Fiddlers Lake
Pre-decisional Environmental Assessment

May 2002

Shoshone National Forest - Washakie Ranger District
Fremont County, WY

Lead Agency: USDA Forest Service

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This document is available on the Internet:
http://www.fs.fed.us/r2/shoshone/forestmgt/nepa/projectinfo.htm

Abstract. This Environmental Assessment (EA) is a public document that will provide evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact. The proposed action is to harvest approximately 103 acres of timber to improve the visual quality of the Loop Road corridor in the vicinity of Fiddlers Lake and to improve the overall health and productivity of forest vegetation within the Atlantic analysis area. Vegetation management along the Loop Road would enhance the use of the Loop Road as a firebreak. There are three alternatives: Alternative 1 (proposed action), Alternative 2 (no action), and Alternative 3 (additional visual consideration). Proposed activities would occur in the Fiddlers Lake area approximately 16 miles south of Lander, WY.

Notice to Comment: This EA will be available for a 30-day public comment period, beginning May 8, 2002 and ending June 7, 2002. **All written comments must be postmarked no later than June 7, 2002.** Written comments may be submitted to Ellen Jungck at the address listed above. Reviewers should provide the Forest Service with their comments during the review period of the EA. We ask that comments be specific to the issues and actions identified in this EA.

Comments received in response to this solicitation, including names and addresses of those who comment, will be considered part of the public record on this proposed action, and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who submit only anonymous comments will not have standing to appeal the subsequent decision under 36 CFR Part 215. Additionally, pursuant to 7 CFR 1.27 (d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The Forest Service will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied, the agency will return the submission and notify the requester that the comments may be resubmitted with or without name and address within 10 days.

INTERDISCIPLINARY TEAM (IDT)

ID Team Member	Occupation	Team Responsibility
Steve Keller Allen Madril	Archaeologist Archaeologist	Cultural Resources (01/2000 – 10/2000) Cultural Resources (05/2001 – present)
Burns Davison	District Ranger	Decision Maker
Ray Zubik	Fisheries Biologist	Fisheries Resources
Jeff Hogenson	Forester	Forest Health/Diversity
Liz Oswald	Hydrologist	Hydrology
Brad Russell	Range Conservationist	Range Resources
Patrick Heuer Ellen Jungck	Forester Forester	Silviculture/Team Leader (01/2000 - 10/2000) Silviculture/Team Leader (07/2001 – present)
Kent Houston	Soil Scientist	Soil Resources/Noxious Weeds/Sensitive Plants
Chiara Palazzolo Vaughn Hintze	Landscape Architect Landscape Architect	Visual Resources (01/2000 - 10/2000) Visual Resources (11/2001 - present)
Mark Hinschberger	Wildlife Biologist	Wildlife Resources

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Chapter 1 Purpose of and Need for Action

1.1 Introduction and Project Location

An environmental assessment (EA) is not a decision document. It is a document disclosing the environmental consequences of implementing the proposed action and alternatives to that action. The decision is documented in a decision notice signed by the responsible official. A decision notice will be prepared and distributed, along with publication of a legal notice, after 30 days of public review and comment on the EA.

This EA describes the environmental effects of a proposal, as well as alternatives to it, to improve the visual quality along the Louis Lake Loop Road (FSR 300) and to improve the health and productivity of forest vegetation along the Loop Road near Fiddlers Lake on the Washakie District of the Shoshone National Forest (Forest).

The area proposed for treatment is approximately 16 miles south of Lander, WY. The legal description of the proposal is:

- Sections 22, 23, 26, 27, 34, 35, and 36, T.31N., R.101W., 6th P.M., Fremont County, Wyoming.

The area adopted for analysis in this EA corresponds to the Atlantic analysis area (analysis area) delineated in the Shoshone National Forest Land and Resource Management Plan. The analysis area is approximately 19,618 acres in size (*see* Appendix A, figures 1 and 2A). The Fiddlers Lake project area (project area) is approximately 1,440 acres in size, and lies approximately ½ mile on either side of the Loop Road within the Atlantic analysis area. Approximately 103 acres are proposed for treatment within the project area.

