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Environmental Assessment

Southwest Fuels Healthy Forest Initiative Project

Powder River Ranger District, Bighorn National Forest
Washakie, Bighorn, and Johnson Counties

T49N R87W; T49N R86W; T48N R87W; T48N R86W; T48N R85W; T47N R87W

Tensleep Canyon

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INTRODUCTION AND BACKGROUND

This Environmental Assessment (EA) documents the purpose and need for the Southwest Fuels Project, identifies issues developed during the scoping process, describes the proposed action and alternatives, describes the project area and its resources, displays the environmental consequences of all alternatives, and the final version will present and addresses comments received from the public during the comment period for this project.

Beginning in 2001, Forest employees and the public became aware of deteriorating fuels conditions within the Tensleep Creek and Leigh Creek watersheds in the southwest corner of the Bighorn National Forest (NF). A team was convened to assess conditions in the area in 2002, consisting of Forest Service employees from other Forests and Regions, as part of the Continuing Education in Ecosystem Management (CEEM) course. The assessment from this effort is a part of the project record, and provided specific recommendations on resource improvements that could be conducted in the area (USFS 2002). Fuels conditions in the project area further deteriorated with the ongoing drought of 2000-2006. Insect and disease mortality include impacts from the white pine blister rust in limber pine, the Douglas-fir beetle in Douglas-fir, and dwarf mistletoe, commandra blister rust, and western gall rust in lodgepole pine.

Because of worsening fuels conditions, the Rocky Mountain Region of the Forest Service embarked upon an implementation initiative for the President's Healthy Forests Initiative. In response, the Bighorn NF developed a proposed schedule titled the Accelerated Watershed and Vegetation Restoration Plan, which included the Southwest Fuels project area due to the known hazardous fuels conditions. Correspondingly, Big Horn County, Johnson County, Washakie County and the Bureau of Land Management (Worland Field Office) have also identified fuels treatment project opportunities, which include and are adjacent to the Southwest Fuels project area. These are documented in the Community Wildfire Protection Plans prepared by the counties, included in the project record. The Forest Service also selected this area in conjunction with the Nature Conservancy to explore restoring fire as an ecosystem process as part of the Fire Learning Network initiative developed by the Nature Conservancy. All of these efforts and initiatives led to the development of this project, some of which include Wildland Urban Interface (WUI) areas as described in the National Fire Plan (www.fireplan.gov) and published in the Federal Register (2001). The Healthy Forests Initiative implements core components of the 10-year Implementation Plan agreed to by states, tribes, and stakeholders. The proposed treatments further the goals of the President's initiative. They will reduce the threat of catastrophic wildfires to protect communities, firefighters, wildlife, and forest health and will reduce the potential for accelerated losses from Douglas-fir beetle infestations.

Collaboration with private landowners, conservation groups, county government, local individuals, and the Forest Service has been a part of this analysis and project development. There is local support for reducing fire risks and commitment to achieving a sustainable ecosystem structure.

The Forest Service has prepared this EA in accordance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA, conducted under the Healthy Forest Restoration Act guidelines, discloses the project's foreseeable environmental effects for consideration in determining whether to prepare an Environmental Impact Statement. If appropriate, this determination will be documented in the Finding of No Significant Impact prepared for this project.

Purpose and Need for Action

The primary **purpose** of the Southwest Fuels project is to achieve Revised Forest Plan objectives and strategies as listed below. This project was conceived and primary analysis was conducted under the direction of the 1985 Forest Plan. However, many of the same themes for management were continued in the 2005 Revised Forest Plan (Chapter 1). While the project meets other objectives and strategies described in the Revised Plan, those listed below are focal for this project, and include Strategies 1, 3, 4, 5, 6 under Objective 1c; Strategy 7 under Objective 1a; Objective 2c; and Strategy 2, Objective 1b. (pp. 1-2 thru 1-8 of Revised Forest Plan).

- Place high priority on fuel reduction activities in Fire Regimes I and II (ponderosa pine, sagebrush/grass) and other strategic areas where high fire hazards exist, such as communities identified in the Healthy Forest Restoration Act (Federal Register, Vol. 166, No. 160, Aug 17, 2001) or as identified in community wildfire protection plans.
- Implement suppression strategies as needed to minimize epidemic outbreaks of insect and disease in areas managed for timber production.
- Implement…vegetation management practices that will move all affected landscapes toward desired vegetation composition and structure. Design management practices that maintain a mosaic of vegetative composition and structure emulating natural processes, patterns, scale, effect, and distribution of community types, age, and structure classes.
- Manage to retain or increase aspen stands.
- Maintain, protect, and enhance wetland function and value when analyzing or implementing all projects.
- Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services.
- Proactively conserve populations of species at risk by maintaining or improving habitat availability and quality when designing projects based on species' habitat needs. Provide diversity in Habitat Structural Stages of forested vegetation, and age-class diversity of non-forested vegetation as needed.

The most substantial change in the project area made with implementation of the Revised Forest Plan was the change in management area direction. Previously, 8 management area prescriptions were applied. The main management area prescriptions now within the project area are 5.12 and 5.13, which call for an active multiple-use, rangeland vegetation and suited timber emphasis. Management area prescriptions 2.2, 4.2 and 4.3 occur in the project area as well, and comprise a much smaller portion of the project area. These emphasize Research Natural Area, scenery (scenic byway) and dispersed recreation management, respectively. The project meets the desired condition, theme, and standards and guidelines of these management prescriptions in the Revised Plan.

In addition to implementing Forest Plan direction, the purpose of the project is to achieve the Healthy Forest Restoration Act and the Healthy Forest Initiative goals and objectives.

From the 2002 CEEM assessment and from collaborator involvement, there is a **need** to:

- Restore fuels and vegetative conditions to reflect desired fire regime condition classes by altering structural diversity in forested and non-forested vegetation communities and reintroducing fire to the ecosystem. Reduce risk of larger wildland fires.
- Reduce hazardous fuel loadings in Wildland Urban Interface (WUI) sites and along primary access routes to those sites for firefighter and public safety.
- Treat increasing insect and disease activity in forested vegetation.
- Retain aspen and improve stand conditions.
- Improve road conditions that are causing watershed and related fish and wildlife habitat degradation.
- Improve forage value for wildlife and livestock.

Existing and Desired Conditions

The 2002 CEEM assessment summarized existing conditions and provided recommendations on how to make improvements. In addition to resource based concerns and opportunities on watersheds, wildlife habitat, vegetative diversity, fire history and soil resources, the assessment also provided input from key social groups in the area. Interviews with key informants were conducted to assess their view of the current and desired conditions. The following existing conditions identify opportunities as they relate to the Forest Plan direction section described previously.

The Tensleep watershed is a municipal watershed, indicating a higher value for improved watershed conditions. The assessment noted that many vegetation types were outside of the desired condition classes for fuels ratings, primarily due to the exclusion of fire for the past century, resulting in a heightened risk for more extensive catastrophic fires. This was particularly evident in the sagebrush, ponderosa pine, and Douglas-fir stands within the project area, where mature conditions and/or undergrowth have altered more historic conditions that occurred when fire was active on the landscape. Limber pine stands were found to have excessive mortality due to the white pine blister rust disease, and lodgepole pine has occurrences of dwarf mistletoe and high susceptibility to mountain pine beetle. Most aspen stands in the project area were noted for conifer encroachment and ungulate browsing concerns.

In addition, there were several areas with degraded road conditions that were causing excessive sedimentation to streams and erosion of soil resources. This was noted to be exacerbated by the unauthorized use of motor vehicles on closed roads and off of roads in the project area.

Summer home groups, subdivisions, campgrounds, the Tensleep Fish Hatchery, and two cow camps occur in the project area. These areas have dense fuel conditions adjoining or surrounding them that need to be reduced.

These conditions present an opportunity to achieve **desired conditions** of: reduced fuel loadings in WUI areas; improved firefighter and public safety; vegetation restored to a more balanced composition in fire regime and condition class; reduced chance of catastrophic wildfire; reduced susceptibility of vegetation to insect and disease mortality; and improved water quality through road and sediment management.

PROPOSED ACTIONS AND ALTERNATIVES

Issues

The following **issues** were identified to guide the analysis and development of alternatives:

1) How will the project activities reduce hazardous fuels conditions in Wildland Urban Interface (WUI) sites and along primary firefighter and public access to the WUI sites?
2) How will the project restore the vigor of forested and rangeland vegetation communities within the project area to implement the provisions of the Forest Plan and the Healthy Forest Restoration Act (HFRA), including reducing insect and disease outbreaks?
3) How will the project improve watershed health, fish, and wildlife habitat resources?

Other issues were identified during scoping and development of alternatives, and have been addressed in the additional design criteria section below.

Proposed Action

The proposed action was developed to meet the purpose and need, and desired conditions associated with the project. Refer to the attached maps for the location of proposed treatments. The proposed action and alternatives incorporated public input from scoping. The line officer validated the purpose and need, issues, and alternatives as documented in the project record. Treatments below are described by the dominant resource or vegetation community being targeted.

Wildland Urban Interface (WUI)

Wildland/urban interface (WUI) is the area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Mechanical removal of forested and non-forested vegetation is proposed for the three following priority sites to reduce the risk of catastrophic fires in or adjacent to these areas:

1) Approximately **130 acres** of Douglas-fir needs fuels reduction activities in the area adjacent to Canyon Creek Country subdivision. Timber harvest would be used to accomplish this, including approximately ½ mile of new temporary road within the stand, and use of existing temporary roads to access the stand. Primary access will be through the previously constructed roads for the Goldmine fire salvage operation.
2) Approximately **100 acres** of forested and non-forested (tall shrub) vegetation needs thinned around the Tensleep Fish Hatchery and the Tensleep and Leigh Creek campgrounds. Non-commercial thinning would be employed to accomplish this, with no additional roads necessary.
3) Forested vegetation along the primary access/escape route (Forest Road 25/452) to the Canyon Creek Country subdivision needs thinned, for approximately 200' either side of the road where needed, totaling approximately **50 acres** of mostly lodgepole pine. Thinning would remove up to approximately ½ of the basal area (stand density) and activity fuels would be treated through piling and burning or lop/scatter. No additional roads are necessary.

