these communities.

4.1.4. Livestock Grazing

There are no anticipated immediate effects from the project on current grazing allotments or individual grazing plans. Because the treatments are likely to increase the health and vigor of the herbaceous community associated with mahogany stands, livestock grazing may benefit from increased forage opportunities in the treated stands in the intermediate future. Herbaceous communities outside the stands may also benefit from increased dispersal of livestock animals into the treated stands. Treatments will occur with cooperation from landowners who have private lands in the project area.

4.1.5. Cultural Resources

Any activity that removes vegetation and leads to soil erosion or creates surface disturbance can cause impacts to cultural resources. However, the proposed project will be using hand crews and small scale/low intensity fires. These methods have a small likelihood of leading to cultural resource damage. The project as planned should not impact known or unknown cultural resources. Reconnaissance inventory (as described in the BLM-WY SHPO PA: IV.C.2.b) will be conducted prior to authorizing any activity associated with the project. If significant cultural resources are discovered the plan will be modified as necessary to prevent impacts to those resources.

4.1.6. Recreation and VRM

Improvements to wildlife habitat are beneficial for wildlife-dependent recreation, including hunting, fishing and wildlife viewing. There will be little to no impact on recreation in treatment areas without legal public access apart from benefits to recreationists associated with a special recreation permit or those who obtain permission to traverse neighboring private lands. Treatments within the Middle Fork Management Area will indirectly improve wildlife-dependent recreational opportunities over the long term. Overall, there will be a beneficial impact to recreation as a result of the treatments for it should eventually assist with stabilizing, or even increasing available browse for mule deer and other big game species.

The removal of trees changes the density of vegetation, a characteristic of texture. Vegetative texture can change from a medium to fine, dense texture in natural areas to a coarse, sparse texture in treated areas as a result of the proposed action. Short-term effects on color and texture would be expected in treated or burned areas until the areas were revegetated. However, treatments can enhance color over time by creating more diversity in the hues and colors associated with a more diverse vegetative composition. Select cutting has the least effect on visual resources compared with other alternatives. Given the small scope of the project area and the method of selective removal, this project proposal is in conformance with VRM Class II objectives over the life of the project (5 years). Restricting motorized travel to designated or existing routes will reduce the potential for surface disturbance, to the benefit of recreation and VRM objectives.

4.1.7 Lands with Wilderness Characteristics

Wilderness characteristics are unaffected within the Unit 5, in T 42 N R 84 W Sections 4 & 5 because the unit does not meet the size requirement for wilderness characteristics.

Wilderness characteristics may potentially be affected by the proposed action in the other 6 treatment areas. However, BLM Manual 6303 expressly allows for (and Section 202, Land Use Planning, of FLPMA does not preclude), approval of projects that may impact but not impair wilderness characteristics for minor restoration projects. This project will result in a net benefit to the wilderness characteristics resource because it will maintain curl-leaf mountain mahogany stands while preserving limber pine as an important component of these sites. This in turn may influence overall landscape health by mimicking natural

disturbances such as low-severity fire.

The adoption and incorporation of the projects mitigation measures, see Section 4.3, below, and Appendix 2, Whitebark and Limber Pine (Five Needle Pine) Management Guidelines for Wyoming BLM, the project will likely cause no impairment to the potential wilderness characteristics of any of the units or their contiguous BLM managed lands. Treatment methods would use existing roads and ways. There would be no new roads or ways constructed or mechanically maintained. There is no construction envisioned with this proposal. Chain saw noise, fire, etc., does not conflict with present land use. There is no anticipation of surface disturbance.

4.2. Cumulative Effects

Implementing the proposed action should protect and benefit curl-leaf mahogany communities, which in turn would benefit mule deer and other big game populations in the area.

Adopting a protective, proactive management posture over all limber pine age classes will simultaneously cutting and burning the obviously dead and dying individuals should foster a more rapid natural succession to encourage genetic diversity and resistance to blister rust.