1.2 Tiering

This EA is tiered to the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Forest Land and Resource Management Plan (Forest Plan; USDA Forest Service, 1986) as amended by the Allowable Sale Quantity (ASQ) ROD (USDA Forest Service, 1994) and the Oil and Gas Leasing ROD (USDA Forest Service, 1995). All references are available at any of the Forest offices in Cody, Dubois, and Lander.

This EA also references the Fiddlers Lake project file (project file). The project file contains planning records and analyses related to this EA.

Tiering is done in accordance with CEQ regulations (40 CFR 1502.20 and 1508.28), which allows the responsible official to focus on site-specific issues that are within the scope of a broader plan, program, or analysis that is already approved. In this case, the Forest Plan (as amended) allocates lands to vegetation management, and prescribes standards and guidelines that apply. All alternatives, including the proposed action, are to be framed in the context of the Forest Plan management area direction. Standards and guidelines form the basis for how

projects are to be implemented to meet the management emphasis for an area, and to mitigate associated impacts. The primarily goal to be met drives alternatives, while application of existing standards and guidelines generally ensures that secondary goals and other resource needs are met.

1.3 Purpose of and Need for Action (40 CFR 1502.13)

1.3.1 Purpose of Action

The purpose for this proposal is to improve the visual quality of the Loop Road corridor near Fiddlers Lake and to improve the overall health and productivity of forest vegetation within the Atlantic analysis area. This would be accomplished by reducing the incidence of commandra rust and dwarf mistletoe in lodgepole stands, by increasing the age class/structural diversity of both conifer and hardwood stands, and by opening up views of ponds, Fiddlers Lake, and mountain vistas. Vegetation management along the Loop Road would reduce wildfire risk and enhance the use of the Loop Road as a firebreak.

Forest Plan Goals (Desired Future Condition). The purpose of the proposed action is derived from the following Forest Plan goals. Goals are numbered sequentially for this project; they do not refer to Forest Plan goal numbers:

- *Goal 1* - Improve tree age class and species diversity to benefit forest health, recreation experiences, visual quality, and wildlife habitat (Forest Plan III-8).
- *Goal 2* - Reduce damage by insect, disease, and other forest pests to acceptable levels through integrated management of vegetation (Forest Plan III-10).
- *Goal 3* - Reduce the accumulation of natural fuels (Forest Plan III-8).
- *Goal 4* - Manage the timber resources on lands suitable for timber management to provide saw timber, round wood, and firewood to meet resource management objectives (Forest Plan III-8).
- *Goal 5* - Manage vegetation types outside of wilderness to provide multiple benefits commensurate with land capability and resource demand (Forest Plan III-6).
- *Goal 6* - Improve the health and vigor of vegetation types outside wilderness and selected types in wilderness where necessary (Forest Plan III-6).
- *Goal 7* - Adopt visual quality objectives that will maintain or enhance the characteristic landscape of the Forest (Forest Plan III-7).
- *Goal 8* - Manage activities along travel routes to maintain and enhance recreation and scenic values (Forest Plan III-7).
- *Goal 9* - Integrate vegetation management with resource management in functional areas, range, recreation, timber, water, and wildlife (Forest Plan III-7).
- *Goal 10* – Improve habitats where vegetation conditions are significantly below biological potential (Forest Plan III-8).
- *Goal 11* - Maintain or improve soil productivity and water quality (Forest Plan III-8).
- *Goal 12* - Develop a transportation system that meets land and resource management needs at lowest cost and least disturbance to the environment (Forest Plan III-10).

Forest Plan Management Area Direction (Desired Future Condition).

Management areas provide further direction to guide activities within the forest. The Atlantic analysis area contains the following seven management areas (*see* Appendix A, figure 2D):

- 2A – Semi-primitive Motorized Recreation
- 2B – Rural and Roaded Natural Recreation
- 7E – Wood Fiber Production
- 8B – Primitive Wilderness
- 8C – Semi-primitive Wilderness
- 9A – Riparian Area Management
- 9E – Water Impoundment Sites

All of the proposed treatments fall within management areas 2B, 9A, and 9E. Table 1-1 summarizes the management emphasis for these three areas.