Ponderosa Pine

Prescribed fire is proposed to treat all ponderosa pine units, totaling approximately **4,400 acres**. Fire severity will vary from non-lethal, low intensity ground fire to mixed severity fire that will include single tree torching and may include occasional group torching. Non-commercial thinning of smaller, understory trees prior to burning may be needed for several sites. This will increase the probability of survival for the large ponderosa pine trees in this area. No additional roads are necessary for this treatment.

Sagebrush

Sagebrush within the project area covers approximately **14,000 acres**, typically occurring in dense stands of a mature age class. By treating these stands, forb and grass production will be increased in the short term, and the pattern of vegetation on the landscape will be altered to improve habitat diversity and resiliency to fire.

Prescribed fire will be used as the preferred treatment tool for sagebrush units. Herbicide treatment (e.g. spike/ tebuthiron) may also be used as a treatment tool in areas where fire may not be a feasible treatment option. Maximum acreage likely to be treated with herbicide is up to 15% of the sagebrush stands. Mechanical treatment (shredding) may be used as a treatment tool for units in the Lone Tree area, up to 700 acres of treatment.

All sagebrush treatments would occur over a multi-year period (up to two decades), with approximately **1,000 to 2,000 acres** done per year depending on funding and resource needs.

Range improvements in the form of fencing and/or water developments would be reconstructed or added to several allotment pastures to facilitate the prescribed burning. This is primarily due to the rest needed in advance of and after prescribed burning, and to take advantage of improved distribution opportunities. Refer to Appendix 1.

Aspen

Currently, the project area has approximately **850 acres** of aspen, most of which suffers from conifer encroachment and heavy ungulate browsing. Treatment of aspen is necessary to halt or reverse the decline. Treatment for aspen may include any of the following:

- Removal of competing conifers within and adjacent to (up to 150 feet) aspen clones.
- Burning residual materials to increase soil exposure to sun, thereby increasing regeneration potential.
- Partial cutting of aspen clone to reduce apical dominance and increase regeneration.
- Mechanically treat aspen roots, for example by "ripping", to reduce apical dominance and increase regeneration.
- Fencing to reduce livestock and wildlife browsing of aspen regeneration.

Due to the cost of fencing and regeneration treatment, many areas will just have conifer removed from within the stand to prolong the clone's lifespan. More extensive removal of conifer adjacent to the stand (likely involving a commercial product removal) and fencing of stands is planned on approximately **150 acres** in the Sand Draw area, while additional treatments may occur annually depending upon budget and priority for the remaining acres.

Limber Pine

Prescribed burning in Tensleep Canyon is proposed to regenerate vegetation and reduce hazardous fuels conditions due to the high volume of dead limber pine. Approximately **930** acres would be treated.

Douglas-fir

The following treatments are proposed to reduce the insect and disease mortality that is currently affecting large acreages in the project area. However, rather than treating all possible stands, the following three priorities were developed. In general, approximately ½ to 3/4 of the basal area (stand density) would be removed.

1) Approximately **900 acres** in the previously harvested Tepee Creek timber sale area have been heavily infested with the Douglas-fir beetle with resulting mortality of the overstory. Up to 2 miles of temporary road may be needed in this area in support of mechanical harvest to meet sanitation/salvage objectives and improve the condition rating of these stands and protect existing investments in the timber stands. This treatment would also provide reduced risk of fire around the structure known as the Rice Cow Camp.

2) A second site involves approximately **360 acres** in the Sand Draw area (southwest corner of project area), where condition class ratings adjacent to the Sand Draw road are overly dense, resulting in increased Douglas-fir beetle mortality. Mechanical harvest is proposed to reduce stand density and remove bug-killed trees. Up to ½ mile of temporary road may be needed in this area in support of mechanical harvest. This treatment also combines the aspen improvement treatment (150 acres) described above.

3) A third site involves approximately **15 acres** along the old Highway (Forest Road 18) in Tensleep Canyon, where condition ratings and insect caused mortality in the stands have provided an unacceptable risk around a heavily used dispersed camping site. Mechanical harvest is planned around this site, with no temporary road needed. This site was selected to protect the investments of summer homes above, given the dispersed camping use occurring here with potential wildfire ignitions, and also to provide a fuel break for prescribed burning lower in the canyon as described for the limber pine activity.

Lodgepole pine

The area in upper Leigh and Canyon Creek (known as the previously harvested Leigh Creek timber sale) has experienced declining conditions outside of the desired stand condition rating due to understory growth and a heavy infestation of dwarf mistletoe. Approximately **1,000 acres** in this area have been identified to treat these conditions with mechanical harvest, including overstory removal and other shelterwood harvest practices, and precommercial thinning. Approximately 2 miles of temporary road would need constructed to treat this area. Treatments would also improve the use of Road 25/452 as an escape route in a potential wildfire scenario. This is the primary access road to the Canyon Creek Country subdivision.

Roads

There were 13 identified road improvement actions identified in the project scoping to improve watershed conditions. Due to public input, the list was revised for this project and is attached in Appendix 2. These would be accomplished primarily through associated treatment activities.

Schedule/Priorities

As funding and conditions would not allow all of these treatments to be conducted at once, the following priorities for implementation were developed:

- WUI treatments and timber harvest to protect stands from increased mortality, and associated road improvements would be conducted in two phases. The western portion of the project area would be treated first, with a timber sale contract offered in 2007. A timber sale contract for the eastern portion or the project area activities would be offered in 2008, which includes the Canyon Creek Country adjacent fuels treatment. Non-commercial activities in Tensleep Canyon may occur in the summer of 2007.
- Sagebrush treatment in the Moses Homestead area (adjacent to Canyon Creek Country subdivision).
- Sagebrush treatment in the High Park Lookout area.
- Prescribed burning and understory thinning in ponderosa pine, and treatments of sagebrush in the Sand Draw area.

All other treatments would remain planned, however, scheduling of some prescribed burns and other treatments may depend on involvement of and coordination with partners adjacent to the Forest to achieve the most beneficial results. Prescribed burning requires flexibility due to site conditions, and may alter priorities in a given year.

Additional Design Criteria

The following design criteria are applicable to this project and the decision accompanying it. They resulted from issues raised by the public during scoping, and from ID Team input.

1. Ensure firefighter and public safety in all prescribed burning activity. Complete burn plans following agency policy. Notify public of planned burning (livestock permittees, adjacent landowners, media, County) to extent practicable. Refer to project record for list of contacts.
2. Utilize stewardship contracting where feasible.
3. Conduct prescribed burning with adjacent landowners through development of agreements and shared resources where feasible and necessary (e.g. The Nature Conservancy, Canyon Creek Country, BLM, Rice Ranch Inc.). Comply with Wyoming DEQ Smoke Management Plan regulations when burning.
4. Conduct hazardous fuels reduction (non-commercial) around the Leigh Creek and Tensleep Creek campgrounds, and the Tensleep Fish Hatchery in conjunction with District Recreation Staff,

Campground Concessionaire, and Wyoming Game and Fish Department (WGFD hatchery). Cooperatively flag planned removal of hazardous fuels to ensure visual objectives and fuel reduction needs are met.

5. Avoid impacts to archaeological sites in conjunction with requirements of Wyoming State Historical Preservation Office (SHPO). As proposed prescribed burning treatments may be staggered over time to allow additional archaeological clearance surveys, ensure clearance prior to approval of burn plans for the affected burn units.
6. Implement all standard forestry practices and Best Management Practices (WDEQ 1997) as appropriate.
7. Follow snag and coarse woody debris retention direction for the project area outlined in Forest Plan.
8. Avoid road construction or mechanical harvest on complex slope movement prone areas identified on the landslide hazard map developed by the Wyoming State Geological Survey. Landslide maps are available in the project record. Multiple block slide/Quaternary talus (mblsl/Qt (old)), such as that found in Tensleep Canyon, is not considered prone to landslides resulting from harvest activities.
9. Obtain 404 permits, through USA COE, for road construction related to stream crossings or any activities affecting wetlands as needed.
10. Ensure access to the Douglas-fir stand to be mechanically harvested adjacent to the Canyon Creek Country subdivision is conducted in accordance with legal access requirements. Ensure land-line surveys are conducted and boundaries posted where needed.
11. Require equipment being used for road construction or timber harvest purposes to be washed prior to arrival on the Forest to reduce noxious weed establishment. Wash engines or other equipment used in prescribed burning before and after use to reduce spread of noxious weeds.
12. Avoid prescribed burning in areas where invasive plant species have been found to occur, if burning would result in their spread. Provide for post-project monitoring and treatment of invasive plant species for all treatments (mechanical or burning).
13. Avoid impacts from prescribed burning or timber harvest to the electric and other utility lines, and contact companies prior to burning or other operations as needed.
14. Close timber sale roads (temporary and/or Level 2 or above) for public safety as necessary during hauling or maintenance activities.
15. Avoid burning or damaging livestock improvements where feasible during prescribed burning activities, and cooperatively fund replacement if necessary. Protect fences during timber harvest (Squaw Cr. and High Park Drift fences), but permittee will be responsible to move the Tepee Ridge Pipeline. Schedule prescribed burning in conjunction with livestock grazing to allow for rest/deferment where needed to improve fire effects.
16. Avoid intentionally lighting riparian areas during prescribed burning, though fire may be allowed to "creep" or back into these areas.
17. Improve road closure effectiveness, dispersed recreation management, and rangeland vegetation (prescribed burning) where appropriate with timber harvest receipts or credits. Replace range improvements or build fences to replace natural barriers if treatment activities reduce their effectiveness.
18. Conduct treatments within sagebrush to maintain recommended levels of age class diversity as recommended by Connelly et al (2000) for sage dependent wildlife species within the project area identified. Ranges are as follows: 50% of unit in medium canopy (11-34% canopy), 30% in high canopy (>35%), and 20% in low canopy (0-10%).
19. Minimize visual impacts or blockages to designated snowmobile or other motorized trail routes and dispersed recreation sites from road re-construction or timber harvest activities. Avoid harvest activities on or adjacent to the state designated snowmobile trails during the winter sports season (12/15-3/31) annually.
20. Follow naturally occurring stand variations and topographic features to establish irregular edges when laying out units for harvest. This is particularly important in minimizing the visual impact of harvests visible from US 16 and FR 18 and if visible from High Park Lookout. Minimize scenic impacts of livestock water pipelines by burying them where feasible, or locating them outside the "seen area" of open forest roads and trails.
21. If using engines or ATVs off-road or on closed roads for prescribed burning, minimize signs of use following completion of burn activities to discourage unauthorized public use.
22. Restrict timber harvest activities (hauling, cutting, skidding, road building) in identified big game parturition habitat (refer to Forest Plan Appendix A map) between May 1st and June 15th.
23. Effectively close and/or decommission temporary roads and Maintenance Level 1 roads upon project completion including, but not limited to: re-contouring, placement of boulders, slash, debris, gates and signs.
24. Provide appropriate spatial and/or temporal buffers as determined by ID Team if sensitive or species of local concern are found during project implementation.
25. Restrict timber harvest activities (see #22 above) from March 15 to August 15 within 2,600 feet (1/2 mile) of any active raptor nest in the project area (USFWS 2002); this applies to active nests discovered after award of the contract. Leave approximately 30 acres around any known raptor nest trees as a no-cut area for mechanical harvest. Site-specific modifications may be made by an ID Team process approved by the Ranger.