4.3. Mitigation Measures

- Desirable, healthy limber pine of all age classes, to include infected but thriving limber pine found in the treatment areas will be untreated, uncut, ungirdled, or marked and avoided with the exceptions explained in the project proposal in Section 2, above.
- Prior to treatment all trees should be visually inspected to ensure the absence of any migratory bird nest.
- To protect nesting raptors, occupied nests would be subject to a seasonal timing restriction.
- Treatment sites will be inventoried for cultural resources prior to the initiation of scheduled activities, as necessary. Following the Wyoming State Protocol Section VI(A)(1) the BLM will electronically notify the Wyoming State Historic Preservation Officer (SHPO) of all properties existing within the area of potential effect (APE). If necessary, identified cultural sites will be avoided. If any items of cultural value are observed during of the development of this project, they will be left intact and the BLM authorized officer will be notified. The BLM authorized officer will conduct an evaluation of the cultural resource prior to resumption of activities.
- The area will be monitored annually for the presence of noxious or invasive weeds. Any infestations would be handled using an integrated pest management approach.
- Burning will be accomplished in the winter months during periods with greater than 20% snow cover, in order to minimize treatment impacts and maximize control.
- During project implementation, motorized use will be restricted to designated or existing roads and trails to the maximum possible extent. Where off-road travel is necessary to accommodate the objectives of the project, travel will be limited to durable surfaces in dry conditions to avoid the creation of trails, ruts, etc.

4.4. Residual Effects

This proposed project should result in no adverse residual effects. Beneficial residual effects may include the ability for this inter-mountain population of limber pine to more rapidly develop resistance to blister rust.

5. Consultation and Coordination

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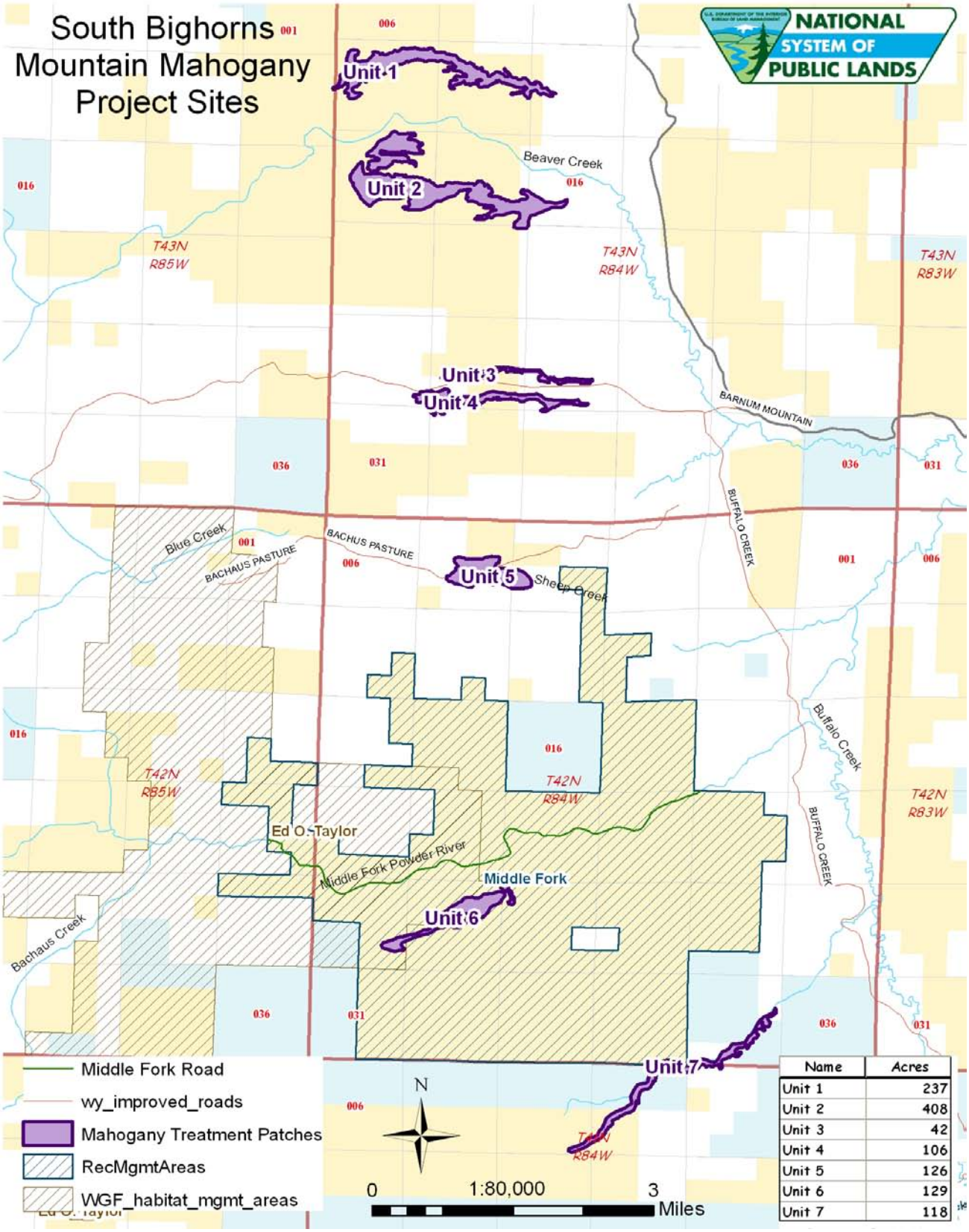
Appendix 1
Southern Bighorns Curl-leaf Mahogany Restoration in Crucial Mule Deer Winter Range