Table 1-1. *Forest Plan management areas and summaries that apply specifically to the proposed action*

Management Area	Emphasis Summary
2B (Forest Plan III-124)	Management emphasis is for rural and roaded natural recreation opportunities. Motorized and nonmotorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes to protect physical and biological resources. Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident or remain visually subordinate along forest arterial and collector roads and primary trails. In other portions of the area, management activities may dominate in foreground and middle ground, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is used. The harvest method by forest cover type is clear-cutting in aspen and lodgepole pine, shelterwood in mixed conifer and Englemann spruce-subalpine fir, and selected in all-aged mixed conifer and Englemann spruce-subalpine fir.
9A (Forest Plan III-207)	Resource use will be managed to protect and maintain the riparian area. Vegetation treatment will enhance plant and animal diversity. Primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided. This prescription applies to all riparian areas located anywhere on the Forest, except those in wilderness, research natural areas, and special interest areas.
9E (Forest Plan III-223)	Emphasis is on needed water impoundments where beneficial effects are demonstrated and water rights have been obtained.

Management direction (MD) specific to the proposed action is summarized below. Management directions are numbered sequentially for this project; they do not refer to Forest Plan management direction numbers:

- *MD-1.* Enhancing or providing more viewing opportunities and increase vegetation diversity in selected areas (Forest Plan III-125).
- *MD-2.* Using silvicultural and other management practices to promote and ensure enhancement of the visual resource:
    - Enhance diversity of trees in foreground areas by maintaining aspen in visually significant areas for fall, spring, and winter color.
    - Create enframement for distance views of panoramic scenery, focal points, meadows, rock outcrops, water bodies, and interesting landforms through vegetation management (Forest Plan III-126).
- *MD-3.* Managing tree stands using either commercial or noncommercial methods. Enhance visual quality, diversity, and insect and disease control (Forest Plan III-129).
- *MD-4.* Apply intermediate treatments to maintain growing stock level standards.
- *MD-5.* Providing roaded natural or rural recreation opportunities along forest development roads (Forest Plan III-127).

1.3.2 Need for Action

Existing Condition. The need for this proposal is evident by the existing condition of the identified stands. Much of the Loop Road has a 'tunnel effect.' Sapling and post and pole sized trees are dense and have stagnated growth. They are growing out into the road corridor, limiting sight distance of motorists, reducing the view into adjacent timbered stands and to Fiddlers Lake, and blocking the background view of distant mountain ranges (*see* Appendix A, figure 3).

Many lodgepole trees have dead tops from commandra rust, are heavily infected with mistletoe, are exhibiting significant net growth loss, and are in a general state of decline. Consequently, mortality within these stands is high and occurring on a regular basis (*see* Appendix A, figure 4). The result is increasing fuel accumulation and potential wildfire risk. In the absence of fire suppression these types of stands readily lend themselves to stand replacement by fire. Although lodgepole pine frequently depends on fire to regenerate itself naturally, silvicultural treatment can achieve similar results.

Because of the lack of natural or human-caused disturbance, aspen stands throughout the analysis area are declining in vigor and are being out competed by conifers.

Lastly, the demand for wood products, including post and poles and burlwood (*see* Appendix A, figure 5) has increased in recent years.

Opportunities. The desired condition for the area relates to the above listed goals and management area direction. Opportunities exist to improve forest health and visual quality through vegetation management. These opportunities include:

- Treating lodgepole stands to reduce disease infestation and improve structural diversity (Goals 1, 2, 5, 6, 10; MD-1, 3)

- Treating lodgepole stands to provide views of fore-, middle-, and background features (Goals 7, 8; MD-1, 2, 3)
- Treating lodgepole stands to reduce natural fuel buildup and reduce wildfire risk (Goal 3)
- Removing competing conifers from existing aspen clones and treating aspen clones to improve health, vigor, and structural diversity (Goals 1, 2, 7, 8, 9, 10; MD-1, 2, 3)
- Treating vegetation to provide wood products to local communities (Goals 4, 5)

1.4 Public Involvement and Issues

1.4.1 Public Involvement

Public involvement in this project began when the Fiddlers Lake project was listed in the Forest's Quarterly Schedule of Proposed Actions (SOPA). The project has appeared in each issue of the SOPA since then, with status updated as the project reached the stages described below.