Other Alternatives

As a result of public involvement and collaborative design of the project, eleven letters were received during the scoping period. All of the respondents supported the project and an action alternative. A few requested further clarification. Several comments were incorporated into either the Proposed Action or the design criteria. See the summarized scoping comments or the letters in the project record. Some comments proposed the development or designation of a motorized trail system in the area, which is outside the scope of this project.

Based on scoping, the District Ranger has found no significant issues or unresolved conflicts concerning alternative uses of available resources that warrant consideration of additional alternatives. Only a **no-action** alternative was used as a baseline in determining effects within the specialist reports. In terms of an alternative considered, but not analyzed in detail, the Forest considered an alternative that would not pursue any mechanical harvest of trees. However, not harvesting trees would not remove the fuels, and would not accomplish the purpose and need. This approach to identifying a range of alternatives is consistent with the direction in the HFRA (Sec. 104 (c) (1) (C)).

EXISTING CONDITIONS AND ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

This section provides a summary of the environmental impacts of the Proposed Action relative to the existing conditions. The main topics of **fire regime and condition class, forested vegetation, wildlife, threatened, endangered and sensitive species, livestock grazing, noxious weeds, roads and roadless areas, soil and watershed,** and **cumulative effects** are summarized in this section. Specialist reports in the project record contain the supporting information from which this information was summarized. Many of the key findings from these specialist reports were incorporated as additional design criteria, as described previously.

This assessment of direct, indirect, and cumulative effects is consistent with the National Forest Management Act, 16 U.S.C. 1604(g)(1) and with the management direction described in the 2005 Bighorn National Forest Land and Resource Management Plan (Revised Plan). It provides the necessary information to determine whether or not to prepare an Environmental Impact Statement. The associated Finding of No Significant Impact discusses whether this project has significant effects.

General Project Area

The project area comprises approximately 44,000 acres. Within this area, there are approximately 900 acres of private land. Vegetation is characterized primarily by naturally fragmented areas of sagebrush, grasslands, aspen, ponderosa pine, Douglas-fir, lodgepole pine, spruce/subalpine fir, and forb/willow dominated riparian areas. Cottonwood and other brush types occur within the lower elevation riparian areas. Elevation ranges from 5,200’ in lower Tensleep Creek to 9,480’ at High Park Lookout. Vegetation typically occurs along an elevational or climate related gradient, with ponderosa pine and Douglas-fir at the lower elevations, followed by lodgepole pine and spruce-fir at higher elevations. There is very little spruce and fir within the project area due to the lower elevation, and no management actions were directed at this cover type. A lack of fire has affected the characterization of vegetation patterns.

The project area is characterized by livestock grazing use and abundant dispersed recreation use in the summer and fall months. Developed recreation use is focused in the Meadowlark Lake area with campgrounds, lodges, and the ski resort. A well developed road network occurs primarily from past timber harvests. Highway 16, a scenic byway, is a major access route through the project area for the south end of the Forest. There are several summer homes in the upper Tensleep Creek portion of the project area including the West Tensleep corridor, and the Canyon Creek Country subdivision occurs on the south border of the project area. Refer to the attached map to view the main features of the project area.

Fire Regime and Condition Class - Existing

The historical role of fire in the project area is best described in terms of its Fire Regime. Fire Regime is a description of cover types and their associated frequency and intensity of naturally occurring fires. A description of Fire Regime and the percent each represented in the project area can be found in Table 1.

Table 1. Fire Regime Description and Percent of Area

Fire Regime Group	Vegetation in Fire Regime	Percent of Project Area
I: 0-35 yrs return interval, non-lethal intensity	Ponderosa pine, aspen associated with ponderosa pine	11
II: 0-35 yrs, Stand replacing intensity	Grassland, forbs, sagebrush, willow, or other shrubs	39
III: 35-100 yrs, mixed intensity	Limber pine, Douglas-fir and lodgepole pine cover types. Aspen when associated.	20
IV: 35-100 yrs stand replacing	Lodgepole pine only, or aspen when associated with lodgepole pine.	15
V: 100+ yrs, stand replacing	Subalpine fir and Engelmann spruce cover types and lodgepole pine or Douglas-fir when present as a seral to spruce-fir.	15

Fire regime groups are further divided into Condition Classes that describe forest health based on fire and fuels functions. Areas in Condition Class 1 are most inline with the natural fire cycles, while areas in Condition Class 3 are least inline, and represent overly dense stand conditions depending on the vegetation type. Condition Class 3 sites often pose unacceptable risk in terms of catastrophic fire effects, which are of most concern in WUI sites. Catastrophic fires outside WUI sites may

also have degrading effects upon watershed depending on fire severity. Fire Regime Condition Class definitions are available at http://www.frcc.gov/ - Fire Regime Condition Classes and in the fire and fuels specialist report in the project record. Table 2 displays the Condition Classes associated with the fire regimes, and the percent of the analysis area with these condition classes.

Table 2. Fire Regime, Condition Class, and Percent of Project Area

Fire Regime	Condition Class 1	Condition Class 2	Condition Class 3
I	0	0	100
II	12	32	56
III	T	72	28
IV	2	98	0
V	T	100	0

Mapping protocols for the Fire Regimes and Condition Classes are also described in the specialist report. In general, they were derived from the Common Vegetation Unit (CVU) GIS database, which is an aerial photo interpreted coverage. The sagebrush vegetation type was further refined from the CVU vegetation database through more detailed aerial photo mapping.

Fire history (occurrence date and size) and further information on WUI sites are also contained in the fire and fuels specialist report in the project record. Three areas considered as WUIs occur. The 54 unit subdivision known as the Canyon Creek Country subdivision, on private land adjacent to the Forest in the southeast corner of the project area, is the most intensively developed area. Developments in the lower Tensleep Canyon include the Fish Hatchery, campgrounds, and adjacent private land developments. Several summer homes occur in upper Tensleep Canyon in the project area. The clustering of other summer homes and the resorts and lodges surrounding Meadow Lark lake are adjacent to (and some within) the project area, but fuels in these sites are being managed through the West Tensleep Phase 1 and Phase 2 Projects. There are two cow camps (cabins) within the project area that represent significant investment. There is also a powerline in Tensleep Canyon that serves the developments mentioned above.

The fuels conditions, and the amount of human use occurring in the project area combined present a heightened risk of fire occurrence. Human-caused fire occurrence accounts for 55 percent of all fires on the Bighorn NF since 1910, and the fire history in the project area follows a similar percentage. The ongoing drought further exacerbates the current conditions, and is causing increased insect and disease related mortality. Aspen succession to conifer is a natural process, however it is held in balance through wildfire that removes conifer. With fire suppression over the past century, there is a widespread occurrence throughout the Forest of aspen dominated by conifer, leading to a heightened risk of losing the aspen clones. The following figure illustrates the existing conditions of conifer mortality (bug kill), loss of aspen, and mature sagebrush canopies, as described by Fire Regime and Condition Class in the project area.

Figure 1. Existing Fuels Conditions

Conifer Mortality, Aspen Loss, and Dense Sagebrush

Fire Regime and Condition Class - Effects

The effects of implementing the proposed action are summarized in Table 3. The changes described are a result of implementing proposed actions within the first 10 years. It may take significantly longer to achieve all prescribed burning within the project area. Under direct effects from the no-action alternative, acres in condition classes 1 and 2 would continue to progress into the higher condition classes as stand densities continue to mature in the presumed absence of fire due to active fire suppression. This would increase fuel hazards and indirectly result in fires that are less likely to be controlled, particularly near WUI sites. For the proposed action, the direct effects would be the reduction, or shifting, of acres in higher condition classes into lower condition classes as indicated in Table 3 below. Indirectly, this would result in less risk of catastrophic fires and a more balanced representation of condition classes on the landscape.

Table 3. Condition Class by Fire Regime following completion of the Proposed Action.

Fire Regime	Condition Class 1	Condition Class 2	Condition Class 3
I	80	10	10
II	24	34	42
III	17	72	11
IV	10	90	0
V	T	100	0

Under the proposed action, there is no change shown to Fire Regime V, as no treatments are targeted for spruce/fir. The fire return interval associated with this cover type makes it less likely that the dense or mature conditions are outside the historical range of fire return intervals. In addition, there are few structures within the project area that occur in this vegetation type.

