

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter Three contains a summary of the existing resources in the project area that could be affected by the alternatives. This chapter also describes the potential changes to the environmental resources due to implementation of the alternatives. It presents the basis for comparison of the alternatives presented in Table 2, which compared the direct effects of the alternatives on the nine resources described in this chapter. This chapter is organized by alternatives; consequences to the affected resources from the No Action Alternative are described first, followed by consequences from the Proposed Action and other action alternatives. Where effects from alternatives are anticipated to be similar the effects are presented together.

General Setting

The project area is located in northwest Wyoming within the east slopes of the Wyoming Range. Topography is rolling to steep mountainous landscapes with narrow to broad valleys. Elevations in the assessment area range from 7,000 to 8,400 feet above mean sea level (amsl) at Kismet Peak. Soils are generally residual and are formed on igneous, metamorphic, and sedimentary rocks. Transported soil materials are mostly derived from alluvium, although some glacial outwash also occurs (Roberts 1989).

Vegetation in the area is mixed shrubland/conifer forest (Knight 1994). The project area is in a transitional zone characterized by big sagebrush at the lower elevations that grades into aspen and lodgepole pine at the higher elevations, with Douglas fir and subalpine fir. The treeless areas have a mixed foothill shrubland vegetational mosaic that consists of bluebunch wheatgrass, fringed sagewort, mountain big sagebrush, needle-and-thread grass, Saskatoon serviceberry, skyrocket gilia, stonecrop, yarrow, and other grasses and forbs (North Wind 2003). Dominant hazardous fuels are the overstocked mixed conifer stands with saplings as ladder fuels that occur on lands south and north of Hoback Ranches and on private land in the eastern sections of Hoback Ranches (BLM 2002).

Information about the climate is from Bondurant, Wyoming, which is near the project area. The average total precipitation in Bondurant is 21.26 inches. Average daily maximum temperatures range from -4.9° F in January to 78.7° F during July. The project area is in a 15-19 inch precipitation zone. Native cool season plant communities' growth begins during April and continues into July (Soil Conservation Service [SCS] 1988).

The general area contains habitat for game species such as mule deer, elk, moose, pronghorn, jackrabbit, cottontail rabbit, and sharp-tailed grouse. Other animal and bird species include black-tailed prairie dog, skunk, fox, raccoon, badger, coyote, bobcat, magpie, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, as well as various songbirds (SCS 1988).

The major land use in the immediate area is recreation and numerous recreational opportunities exist within and near the project area including: wildlife observation, bird watching, hiking, motorcycle riding, all-terrain vehicle (ATV) riding, cross country skiing, snow machine riding,

and snowshoeing. Livestock grazing occurs on BLM and Forest Service lands as well as on some adjacent State of Wyoming lands and private land not located within Hoback Ranches.

Hoback Ranches span more than 6,000 acres of the Hoback Rim and adjacent foothills. Approximately 106 homes exist within the project area, with more being constructed. Landowners and homeowners in the Hoback Ranches subdivision have adopted certain covenants that restrict activities that may take place on the properties. One stated intention of the covenants is to, “maintain the natural environment and protect the ecology of the area.” In order to reach this goal the covenants include restrictions on grazing and tree removal. One restriction prohibits cutting trees that are greater than three inches in diameter (Hoback Ranches 2003).

Critical Elements of the Human Environment

Federal regulations require that issues that are not significant to the project be identified and eliminated from detailed study. Resource components identified by an “X” in the “Not Present” or “Present, No Effect” columns of Table 3, Critical Elements of the Human Environment, are not affected and will receive no further consideration in this EA. Elements that are present and are likely to be affected by the alternatives are discussed further in this chapter. The rationale for the conclusion is also shown in Table 3.

Table 3. Critical Elements of the Human Environment

Critical Element	Not Present	Present, No Effect	Present, May Affect	Governing Regulation	Rationale
Air Quality			X	The Clean Air Act as amended (42 USC 7401 et seq.)	Slash pile burning would deteriorate air quality in the short term in and adjacent to the project area. Activities related to road construction and improvement would also impact air quality in the short term in the project area by potentially increasing fugitive dust.
Areas of Critical Environmental Concern	X			Federal Land Policy and Management Act of 1976 (43 USC 1701)	There are no areas of critical environmental concern in the project area.
Cultural Resources		X		National Historic Preservation Act as amended (16 USC 470)	A Class I Cultural Resource Inventory (literature search) was conducted for the project area. The literature search consisted of a file search (No. 8848) from the Wyoming State Historic Preservation Office, homestead patents, and examination of General Land Office maps. The file search revealed that three projects have occurred in the area and one site was recorded. Additionally, 12 homesteads are located, either wholly or in part, within the project area (See North Wind, Inc. 2003 in Appendix E). No effect is anticipated because implementation of the action alternatives would avoid cultural resource sites near the proposed fuels reduction sites. In the event an inadvertent discovery is made during implementation, all activities would be stopped until the BLM or Forest Service Archaeologist with jurisdiction could evaluate the finding and make a determination as to whether the project could continue or not.
Environmental Justice	X			E.O. 12898 2/11/94	The Proposed Action does not exclude persons (including populations) from participation in, deny persons the benefits of, or subject persons to discrimination because of race, color, or national origin.
Farmlands, Prime or Unique	X			Surface Mining Control and Reclamation Act of 1977 (30 USC 1201 et seq.)	There is no prime/unique farmland located within the project area.
Floodplains	X			E.O. 11988, as amended, Floodplain Management, May 24, 1977	There are no floodplains located in the project area.

Table 3. Critical Elements of the Human Environment

Critical Element	Not Present	Present, No Effect	Present, May Affect	Governing Regulation	Rationale
Hazardous Substances or Solid Wastes	X			Resource Conservation and Recovery Act of 1976 (42 USC 6907 et seq.), Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 USC 9615)	There are no known hazardous materials within the proposed project area and hazardous waste would not be created by the Proposed Action. If any sites are encountered during the installation of the firebreak, work would cease until clearance was granted by the BLM HazMat Officer and the Forest Service counterpart.
Native American Religious Concerns	X			American Indian Religious Freedom Act of 1978 (42 USC 1966)	There are no known sites or locales in the project area that are currently recognized to be of concern to modern day Native Americans.
Migratory Bird Species		X		Neotropical Migratory Bird Conservation Act	Project activities are not expected to negatively affect migratory bird species. In the long term, forest thinning would improve habitat conditions.
Noxious Weeds, Invasive Species			X	Lacey Act as amended, Federal Noxious Weed Act of 1974, as amended Endangered Species Act of 1973, as amended E.O. 13112, Invasive Species, 2/3/99	Implementing forest treatments may allow noxious weeds to become established or increase. Due to soil disturbances resulting from temporary road construction, equipment and vehicles, and thinning activities, the Proposed Action has the potential to increase the spread of weeds within the project area because soil disturbance provides excellent seedbeds for the germination of noxious weeds. Agency guidelines would be followed to minimize the potential for impacts.
Special Status Species			X	Endangered Species Act of 1973 as amended (16 USC 1531) Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.)	There are three Federally listed species that may potentially occur in the project area: gray wolf, grizzly bear, and Canada lynx. The Proposed Action “may affect, not likely to adversely affect” these species. In addition BLM and FS sensitive wildlife and FS MIS may also potentially occur in the project area. Short-term displacement of wildlife may result in the project area. There are no known BLM or FS sensitive plant species within the project area; however the Payson’s milkvetch may occur in the area. Affects to this species if it is present are expected to be positive because it prefers disturbed areas.

Table 3. Critical Elements of the Human Environment

Critical Element	Not Present	Present, No Effect	Present, May Affect	Governing Regulation	Rationale
Water Quality Concerns			X	Safe Drinking Water Act as amended (42 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.)	Soil erosion and chemical use could potentially impact water quality. Fuels projects conducted next to live streams may cause a short-term impairment of water quality and an increase in run-off and sediment yield. However, no permanent surface water occurs in the project area so there is minimal risk to water quality from the Proposed Action. The Proposed Action would comply with Forest Service standards regarding buffer zones around all waterways and riparian habitat.
Wetlands/ Riparian Zones		X		E.O 11990, Protection of Wetlands, May 24, 1977	Forest Service and BLM guidelines regarding buffers around riparian areas would be adhered to and no treatments would occur in these zones.
Wild & Scenic Rivers	X			Wild and Scenic Rivers Act as amended (16 USC 1271)	There are no Wild & Scenic Rivers located within the project area.
Wilderness Study Areas	X			Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.) Wilderness Act of 1964 (16 USC 1131 et seq.)	There are no designated Wilderness Study Areas in the project area.
Wild Horse Herd Management Areas	X			Public Law 92-195 The Wild Free-Roaming Horse and Burro Act of 1971, Title 43 Code of Regulations Part 4700 Protection, Management, and Control of Wild Free-Roaming Horses and Burros	There are no Wild Horse Herd Management Areas in the project area.