Scoping was conducted in January and February of 2000. The scoping letter stated the proposed action as treating approximately 100 acres of decadent and dying lodgepole pine stands with the clear-cut regeneration method. By this mailing, scoping comments were solicited from the public, other agencies (federal, state and local), and potentially affected parties. All letters received from scoping are located in the project file. All letters received were evaluated. Appendix B contains a summary of all scoping comments, how they were categorized, and responses to the comments. Additional information on issues generated from scoping is described below.

A legal notice of distribution of this pre-decisional EA has been published in the Lander *Journal* on May 8, 2002. Through this distribution and notification, the public was informed of the opportunity to comment.

1.4.2 Identification of Issues

Significant Issues. The IDT identified issues relating to the proposed action based on input from Forest Service resource specialists, other agencies, organizations, landowners, and members of the general public. Pertinent comments from these sources were used to develop the issues to be studied in detail. These issues were considered 'significant' in terms of the National Environmental Policy Act (NEPA). Significant issues are those that are used in the formulation of alternatives, prescribing mitigation measures, or analyzing environmental effects. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict. These issues are summarized below. They are also addressed through alternatives (Chapter 2), through mitigation measures (Chapter 2), through the analysis process and/or disclosure of effects (i.e. Chapters 3 and 4, Appendix B, Appendix C, project file).

1. *Clear-cutting and Effects on Visual Quality.* Concerns were raised that the proposed action to clear-cut directly adjacent to or in close proximity to the Loop Road could adversely affect the visual quality of the area. Decreasing the acreage of timber clear-cut could reduce visual impacts. The proposed action presented in the scoping letter has been modified based on this issue, and an additional alternative was developed to address this issue more fully (*see* Chapter 2). Effects of harvest on visual quality are discussed in Chapters 3 and 4.

2. *Harvesting Effects on Wildlife, Soils, Roadless Areas, Water Quality, Fisheries, and Recreation Experiences.* Many concerns were raised about the effects harvesting would have on various resources. The affected environment and associated impacts are discussed in Chapters 3 and 4. Associated mitigation measures are summarized in Chapter 2.

3. *Forest Health.* Some concerns were raised regarding insects and disease processes, dead and dying trees, and fire are part of a natural ecosystem and are not detrimental to the overall health and productivity of the forest. These concerns are addressed in Chapters 3 and 4 and through comment disposition in Appendix B.

4. *Economics.* Some concerns were raised about the overall economics of the project and net public benefits. These issues are discussed in Chapters 3 and 4 and Appendix D.

Other Issues. These issues are not used in the envionmental analysis, generally because they are outside of the scope of the proposed action, they are already decided by law, regulation, Forest Plan or other higher decision, or are general statements of opinion. These comments are summarized and responded to in Appendix B.

1.5 Proposed Action (40 CFR 1508.23)

The Washakie District proposes to treat approximately 103 acres to improve the visual quality along the Loop Road and to improve the health and productivity of forest vegetation along the Loop Road near Fiddlers Lake. Vegetation management along the Loop Road would reduce wildfire risk and enhance the use of the Loop Road as a firebreak.

Direct actions associated with the proposed action include:

- Clear-cut, clear-cut with reserve tree, and commercially thin lodgepole pine stands to improve the long-term health and productivity of these stands, reduce fire risk, and to improve visual quality (Goals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; MD-1, 2, 3, 4)
- Visual cut[1] lodgepole stands open up views of ponds in the foreground of the Loop Road, provide vistas of surrounding mountain ranges, and enhance views of Fiddlers Lake. (Goals 9, 10; MD-1, 2, 3, 4)

[1] Visual treatments would be variably marked; removing a few, some, or all trees from small clumps or groups within the stand.