Fire suppression would continue under either alternative primarily due to the existing developments in the project area.

Cumulatively, the proposed action would contribute towards improvement in condition class ratings with other projects in the watershed, such as the West Tensleep Phase I and II projects.

There have been publications such as Beschta et al (2004) and Rhoades (2004), refuting the benefit of fuels management projects in advance of wildfire in forested ecosystems, due in part to potential negative soil and watershed effects associated with logging. However, there have also been publications derived from research on recent fires showing the benefits of fuels reduction in advance of wildfire (Omi et al 2006; Cram et al 2006; Graham et al 2004) in terms of reducing wildfire severity. With application of watershed standards and guidelines applied to harvest methods, watershed concerns should be mitigated as discussed below. It is standard practice for firefighters attempting a suppression response on a fire to select a thinned out stand, rather than a decadent stand, in terms of safety and effectiveness of the action.

Forested Vegetation - Existing

While directly related to the Fire Regime and Condition Class previously described, it is helpful to show the existing amounts of each forested vegetation cover type and Habitat Structural Stage (HSS) in the area, and how that would change under the proposed action. The Revised Forest Plan describes desired conditions within each geographic area, in this case the Tensleep Watershed, to describe a range of HSS that would be desirable in terms of sustaining long term diversity of age classes given the potential for fire disturbances and needed resiliency. In addition, vegetative manipulations proposed are specific to the cover type, as described in the alternative section previously. Table 4 below describes the HSS definitions.

Table 4. Habitat Structural Stage (HSS) definitions.

Habitat Structural Stage	Description	Diameter	Crown Cover %
1	Grass/ Forb	N/A	0-10%
2	Seedling/ Sapling	< 1”	10-100%
3	Pole Sized	1”-9”	A = 10-40% B = 40-70% C = 70-100%
4	Mature Timber	> 9”	A, B, C as above

Table 5 describes the acres by cover type of each HSS in the project area. The current amount of each structural stage results primarily from past fire history, and to a lesser extent timber harvest in the past 100 years. In total, approximately 7,000 acres (or 26% of the total forested vegetation) have had harvest activities in the project area in the past, though only 500 acres have resulted in changes to structural stage 1 or 2 (refer to cumulative effects report in project record). The table also displays results of the old growth inventory conducted in 2004. POG refers to potential old growth, while OG designates stands that meet the definition as per the Revised Forest Plan. The “T” designator in HSS 1 and 2 represents a temporary condition that will revert to a forested condition with succession.

Table 5. HSS Acres by Cover Type in the Project Area

Cover Type	1T	2T	3	4	POG	OG	Total
Forbs	11						11
Grass	175						175
Aspen			467	46			513
Cottonwood			94	113			207
Douglas-fir			6,239	2,615	421	791	10,066
Limber Pine			358	337			695
Lodgepole Pine		416	7,840	1,226	471	160	10,113
Juniper			936				936
Ponderosa Pine			2,508	235			2,743
Spruce/ Fir			544	723	221	172	1,660
Total	186	416	18,986	5,295	1,113	1,123	27,119

Note: Areas of rock, water, or roads comprise the difference in total project area acres vs. total acres of HSS.

As the old growth plan requirement is by cover type in the Tensleep watershed, not just the project area, this was also analyzed for the project. Out of the 10% required in the watershed, Douglas-fir is at 15%, and lodgepole pine is at 17%. Out of the 15% required for spruce-fir, approximately 12% is estimated to occur. The Meadowlark Fire contributed to less spruce/fir old growth, and represents its dynamic potential.

The Desired Future Condition described in the Revised Forest Plan (Chapter 3) also refers to young structural stages (HSS 1 and 2), of which neither the project area nor the watershed currently have 5%, which is the objective stated in the Plan.

Other elements of importance under this heading include the provision for snags and coarse woody debris. While there is no inventory of either of these elements, they are also inherently related to the amount of old growth. In addition, the project area is known to be affected heavily by insects and disease, creating even more snags and coarse woody debris with continually increasing levels observed. Forest Plan guidance was established for these two forested vegetation elements that are of important value for wildlife habitat. From professional observation of existing conditions, these amounts are readily met in the project area.

Forested Vegetation - Effects

The direct effects of implementing the proposed action shown in Table 6 below to HSS are due primarily to mechanical harvest in the Douglas-fir and lodgepole pine cover types. Prescribed fire may change the structural stage of limber pine, juniper, and ponderosa pine depending on fire severity.

However, the limber pine is currently primarily dead from the white pine blister rust, a non-native disease occurring at epidemic levels across the Forest, and fire would create an opportunity to regenerate it and possibly lower susceptibility to further infection through a reduction in competition. In addition, the ponderosa pine community would be enhanced through prescribed fire by re-establishing its fire condition class rating to a more natural class, and protecting old growth. Some pockets of mature canopy could be removed through prescribed fire, however burning would primarily be focused on removing dense understory conditions. Some spruce-fir is shown as being reduced, which would occur if all of the aspen treatments occurred, where conifer stands would be removed surrounding the aspen to promote aspen regeneration. However, those stands have not been targeted for any commercial harvest, so this is not likely to occur to the extent described in the alternative above.

Table 6. HSS Acres in Project Area from Proposed Action.

Cover Type	1T	2T	3	4	POG	OG	Total
Forbs	11 (0)						11
Grass	175 (0)						175
Aspen	985 (+)		467 (0)	54 (+)			1,506
Cotton-wood			94 (0)	113 (0)			207
Douglas-fir			7,138 (+)	1,568 (-)	211 (-)	783 (-)	9,700
Limber Pine	200 (+)		258 (-)	224 (-)			682
Lodgepole		416 (0)	7,521 (-)	1,085 (-)	424 (-)	144 (-)	9,590
Juniper	200 (+)		736 (-)				936
Ponderosa	30 (+)		2,421 (-)	235 (0)			2,686
Spruce/Fir			519 (-)	714 (-)	221 (0)	172 (0)	1,626
Total	1,171	416	19,484	4,093	856	1,099	27,119

Note: Acres in community types are followed by an indication of increase (+), decrease (-), or no change (0) compared to existing condition. The acres represented in aspen would be from a potential condition where all stands are treated around the perimeter to remove conifers, which would not likely be the case due to access and other feasibility issues.

The Desired Future Condition of forested structural stages in the Revised Forest Plan specifically relating to young structural stages (1 and 2) would not be met. This is largely due to the continuation of silvicultural systems already begun in the project area that do not call for the creation of young structural stages (i.e. shelterwood harvests). As mentioned in the Revised Forest Plan, this will most likely be created through a wildfire event that is difficult to predict in terms of extent and severity.

The changes in HSS would indirectly reduce the risk to continued insect and disease mortality to those stands treated, and those immediately adjacent to them. The Douglas-fir beetle would likely continue to impact stands within the project area, however with less effect to the treated stands. All stands where commercial harvest is used would also have activities fuels reduction as part of standard operating procedures, through prescribed burning, piling and burning, or lop and scatter methods.

With the minor changes in the Douglas-fir and lodgepole pine from mechanical harvest, the amount of old growth, snags, and coarse woody debris would still be maintained above the Forest Plan minimum levels at 16% and 13% respectively in the Tensleep watershed. There are no proposed treatments within spruce-fir old growth cover types, however the current level would remain below 15% in the watershed until growth and succession occurs. While the inventory conducted in 2004 did not address Ponderosa pine, the prescribed burning and understory thinning planned would contribute to the maintenance of old growth Ponderosa pine.

Few snags would be lost during commercial tree harvest for safe-felling and skidding operations, but none targeted for harvest, except in the stand adjacent to the Canyon Creek Country estates. Snags may also be removed through fuelwood harvest prior to road closure. Prescribed burning would create more snags where conifer patches would be burned, and snags would continue to be created through mortality associated with insects and disease. From professional observation of similar timber harvest activities on the Forest, from the amount of un-harvested area remaining following project implementation, from continued insect and disease mortality, the Forest Plan recommended levels of snags and coarse woody debris would be met in the project area, including adequate recruitment trees.

While there would be no direct effects to forested vegetation from the no-action alternative, there would be indirect effects through continued insect and disease having a more widespread effect, causing a change to more HSS1 in Douglas-fir, lodgepole, and limber pine. Cumulative effects are summarized in a section below.

Fish and Wildlife – Existing Condition and Effects

Project design and analysis for wildlife was conducted for Management Indicator Species (MIS) and for the other emphasis species (Revised Forest Plan Appendix C). These represent surrogates for all rare or management focus species that could potentially inhabit the project area.

Of the six MIS listed in the Revised Forest Plan, elk, red squirrel, red-breasted nuthatch, and the Brewer's sparrow were best suited for use in analyzing effects of this project. The beaver and rainbow trout, while occurring in the project area, would not be measurably affected by the project activities, and thus were not considered in detail. Revised Forest Plan direction for MIS is to "provide ecological conditions and habitat to sustain viable populations" and to "maintain or improve habitat availability and quality when designing projects". Refer to the aquatics and wildlife specialist report in the project record for further information on analysis of MIS, existing conditions, and project effects to these and other emphasis species. Other fish species inhabiting the project area include brook trout and brown trout.

Habitat alterations (direct effects) from the proposed action would not reduce *elk security* habitat. Forest Plan direction is to maintain or increase this habitat. No harvest activities are

planned within existing elk security habitat. The current condition of motorized recreation use occurring on "closed" roads would be improved following project completion through improved road closure efforts on timber sale roads. No access currently open to the public would be further restricted or closed. Due to the improvements in closures, there is some potential elk security habitat that may be improved, or classified into existing elk security habitat, if closures are successful. These potential improvements would not happen under the no-action alternative, unless other funding emphasis is sought.

With temporary roads, only short-term (or indirect) disruptions to elk use of the project area are anticipated, with no variance in the levels of harvest obtainable on elk through hunting. The proposed action would not affect population levels of elk or their management with security habitat at the geographic area scale, or at the forest-wide scale. This project would not alter the dominant forces of winter range condition and hunter harvest that drive elk population levels.