Physical Factors

1. Soils

Soils on the Bridger-Teton are classified according to the Soil Taxonomy of the National Cooperative Soil Survey, United States Department of Agriculture (Forest Service 1990). Four soil types occur in the project area: hyattville, granile, Tongue River, and the venable-coutis complex (Reckner 2003). These soils are mainly characterized as gravelly sandy loams. Common trees associated with these types of sites are lodgepole pine, ponderosa pine, and Douglas fir.

No Action Alternative

Alternative One, the No Action Alternative, would have no direct effect on the soils resource. However, by not removing hazardous timber and thinning the existing dense timber stands, the likelihood of large-scale, intense fires may increase. The detrimental effects of such fires would result in impacts to the soil resource, including soil sterilization, exposure to erosive forces, increased stream sedimentation, and risk to water quality.

Alternative Two

Under Alternative Two, the Proposed Action, the greatest number of acres would be harvested and construction of 11.3 miles of temporary roads would occur. Ground disturbance that typically occurs during harvest activity may result in an increased risk of soil erosion and transport of sediment to stream channels. Due to the amount of tractor harvesting and soil disturbance from temporary road construction, construction equipment and vehicles, the Proposed Action poses the highest risk to the soils resource. Compaction can occur when heavy equipment, vehicles, or people make repeated trips over the same areas. Soil compaction can reduce root penetration, seedling establishment and soil hydraulic function. Compacted soils can cause a higher percentage of precipitation to runoff, which can, in turn, indirectly lead to increased erosion rates and reduced soil moisture content. Minimal risk of increased erosion due to harvest activities can be acceptably mitigated using standard erosion control practices. Deep down and dead woody materials at the ground level would serve to “cushion” timber harvest equipment. Forest Plan and RMP standards for soils quality would be adhered to, and therefore this alternative is not expected to significantly affect the soils resource. Because no other projects are known for the project area no cumulative effects are expected.

Alternatives Three through Six

Effects from Alternatives Three, Four, Five and Six would be similar to but less than the Proposed Action because of the reduced number of acres treated. Effects under Alternative Three would be the most similar to Alternative Two. Approximately 1,155 acres less is proposed for harvest under this alternative and therefore the potential impacts would be less than the Proposed Action. Alternative Six would harvest slightly less acreage than Alternative Three and therefore would potentially result in less soil disturbance. The Proposed Action and Alternative Six both have the greatest number of miles proposed for new and improved roads, and therefore have the greatest potential to affect the soil resource.

Effects to the soils resource from Alternative Four would be less than Alternatives Two, Three, and Six. Less ground disturbance would result because only 1,299 acres are proposed for harvest. No new road construction is proposed and only 5.7 miles of road reconstruction are proposed for improvement under Alternative Four.

Alternative Five has the least potential for impacts to the soils resource of all the action alternatives; no road construction is proposed and only 376 acres are proposed for fuels treatment. All action alternatives with the potential for effects to the soils resource would include mitigations and BMPs.

2. Fuels/Fire Hazard

The dominant hazardous fuels in the project area are the overstocked mixed conifer stands with saplings as ladder fuels that occur on lands south and north of Hoback Ranches and on private land in the eastern sections of Hoback Ranches. Sagebrush/grass fuels that are present at Hoback Ranches can also present hazardous fuel conditions on slopes of the assessment area in late summer and fall (BLM 2002). The assessed mixed conifer fuel types will exhibit a high resistance to fire control and make initial attack difficult. Existing stand density on some slopes will enhance the possibility of a crown fire. The possibility of ignition in both lodgepole/mixed conifer and sagebrush/grass fuel types is high, due to vehicular traffic on roads in the assessment area and lightning strikes associated with summer thunderstorms. Numerous topographic features in the area such as steep slopes, gullies, and aspect will increase rates of spread and will allow fires to “roll out” beneath fire fighters or spot over roads (BLM 2002).

No Action Alternative

Natural processes would be responsible for the changes in fuels and flammability properties in the project area under the No Action Alternative. No action would exacerbate the current fuel-loading problem, increase forest health problems, increase potential wildfire intensity and severity, and increase the hazard potential for homeowners. Areas with high flammability properties would continue to accumulate higher volumes of dead and down fuels and other fuels would also continue to increase. Continued conifer encroachment into aspen areas would also increase the flammability properties in those areas. Over time, overall fuels characteristics of the project area would develop into stands with higher potential for problem fire behavior increasing the risk of catastrophic wildfires. Increased suppression efforts would be necessary and consequently a greater threat to private property and structures adjacent to the project area would result. Existing roads would not be improved and no new roads would be constructed therein inhibiting access by fire engines and other suppression vehicles.

Alternative Two

The greatest reduction in fuels would occur under the Proposed Action. The Proposed Action would result in thinning treatments to create fuels characteristics conducive to lower fire intensities. Thinning, tree removal, and creation of shaded fuel breaks between BLM, Forest Service and private lands would directly reduce the chance of wildland fire spreading from private to public land and from public to private land. In addition, this action would indirectly enhance firefighter access, increase fire fighter safety and improve effectiveness of aerial suppression techniques. Thinning of ladder fuels, dead and down fuels, and conifers encroaching into aspen stands, would change the fuels and flammability properties of the project area. Overall fuels characteristics would exhibit properties that would allow for increased chances of suppressing fires before problem fire behavior characteristics develop. Road construction and reconstruction under this alternative would result in improved access for fire suppression teams and vehicles. Minor fuels treatments have taken place on some private properties in Hoback Ranches. In terms of cumulative effects, this would also slightly reduce the fuels risk in the area.

Alternatives Three through Six

Alternatives Three, Six, Four, and Five, in that order, would decreasingly reduce fuels and the fire hazard because each of these alternatives treats a progressively smaller number of acres. Alternative Three would result in fuels reductions on 2,648 acres and therefore would be the most similar to the Proposed Action. This would be followed by Alternative Six which would reduce 2,439 acres. However the strategic placement of the shaded fuels breaks associated with this alternative would also increase their effectiveness in controlling and treating fire outbreaks. In terms of improved access, the Proposed Action and Alternative Six would provide the greatest benefit because they include the greatest amount of road construction and reconstruction.

Alternative Four may improve access to some degree because of the 5.7 miles of road reconstruction included in this alternative while Alternative Five would not impact access at all. Alternative Four would result in reduction of fuels on 1,299 acres. Alternative Five would reduce the least amount of fuels (376 acres) but creation of shaded fuel breaks would still provide an important buffer between BLM, Forest Service and private lands and would directly reduce the chance of wildland fire spreading from private to public land and from public to private land.

3. Visual Resources

The BLM portion of the project area is a Class III visual resource area (BLM 1988). According to the RMP, the objective of visual resource management (VRM) will be to maintain overall integrity of visual resources while allowing for modification and changes to occur to meet other resource objectives. The Forest Service portion of the project area is also in a Class III visual resource area. This visual quality area allows for modification, which allows management activities to be visually dominant. However, they must be harmonious with features of the natural landscape. Timber harvest units and roads are elements that may be found in a landscape that meets this VQO. Alterations to the landscape may not be in glaring contrast to natural forms. Partial Retention allows that alterations to the natural landscape may be apparent, but they are visually subordinate to natural features. Management activities such as timber harvesting and roading may occur, but they must be designed so they are not striking features (Forest Service 1990).

No Action Alternative

The No Action Alternative would not directly impact current visual resources; processes outside the scope of the proposed fuels reduction would affect visual quality. With the No Action Alternative the possibility of increased fire risk could increase the risk of a severe crown fire, which would indirectly affect visual resources in the Hoback Ranches area.

Proposed Action Alternative

The Proposed Action would reduce the levels of hazardous fuels, which, in the short term, would have the direct effect of removing from view areas of overstocked forest that occur in the project area. In the long term, this activity would indirectly increase forest health, which in turn would keep the forest visually appealing. In general, fuel reduction would have nearly no visual effect on the landscape. The foreground view would potentially be perceptible in the short-term (one to five years). From middle and background views, effects are expected to be imperceptible. In the long-term, a high visual quality would result due to the improved forest health. Burning of slash piles may result in a short-term perceptible effect in color change in the immediate vicinity of the

slash piles. Skid trails and landings would be rehabilitated to a natural appearance. The shaded fuel breaks, which would occur under all of the action alternatives, would be constructed in a visually appealing manner due to the close proximity of private homes and the objectives of the existing covenants. Alterations would be made within the constraints of the existing VQOs and all of the action alternatives would be in compliance with the VQO of Modification for this management area. Because no other activities are planned for the project area no cumulative effects are anticipated.