Name	Acres
Unit 1	237
Unit 2	408
Unit 3	42
Unit 4	106
Unit 5	126
Unit 6	129
Unit 7	118

Appendix 2

Whitebark and Limber Pine (Five Needle Pine) Management Guidelines for Wyoming BLM.

These guidelines are developed to provide direction on how to manage both whitebark pine and limber pine found on BLM lands in Wyoming. The silvicultural prescriptions are to be used as guidelines to meet the objectives of the maintenance and restoration of five needle pine on the landscape. The objectives are: 1- to maintain these stands on the landscape in the face of changing climate and insect (mountain pine beetle – MPB) and disease (white pine blister rust – WPBR) epidemics that are severely impacting these species, 2- to maintain genotypic diversity on the landscape and. 3- to provide both the source and opportunity for these species to naturally migrate or change their species ranges as climatic conditions change in the future. Field Offices need to evaluate the objectives of projects that involve five needle pines to ensure that the long term objectives of maintaining these sensitive species on the landscape are appropriately evaluated along with other management objectives.

Reference materials that can be used for documentation of potential management actions can be found at: http://web.wy.blm.gov/930/forestry/pines/index.htm

Wyoming BLM is working with Utah State University to develop Stand Density Index Charts for both whitebark and limber pine. When these are completed they will be valuable tools with which to manage these stands. All Stand Density Index (SDI) materials can be found at: http://web.wy.blm.gov/930/forestry/SDI/index.htm

General Guidelines:
Cone (Seed) Collection: There are significant regional whitebark and limber pine seed collection efforts underway to identify white pine blister rust (WPBR) resistant trees. The cone collection efforts are central to five needle pine restoration for three reasons: 1- blister rust resistance testing, 2- restoration plantings, and 3-*ex-situ* gene conservation.

Preliminary seed tree selection involves finding and marking trees that are nearly free of both WPBR and mountain pine beetle (MPB) infestation. Trees need to be marked and located with a Global Positioning System (GPS) so that they can be relocated for further collections if testing determines that these trees are WPBR resistant. This information will be stored on a GIS data layer at the District level. The entire process, from cone collection to rust resistance determination, takes approximately five years, so these trees need to be protected from both natural and human disturbance until the determination is made. If the testing shows WPBR resistance, these trees will be permanently marked and used as a seed source. These trees are identified as “plus” trees. All trees either tentatively or positively identified as “plus” trees need to be protected by pheromones or insecticides (see next page).

Whitebark pine seed collection procedures can be found in the on- line five needle pine references. Limber pine, because of its different cone structure, does not normally require the caging that whitebark pine does and can be collected as soon as the seed is ripe. In high pine mortality areas (limited seed source), where there is significant predation from squirrels and birds caging of both species is necessary. Collections for both species is normally done, dependent on site and climatic conditions, in late August or early September when their embryo cavities are found to be at least 80 percent full.

Because of the workload associated with identification of potential “plus” trees as well as the seed collection, it is recommended that Field Offices develop BPS submissions in conjunction with the “Seeds for Success” program assist in funding these activities.