Habitat (mature conifer) for the *red squirrel* and the *red-breasted nuthatch* is expected to be maintained at sufficient levels in the project area under the proposed action. Compliance with Forest Plan guidance on snags and coarse woody debris would maintain habitat components. HABCAP modeling for these two species was conducted for this project, as reported in the wildlife specialist report. This model compares existing forested habitat conditions in terms of HSS to conditions following implementation of the proposed action, in terms of direct effects. The result is a model index described as a percent of the optimal habitat for that species (100%). It must also be recognized that effective habitat management does not seek to maximize habitat for only one group of species, but should reflect a range of HSS to provide for long term representation of habitat types in the project area. Table 7 summarizes the existing and anticipated effects based on HABCAP values.

Table 7. HABCAP Values for the Red Squirrel and Red-breasted Nuthatch in the Project Area from Proposed Action.

Red Squirrel

Alternative	Project Area	Tensleep Creek Geographic Area	Forest-wide
No-Action (Existing Condition)	60%	70%	71%
Proposed Action	54%	68%	71%

Red-breasted Nuthatch

Alternative	Project Area	Tensleep Creek Geographic Area	Forest-wide
No-Action (Existing Condition)	39%	52%	47%
Proposed Action	34%	49%	47%

Based on the minimal habitat effects found, there would be no measurable change in population levels at the geographic area or forest-wide scale from this project for these two species. There is potential for greater reductions in habitat occurring indirectly through the No-Action alternative due to insect-related mortality that is occurring in Douglas-fir stands, creating stand openings and resulting in younger stands in time. Refer also to the discussion under the Forested Vegetation section above with regards to snags and coarse woody debris, which are important habitat elements for these two species. While there may be short term disruptions (indirect effects) of either of these species' use of the stands treated, a mature forested canopy would also be retained in most treatments, providing potential habitat to continue.

Sagebrush habitat for the *Brewer's sparrow* is currently dominated by mature and decadent canopy cover conditions, as described previously with the Fire Regime and Condition Class. Sagebrush habitat is at risk from widespread loss to wildfire in the project area due to past suppression of wildfires. Sagebrush canopy covers in the project area were mapped using field inventory and aerial photo interpretation, due to the interest in benefiting management for sage dependent wildlife species. The results of this inventory and the anticipated changes following direct effects of the proposed action are described in Table 8.

Table 8. Existing and Anticipated Sagebrush Canopy Cover in the Project Area.

Sagebrush Canopy Density	Acres Existing (% Total)	Acres Anticipated in 10 Years (% Total)
High (>35% canopy cover)	8,200 (56%)	4,365 (30%)
Medium (11-34% canopy cover)	4,665 (32%)	7,300 (50%)
Low (<10% canopy cover)	1,800 (12%)	3,000 (20%)

It is anticipated that project implementation would achieve better diversity in the age classes of sagebrush. Prescribed fire treatments would be managed to be within the guidelines established in the Connelley et al (2000) publication for managing sage grouse habitat, as described in the design criteria above. Sage grouse, a sensitive species also within the project area, require similar habitat to the Brewer's sparrow. While there may be short term changes to the age-class distribution of sagebrush, with corresponding disruption in the use of habitat by Brewer's sparrow or other sage dependent species, long term sustainability of this important habitat type is better provided through the proposed action as compared to the No-Action alternative. There may be short term population effects in terms of distribution or abundance at the local project scale through indirect effects of disturbance, however there should be no detectable change (due to matters of scale) at the forestwide population level for Brewer's sparrow. Long term population stability is more likely with the proposed action. No cumulative effects as assessed in the specialist report were found that would indicate this project would cause a detriment for these species when considered with others. Cumulative effects assessed in the specialist report did not show any detriment from this project to these species. In summary, the

proposed action would meet the Revised Forest Plan goals and objectives for MIS, and management direction in the Plan.

Threatened, Endangered, Sensitive Species – Existing Condition and Effects

Forest Service policy is to protect the habitats of federally listed (threatened or endangered) species, or those proposed and candidate species, from adverse habitat modification or destruction, as well as to protect individual organisms from harm or harassment. The Forest received a list of species from the US Fish and Wildlife Service to consider for projects, dated April 18th, 2006. The list included the Canada lynx and the bald eagle. The project does not take place within any identified lynx habitat, lynx are not known to occur in the project area or on the Forest, and the project does not take place in key linkage corridors. There are no known bald eagle roosts or nests in the project area or on the Forest. Proposed disturbances would not measurably affect potential foraging habitat for eagles. Due to this "no effect" determination, these two species will not be discussed further in this analysis.

Forest Service sensitive species are designated by the Regional Forester, and comprise a list of species for which viability may be of concern. Surveys for sensitive plant and wildlife species occurred for this project. A Biological Evaluation (refer to the project record) was prepared for the project to analyze the effects to threatened, endangered, and sensitive species. These findings with their associated determinations for the species are summarized in the table in Appendix 3. Conservation measures were incorporated into project design to mitigate potential adverse effects to potential habitat or species' occurrences.

Though effects to individual species varied, the proposed action was not found to lead to a trend toward federal listing of any sensitive species, and was found to have no effect on any threatened or endangered species. A similar determination would accompany the no-action alternative, as there would still be habitat changes over time due to insect and disease mortality, and potential disruption of large habitat areas from wildfire.

Noxious Weeds – Existing Condition and Effects

The proposed project area currently contains 10 identified noxious weed species. Approximately 340 acres were treated in 2004 and 2005 through the contractual agreement with Washakie County Weed and Pest District. Weed infestations are currently being recorded and mapped through a Geographical Information System (GIS) database. There are likely more acres infested than those actually treated, however a reliable inventory is difficult to obtain as weeds often occur in small patches or clusters that are difficult to detect, and may remain "hidden" until a disturbance event occurs that favors their expansion. A large portion of the Southwest Fuels project area was surveyed in 2005 for noxious weeds by a contractor, contributing to the knowledge base of existing infestations.

With the additional mechanical treatments and prescribed burning associated with this project, there is an opportunity that noxious weeds could increase. Mitigation and prevention measures were incorporated into the design criteria. With the no-action alternative, weeds are still likely to increase given the ongoing disturbances from recreation, wildlife, and livestock use in the project area. In addition, under the no-action alternative, more severe wildfires would have the opportunity to indirectly affect and expand weed populations as fires would likely be larger and more severe, creating ideal conditions for weeds to expand. Noxious weeds are a threat to native wildlife and plant habitat that the Forest considers a serious management issue.

Livestock Grazing – Existing Condition and Effects

Livestock grazing has been occurring in the project area for over a century. Stocking rates have been greatly reduced from historic levels, resulting in the improved condition of rangeland vegetation. Table 9 summarizes the allotments and associated permitted animal months of grazing within the project area.

Table 9. Livestock Grazing Allotments and Permitted Grazing in the Project Area.

Allotment	Permitted Livestock #	Allotment Total Acres	AMP scheduled Revision
Dry Tensleep C&H	1,814	5,466	2009
Hazelton S&G	612	5,954	2009
Monument C&H	998	3,643	2009
North Canyon C&H	3,368	13,384	2009
Powder River C&H	1,086	8,680	1998
South Canyon C&H	1,877	14,097	2009
Tensleep Canyon C&H	699	2,671	2009
TOTAL	10,453	53,895	

Note: The total allotment acres exceed the project area acres as allotments extend beyond the project area. There is an additional allotment in the project area with no permitted numbers as it is used in conjunction with other allotments.

Livestock grazing management is addressed in Forest Plan and Allotment Management Plan (AMP) direction. There would be no direct effects in permitted levels of grazing likely to occur from the proposed action, or the no-action alternative.

Livestock grazing would be indirectly affected by the proposed actions. In anticipation of the prescribed burning, upgrading of several structural range improvements were deemed necessary to facilitate improved distribution of livestock given the rest that is necessary for burning. These are listed in Appendix 1. As proposed improvements would be constructed following Revised Forest Plan standards and guidelines, there would be minimal, if any impacts to other resources. Scheduling of prescribed burning will be necessary to ensure adequate rest/deferment occurs on the pastures to be burned to provide adequate fine fuels for the burn, and for recovery to occur following the burn. In general, there will be an indirect benefit to livestock grazing opportunity in the project area due to the improvements and the prescribed burning that would generate improved forage availability. The no-action alternative would

not allow for the indirect improvements to occur. Indirect effects from the proposed action (harvest and burning) could result in damage to range improvements or natural barriers, resulting in the need to repair these conditions. There were no cumulative effects found from the proposed action that would further impact the livestock grazing resource. For further details, refer to the project record specialist report.

Roads and Roadless Areas – Existing Condition and Effects

The major roads of Highway 16, West Tensleep road, High Park road, Goldmine road, Canyon Creek road, and the old Tensleep Highway characterize the major access routes in the project area. The majority of roads in the project area are either Maintenance Level 2 roads (unimproved, native surface) or Level 1 roads (closed, administrative use only). There are approximately 13 miles of user-created roads in the project area.

There are two areas with high concentration of Level 1 roads from past timber sale activities. These areas were identified as an issue due to the unauthorized use of motor vehicles on these roads, affecting wildlife habitat and watershed resources. In addition, several roads and stream/road crossings in the project area are in need of heavy maintenance due to poor design and/or heavy use over time. All Level 1 roads within timber sale harvest areas, or those used to access them, would be effectively decommissioned following harvest and regeneration activities, with the exception of the 429/434 road spur accessing the Leigh Creek Vees, which would be left as a Level 1 road (closed but available for administrative use), and road spur 434 that accesses the Rice Cabin. A list of road maintenance needs occurs in Appendix 2. These heavy maintenance and closure activities would be delayed for an unknown period of time under the no-action alternative due to lack of funding and project implementation emphasis.