Alternatives Three through Six

These four action alternatives would reduce the levels of hazardous fuels to a lesser extent than the Proposed Action. Therefore the effects from these alternatives on the visual resources would be similar to but less than those described above for the Proposed Action. Alternative Three and Alternative Six would result in treatment on 2,648 acres and 2,439 acres, respectively, and thus would have impacts on visual resources most similar to the Proposed Action. However, fewer slash piles would need to be burned under these alternatives than the Proposed Action because fewer acres would be treated. Alternatives Four and Five would have minimal impacts to visual resources since they treat the fewest acres and the least amount of road work would be done under them. In all alternatives, the shaded fuel breaks would result in visibly thinned areas alongside roads in the Hoback Ranches area. These would be constructed in a visually appealing manner as described in Chapter 2.

4. Air Quality

The Bridger-Teton National Forest, with the exception of the Teton and Bridger Wildernesses, is a Class II area (Forest Service 1990). There are no non-attainment areas on the Bridger-Teton National Forest. Minor periodic occurrences of pollutants may occur during summer and fall wildfires, prescribed burning, and wood and coal smoke from home heating sources. Roads in the project area also contribute fugitive dust to the atmosphere. National Forest smoke management is coordinated with the State Air Quality Supervisor.

No Action Alternative

This alternative precludes the implementation of the fuels reduction and therefore no post-harvest burning would occur. Wildland fire suppression activities would continue as in the past. In the short term, the No Action Alternative would result in no change in smoke emissions but would maintain or increase potential wildland fire emissions for the long term. As the fuel loading increases, the incidence and intensity of wildland fires, and the smoke they produce, would increase. In addition, no temporary roads would be constructed and/or used under this alternative, and therefore fugitive dust would not be produced beyond the amount produced by existing activities.

Proposed Action Alternative

Project implementation related to the Proposed Action would include the burning of slash piles. This burning would take place in the fall and early winter months after the first accumulation of snow. Smoke produced from the post-harvest burning of slash piles under the action alternatives can have a direct effect on air quality and may impact local communities including residents of the Hoback Ranches and Bondurant. The impacts to air quality would be related to the amount of smoke produced, which varies with burning conditions and volume burned. The amount of smoke produced is influenced by the amount, type and timing of burning as well as weather conditions. Meteorological conditions, the type of vegetation present, the moisture content of the

fuel, topography, and the total weight of consumable material available are all important variables.

The size of a single slash pile would vary in size depending on the harvest equipment used. After the timber is cruised and a prescription for treatment is developed, the area used and the volume of slash generated would be provided to the Forest Service Air Quality Specialist for input into a model to determine the emissions. This burning would not all occur in one day and days would be selected on which atmospheric conditions are such that drift of emissions would be into the upper atmosphere and away from developed areas. Slash pile burning would be in adherence to Wyoming State guidelines related to smoke emissions and a burn permit would be secured from the State prior to any burning.

All of the action alternatives have the potential to effect air quality through increased fugitive dust produced by vehicular traffic, especially on unpaved roads, and logging operations. The effects of fugitive dust, for each action alternative, are directly related to the volume of timber to be removed, and include reduced visibility on and adjacent to roads and increased levels of PM_{2.5} and PM₁₀. The silt content of the road surface layer, the distance traveled, the weight and speed of the vehicle, as well as weather conditions would influence the amount of dust produced (Ferguson et al. 1999). Potential differences in amount of fugitive dust produced between the alternatives are based on the distance of road traveled, the size of the area harvested, and whether the construction of temporary roads is proposed. Road use in the area is not expected to increase and therefore existing impacts from road traffic would remain the same in the long term resulting in no cumulative effects.

Under the Proposed Action, 11.3 miles of temporary road construction is proposed as well as improvement to 5.7 miles of existing roads. In the short term, these efforts would cause an increase in fugitive dust for the immediate area.

No long-term effects to air quality are expected from the Proposed Action Alternative. In terms of cumulative effects, public and private burning occurs in the area in addition to burning of methane and natural gas wells that exist downwind of the project site. These activities have not resulted in violations of the state standards or NAAQS and therefore no cumulative effects to air quality that would result in exceedances of the standards are expected.

Alternatives Three through Six

All of the action alternatives have the potential to affect air quality through increased fugitive dust produced by vehicular traffic and logging operations. The effects of fugitive dust, for each action alternative, are directly related to the volume of timber to be removed. Potential differences in amount of fugitive dust produced between the alternatives are based on the distance of road traveled, the size of the area harvested, and whether the construction of temporary roads is proposed. As such, Alternative Five would produce the least amount of fugitive dust from logging operations.

Under Alternative Three, 11.3 miles of temporary road construction is proposed as well as improvement to 5.7 miles of existing roads. In the short term, these efforts would cause an increase in fugitive dust for the immediate area. Under Alternative Four, no new road

construction is proposed but 5.7 miles of existing roads would still require some degree of improvement. Alternative Six would require the construction of 11.3 miles and the improvement of 6.4 miles of existing road. Alternative Four would therefore result in a smaller increase in fugitive dust than Alternatives Two, Three, or Six. Alternative Five does not involve any road construction or improvement and therefore no increases in fugitive dust would occur from these sources. No long-term effects to air quality are expected from any of the action alternatives.

Slash pile burning would occur under each of these alternatives. Because fewer acres would be treated under each of these in comparison to the Proposed Action, fewer slash piles would need to be treated. Alternative Three would treat 2,648 acres and would result in effects most similar to the Proposed Action. Alternative Four would treat 1,299 acres and require fewer slash piles and thus result in a smaller amount of smoke emissions. Alternative Five would involve only treatment in the areas identified for shaded fuels breaks. These 376 acres would require the least number of slash piles of any of the action alternatives and therefore would result in the smallest increase in smoke emissions. Alternative Six would treat 2,439 acres and would result in effects similar to those produce by Alternative Three.

5. Water Quality

Monitoring has taken place to monitor potential water quality effects from the major resource programs and activities on the Bridger-Teton Forest. With only a few minor exceptions, the varied uses of the National Forest have had little effect on the water quality in the Forest. Road building in the past has been one activity that has increased the amount of sediment being carried by the streams. The major changes in the quality of stream water take place naturally in the spring of the year with snowmelt (Forest Service 1990). Overall, the water quality monitoring of the natural resource programs on the National Forest has not uncovered any widespread reduction in water quality which can be attributed to wildlife and range improvement practices, herbicide use, exploration and development of oil and gas, recreational activities, or timber harvesting (Forest Service 1990). Fisherman Creek, South Fork Fisherman Creek, and Sled Runner Creek, are all in the project area. The streams are in a healthy condition and no DEQ water quality issues have been identified in the project area (Smith 2003).

No Action Alternative

This alternative would not directly affect water quality because sediment yield, road densities, and the number of road-stream crossings would not change as a result of harvest or road-related activities. Existing fuel loads would continue to increase indefinitely, and the potential for a high severity, stand-replacing fires would increase. Indirect effects could occur in the event of catastrophic fire such as sedimentation and loss of stream shade. If a severe fire occurred, there could be a reduction in ground cover, an increase in seasonal runoff, and an increase in sediment delivery to the aquatic system in both the short and long-term.

Alternative Two

Road construction, tree cutting and removal, and site preparation, may cause non-point pollution that could affect water quality. Primary sediment producing activities include new temporary road construction and road reconstruction. Implementation of soil BMPs would mitigate the potential impacts of harvest and road construction, reconstruction, and maintenance activities. The proposed logging systems are designed to reduce the risk of increased sedimentation in the short and long term. Design criteria and BMPs would be applied to these activities to minimize the risk of sediment delivery to stream channels. No harvest would occur in the stream corridor

buffer areas, as recommended by PACFISH, so vegetative filtering and soil infiltration would occur between the units and stream channels minimizing potential sediment delivery. No fertilizer or pesticide applications are planned as part of any of the action alternatives. After implementation of BMPs minimal direct or indirect effects are expected. No other activities are planned for the project area and therefore no cumulative effects are expected.

Alternatives Three through Six

Alternatives three, four, five, and six would have effects similar to the Proposed Action but to a lesser degree because each of these alternatives treats a progressively smaller number of acres and involves fewer miles of road construction. The same considerations discussed above under the Proposed Action would be taken if any of these alternatives were selected in order to minimize the potential for impacts to water quality.