Seedling Planting: Seedlings from these trees have a fairly low survival rate ranging from less than 30 to approximately 70 percent. Seedlings should be planted in the autumn, to avoid summer drought stress, at approximately 200-250 seedlings per acre with the goal to have a three to five year survival of 85-100 trees per acre. There should be no overstory competition within 20 feet. The planting design should be a patchy pattern with densities similar to that of nearby stands. Microsite placement is critical. The transplants should be placed in a protected microsite in moist to the touch soil on the north side of a log, rock, or stump. Gophers feed on roots and bury trees, so avoid planting the seedlings in areas of deep soils and swales where they burrow. Competing vegetation such as grasses and sedges should be removed from the immediate vicinity of the planted seedling. Avoid planting seedlings within two feet of bear grass (*Xerophyllum tenax*). On more mesic sites, grouse whortleberry (*Vaccinium scoparium* Leib. ex Coville) appears to be beneficial to establishment when growing in association with whitebark pine and should be retained. Lower elevation xeric sites may not have these vegetative components. Current recommendations for planting with WPBR resistant seedlings include, 1- sites where WPBR mortality exceeds 20 percent and, 2- WPBR infection is more than 50 percent.

Pheromone Usage: Pheromones, especially verbenone, can be used to protect against MPB attack. Recent work in Idaho on whitebark pine shows a 20 percent increase in survival over a control population when verbenone is used. Because of costs, this use is only feasible in high value recreation/visitor areas or on trees either tentatively or positively identified as plus trees.

Insecticide Usage: Carbaryl is commonly used to provide protection from MPB. This insecticide when properly applied by spraying can provide almost 100 percent protection from MPB attack for up to two years. Trees must be accessible to compressor driven spray equipment, limiting this application to trees in close proximity to roads.

Pruning: Pruning can be used to extend the life of a five needle pine. Pruning should be done by hand, leaving the branch collar (swollen base of the limb) intact. This should only be used on limbs where the WPBR canker is more than 4 inches from the bole (trunk) of the tree. Because pruning is labor intensive it should only be used to: 1- to protect high value individual trees in high visibility sites such as recreational/ski areas or, 2- in a small isolated stand with few cone bearing trees and no existing seed source for regeneration. Pruning will not change the WPBR resistance of an individual tree or stand, but will extend the life span and potential reproductive life of the tree.

Range Management Applications: The historic bison range in Wyoming closely approximates the range of lower treeline limber pine in Wyoming. The Nature Conservancy along the Front Range has used the following range management technique to replicate bison/limber pine interactions with success. Where feasible, this technique can be used on Wyoming BLM lands.

Place water developments and salt stations in close proximity to limber pine stands. This will provide thermal cover for livestock. Their usage of the limber pine stands will raise the crown heights due to rubbing, reduce ground cover including tree reproduction, and reduce flammable fuels within the stand. The long term objective (50 + year) is to approximate an open limber pine stand that resembles historic bison/limber pine interactions.

Wildland Fire Management: Wildland fire has been an integral component of the five needle pine ecosystem. At high elevations, low to moderate intensity fires reduce competing vegetation and reduce fuel loadings. Small areas of high intensity fires create open areas for Clark's nutcracker seed caching activities and therefore create areas where whitebark pine can regenerate naturally. However, when subalpine fir has expanded extensively into, and provides a closed canopy fuel load below them, these

stands can burn large areas of five needle pine habitat and reduce or eliminate the available seed source. The potential for natural reseeding of these stands *via* the Clark's nutcracker is subsequently reduced. Some researchers have found a 40 year lag time between fire and the re-establishment of whitebark pine on these high elevation areas.

Less is known about the wildland fire effects on the lower elevation five needle pines: Information available suggests fire return intervals ranging from 100 to 1,000 years and most fires were probably low to moderate intensity.

At high elevations wildland fire should be allowed to play a role in maintaining these high elevation five needle pine ecosystems. A combination of mechanical thinning and prescribed fire can also be used to create the patchy mixed severity fire effects in these stands, replicating natural fires. Altering the mixed conifer stands below these high elevation stands may be necessary to break up and reduce the canopy cover by creating patches of younger aged (less flammable stands), and reducing the basal area/SDI of the mature mixed conifer stands to reduce fire behavior before it burns into the high elevation stands. Because many of the Wyoming BLM high elevation whitebark and limber pine exist in small isolated stands, careful evaluation of fire potential must be done to ensure that these disjunct stands are not eliminated from the landscape.