No closures of existing open roads (Level 2) or unclassified (user-created) roads would occur with the proposed action. Temporary roads and roads planned for decommissioning would be decommissioned following harvest activities, however use of Level 1 and Level 2 roads would occur for approximately ten years associated with timber sale activities to allow for reforestation needs, and prescribed burning where feasible. There would be no indirect effects to the authorized motorized route use in the project area.

A specialist report for Roadless Area analysis was conducted for this project. During initial project analysis, the Forest was able to implement roadless direction according to the Revised Forest Plan (2005) and the roadless inventory developed for that effort. Then, in September 2006, the Roadless Area Conservation Rule (RACR 2001) was put back in effect by court order. Analysis was conducted under both sets of direction, so that whichever rule was in effect during the time a decision was made, the project could be implemented. This did not necessitate an additional alternative being considered, but the decision to be made would just need to be compliant with current direction. If the Revised Plan direction is applicable, the proposed action could go forth as described above with minimal and non-significant intrusions into the 2005 Inventoried Roadless Area that occurs in the project area. These minor intrusions would be allowed under Revised Forest Plan direction.

However, if the RACR direction is applicable, the commercial harvest proposed in Douglas-fir stands to benefit aspen in the Childs Creek area would not be implemented due to conflicts with the roadless rule. Other intrusions into the RACR roadless area in the project would occur, but all are minor and are within exceptions identified within the rule. These exceptions include no new road construction, harvest within previously harvested and roaded areas (upper Leigh Creek lodgepole pine unit of ~100 acres), harvest that is incidental to management treatment (15 acres in Squaw Cr. to establish fuel break for prescribed burning), and cutting/removal (non-commercial) of small diameter trees for fuels and ecosystem maintenance purposes (small tree and brush removal by Tensleep fish hatchery and campgrounds).

These effects to both the 2005 roadless area and the RACR roadless area would not occur under the no-action alternative.

Cumulative effects to roadless areas include ongoing recreational and livestock administration use within the roadless areas. Unauthorized motorized use on closed roads is occurring and may not be effectively managed under the no-action alternative due to lack of emphasis to more effectively close these closed roads. Indirect effects of the proposed action would include a positive benefit of more effectively closing these roads. A Roads Analysis was also conducted for this project as in the project record, and included some cumulative effects.

Scenery – Existing Condition and Effects

The dominant features of scenery in the project area relate to the natural features of the landscape. Tensleep Canyon is perhaps the most scenic area, with a scenic byway (Highway 16) crossing throughout the project area. In addition, scenic vistas are often enjoyed from the High Park lookout, and from other main roads (FR 25/452, FR 18) within the project area. Impacts to scenery are attributed to both natural changes (insect and disease mortality of forested vegetation, wildfire) and management related effects (timber harvest, prescribed burning). Scenic viewing of the landscape is often a primary recreation use on the Forest.

As prescribed burning mimics wildfire events in terms of direct or indirect effects to scenic integrity, there were no mitigating factors applied to this component of the proposed action as natural appearing mosaics would be achieved. Wildfire, under the no-action alternative, may have the potential to impact greater acreage as compared to the proposed action, due to the higher levels of fuel loadings maintained.

Concerns with mechanical harvest or non-commercial thinning were addressed through the addition of design criteria as described previously in the alternative section, and through silvicultural prescriptions. With these criteria applied, it is anticipated that project implementation would maintain the

scenic integrity objectives of the visual resources as described in the Revised Forest Plan. One proposed mechanical harvest within the "seen area" (in Mgt. Area 4.2) of Highway 16 is the Douglas-fir treatment in Squaw Creek, which should maintain visual quality as it will not be a "clear-cut", but will significantly thin the stand. The treatment at this site is only 15 acres, further limiting its visual impact. The other mechanical entry into a "seen area" (in Mgt. Area 4.2) would be near the junction of Hwy. 16 and Road 25, which would similarly employ either shelterwood or small group selection harvests, rather than clear-cut techniques to treat timber, totaling less than 50 acres within the "seen area". Both of these treatment areas would likely show signs of widespread mortality under the no action alternative due to insect and disease activity in the stands.

Finally, the Revised Plan also contains direction for roads that receive high volume use, other than the highways. The main travel route to the Canyon Creek Country estates (FDR 25/452) is one of these roads. Mechanical treatments along this road will be conducted primarily through thinning (e.g. shelterwood harvests, commercial thinning) to maintain a mature overstory, and yet reduce fuels for public and firefighter access and safety. Activity fuels would be treated primarily through piling and burning. This type of treatment will also blend in with other treatments (past timber sales) along this road and the seen areas from it.

In general, short term impacts to scenery would occur with the proposed action from mechanical harvest and prescribed burning. However, mitigation applied would result in effects comparable to those anticipated in the Revised Forest Plan and FEIS, to which this analysis is tiered. Cumulative effects to scenery may occur within the project area from recreation use and livestock grazing, however the proposed action would not contribute significantly towards those ongoing effects. Refer to the cumulative effects section below.

Watershed and Soils – Existing Condition and Effects

The focal elements of analysis under this topic will be on soils (erosion potential), riparian areas (condition), and water yield.

For a list of the several different soil types that occur within the project area, refer to the soils/aquatics specialist report in the project record. Based on the landslide map developed by the Wyoming State Geological Survey, there are a number of different landslide combinations that are within the project area. The proposed activities will have minimal effects on soils within the project area with implementation of Revised Forest Plan direction (Riparian Forest-wide Direction, Watershed Conservation Practices Handbook). The application of these BMPs would be sufficient to prevent displacement, compaction, or surface erosion, and have been shown to have a high rate of success and effectiveness in past studies as referred to in the Revised Forest Plan and FEIS, to which this analysis is tiered.

Riparian areas, wetlands, and floodplains help to maintain water quality and stream conditions. They also buffer fluctuations in water yield and erosion, thereby aiding in the maintenance of stream stability. Fire is assumed to play a natural role in the riparian zones within the project area, but tremendous variation exists among riparian areas of a stream network and is dependent upon local conditions and position in the watershed (Dwire and Kauffman 2003). The processes that may detrimentally affect riparian zones are stand replacing, high intensity and high severity wildland fires. The chances of this type of fire increase without prescribed burning. Therefore, the proposed action may have reduced effects over the long term, as compared to the no action alternative.

The proposed action is not expected to cause sufficient changes in sediment delivery, peak flow, riparian condition, or channel stability to create destabilizing effects on channel equilibrium. Stream channels in the analysis area would be expected to maintain their natural form and function following the implementation of the proposed action. Prescribed burning is expected to be a beneficial impact to the watershed by lowering the potential of a high severity, high intensity wildland fire. Implementation of riparian management direction from the Revised Plan (100' and 300' streamside management zones) would minimize any adverse effects from proposed mechanical harvest. No geomorphic response is expected in the channels located in the cumulative effects watersheds. The indirect effects on sediment, peak flows, riparian, and large organic debris is not expected to increase to a point where channel adjustment would occur. While short term increases in sediment may occur from watershed improvements conducted (road and stream crossing improvements), long term benefits in the form of stabilized streambanks and reduced sediment would occur.

Based on current research, water yield may increase from the proposed action due to a loss of vegetation from prescribed fire and silvicultural activities in the analysis area, but these yields will not be detectable in the amount of water generated by the watershed, the duration of flows in the near bankfull range, or extreme peaks during spring runoff. This information is consistent with what has been observed to occur in other watersheds within the snow zone of the Rocky Mountains (Troendle et al. 2001, Ziemer 1986). There would be no change to water yield under the no-action alternative.

The no-action alternative would have no direct effects on soils, but may have potential indirect effects if more widespread wildfire with high intensity and severity should occur as compared to the proposed action.

Cumulative effects associated with watershed conditions were assessed as described below. There were no findings where the proposed action would detrimentally contribute to watershed conditions with past, ongoing or known future activities.

Economics

There are two realms of economic consequences which need disclosure - efficiency and impacts. **Efficiency** considers the benefits and costs over time and expresses the net benefits of the sale. Two efficiency analyses are considered for this project: financial and economic. *Financial efficiency* considers the revenues and costs of each alternative from the standpoint of the agency. Economic efficiency considers the benefits

(market and non-market) and costs of each alternative from the standpoint of society as a whole. Both these analyses are expressed in terms of Present Net Value (PNV).

Consistent with economic analysis standards, both analyses start from the decision point of the project; that is, all prior costs, benefits, revenues, and consequences (including this NEPA analysis) are "sunk" and not considered. Inflation is not considered in either analysis. Only real (constant) 2006 prices and a 4% discount rate are used in the efficiency analyses. The Quicksilver economic analysis program was used for calculations.

The financial and economic efficiency analyses results show a PNV of $47, 889 for financial efficiency, and a PNV of -$32, 474 for economic efficiency for the proposed action. There is no PNV associated with the no action alternative. The PNV figures are tied to the approximate 8 MMBF of timber to be harvested.

Economic impacts consider the local employment and income consequences of each alternative. These are expressed in jobs and employee compensation. Local is defined here as the larger Bighorn area of Big Horn, Johnson, Sheridan, and Washakie counties. The Revised Forest Plan FEIS includes both social and economic analyses at the four county scale, to which this analysis is tiered.

The direct and indirect effects analysis indicates that local income and employment will be affected by the timber harvest and processing. There is no change expected in Animal Unit Months of grazing. As portrayed in the Revised Forest Plan FEIS, to determine the economic impacts of timber harvest, for every MMBF processed, 9 jobs and $222,361 of personal income are supported. The base assumptions for the timber valuation are found on pages 3-498 to 500. For the proposed action, there would be 72 jobs sustained, with $1,779,000 personal income supported from the approximate 8 MMBF produced. These outputs would not occur with the no-action alternative.

In terms of cumulative effects, the Revised Forest Plan projected a sawtimber output of about 5-6 MMBF annually, applicable to the four county area considered for economics. The SW Fuels timber offer is approximately one year’s worth of Bighorn NF sawtimber offer.

Cumulative economic effects of this project combined with other recreation projects were considered. Concerning past activities' effects upon the economics of hunting use, the Wildlife Task Force report (1991) documents that past timber harvest and road building have resulted in reduced hunter days.