Alternative Three involves thinning on 2,648 acres, the same amount of road construction as the Proposed Action, and 5.7 miles of road improvement, slightly less than the Proposed Action. Alternative Four would thin timber on 1,299 acres, would have the same amount of road improvement as Alternative Three, but would require no new road construction. Because no road construction or reconstruction is proposed under Alternative Five, and it would treat only 376 acres, it would have the least potential for impacts to water quality. Alternative 6 involves the thinning and treatment of up to 2,439 acres and the construction of 11.3 miles of roadway and the improvement of 6.4 miles of roadway. This alternative would require the same amount of road work as Alternative Two and would have the same impacts as Alternative Two and greater impacts than Alternative Three, Four, and Five.

6. Noise

The Hoback Ranches subdivision is a relatively secluded and quiet community. Most, if not all, of the houses are vacation or seasonal residences and as such are not used year round. There is minimal noise from traffic, which only consists of residential vehicles; commercial traffic is prohibited.

No Action Alternative

The No Action Alternative would not directly or indirectly affect the amount of noise in the project area.

Proposed Action Alternative

Under Alternative Two, increased noise would directly result from the presence of logging equipment in the area, including the use of helicopters for logging, and from road construction and improvement. Effects would be short term in nature. The exact length would depend on the operator, prescription, weather, etc. A large timber operation could accomplish the Proposed Action in six weeks to three months. No long-term direct or indirect effects are anticipated. No increases in noise are anticipated from other activities in the area and therefore no cumulative effects are expected.

Alternatives Three through Six

Alternatives Three through Six would result in fewer noise impacts than Alternative Two due to the absence of helicopter logging from these alternatives. Noise impacts would still result from logging and road construction and improvement under Alternatives Three and Six, and from logging and road improvement under Alternative Four. Alternative Five does not include the use

of helicopters or any road construction or improvement and therefore would result in the least increase of noise. Effects from all of the action alternatives would be short term in nature. The exact length would depend on the operator, prescription, weather, etc. No long-term direct or indirect effects are anticipated.

7. Cultural Resources

Both prehistoric and historic sites are expected in the project area. Prehistoric sites will likely consist of open camps and lithic scatters, although tipi rings, cairns, rock alignments, or other rock features may be located on ridges, knolls, or other high spots. Historic sites will likely consist of stock-raising related sites, homesteads, or rendezvous-era sites. These may be trash dumps or scatters, buildings or structures, and possibly cairns, or ephemeral short-term campsites. A Class I cultural resource inventory (literature search) was conducted for the project area. The literature search consisted of a file search (No. 8848) from the Wyoming State Historic Preservation Office, homestead patents, and examination of General Land Office maps (Appendix E). The file search revealed that three projects have occurred in the area and one site was recorded. Additionally, 12 homesteads are located, either wholly or in part, within the project area (North Wind, Inc. 2003).

No Action Alternative

The No Action Alternative would not result in direct effects to cultural sites but has the potential to indirectly affect cultural resources. The lack of firebreaks may lead to fire, which would damage or destroy sites that may be NRHP eligible; particularly wooden structures associated with homesteading in the area.

Proposed Action Alternative

The Proposed Action has the potential to affect NRHP-eligible sites if any are located in the project area. The action will be subject to Section 106 of the National Historic Preservation Act and subject to a Class III level cultural resource inventory. No effect is anticipated because implementation of the Proposed Action Alternative would avoid cultural resource sites near the proposed fuels reduction sites. In the event an inadvertent discovery is made during implementation, all activities would be stopped until the BLM or Forest Service Archaeologist could evaluate the finding and make a determination as to whether the project could continue or not. No other activities are anticipated that would result in cumulative effects to cultural resources.

Alternatives Three through Six

Effects to cultural resources from Alternatives Three, Four, Five, or Six would be similar to the Proposed Action but less likely due to the decrease in the number of acres treated under each alternative. Mitigations as stated under the Proposed Action would also be implemented under each of these action alternatives. No effect is anticipated because implementation of the action alternatives would avoid cultural resource sites near the proposed fuels reduction sites.

Biological Factors

1. Invasive Species/Noxious Weeds

Invasive species and noxious weeds tend to quickly spread into and dominate disturbance openings where sunlight is high and competition from other plants low. Noxious weeds are a

threat to native ecosystems because they out-compete and displace native vegetation. Disturbed sites throughout the Bridger-Teton Forest have established infestations of noxious weeds. Some of the more common species that are known to occur both on the Forest and in Sublette County are: Canada thistle (*Cirsium arvense*), musk thistle (*Carduus notans*), spotted knapweed (*Centaurea maculosa*), and leafy spurge (*Euphorbia esula*) (Forest Service 1990 and University of Wyoming 2003). According to the Hoback Ranches Weed Plan, residents of Hoback Ranches have been identifying and eradicating noxious weeds from the area for a few years. The main species known to be present are musk thistle, bull thistle (*Cirsium vulgare*), Canada thistle, spotted knapweed, and black henbane (*Hyoscyamus niger*) (Hoback Ranches 2003). On Federal lands in areas that are known for or have the potential for invasion or spread of noxious weeds, spraying would occur through a contract with Sublette County.

No Action Alternative

Alternative one, the No Action Alternative, would not directly affect the spread of noxious weeds because no ground disturbing harvest related activities would take place. However, by allowing hazardous fuel levels to continue to increase, the likelihood of a large-scale, intense fire would increase. The creation of large openings from stand replacing fires and fire suppression activities would indirectly increase the likelihood of weed invasion into new areas. Additionally, large-scale, intense fire would prepare an ideal seedbed for weed seed and further establishment of invasive weed species.

Proposed Action Alternative

Thinning, removal, piling and burning, and shaded fuel breaks are expected to improve overall forest health, increase forest floor vegetative diversity, and provide additional forage for wildlife. Under Alternative two, the Proposed Action, approximately 11.3 miles of temporary roads would be constructed and 5.7 miles of roads would need reconstruction or minor maintenance. This alternative would harvest approximately 3,803 acres of trees and represents the greatest amount of acreage of the action alternatives that would be harvested. Due to soil disturbances resulting from temporary road construction, construction equipment and vehicles, and thinning activities, the Proposed Action has the potential to indirectly increase the spread of weeds within the project area and poses a moderate risk of invasion by noxious weeds. However, since harvest activities are mandated to follow the Region 4 Noxious Weed Management Guidelines, the possibility of large-scale infestation would be minimized. No other activities are planned that would lead to the spread of invasive species and therefore no cumulative effects are anticipated. Once the proposed activities are completed a follow-up weed monitoring and control action would be implemented.

Alternatives Three through Six

Alternatives Three, Four, Five and Six would have effects similar to the Proposed Action but to a lesser degree because each of these alternatives treats a progressively smaller number of acres and excludes the use of helicopter logging. Alternatives Four and Five would result in less of a risk of the spread of noxious and invasive species than Alternative Two, Three, and Six because they involve fewer (or zero) miles of road construction or reconstruction.

Since harvest activities are mandated to follow the Region 4 Noxious Weed Management Guidelines, the possibility of large-scale infestation would be minimized. Mitigations would be applied to all action alternatives that would minimize the potential for spread of invasive species

and noxious weeds. Once the proposed activities are completed a follow-up weed monitoring and control action would also be implemented.

2. Special Status Species

This section describes the special status species with the potential to occur in the project area. Special status species addressed in this EA included Federally listed threatened, endangered, and proposed species, Forest Service Sensitive and Management Indicator Species (MIS), and BLM Sensitive Species. These lists of species were reviewed for the project area to assess the potential habitat and occurrence of these species (Table 4). There are no known special status plants or aquatic species in the project area. Where habitat requirements are not met in the project area (as indicated in Table 4), no further consideration is given to those species in this EA. Based on habitat requirements, the potential exists for 13 special status species to occur within the habitat type present in the project area.

A biological assessment (BA) examining the impacts of the proposed action on Federally listed species was prepared. The proposed project area does not contain suitable habitat for the black-footed ferret, mountain plover, yellow-billed cuckoo, whooping crane, Kendall Warm Springs dace, Colorado pikeminnow, bony-tailed chub, humpback chub, razorback sucker, or the Ute ladies'-tresses. Suitable habitat exists for Canada lynx, grizzly bear, gray wolf, and bald eagle and these species were addressed in the BA. The determinations are listed in Table 4 for all of these species and the detailed examination in the BA can be reviewed in the project file at the Pinedale Field Office.

Canada Lynx

The proposed project area contains potential suitable habitat for Canada lynx. The most recent sighting of a lynx within the project area was over 34 years ago and the most current sighting in the areas surrounding the project areas was 2 years ago. Currently there are no individuals known to inhabit the project area. However, due to the presence of suitable habitat and known past occurrences, there is the potential for lynx and/or their prey species to be present in the project area when fuels reduction activities take place, which would cause these species to avoid the project area. The noise and human activities do not reduce the suitability of the site for lynx. Associated with the proposed activities five to seven tons per acre of course woody debris would be left within the treatment areas to provide cover habitat for the lynx and other wildlife species.