At lower elevations, prescribed and wildland fire can be used at low to moderate intensities to reduce accumulated fuels and thin the stands. The best description of this is to "take some and leave some", so that the stand can remain on the landscape and provide for gene conservation and ecosystem services.

General Silvicultural Information for Five Needle Pine Stands:

Whitebark and limber pine occur over a range of ecological gradients and vegetative associations. This enables the forester to select from a variety of silvicultural prescriptions that will meet desired goals for the management of these species. It is important to remember that both species of five needle pines are very slow growing, often requiring 50 or more years to reach maturity and produce a cone crop. Small size is a poor indicator of recent establishment.

The five needle pines generally do not show strong apical dominance. Because of this, different types of thinning around these trees can influence their growth form. Thinning on all four sides will encourage a more spread out, multi- forked tree, while thinning on two or three sides will encourage a straighter less forked tree. In mixed stands thinning on two or three sides would encourage the tree to have a straighter, taller growth form to allow it to get higher in the canopy and access more light for growth. In more open monoculture stands thinning around all four sides of either single or multi-stemmed trees would encourage a more open branching crown, increasing cone production.

Important factors in any silvicultural practice are the identification of potential WPBR resistant trees and building the on-site prescription around them. Individual stands also vary in their resistance to WPBR due to local genetic material. WPBR often takes 25-35 years to kill a mature tree and but only five years to kill a sapling. WPBR severely reduces cone crop production, often eliminating a living tree from the reproductive pool by killing the cone producing limbs long before the tree actually dies.

These five needle pines are among the least resistant to the MPB, so often the best strategy may be to manage them to reduce the mortality risk. Thinning to reduce the potential for widespread MPB mortality also has the advantage of reducing the competition among the remaining trees and increasing resource availability. Field observations have documented MPB attacking 3" to 5" diameter trees. In cases of severe MPB infestations, it may be necessary not only to remove of all infested five needle pines but also

any mature uninfected overstory to reduce the MPB habitat (larger diameter trees) and reduce the numbers of MPB surviving on site. This may be the only way to protect the advanced reproduction so that the reproduction survives on site to provide for future trees and seed source. This will reduce the Basal Area (BA) and/or Stand Density Index (SDI) below the guidelines in the specific silvicultural operations described below.

Elevational Differences: Limber pine grows across the widest elevational range of any conifer in the Rocky Mountains, ranging from approximately 5,250 feet (1600 m) to almost 11,000 feet (3300 m). The 8,500 foot elevation was selected as the dividing point between high elevation/upper treeline and low elevation/lower treeline limber pine because of its usage in the only peer reviewed document that established elevational differences in limber pine as a research criteria. It is possible that stands meeting the meaning of "high elevation/upper tree line", i.e. subalpine ridge and mountain tops can be found below 8,500 feet and expert field opinion must be used to determine which category best fits the stand. Whitebark pine generally grows above 8,000 feet in elevation, but potentially can be found at lower elevations. All guidelines for whitebark pine should be used without regard to actual elevation of the stand but rather, the associated species.

Specific Silvicultural Operations, Treatments and Prescriptions for Five Needle Pine Stands:

Stand Type: High elevation/upper treeline predominately whitebark and limber pine stands (Generally found above 8,500 ft. in the subalpine zone).

Desired Conditions/Functions: Maintain and/or restore these stands on the landscape to fill their hydrologic, wildlife and other related ecosystem services. Stand structure will be as resistant as possible to MPB infestations. Maintain WPBR resistant individuals on site and use their seed source for interplanting to maintain five needle pine stands.

Existing Conditions: These stands are severely impacted by both WPBR and MPB. They are also being encroached on by mixed conifer species, especially subalpine fir. These stands range from patchy open woodlands to a more closed canopy structure.