The SW Fuels alternatives create no direct or indirect range economic effects that could be combined with economic effects caused by other range activities. There are no cumulative range economic effects.

Cumulative Effects Summary

Cumulative effects were assessed for the project area, and for the Tensleep Watershed where necessary. They include past, present, and reasonably foreseeable future actions. This report is contained within the project record. The proposed action was not found to have cumulative effects that would impact any resource analyzed above those that are already occurring in the project area or that have been analyzed through the Revised Forest Plan and FEIS, to which this analysis is tiered. Many of the features of the proposed action would reduce cumulative effects that are ongoing, such as through watershed improvements, more effective road closures, and reduced opportunities for catastrophic wildfire. The no action alternative may have fewer short term cumulative effects, but would likely result in greater long term cumulative effects due primarily to the potential for more widespread wildfire.

CONSISTENCY WITH OTHER LAWS AND REGULATIONS

Flood Plains, Wetlands, or Municipal Watersheds

The project will result in no net loss of wetlands and no alteration of the current floodplains. The project will not adversely affect a municipal watershed.

Congressionally Designated or Special Emphasis Areas

This project does not propose actions in wilderness, wilderness study areas, or National Recreation Areas. Roadless areas would be affected as described previously, however not to the extent that significant degradation results that would affect the long term viability of the roadless area. The proposed prescribed burning could occur within the Leigh Creek Research Natural Area, however no commercial harvest would occur in this area. The prescribed burning is being done to maintain more natural vegetation conditions in terms of fire regime and condition class, and therefore would not have any negative effect on the RNA. Prescribed burning is allowed within the Revised Forest Plan for RNAs. An establishment record has not been written for this RNA.

American Indians and Alaska Native Religious or Cultural Sites

No known cultural resources will be affected. Tribal consultation was conducted through project scoping as documented in the project record, and no issues were identified by the tribes.

Clean Water Act (1948) and Amendments (1972)

The design of all activities is in accordance with Revised Forest Plan standards and guidelines, Soil and Water Conservation Practices Best Management Practices, and applicable Forest Service Manual direction (Forest Service Manual 2532.02, Water Quality Management). The project activities are expected to meet or exceed all applicable Best Management Practices listed at 33 CFR 323.4(a) and Soil and Water Conservation Practices (FSH 2509.22). Where required, permits would be obtained under Section 404 of the Clean Water Act. For further information, refer to the aquatics specialist report in the project record.

Clean Air Act (1972)

Emissions anticipated from the implementation of any project alternative would be of short duration and designed to comply with the Wyoming Department of Environmental Quality ambient air quality standards. Compliance with the WYDEQ smoke management process has been implemented successfully with all other prescribed burn projects on the Forest to date, and compliance with these regulations would continue. Smoke issues to be tracked through the burning process may involve mitigating impacts to nearby residences in Tensleep Canyon, and motor vehicle safety on Highway 16. Therefore, this project would be in compliance with the Clean Air Act.

Forest and Rangeland Renewable Resource Act (1974)

This project is consistent with the Revised Forest Plan (2005). The Forest and Rangeland Renewable Resources Planning Act is analyzed and implemented in the Forest Plan.

National Historic Preservation Act

The project will not adversely impact any recorded historic sites. If any previously undiscovered historic properties are encountered during project implementation, the Forest archaeologist will be notified immediately and the area protected from further disturbance until a determination can be made on the newly discovered sites. Class II and Class III surveys were conducted by archaeologists, and the State Historic Preservation Office (SHPO) concurred with the findings of no adverse impacts. Surveys will be ongoing for prescribed burning on an as needed basis to comply with the Programmatic Agreement for prescribed burning developed between the Forest Service and SHPO. All mechanical harvest projects, range improvement projects, and road improvement sites have been cleared with Class III surveys as prescribed by SHPO.

Statement of Environmental Justice:

Members of the ID Team considered the scope of impacts that could be experienced by minority recreationists. The best statistical information regarding diversity of recreationists on the Bighorn National Forest is found in the Bighorn National Forest's Visitor Use Monitoring report.

Table 11. Visits to National Forest by racial group.

Category	National Forest visits (%)
Black/African American	0.0
Asian	0.1
White	97.6
American Indian/Alaska Native	0.3
Native Hawaiian or Other Pacific Islander	0.0
Spanish, Hispanic, or Latino	0.4
Other	1.6

The communities surrounding the analysis area are not considered minority or low income and do not have significant disabled populations. There is no reason to anticipate, based on public comment, past Bighorn NF actions, or any published literature, that any disproportionate effects to minority or low income populations would occur with implementation of the proposed action.

AGENCIES AND PERSONS CONSULTED

The project record contains a list of individuals, federal, state, and local agencies, tribes and non-Forest Service persons the Forest Service consulted during the development of this EA. A collaboration group was formed to guide the development of this project, with meetings held to refine the proposed action and to inform these individuals of potential effects.

REFERENCES

Beschta, R.L. et al. 2004. The effects of postfire salvage logging on aquatic ecosystems in the American West. Bioscience. Vol. 54, no. 11. p. 1029-1033.

Connelly et al. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985

Cram, D.S. et al. 2006. Wildland Fire Effects in Silviculturally Treated vs. Untreated Stands of new Mexico and Arizona. USDA Forest Service RMRS-RP-55.

Dwire, K.A. and J.B. Kauffman. 2003. Fire and riparian ecosystems in landscapes of the western USA. Forest Ecology an Management 178:61-74.

Graham, Dr. R.T. et al. 2004. Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity. USDA Forest Service RMRS-GTR-120. 43 pp.

Omi, P.N. et al. 2006. Effectiveness of Pre-Fire Fuel Treatments. Final Report JFSP Project 03-2-2-07. 29 pp.

Rhodes, J. J. 2004. Declaration of Jonathan Rhodes. In Friends of Clearwater et al v. Lohn (NOAA). Civ. No. 04-1383Z.

Troendle, C.A., M.S. Wilcox, and G.S. Bevenger. 2001. The Coon Creek water yield augmentation project: implementation of timber harvest technology to increase streamflow. Forest Ecology and Management 143: 179-187.

USDA Forest Service. 2002. Tensleep Assessment Area CEEM Assessment. 105 pp. Unpublished Report. On file at Sheridan and Buffalo USFS offices.

USDA Forest Service. 2005. Revised Bighorn National Forest Land and Resource Management Plan and Final Environmental Impact Statement. Lakewood, CO. On file at Sheridan USFS office.

USDI Fish and Wildlife Service. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. Salt Lake City, UT. 30pp.

USDI Fish and Wildlife Service. 2006. Letter to Bighorn NF displaying T&E species necessary for project analysis.

Wyoming Department of Environmental Quality. 1997. Best Management Practices for Forestry. Cheyenne, WY.

Ziemer, R. R. 1986. Water yields from forests: an agnostic view. California Watershed Management Conference, November 18-20. West Sacramento, CA. 5 pages.

Appendix 1
Southwest Fuels Project

Refer to Range Improvement Files (2240) in District Files for further description.

Improvement #	Improvement Name	Project Description
Dry Tensleep		
502-006	Zaybrook Spring	Install new stock tank
502-008	Lone Tree Spring	Re-set stock tank with new overflow and pipe from storage tank
502-030	Corner Spring	reconstruct with new stock tank in SW corner
502-097	Antelope Pipeline	Replace Stock Pipeline
502-166a	Warner Ridge Pipeline, to Dry Tensleep Tank North	Replace Stock Pipeline
502-166b	Warner Ridge Pipeline & Tank East	Replace Stock Pipeline
502-166c	Warner Ridge Pipeline & Lonetree Tank	Replace Stock Pipeline
502-168	Zaybrook Spring North	Repair and install new tank
502-168a	Zaybrook Spring North overflow tank	install pipeline and new tank from 168 to Lower Zaybrook Pasture
Tensleep Canyon		
507066	Willow Spring	Install new stock tank and rebuild exclosure
507102	Willow Springs Pipeline and Tank	Replace pipeline and stock tank
507129	South Pasture Division Fence	Reconstruct permanent fence
507131	Willow Spring Riparian Fence	construct permanent 2-wire electric let-down
N Canyon		
504171	Bull Creek Tree Fence	move to logging road
504202	Rice Cow Camp Pipeline and Tank a at horse pasture	new tank behind gate above cow camp
504203	Rice Cow Camp Pipeline and Tank b	New tank at cow camp from proposed 504202 pipeline
504205	Timber Sale pipeline & tank	pipeline from Bull Creek to Timber Sale area
S Canyon		
505110	Child's Creek Pipeline replace with 2" and bury	replace with 2" and bury
505120d	Sand Draw Butte Pipeline	Extend to a new stock tank d
505128	Sand Draw Horse Pasture	Enlarge with additional fence
505615	Prospect Ridge Spring	Construct new
505616	Childs Creek Rim Fence	Construct new
505617	Childs Creek Electric Temporary Fence	Construct new
508130c	Upper Trails Pipeline	Replacement

Appendix 2
Southwest Fuels Road Improvement Sites

The following sites have road conditions that do not meet current Forest Plan Standards and Guidelines or Wyoming Department of Environmental Quality Best Management Practices (BMPs). Measures are proposed for implementation at each site as described below. Most of these activities are normally categorically excluded from documentation in a NEPA analysis, due to the small scale in disturbance that the activities generate for routine maintenance. However, since a watershed inventory was conducted in support of this project and its analysis, the following opportunities were summarized to ensure their consideration in project implementation, as normally funding is sparse to target these type of maintenance activities. This list was modified in response to public scoping conducted for the project. See the attached Road Treatment Areas map for reference.

Site 1: Roads 414 and 410 are contributors of sediment into the South Fork of Brokenback Creek. Culverts are needed to reduce or eliminate impacts.

Site 2: Road 426 into Big Horn Mountain Resort becomes plugged with ice during the winter months and causes overtopping of the road by spring high water flow. If the current culvert replacement does not suffice, road relocation may be necessary.