- Removing competing confers from existing aspen clones; regenerate decadent and dieing aspen with the coppice[2] method (Goals 1, 6, 7, 8, 9, 10; MD-1, 2)

Connected actions associated with the proposed action include:

- The use of existing roads and approximately 0.25 miles of temporary road. All temporary roads would be obliterated, recontoured, and, if necessary, seeded, after use (Goal 12; Forest Plan III-88; ASQ ROD pp. 5-6)
- Relocating the pullout at Fiddlers Lake to the east side of the Loop Road. The existing pullout would be closed. This is being done to provide a landing area for slash and to reduce the amount of sediment entering the lake from the existing pullout (Goals 11, 12; MD-5, Forest Plan III-89).
- Road side clearing to improve sight distance and public safety along the Loop Road (Goal 12; Forest Plan III-89)
- Possible fill-in or full planting to ensure sufficient regeneration (Forest Plan III-66-68)
- Broadcast or jackpot burning concentrations of slash following harvest (Forest Plan III-28, III-96-97)

The proposed action would be implemented within Forest Plan standards and guidelines, including specific mitigation measures. The proposed action with mitigation is present in detail in Chapter 2.

Alternatives to the proposal must also meet the underlying purpose for which the proposal is being made. The proposal and alternatives to it facilitate the management direction specified for this part of the Forest.

1.6 Decision to be Made

Decisions to be made for this project are:

- *Whether to implement the proposed action or to select an alternative to the proposed action*
    - The decision could be a mix of activities that are evaluated in the three alternatives. The decision is to include any mitigation measures that might be needed in accordance with the impacts that are disclosed in the assessment, including but not limited to those that are presented in the alternatives.

- *Whether a Forest Plan Amendment is needed*
    - The original scoping document described that a project level amendment to the Forest Plan may be needed. In addition, sections 3.6 and 4.6 discuss visual quality and effects to visual quality. This amendment would relate to the 2B

[2] Regeneration method where all trees are clear-cut and resprouting occurs from the roots or stumps. In aspen, root sprouting occurs.

management area direction listed on page III-125 of the Forest Plan: 'Do not exceed an Adopted Visual Quality Objective (VQO) of partial retention.'

- *Whether to prepare an Envrionmental Impact Statement*
    - If the environmental analysis indicates to the decision maker that impacts associated with the alternatives would be significant, then she or he will not make a finding (FONSI, 40 CFR 1508.13) that allows the action to proceed without performing an environmental impact statement (EIS).

Chapter 2 Alternatives Including the Proposed Action

2.1 Alternatives Analyzed in Detail

Based on the significant issues listed in section 1.3.2, three alternatives were identified and analyzed in detail. They are described below as to the major defining actions, the issues they respond to, and the mitigation measures that are associated with them. Figures 6 and 7 in Appendix A depict the locations of action alternative treatments. Table 2-1 provides a tabular summary of all the alternatives. All units (acreages, mileages, etc.) are approximations.

2.1.1 Alternative Description

Alternative 1 – Proposed Action. This alternative represents the Forest's proposal to meet the purpose and need derived from the Forest Plan while partially responding to the issue of how proposed clear-cutting could potentially affect visual quality along the Louis Lake Loop Road (the proposed action has been modified from the scoping statement to incorporate the significant issue). This alternative proposes approximately 103 acres of treatment. It proposes more traditional silvicultural methods (clear-cutting, reserve tree cutting, thinning) while incorporating some visual cutting adjacent to Fiddlers Lake and the Christina Lake Trailhead. Thinning units are also used as a 'connector' between visual treatments and clear- and reserve tree cuts, so that treatment units are less compartmentalized along the Loop Road. The resulting effect would be treatments that are connected and undulating rather than disjointed.

Alternative 2 – No Action. This alternative presents a choice for the decision maker to do nothing. It also provides a basis for comparing effects of other alternatives relative to existing conditions and trends. This alternative would result in continuation of resource conditions and trends as described in Chapter 3 – Affected Environment. Since there is no action associated with this alternative, other than a decision to do nothing, there is no mitigation necessary.

Alternative 3. This alternative more fully responds to the issue of how proposed clear-cutting could potentially affect visual quality along the Loop Road. This alternative treats approximately 123 acres. This alternative proposes less clear-cutting and more reserve tree and visual treatments than Alternative 1. Additional visual cutting would be used to connect all treatments along the Loop Road corridor. It would more effectively treat the entire Loop Road corridor than Alternative 1, resulting in more connection and visually pleasing landscape.