Grizzly Bear

The proposed project area contains suitable habitat for grizzly bears, however the proposed project is located on the southern extent of the GYE, and a viable grizzly bear population has not been reestablished in this area. It is unlikely, but possible that a grizzly bear could be found within the project area. Mitigation measures are incorporated into the project design to limit human/bear interactions. These mitigations state that appropriate trash and food storage and disposal procedures would be implemented to minimize any potential conflicts with grizzly bears. Crews will be required to keep a sanitary work site and environment at all times. Waste materials at the work site shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, etc.

Gray Wolf

The project area is within suitable wolf habitat, and wolves are known to use the area around Black Butte and south around Horse Creek. However, there are no denning or rendezvous sites known to occur within the project area. There is a vast area of habitat available adjacent to the project area for the primary prey species of wolves.

Table 4. Special Status Species List

Species	Status	Habitat Types	Present in the Project area	Species Effected
Bald eagle <i>Haliaeetus leucocephalus</i>	Listed Threatened	Forest areas adjacent to lakes, rives, and large bodies of water that provide an ample prey base	Not likely	No effect
Grizzly bear <i>Ursus arctos horribilis</i>	Listed Threatened	Montane forests	Potentially	No effect
Gray wolf <i>Canis lupus</i>	Listed Experimental	Greater Yellowstone Ecosystem	Potentially	No effect
Black-footed ferret <i>Mustela nigripes</i>	Listed Endangered	Prairie dog towns	Not likely	No effect
Canada lynx <i>Lynx canadensis</i>	Listed Threatened	Montane forests	Potentially	May affect, not likely to adversely affect
Ute ladies' -tresses <i>Spiranthes diluvialis</i>	Listed Threatened	Seasonally moist soils and wet meadows of drainages below 7,000 feet elevation	Not likely	No effect
Colorado pikeminnow <i>Ptychocheilus lucius</i>	Listed Endangered	Lower Colorado watershed	Not likely	No effect
Bonytailed chub <i>Gila elegans</i>	Listed Endangered	Lower Colorado watershed	Not likely	No effect
Humpback chub <i>Gila cypha</i>	Listed Endangered	Lower Colorado watershed	Not likely	No effect
Razorback sucker <i>Xyrauchen texanus</i>	Listed Endangered	Lower Colorado watershed	Not likely	No effect
Kendall Warm Spring dace <i>Rhinichthys osculus thermalis</i>	Listed Endangered	Lower Colorado watershed	Not likely	No effect
Mountain plover <i>Charadrius montanus</i>	Proposed	Grassland and prairie dog towns	Not likely	No effect
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Candidate, BLM Sensitive	Open woodlands, streamside willow and alder groves	Not likely	No effect
Dwarf Shrew <i>Sorex nanus</i>	BLM Sensitive	Mountain foothill shrub, grasslands	Potentially	No effect
Long-eared myotis <i>Myotis evotis</i>	BLM Sensitive	Conifer and deciduous forests, caves and mines	Potentially	May affect, not likely to adversely affect
Townsend's big eared bat <i>Plecotus townsendii</i>	USFS Sensitive	Conifer forests, caves, homes, and mines	Potentially	May affect, not likely to adversely affect
Spotted bat <i>Euderma maculatum</i>	USFS Sensitive	Conifer forests, caves and mines	Potentially	May affect, not likely to adversely affect
Pygmy Rabbit <i>Brachylagus idahoensis</i>	BLM Sensitive	Basin-prairie and riparian shrub	Not likely	No effect
White-tailed prairie dog <i>Cynomys leucurus</i>	BLM Sensitive	Basin-prairie shrub, grasslands	Not likely	No effect
Wolverine <i>Gulo gulo</i>	USFS Sensitive	Montane forests, conifer and deciduous forests, remote mountainous habitat with little disturbance	Not likely	No effect
Fisher <i>Martes pennati</i>	USFS Sensitive	Mature forests and riparian areas	Potentially	May affect, not likely to adversely affect
Idaho pocket gopher <i>Thomomys idahoensis</i>	BLM Sensitive	Shallow stony soils	Not likely	No effect

Species	Status	Habitat Types	Present in the Project area	Species Effected
Three-toed woodpecker <i>Picoides tridactylus</i>	USFS Sensitive	Mature forests with bug-killed trees	Not likely	No effect
White-faced ibis <i>Plegadis chihi</i>	BLM Sensitive	Marshes, wet meadows	Not likely	No effect
Trumpeter swan <i>Cygnus buccinator</i>	BLM Sensitive USFS Sensitive	Lakes, ponds, rivers	Not likely	No effect
Northern goshawk <i>Accipiter gentiles</i>	BLM Sensitive USFS Sensitive	Conifer and deciduous forests	Potentially	May affect, not likely to adversely affect
Harlequin duck <i>Histrionicus histrionicus</i>	USFS Sensitive	Undisturbed, low gradient mountain streams with healthy riparian components	Not likely	No effect
Common loon <i>Gavia immer</i>	USFS Sensitive	Lakes, ponds	Not likely	No effect
Ferruginous hawk <i>Buteo regalis</i>	BLM Sensitive	Basin-prairie shrub, grassland, rock outcrops	Not likely	No effect
Peregrine falcon <i>Falco peregrinus</i>	BLM Sensitive USFS Sensitive	Tall cliffs	Not likely	No effect
Greater sage-grouse <i>Centrocercus urophasianus</i>	BLM Sensitive	Basin-prairie shrub, mountain foothill shrub	Not likely	No effect
Long-billed curlew <i>Numenius americanus</i>	BLM Sensitive	Grasslands, plains, foothills, wet meadows	Not likely	No effect
Burrowing owl <i>Athene cucularia</i>	BLM Sensitive	Grasslands, basin-prairie shrub	Not likely	No effect
Flammulated owl <i>Otus flammeolus</i>	USFS Sensitive	Mature conifer forests	Potentially	No effect
Great gray owl <i>Strix nebulosa</i>	USFS Sensitive	Mature forest and meadow openings	Not likely	No effect
Boreal owl <i>Aegolius funereus</i>	USFS Sensitive	Boreal coniferous forest	Not likely	No effect
Flammulated owl <i>Otus flammeolus</i>	USFS Sensitive	Mature Douglas fir forest	Not likely	No effect
Sage thrasher <i>Oreoscoptes montanus</i>	BLM Sensitive	Basin-prairie shrub, mountain foothill shrub	Not-likely	No effect
Loggerhead shrike <i>Lanius ludovicianus</i>	BLM Sensitive	Basin-prairie shrub, mountain foothill shrub	Not-likely	No effect
Brewer's sparrow <i>Spizella breweri</i>	BLM Sensitive USFS MIS	Basin-prairie shrub	Not-likely	No effect
Sage sparrow <i>Amphispiza billineata</i>	BLM Sensitive	Basin-prairie shrub, mountain foothill shrub	Not-likely	No effect
Northern leopard frog <i>Rana pipiens</i>	BLM Sensitive	Beaver ponds, permanent water in plains and foothills	Not-likely	No effect
Boreal toad (Northern Rocky Mountain population) <i>Bufo boreas boreas</i>	BLM Sensitive	Ponds margins, wet meadows, riparian areas	Not-likely	No effect
Spotted frog <i>Ranus pretiosa (lutiventris)</i>	BLM Sensitive USFS Sensitive	Ponds, sloughs, small streams	Not-likely	No effect
Meadow pussytoes <i>Antennaria arcuata</i>	BLM Sensitive	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands	Not-likely	No effect