Silvicultural Treatments/Prescriptions:

1- Removal of subalpine fir from the stand to reduce competition for resources. If it is not possible to remove all the subalpine fir, remove the fir in a radius of 20 feet around large five needle pines (or clumps) and remove fir in a radius of at least 10 feet from seedling/sapling five needle pines. Because the five needle pines are very slow growing, evidence of release may not be exhibited for five (5) plus years. The relative densities should range between 10 and 25 percent of the maximum SDI for newly treated stands and should not exceed 40 percent maximum SDI.
2- Thin stands to make them more resistant to MPB attacks in areas with incipient MPB infestation or threat, reduce the Basal Area of the trees to approximately 40-45 ft^2. Slash must be disposed of by burning within one year or less or by mastication to eliminate the risk of pine beetles currently in the removed trees to survive in the slash. In areas infected with WPBR preferentially thin the trees exhibiting the greatest amount of infection. Attempt to leave different ages and sizes of trees within the stand, but, dependent on proximity to MPB, preferentially leave five needle pine trees of less than 6 inches DBH. The relative densities should range between 10 and 25 percent of the maximum SDI for newly treated stands and should not exceed 40 percent of maximum SDI.

3- Use prescribed fire and natural ignitions where feasible at low to moderate intensities to create openings in the stands for Clark's nutcracker seed caching, to reduce competition from other conifers and to reduce fuel loadings. Ensure that small disjunct stands are protected from high intensity crown fire to prevent their elimination form the landscape when feasible.
4- Identify, monitor and collect seeds from potential "plus" trees to provide for a future seed source.
5- Use locally collected seed from "plus" trees to inter-plant these stands when WPBR reaches the break points listed above in Seedling Planting section above and there is an absence of uninfected advanced regeneration in the understory.

Stand Type: Mixed conifer stands with a five needle pine component (Generally found above 8,500 ft. and directly below the subalpine zone)**:**

Desired Conditions/Functions: Maintain five needle pine component in the mixed conifer systems. Maintain an appropriate mix of species to maximize whitebark pine seed caching by squirrels for grizzly bear food source. Pine species (lodgepole and five needle pine) densities are low enough to minimize MPB epidemics and keep MPB at endemic levels. Maintain WPBR resistant individuals on site and use their seed source for in-planting to maintain five needle pine stands.

Existing Conditions: These stands are characterized by multiple tree species including lodgepole pine, Engelmann spruce, and subalpine fir and the five needle pines. New, unpublished research presented at the High 5 Symposium in 2010 shows a positive symbiotic relationship between the red squirrel, lodgepole pine, five needle pines, and grizzly bears in Canada and the Yellowstone area.

Silvicultural Treatments/Prescriptions:

1- When working in these stands, reduce the five needle pine Basal Area to approximately 25 ft^2 and reduce the lodgepole pine Basal Area to approximately 40 ft^2. Preferentially remove the spruce and fir to accomplish other vegetative management objectives. The reduction of pine (five needle and lodgepole) Basal Area to the 60-65 ft^2range will inhibit the spread of MPB. The relative densities should range between 15 and 25 percent of the maximum SDI for newly treated stands and should not exceed 40 percent of the maximum SDI to inhibit the spread of MPB.
2- Remove competing woody vegetation around existing five needle pines to provide for release.
3- Identify, monitor and collect seeds from potential "plus" trees to provide for a future seed source.
4- Use locally collected seed from "plus" trees to interplant these stands when WPBR reaches the break points listed above in Seedling Planting section above.
5- Most of these stands have a long fire return intervals that are a mixed severity to stand replacement types. Prescribed fire should be targeted to those areas (south facing slopes, lower elevations) where the vegetation indicates a mixed severity shorter fire return interval. North facing mesic sites with a crown replacement fire regime should only be spot treated (i.e. removal of slash accumulations/piles) and small openings created in the overstory.

Stand Type: Limber pine growing in association with ponderosa pine and/or Douglas-fir, aspen, and mountain shrub (Generally found below 8,500 ft. /lower treeline).

Desired Conditions/Functions: Maintain healthy forest conditions with an appropriate limber pine component to fulfill ecosystem services and to provide a seed source for post disturbance early seral limber

pine establishment to serve as a nurse plant and to provide ecological modification of the site to allow for other species to re-establish.

Existing Conditions: In many cases the limber pine in these stands is an early seral species and will be outcompeted by the ponderosa pine and Douglas-fir. Limber pine serves an important function in these landscapes as a nurse tree species and as a site modifier to enable other species to establish. MPB is the primary agent of limber pine mortality in these stands.