Site 3: Stovepipe Road (user-created, non system) is located near Stovepipe Creek, and is generating substantial sediment through unauthorized use. Reinforcement of existing closure or more effective decomissioning is necessary.

Site 4: The network of closed system roads stemming from road 420 was constructed for past timber sales and is receiving motorized use during the fall hunting season, causing erosion and sedimentation. Improvement of existing closures through proper decommissioning would be conducted following mechanical harvest in this area.

Site 5: Road number 440.01 is currently closed, but is being traveled by unauthorized motor vehicles. The road crossing at the headwater section of Canyon Creek is causing sedimentation to the creek. An additional user-created route has also been created on the east side of Canyon Creek. Improvement of existing closures would be conducted to prevent use of stream crossing.

Site 6: The Gold Mine Road, road number 452, has a low water crossing on Canyon Creek approximately .25 miles from its junction with road 25. Approaches to the crossing are on steep hill slopes that provide a direct source of sediment from the road. A bottomless arch culvert or additional waterbars and relief culverts before the crossing are necessary at this site.

Site 7: Old Highway 16, road number 18, has two perennial crossings, one on Indian Creek, and one on Squaw Creek. Culverts appear to be undersized at those crossings and are causing some erosion of the road fill material. Upgrading culverts is necessary, and may be conducted in association with mechanical harvest activities.

Site 8: This closed road on Leigh Creek Vee has a high erosion potential due to the steep slope and lack of vegetation on the road surface, and runs directly into Tepee Creek, causing sedimentation. Water bars and seeding are likely to improve road conditions. In addition, closed roads located in the past Tepee timber sale are proposed to be effectively decomissioned upon completion of proposed salvage harvest activities to reduce unauthorized use of motor vehicles and erosion. The only roads that would remain as a Level 1 road (rather than decomissioned) in this group of past timber sale roads, are roads

429 and 434 that lead out to the Leigh Creek Vees, and would remain as a Level 1 road for administrative use purposes to access a weather station and range allotment improvements. The current gate location may be modified to more effectively close this road.

Site 9: Road number 436.03, west of road number 25, provides access to the Canyon Creek cow camp and is used heavily by recreationists. Along the first 1/2 mile, the road is steep and narrow in places, posing an unsafe or hazardous condition, and causing substantial erosion. Beyond Canyon Creek cow camp, there are two stream crossings generating substantial sediment. Maintenance including culvert installations may be needed along the first half mile, and bottomless arch culverts may be installed at the Canyon Creek stream crossings with minor road realignment, and culvert replacement at Prospect Creek.

Site 10: Road number 436.03/436.04 is being used to access the Gold Mine Road (road number 452) to/from road number 25. The road is adjacent to and in contact with an intermittent, spring fed, stream channel for most of its length. The road is approximately .75 miles and is an impact to the aquatic resources of Canyon Creek drainage. Heavy maintenance including surfacing, culverts, and/or relocation of the road is proposed.

Site 11: Road 501 was proposed for closure in the original scoping document. However, since this is not a travel management project and this is a Level 2 road, this closure would not occur with this decision. Travel management in the watershed may occur in the near future due to public interest.

Site 12: The Childs Creek crossing on road number 436.01 receives a high level of use by recreationists and permittees, with sedimentation occurring. Proposed treatment includes upsizing and realignment of culvert with crossing constructed using a viable fill material.

Site 13: There is a previously used gravel pit in this area that is proposed for use to obtain surfacing and fill material necessary for road improvements planned in this area. In addition, there may be other previously used gravel pits in the project area needed for road improvements necessary to reduce erosion, primarily along roads 25/452.

Appendix 3
Summary of Sensitive Species Analyzed and Determinations

Common Name	Scientific Name	Habitat	Species Occurrence on Forest
Fish			
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*	Riverine	Known to streams and lakes in limited areas.
Mountain Sucker	*Catostomus platyrhynchus*	Riverine	Known to Tongue River drainage and Kearney Reservoir.
Amphibians			
Northern leopard frog	*Rana pipiens*	Ponds/wetland/ riparian	Known to limited areas.
Columbia spotted frog	*Rana luteiventris*	Ponds/wetland/ riparian	Known to limited areas.
Wood frog	*Rana sylvatica*	Ponds/wetland riparian	Known to limited areas.
Mammals			
Fringed myotis	*Myotis thysanodes*	Caves/mines & forested areas	Known to limited sites.
Spotted bat	*Euderma maculatum*	Caves/mines & forested areas	None known, but locations near Forest and potential habitat.
Townsend's big-eared bat	*Corynorhinus townsendii*	Caves/mines	Known to limited sites.
Water vole	*Microtus richardsoni*	Riparian	Known to limited sites.
American marten	*Martes americana*	Late-successional conifer and riparian	Known to several areas.
Wolverine	*Gulo gulo*	Spruce-fir/alpine tundra	Historic/Potential with uncommon but recent sightings.
Birds			
Harlequin duck	*Histrionicus histrionicus*	Riverine	Historic/Potential as sighted nearby.
Northern harrier	*Circus cyaneus*	Grasslands/shrub-steppe	Known with many observations in mountain meadows.
Northern goshawk	*Accipiter gentilis*	Mature conifer/aspen	Known with several nesting areas.
Peregrine falcon	*Falco peregrinus anatum*	Canyons/cliffs/ riparian	Known, though sporadic but historic nesting on Forest.
Greater sage grouse	*Centrocercus urophasianus*	Sagebrush	No leks (breeding) on Forest. Late summer brood rearing primarily on west side of Forest.
Flammulated owl	*Otus flammeolus*	Mature ponderosa/ aspen	None currently known on Forest, though north of it. Limited potential habitat.
Short-eared owl	*Asio flammeus*	Grassland/sage steppe	Known/historic, though somewhat limited potential.
Boreal owl	*Aegolius funereus*	Mature conifer	Known, but from very limited sightings.
Lewis' woodpecker	*Melanerpes lewis*	Conifer/riparian	Known, but from limited sightings.
Three-toed woodpecker	*Picoides tridactylus*	Mature conifer	Known to several areas of Forest.
Olive-sided flycatcher	*Contupus cooperi*	Mature conifer	Known to several areas of Forest.
Loggerhead shrike	*Lanius ludovicianus*	Grassland	Known on fringes of Forest where meadows occur.
Brewer's sparrow	*Spizella breweri*	Sage steppe	Known to several areas of Forest.
Sage sparrow	*Amphispiza bellii*	Sage steppe	None known on Forest, but potential.

Common Name	Scientific Name	Habitat	Species Occurrence on Forest
Grasshopper sparrow	*Ammodramus savannarum*	Grasslands	Known from limited sightings.
Plants			
Leathery grapefern	*Botrychium multifidum*	Wet meadows	Known from 1 occurrence on Forest.
Mountain lady's slipper	*Cypripedium montanum*	Shady forests and riparian shrublands at mid-elevations.	Known from 3 occurrences on Forest.
Yellow lady's slipper	*Cypripedium parviflorum*	Damp mossy forests, and streamsides at mid-elevations.	Known from 2 occurrences on Forest.
Russet cotton-grass	*Eriophorum chamissonis*	Montane swamps and bogs.	Known from 1 occurrence on Forest.
Hall's fescue	*Festuca hallii*	Montane meadows	Known from 1 vague historical (1898) record.
Grass-of-parnassus	*Parnassia kotzebuei*	Moist seeps.	Known from 1 occurrence on Forest.
Cary beardtongue	*Penstemon caryi*	Disturbed areas on sedimentary soils.	Known from 14 occurrences on Forest.
White larchleaf beard-tongue	*Penstemon laricifolius ssp. exilifolius*	Rocky, calcareous hills, bare soils	Known adjacent to Forest with potential habitat on Forest.
Wooly twinpod	*Physaria didymocarpa var. lanata*	Rocky outcrops and rocky soil, without dense grass or shrub cover. Forested areas.	Known from 3 occurrences on Forest.
Tranquil golden-weed	*Pyrrocoma clementis var. villosa*	Sagebrush grasslands and montane meadows.	Known from 3 occurrences on Forest.
Northern blackberry	*Rubus arcticus ssp. acaulis*	Riparian area along Sourdough Creek	Known from 1 occurrence on Forest.
Lesser bladderpod	*Utricularia minor*	Submerged in ponds, slow moving streams	Known from 1 occurrence on Forest.

Summary of Determinations

Threatened Species:

Bald Eagle: The no action and proposed action would have **no effect** on this species.
Canada lynx: The no action and proposed action would have **no effect** on this species.

Forest Service Sensitive Species:

The no action and proposed action alternatives would likely have no impact on the following species:

Plants: *Botrychium multifidum, Eriophorum chamissonis, Festuca hallii, Parnassia kotzebuei, Rubus arcticus spp. acaulis, Utricularia minor*
Fish*:* mountain sucker, Yellowstone cutthroat trout
Amphibians*:* Northern leopard frog, spotted frog, wood frog.
Birds: Boreal owl, flammulated owl, harlequin duck , American three-toed woodpecker.
Mammals: Wolverine, Townsend's big-eared bat, fringed-tailed myotis, spotted bat, river otter, water vole.

The proposed action alternative **may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide** of any of the following sensitive species:

Plants: *Cypripedium parviflorum, Cypripedium montanum, Penstemon laricifolius spp. lexilifolius, Penstemon caryi, Physaria didymocarpa var. lanata, Pyrrocoma clementis s var. villosa.*
Birds: Peregrine falcon, greater sage grouse northern goshawk, olive-sided flycatcher, Brewer's sparrow, loggerhead shrike, Lewis' woodpecker, grasshopper sparrow, sage sparrow, short-eared owl, Northern harrier.
Mammals: Marten.

Refer to the Biological Evaluation contained in the project record for further analysis details. The determinations made in the Biological Evaluation are tiered to and incorporate the viability and impact analysis contained in the Revised Forest Plan FEIS.