Species	Status	Habitat Types	Present in the Project area	Species Effected
		4,950-7,900 feet		
Trelease's milkvetch <i>Astragalus racemosus</i> var. <i>treleasei</i>	BLM Sensitive	Sparsely vegetated sagebrush communities on shale or limestone outcrops & barren clay slopes at 6,500-8,200 feet	Not-likely	No effect
Cedar Rim thistle <i>Cirsium aridum</i>	BLM Sensitive	Barren, chalky hills, gravelly slopes, & fine textured, sandy shaley draws 6,700-7,200 feet	Not-likely	No effect
Large-fruited bladderpod <i>Lesquerella macrocarpa</i>	BLM Sensitive	Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700 feet	Not-likely	No effect
Beaver rim phlox <i>Phlox pungens</i>	BLM Sensitive	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400 feet	Not likely	No effect
Tufted Twinpod <i>Physaria condensata</i>	BLM Sensitive	Sparsely vegetated shale slopes & ridges 6,500-7,000 feet	Not likely	No effect
Pink agoseris <i>Agoseris lackschewitzii</i>	USFS Sensitive	Subalpine wet meadow, saturated soils at elevations ranging from 8500-10600 Flowering/Fruiting July-August	Not likely	No effect
Sweet-flowered rock jasmine <i>Androsace chamaejasme</i> ssp. <i>carinata</i>	USFS Sensitive	Montane rock crevices in rocky limestone or domolite soils at elevations ranging from 8500-10800, Flowering/Fruiting May-July	Not likely	No effect
Soft aster <i>Aster mollis</i>	USFS Sensitive	Sagebrush grasslands and mountain meadows in calcareous soils at elevations ranging from 6400-8500, Flowering/Fruiting July-September	Not likely	No effect
Payson's milkvetch <i>Astragalus paysonii</i>	USFS Sensitive	Disturbed areas and recovering burns on sandy soil at elevations ranging from 6700-9600, Flowering/Fruiting Jun-Aug/Jul-Oct	Potentially	May have positive or beneficial impacts
Wyoming tansymustard <i>Descurainia torulosa</i>	USFS Sensitive	Sparsely vegetated sandy slopes at base of cliffs of volcanic breccia or sandstone at elevations ranging from 8300-10000, Flowering/fruitletting July-September	Not likely	No effect
Boreal draba <i>Draba borealis</i>	USFS Sensitive	Moist north-facing limestone slopes and cliffs and shady stream sides at elevations ranging from 6200-8600, Flowering/Fruiting Jun-Aug/Jul-Sep	Not likely	No effect
Narrowleaf goldenweed <i>Haplopappus macronema</i> var. <i>linearis</i>	USFS Sensitive	Semi-barren, whitish clay flats and slopes, gravel bars, and sandy lake shores at elevations ranging from 7700-10300, Flowering/Fruiting July-September	Not likely	No effect
Payson's bladderpod <i>Lesquerella paysonii</i>	USFS Sensitive	Rocky, sparsely-vegetated slopes, often calcareous substrates at elevations ranging from 6000-10300	Not likely	No effect
Creeping twinpod <i>Physaria integrifolia</i> var. <i>monticola</i>	USFS Sensitive	Barren, rocky, calcareous hills and slopes at elevations ranging from 6500-8600, Flowering/Fruiting Jun-Jul/Jul-Aug	Not likely	No effect
Greenland primrose <i>Primula egaliksensis</i>	USFS Sensitive	Wet meadows along streams and calcareous montane bogs at elevations ranging from 6600-8000, Flowering/Fruiting May-Jul/Jul-Aug	Not likely	No effect
Pine Marten <i>Martes americana</i>	USFS MIS	Conifer and deciduous forests	Known	May affect, not likely to adversely affect

Species	Status	Habitat Types	Present in the Project area	Species Effect
Elk <i>Cervus elaphus</i>	USFS MIS	High mountain pastures, conifer and deciduous forests and grasslands	Known	May affect, not likely to adversely affect
Mule deer <i>Odocoileus hemionus</i>	USFS MIS	Conifer and deciduous forests and grasslands, sagebrush communities	Known	May affect, not likely to adversely affect
Moose <i>Alces alces</i>	USFS MIS	Conifer and deciduous forests and grasslands, swamps and riparian habitat	Known	May affect, not likely to adversely affect
Bighorn sheep <i>Ovis canadensis</i>	USFS MIS	Semi-open steep rocky slopes, cliffs, and rugged canyons	Not likely	No effect

The following BLM and Forest Service Sensitive species have the potential to occur in the project area based on habitat requirements identified in Table 4. BLM and Forest Service sensitive wildlife species are discussed first, followed by Management Indicator Species (MIS).

Northern Goshawk

Northern goshawks can be found in dense coniferous and deciduous forests. They prefer to nest in mature forests consisting of a combination of old growth trees with intermediate canopy coverage and small open areas that are used for foraging. The northern goshawk is carnivorous with a primary prey base of birds, mammals, and invertebrates. Goshawks that breed in the north and northwest part of North America typically migrate to warmer climates during the winter months (Hayward 1988). The project area contains potential roosting and foraging habitat for the northern goshawk. A survey for this species was conducted concurrently with the stand exam. While species were observed flying overhead, no nests were encountered in the areas surveyed. If nesting birds are encountered during fuels treatment activities, buffer zones will be established in consultation with the BLM and/or Forest Service wildlife biologist.

Fisher

Fishers are primarily solitary animals that have been found to use most forest cover types within the northern coniferous forests, but have been considered to favor late successional forests in the Pacific Northwest. Riparian areas are also considered important for fishers in Idaho (Ruggiero et al. 1994). Denning, resting, and foraging habitat consists of old growth communities with snags or live trees with hollows that can be used for resting. Fishers are also known to use dense, young stands of lodgepole pine during the winter months. Suitable habitat for the fisher exists within the project area; however, the fisher is not known to occur in Sublette County (Fertig and Beauvais 1999).

Long-eared Myotis, Townsend's Big-eared Bat, and Spotted Bat

These two bats and the myotis species are known to use buildings, rocky cliffs, caves, and occasionally trees, for roost sites. The long eared myotis is primarily found in coniferous forests. They roost in tree cavities and beneath exfoliating bark, and in live and dead snag trees. Pregnant females of this species may roost at ground level in rock crevices, fallen logs, and sawed off stumps. However, they cannot rear young in such vulnerable locations. Long-eared myotis bats capture prey in flight, but also glean stationary insects from foliage or the ground. Their main diet appears to consist of moths, and their relatively quiet echolocation calls are used to stock prey, as well as for maneuvering through cluttered habitats (Bat Conservation International 2004).

The Townsend's big eared bat roosts in desert scrub and pine forest habitats in the spring and summer. These bats forage after dark, using echolocation calls to hunt moths and other insects. Females form maternity colonies in mines, caves, or buildings. Males roost individually. In the winter males and females roost in colonies in hibernacula caves and abandoned mines. These bats are extremely sensitive to disturbance at their roosting sites and have suffered severe population declines throughout much of the U.S. (Bat Conservation International 2004).

Initially the spotted bat was thought to be extremely rare, now it is known to occupy a rather large range throughout central western North America from southern British Columbia to northern Mexico. The spotted bat roosts high in cliff crevices making it difficult to observe and unlikely to be harmed by humans (Bat Conservation International 2004). This bat has also been observed in pine forests at high elevations (7,475 feet), pinyon pine juniper habitats, and open scrub desert habitats (Allen 2004). This bat appears to feed almost exclusively on moths, which it captures high above the ground. This is one of the few bats that use echolocation frequencies low enough to be audible by humans (Bat Conservation International 2004).

There are no buildings, cliffs, or caves located within the proposed project area. However there are residential structures located on private land adjacent to the areas proposed for treatment. There is suitable habitat for these species within the project area, but of these three species only the long-eared myotis is known to occur within Sublette County (Fertig and Beauvais 1999).

Dwarf Shrew

This species is primarily found in montane areas and has been collected from areas ranging from rockslides in subalpine and alpine zones to dry, shortgrass prairies. The proposed project area contains potential habitat for the dwarf shrew, however there has been no documented occurrence of the dwarf shrew in Sublette County (Fertig and Beauvais 1999).

Payson's milkvetch

Payson's milkvetch is an early successional stage plant requiring disturbance to persist. Surveys by the Nature Conservancy have located populations of Payson's milkvetch on the Pinedale and Big Piney Ranger Districts. Areas where populations are located have been intensively managed for timber since the 1960's, providing the required disturbance. Based on available data, Payson's milkvetch favoring disturbance, it's likely that over the long-term there will be a "positive or beneficial impact" associated with the implementation of the proposed project.

Management Indicator Species

Pursuant to the National Forest Management Act, the Forest Service must maintain viable populations of native and desired non-native species. The vast number of wildlife species found on the Bridger-Teton National Forest precludes special consideration of every species. Instead, select species were identified in the Forest Plan as MIS. The use of MIS allows reasonable assessments on the impacts of land management activities to wildlife resources. The current Federal ESA-listed species are used as MIS species on the Bridger-Teton National Forest (these species were discussed in the BA). Elk, deer, and moose are also listed as MIS because of their economic importance as game species. The pine marten and Brewer's sparrow are MIS for ecological indicator species for old growth forests and sagebrush communities. (The Brewer's

sparrow is listed as a BLM sensitive species and was addressed in Table 4). More detail about each of these other species is provided below. Surveys for additional raptors were also carried out and are discussed below.

Ungulates (Elk, Deer, and Moose)

These species are known to use a wide variety of habitats ranging from forested areas (cover) to grasslands (foraging) to riparian areas, swamps, rivers and the edge of lakes (foraging). The proposed project area lies within FS Management area 23 as identified in the Bridger-Teton Forest Plan and is managed under the Desired Future Condition 10 and 12 which allow some resource development and roads, and identifies high quality wildlife habitat, escape cover which drives management actions (U.S. Forest Service 1990).