Silvicultural Treatments/Prescriptions:

1- Thin stands to make them more resistant to MPB attacks. Reduce Basal Area in pine dominated stands to less than 60 ft^2. Leave a scattering of limber pine in the understory to provide for a seed and genetic source. Emphasize limber pine on exposed slopes and ridges. Maintain maximum SDI of between 25 and 40 percent.
2- In Douglas-fir dominated sites, keep some residual limber pine on site for a seed and genetic source after a disturbance. Maintain maximum SDI of between 25 and 40 percent (total SDI for all species).
3- In aspen stands where there is a viable limber pine stand in close proximity to the aspen stand, it is permissible to remove the limber pine from the aspen stand as part of an aspen regeneration/wildlife project. Limber pine that predates the establishment of the aspen stand should be retained for diversity.
4- Limber pine grows in association with mountain shrubs, often being a nurse tree for the mountain shrub community. When needed, thin the limber pine to a tree crown cover of approximately five percent (or a five to ten percent of the maximum SDI) to allow the tree to remain on site to provide for a seed and genetic source while opening up the stand to encourage mountain shrub production. Leave multi-age cohorts on site wherever feasible.
5- Identify, monitor and collect seeds from potential “plus” trees to provide for a future seed source.
6- Use locally collected seed from “plus” trees to inter-plant these stands when WPBR reaches the break points listed above in Seedling Planting section above.
7- Prescribed fire can be used in these stands. Primary objectives of prescribed fire will often be reduction of fuels and re-introducing fire for the benefit of other later seral woody species. Low to moderate intensity fire will assist in maintaining limber pine on site, and should not be directed at limber pine stand eradication.

Stand Type: Limber pine stands growing in riparian areas (Generally found below 8,500 ft.).

Desired Conditions/Functions: Restore or maintain a fully functioning riparian/wetland area as measured by Proper Functioning Condition (PFC, and/or other site specific resource objectives).

Existing Conditions: In some riparian/wetland areas there has been an expansion of upland vegetation including limber pine, Douglas-fir, Douglas-fir and sagebrush into these systems. This expansion is detrimental to the functions of the riparian/wetland areas as determined by the Standards for Healthy Rangeland (WY BLM). Limber pine in these areas tends to be faster growing than in upland areas and can impact, in conjunction with the other upland species, the functioning conditions of riparian/wetland areas. Impacts from MPB and WPBR vary widely in these stands, ranging from areas of very high mortality to stands that are just beginning to be impacted. Future outlook is for increasing MPB mortality and increasing WPBR infection/mortality as well as continued expansion into the riparian/wetland areas.

Silvicultural Treatments/Prescriptions:

1- Limber pine does play a significant role in the hydrology of the watershed. It should be left on the landscape in the upland areas away from the riparian zone. Management of these upland stands should follow the silvicultural treatments and prescriptions in the stand type "Lower treeline limber pine stands either in association with Douglas-fir species or a monoculture" described below.

2- In areas where PFC or other monitoring studies, assessments, or evaluations indicate: 1- an excess of upland vegetation exists in the riparian/wetland area, and 2- conifer expansion is identified as one of the casual factors affecting the functionality of the system, it is permissible to remove limber pine. The removal of some limber pine and other upland vegetation within the riparian/wetland system will assist in meeting or making progress towards meeting the Standards for Healthy Rangelands (BLM, Wyoming), and/or other site specific objectives. Because the ecology of limber pine is not fully understood, a "leave some take some" approach should be implemented in the riparian/wetland zones as in upland areas.

Stand Type: Lower treeline limber pine stands either in association with Douglas-fir species or a monoculture (Generally found below 8,500 ft. in ecotones).

Desired Conditions/Functions: Preserve and maintain these stands on the landscape as woodlands and savannas, with density levels commensurate with reduced risk of widespread MPB mortality. Allow these stands the flexibility to move on the landscape in response to changing climatic and other environmental conditions.

Existing conditions: There has been a lack of research on these stands, and very little is known about the ecosystem services provided. These often occur on steeper, rocky, exposed slopes and have shown movement downslope in the past 100-200 years. MPB is found in these stands at increasing levels of infestation and mortality. WPBR infections and MPB infestations vary widely in these stands, ranging from areas of very high mortality from one or both WPBR and MPB to stands that are just beginning to be impacted. Future outlook is for increasing MPB mortality and increasing WPBR infection/mortality.