The proposed project area is designated as winter/yearlong and parturition range for the Hoback Elk Herd; spring, summer, fall and parturition range for the Sublette Mule Deer Herd; and winter/yearlong and parturition habitat for the Sublette Moose Herd. The proposed project area is also known to be within a deer and elk migratory corridor, which is used to travel from high elevation summer habitat to low elevation winter range. The McNeel elk feedgrounds lies adjacent to the project area. Within the Pinedale RMP stipulation are posed to state “management emphasis will be on maintenance of habitat quality and continued use of the areas as elk feedgrounds. To maintain the integrity of the elk feedgrounds, certain activities would be constrained on lands near them. The “no surface occupancy mitigation guidelines” restriction would be imposed on the lands described in Appendix A-2, for all activities except those which have impacts that are temporary in nature or that are compatible with elk habitat management” (BLM 1988). To protect the feeding grounds and parturition areas no activities would be allowed within Sections 5 and 6 of T 36 N, R 112 W from May 1 to June 30. There is a hunting season for each of these animals that provides a great economic value to the surrounding communities and agencies.

Pine Marten

Martens are limited to conifer-dominated forests and nearby vegetation types. In most studies of marten habitat use, martens were found to prefer late-successional stands of mesic coniferous forests, especially those with complex physical structures near the ground. Down logs and snags provide refuge and den sites (Buskirk and Ruggerio 1994). In the northern Rocky Mountains, martens have been found to prefer stands dominated by mesic subalpine fir, Douglas fir, and lodgepole pine if the appropriate dense understory complex is present. There have been multiple sightings of pine martens in the Hoback Ranches Subdivision and is anticipated to be present in the harvest areas.

Raptors

As part of this study, surveys for Swainson’s hawks (*Buteo swainsoni*), Ferruginous hawks (*Buteo regalis*), and flammulated owls (*Otus flammeolus*) were conducted concurrently with the stand exam activities. While suitable habitat for these species exists within the survey area, no individuals or nests were encountered during the surveys. However, there have been unconfirmed sightings of Swainson’s hawks by residents of Hoback Ranches.

No Action Alternative

Existing habitat conditions would be maintained under the No Action Alternative. Natural changes (from fire, insects, disease, and aging) and human-caused changes (fire suppression) would continue to affect the project area. In the absence of fire, an older, more structurally complex stand would result, possibly improving or maintaining habitat for mature forest species, with eventual elimination of existing openings due to forest encroachment. There would be direct and indirect effects associated with Alternative one. These would result from the continued fuel buildup from natural succession, leaving the potential for stand replacing fires that could destroy potential habitat for northern goshawk, fisher, snowshoe hare, pine martens, and other wildlife species. Crown fires would result in habitat loss for cavity nesters, would reduce security cover for big game, and would reduce foraging and habitat for lynx and other wildlife. Another indirect effect would be further closure of the canopy, which would reduce light reaching the forest floor. This would limit the growth of the understory vegetation that is used as forage for ungulates. Under the No Action Alternative, existing habitat would remain the same for raptors, although the risk of a large wildfire that could destroy much of the habitat would be higher.

Proposed Action Alternative

Potential effects to special status species could result from habitat alteration and disturbance or displacement due to implementation of the Proposed Action Alternative. The areas of the proposed project associated with fuel breaks will have the greatest impact on lynx habitat. The removal of the brush in these areas removes potential habitat for the snowshoe hare. The thinning and harvest activities within the project area would open the canopy increasing the amount of light that reaches the forest floor which would promote increased growth of the understory vegetation and shrub communities, increasing potential habitat for lynx prey. The initial implementation of the project may have a negative affect; however these impact are not anticipated to be long lived and overall the increased forest health would eventually increase suitable lynx habitat within the project area.

Important habitat components such as snags and riparian zones would be retained at levels necessary to preserve the value of the habitat, but at concentrations that are low enough to meet fuels reduction objectives. Temporary disturbance of wildlife would occur during tree removal and creation of the firebreaks. The increased noise and human activity would cause gray wolves (and their prey base), grizzly bear, and other sensitive species to avoid the project area during harvest activities.

Scattered large standing dead trees may be left on sight as raptor perches and possible nest areas. Trees with observed nests would be left in place and where possible a buffer of trees would also be left around the nest site. Mitigation measure have been implemented with the proposed project requiring that four to six snags per acre when available would be left within each fuels reduction area, and would be left in clusters as much as possible. Five to seven tons per acre of dead material would be left to benefit species such as the pine marten that use this type of habitat for foraging and cover. Road clearing and harvest activities would create areas of early seral stage vegetation, particularly along skid trails and landings. The early seral habitat and stand thinning would increase ungulate forage habitat and potentially increase prey base for wolves in the project area. This project is not expected to have a measurable negative effect on bird populations because of the limited extent of the habitat removal. Generalist species would be

minimally affected especially by displacement during project implementation. Some cover would be lost which may affect fall and winter habitat due to the thinning of trees. In the fuel breaks areas in addition to the thinning of trees understory would be removed resulting in a loss of this type of cover as well. The action alternatives would meet all applicable Standards and Guidelines from the Forest Plan and the RMP. Species-specific effects are described below.

The Proposed Action could change habitat quality or suitability but would not render habitat unsuitable for the sensitive species with the potential to occur in the project area. Removal of snags could result in reduced availability of perch and roost trees, potential nest sites, and foraging opportunities. However, mitigations related to snags should ensure that an adequate number remain where available. Coarse woody debris, which is important for cover, feeding, resting, and denning sites, would be reduced, but again mitigation would ensure that some downed material is retained. Additionally any nest/den sites that are found would be protected. It is unlikely that the Proposed Action would result in any long-term adverse impacts to sensitive species associated with this type of mature forest.

The project area contains potential roosting and foraging habitat for the northern goshawk. The thinning of trees associated with the proposed project would increase openings, which would increase foraging area. The increased noise and human activity associated with the thinning and harvesting activities would likely cause individuals to avoid the area, but this would only be temporary while the actual thinning and harvesting activities are occurring, and would be limited to those immediate areas where activities are occurring. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action may affect, but is not likely to adversely affect the northern goshawk.

Even though potential habitat for the fisher exists within the project area, the fisher is not known to occur in Sublette County (Fertig and Beauvais 1999). The thinning and harvesting activities would indirectly reduce potential habitat by reducing the general age of the forest stands resulting in less favorable denning habitat. However it would promote young lodgepole pine stands that have been identified as winter foraging habitat. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action may affect, but is not likely to adversely affect the fisher.

There is potential habitat for the long-eared myotis, Townsend's big-eared bat, and spotted bat within the project area, however the Proposed Action is not anticipated to directly or indirectly affect these species due to their foraging methods and preferred roost habitat. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action may affect, but is not likely to adversely affect the long-eared myotis, Townsend's big-eared bat, and spotted bat.

The proposed project area contains potential habitat for the dwarf shrew, however there has been no documented occurrence of the shrew in Sublette County (Fertig and Beauvais 1999). Because the dwarf shrew is not expected to occur in the project area, the proposed activities are not anticipated to directly or indirectly affect the dwarf shrew. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action will have no effect on the dwarf shrew.

The proposed project area contains potential habitat for the Payson's milkvetch. No Payson's milkvetch are known to occur in the project area and therefore no direct effects to the species are expected. However, the ground disturbance associated with the proposed activities would increase potential habitat for this species. Therefore, the proposed project may have a positive and/or beneficial indirect effect by increasing suitable habitat for the Payson's milkvetch.

In the short-term the proposed actions are anticipated to cause direct disturbance to ungulates and other MIS species resulting in avoidance of the activity area due to increased human activity and increased noise due to harvest and thinning activities. No activities would be allowed between May 1 and June 30 to protect elk parturition areas. The loss of cover may directly affect fall and winter habitat for these species. However, the reduction in canopy cover would increase the amount of light that reaches the forest floor, promoting an increased growth rate of understory vegetation that is used as foraging material. This increased vegetative diversity and forage would indirectly benefit elk, deer, and moose in the long term. The increased complexity of the understory would also increase potential habitat for the pine marten. The pine marten occurs in the project area and the Proposed Action may affect suitable habitat but it is not anticipated to directly affect any individuals. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action may affect, but is not likely to adversely affect MIS species.

If nesting raptors are encountered during fuels treatment activities, buffer zones would be established in consultation with the BLM and/or Forest Service wildlife biologist(s). Under each of the action alternatives, portions of the forest would be treated and dense areas would be opened up. Removal of trees would reduce available perches and nesting habitat, however, snags and trees with cavities would be left standing and clustered where possible. The presence of open spaces would create a more favorable hunting habitat for these species and would enhance habitat for the prey base of these species. No other activities are planned for the project area and therefore no cumulative effects are expected. The proposed action may affect, but is not likely to adversely affect the swainson's hawk, ferruginous hawk, and the flammulated owl.

Alternatives Three through Six

Effects under Alternatives Three, Four, Five, and Six would be similar to those from the Proposed Action Alternative but slightly less because these alternatives involve fewer acres of treatment. All of these alternatives would eliminate some of the areas of harvest because of the omission of helicopter logging and would therefore leave some areas with a more complex understory. Areas with a complex understory could potentially provide denning habitat for Canada lynx and other species. Additionally, the omission of helicopter logging would reduce the potential for noise disturbance. Noise levels would still increase because of the presence of logging equipment in other areas but there would be less of an effect in the specific activity area where the helicopter logging is proposed under Alternative Two.

Alternative Four, would result in even less habitat disturbance because fewer acres are proposed for treatment and no temporary road construction would occur. Alternative Five proposes only 376 acres of treatment and therefore involves the least disturbance. Alternative 6 would have more effect on special status species than Alternatives Four and Five but would have less of an effect than Alternatives Two or Three. Alternative Six would result in the construction and

improvement of roads that would increase noise and may result in the fragmentation of suitable wildlife habitat. Even though these alternative would initially have less direct impacts on wildlife habitat due to treating few acres, there is an increased risk of catastrophic, stand replacing fires that could potentially affect all wildlife species within the area caused by not treating enough area to reduce fuel loads to a level that would make the area defensible.

Socioeconomic Factors

1. Cost

The cost of the treatment would depend upon the extent of the area treated and the implementation method(s) selected. Helicopter logging is more expensive than the ground-based systems that are proposed. However, because of increased demand, there are more helicopter logging companies operating in the Inland Northwest than in the past resulting in increased competition and lower logging costs. Currently, helicopter logging costs generally run from a minimum of \$250/MBF to well over \$300/MBF and are usually three to five times higher than traditional logging costs. These figures include all costs associated with harvesting logs and delivering them to a nearby sawmill. Commercial loggers from outside of the immediate area, most likely from Idaho or Montana, would likely be contracted to remove the timber.

Cost of implementation of any of the action alternatives has not been determined. Different methods of implementation and extent of the treatments would be the variables with the most impact on cost. In general, the more acres proposed for treatment and the more implementation methods proposed, the greater the cost. Implementation would take place over several years, which would result in the cost being spread out over that time period. Treatment costs would be partially offset by the sale of forest products in the form of house logs, sawlogs, post and poles, and firewood.

No Action Alternative

There is no cost of implementation associated with the No Action Alternative. Due to the increased risk of a large wildland fire however, high suppression costs could be an indirect result. There is also the potential for loss of houses on private property, which are of great economic value to the community.

Proposed Action Alternative

The cost of the Proposed Action Alternative would be higher than the other action alternatives. The Proposed Action involves the greatest number of acres for harvest, including acres proposed for harvest with helicopter logging, and the greatest amount of road construction and improvement. Although helicopter logging has its limitations and is expensive, costs are lower than in the past and there is virtually no soil disturbance because timber is lifted vertically and flown out rather than being skidded across the forest floor. No cumulative effects are anticipated.

Alternatives Three through Six

Alternatives Three, Four, Five, and Six would cost less than the Proposed Action because each of these alternatives treats a progressively smaller number of acres and involves fewer miles of road work. In addition no helicopter logging is proposed under any of these alternatives. Costs associated with Alternative Three would be the same as Alternative Two with the exclusion of the costs of helicopter logging because those areas are not included. Alternative Four would cost

even less because it removes additional acres from potential treatment and excludes any new road construction. Because only 376 acres would be treated and no road construction or reconstruction is proposed under Alternative Five, it would cost the least of any of the action alternatives. The cost of implementing Alternative Six would be greater than that of Alternatives Four and Five but less than the cost of implementing Alternatives Two and Three, due to the treatment of fewer acres.

Cumulative Effects and Effects Summary

Cumulative effects result from incremental impacts of the proposed action and other past, present, and reasonably foreseeable future actions. Road building, residential development, human activities, recreation, fire control, livestock grazing, and other multiple use activities to different degrees have previously affected portions of the proposed project area. Recreation activities within the project area, such as hunting, OHV use, and camping, may result in the disturbance of Federally listed, BLM and Forest Service special status wildlife species. Incidental mortalities of these species may result from shooting or vehicle strikes, while the project area is used for recreational activities.

The invasion of non-native species and subsequent noxious weed treatment, prescribed fire and fire suppression, timber harvest activities, and recreation use could affect the vegetation and wildlife species within the project area. Currently, fuels treatment activities are occurring on some private lands between the BLM and Forest Service lands in the general area. The national Fire Plan provides funding to for activities on private land through a cost share program which is awarded through the State Forestry Office and has resulted in the development of some fuel reduction activities around homes in the Hoback Ranches community. Opportunities for funding under that program ended in September 2003. There is also a Forest Land Enhancement Program with funds available to help homeowners implement fuels reductions around their homes. These activities that are taking place on private lands are not anticipated to result in negligible changes in the area (Halbeck 2003).

The effects of the proposed project in conjunction with other activities in the area are expected to be negligible. The planned activities would not result in any irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of reasonable and prudent alternatives under Section 7 of the ESA. Because no other projects are planned for the project area, no cumulative effects are anticipated.

Ground disturbance that typically occurs during harvest activity may result in an increased risk of soil erosion and transport of sediment to stream channels. Soil compaction may result from project activities and can cause a higher percentage of precipitation to runoff, in turn, increasing erosion rates and reducing soil moisture content. This would be mitigated using standard erosion control practices and therefore the Proposed Action is not expected to significantly affect the soils resource.

Thinning, tree removal, and creation of shaded fuel breaks between BLM, Forest Service and private lands would directly reduce the chance of wildland fire spreading from private to public land and from public to private land. In addition, firefighter access would be enhanced,

firefighter safety would be increased and effectiveness of aerial suppression techniques would be improved.

In general, fuel reductions would have no long-term visual effect on the landscape. Burning of slash piles may result in a short-term perceptible impact in color change in the immediate vicinity of the slash piles. Skid trails and landings would be rehabilitated to a natural appearance.

All of the action alternatives have the potential to impact air quality through fugitive dust increases and post-harvest burning of slash piles in the short term. No long-term effects to air quality are expected from any of the action alternatives. In terms of cumulative effects, public and private burning occurs in the area in addition to burning of methane and natural gas wells that exist downwind of the project site. These activities have not resulted in violations of the state standards or NAAQS and therefore no cumulative effects to air quality that would result in exceedances of the standards are expected.

Implementation of BMPs would mitigate the potential for impacts to water quality from the forest treatment and road construction, reconstruction, and maintenance activities. No harvest would occur in riparian areas, so vegetative filtering and soil infiltration would occur between the units and stream channels minimizing potential sediment delivery. After implementation of BMPs, minimal direct or indirect effects are expected.

Increased noise would directly result from the presence of logging equipment in the area, including the use of helicopters for logging, and road construction and improvement, during the implementation of the project. Effects from all of the action alternatives would be short term in nature. No long-term direct or indirect effects are anticipated.

No effect is anticipated to cultural resources because cultural resource sites near the proposed fuels reduction sites would be avoided. In the event an inadvertent discovery is made during implementation, all activities would be stopped until the BLM or Forest Service Archaeologist could evaluate the finding and make a determination as to whether the project could continue or not.

Thinning, removal, piling and burning, and shaded fuel breaks are expected to improve overall forest health, increase forest floor vegetative diversity, and provide additional forage for wildlife. Due to soil disturbances resulting from temporary road construction, construction equipment and vehicles, and thinning activities, the Proposed Action has the potential to indirectly increase the spread of weeds within the project area and poses a moderate risk of invasion by noxious weeds. However, since harvest activities are mandated to follow the Region 4 Noxious Weed Management Guidelines, the possibility of large-scale infestation would be minimized.

Potential effects to special status species could result from habitat alteration and disturbance or displacement due to implementation of the Proposed Action Alternative. Temporary disturbance of wildlife would occur during tree removal and creation of the firebreaks. Some cover would be lost which may affect fall and winter habitat for some species. The action alternatives would meet all applicable Standards and Guidelines from the Forest Plan and the RMP. The Proposed

Action could change habitat quality or suitability but would not render habitat unsuitable for the sensitive species with the potential to occur in the project area and would not adversely affect special status species.