Silvicultural Treatments/Prescriptions:

1- Thin stands to make them more resistant to MPB attacks. Stands should be thinned to a Basal Area of 40-45 ft^2 where they form a fairly continuous canopy cover. Preferentially remove Douglas-fir species (Utah and Rocky Mountain) to allow for release and to open up the understory for grass and forb establishment and growth. Maintain Maximum SDI of between 25 and 40 percent.
2- On deeper soils at the bottom of slopes and drainages, when needed, thin the limber pine to a tree crown cover of approximately five percent (or a five to ten percent of the maximum SDI) to allow the tree to remain on site as an open woodland and to provide for a seed and genetic source. If maintenance of a higher density woodland is desired, maintain Maximum SDI of between 25 and 40 percent. Leave multi-age cohorts on site wherever feasible.
3- Use the Range Management Application described above to assist in creating an open woodland stand of limber pine.

4- Identify, monitor and collect seeds from potential "plus" trees to provide for a future seed source
5- Use locally collected seed from "plus" trees to inter-plant these stands when WPBR reaches the break points listed above in Seedling Planting section above.
6- Use low to moderate intensity prescribed and natural fire to assist in thinning of the stands. The best description of this is to "take some and leave some", so that the stand can remain on the landscape and provide for gene conservation and ecosystem services.

Stand Type: Lower treeline limber pine stands growing in sagebrush areas such as former sagebrush meadows and otherwise suitable sage-grouse habitat (Found below 8,500 ft. in ecotones).

Desired Conditions/Functions: Restore open sagebrush flats and meadows for suitable sage-grouse habitats and to protect important habitats from extreme fire behavior.

Existing Conditions: In some transitional sagebrush areas there has been observed expansion, and in some cases invasion, of coniferous vegetation including limber pine and Douglas-fir into habitats managed for Sage-grouse. This noted expansion is detrimental to the overall functionality of important Sage-grouse habitats as measured by the Habitat Assessment Framework and associated Standards for Healthy Rangeland (WY BLM). The expansion of Limber pine and other coniferous species in these areas may increase risk for high severity wildland fire and threaten reduction of important Sage-grouse habitat functionality.

Silvicultural Treatments/Prescriptions:

1- Conifer removal efforts must consider and observe the concurrent goals and objectives of the sensitive species of limber pine management and maintain adjacent limber pine sites for local seed source. Projects would be conducted following the silvicultural treatment prescriptions in the stand type "Lower treeline limber pine stands (below 8,500 ft.) either in association with Douglas-fir species or a monoculture" described above.

2- In areas where long-term sagebrush steppe and sage-grouse habitat management objectives would require removal of encroaching conifer species, including limber pine, it is permissible to remove conifers from important sagebrush steppe habitats in an effort to support maintain and improve conservation of habitat for Sage-grouse and other sagebrush obligate species.

Stand Type: Limber pine stands growing in surface disturbance areas such as rock/gravel quarries and other mining activity (Generally found below 8,500 ft., but can occur at other elevations dependent on mineral locations).

Desired Conditions/Functions: Reclamation of disturbed limber pine sites including the planting of limber pine seedlings using local seed source and other mitigation methods determined to be acceptable.

Existing Conditions: The development of surface disturbing activities can eliminate all or portions of limber pine stands. These activities may occur in any of the limber pine types, but will be concentrated in the "Limber pine growing in association with ponderosa pine and/or Douglas-fir, aspen, and mountain shrub" and the "Lower treeline limber pine stands either in association with Douglas-fir species or a monoculture" types. MPB and WPBR vary widely in these stands, ranging from areas of very high mortality from one or both WPBR and MPB to stands that are just beginning to be impacted. Future outlook is for increasing MPB mortality and increasing WPBR infection/mortality.

Silvicultural Treatments/Prescriptions:

1- Limber pine within the project boundaries that are not in the disturbed area will be managed as per the appropriate sivlicultural treatments/prescriptions listed above as partial mitigation of the disturbance.
2- Disturbed areas will be planted with local seed source seedlings from project area or adjacent stands as per the seedling planting guidelines.
3- If an entire stand is within the disturbance area, off-site mitigation in the form of appropriate silvicultural treatments of adjacent stands, collection of seed, identification of “plus“ trees or other acceptable mitigations will be done to offset the loss of a stand in addition to replanting limber pine on the reclaimed area.