Table 2-1. *Comparison of action alternatives (all units are approximations)*

Alternative Features	Alternative 1	Alternative 2	Alternative 3
Clear-cut (acres)	28	NA	21
Clear-cut with Reserve Trees (acres)	20	NA	27
Commercial Thin (acres)	17	NA	17
Aspen Release/Coppice (acres)	12	NA	12
Visual Treatments (acres)	26	NA	46
Temporary Road (miles)	.25	NA	.25
Sale Duration (years)	2	NA	2

2.1.2 Features Common to all Action Alternatives

Visual Treatments. Visual treatments would be variably marked, removing a few, some, or all trees from small clumps or groups within the stand. Each clump or group would not be more than a few acres in size. All trees would be removed in some groups to open up views of kettle ponds along the Loop Road corridor, where mistletoe and commandra rust infection are so heavy that healthy reserve trees are lacking, or where vistas or background views would be made visible (*see* Appendix A, figures 8 and 9). Where possible, edges of groups with trees completely removed would be udulating. Other groups would be marked to various spacings. Groups of different spacings would be placed adjacent to one another to provide maximum visual diversity.

The visual cut on the southeast side of Fiddlers Lake (between the lake and the Loop Road) would involve removing or limbing individual trees to meet specific visual objectives. Some saplings and pole timber would be removed to improve motorist's sight distance while driving down the road (*see* Appendix A, figure 10). Removal of these trees, with the additional removal of some of the sawtimber trees would provide 'gaps' in the tree cover where views of the lake and surrounding mountain range would be provided (*see* Appendix A, figures 11 and 12). Large whitebark pine trees would be left along the lakeshore as 'character' trees (visually pleasing because of their multi-stemmed form). These trees would also be left to provide shade for anglers (*see* Appendix A, figure 13). Some of these trees may have limbs removed from the bottom so that the lake can be viewed from the road (*see* Appendix A, figure 14). Pole and saw timber would also be left along the lakeshore to provide replacement trees for those that are cut. Enough trees would remain in this area to provide visual and noise screening from the Fiddlers Lake Campground, located on the west side of the lake (*see* Appendix A, figure 15).

Areas of heavy mistletoe and commandra rust infection in visual treatments would be sanitized.

Regeneration Harvests. Regeneration treatments (clear-cut and clear-cut with reserves[3])

[3]Clear-cut with reserve tree cuts would result in an open park-like stand comprised of randomly spaced reserve trees in clumps and as individual scattered trees. Approximately 75-80 percent of the trees would be removed under this method.

in lodgepole pine would target stands with heavy dwarf mistletoe and commandra rust infection and where current or expected mortality is high. Low seed production associated with numerous dead tops in the stands proposed for harvest would likely affect the natural regeneration capability of these stands. As a result, fill-in or full planting may be necessary to insure sufficient regeneration.

Clear-Cut Units. Clear-cut units would be used where current mortality from mistletoe and commandra rust is excessive (*see* Appendix A, figure 16). Trees in these units are mostly dead or dying, or are so heavily infected with mistletoe that leaving reserve trees would infect newly established regeneration. Some clear-cuts would also be used to open up vistas of surrounding mountain ranges (*see* Appendix A, figure 17).

Clear-cuts with Reserve Trees. Reserve tree units would also be used in place of traditional clear-cuts to provide visual diversity. Some reserve tree units would also be used to open up vistas of surrounding mountain ranges. Although trees in these stands are infected with mistletoe and commandra rust, those that are exceptionally healthy, cone producing, and exhibiting good form with full crowns would be left as reserve trees. Reserve would be retained within the stand until regeneration is established or as long as they are free of disease. Reserve trees used in conjunction with clear-cutting would promote more visually appealing stands while moving these stands toward the desired condition. They would also provide structural diversity within the regenerated stands, a potential seed source for natural regeneration, and habitat for certain species of wildlife.

Commercial Thinning and Aspen Release/Coppice. Lodgepole pine stands proposed for commercial thinning[4] are post and pole stands past rotation age. Areas of heavy mistletoe and commandra rust infection in thinning units would be sanitized. Thinning may not necessarily improve growth due to the physiological age of the trees, but delaying regeneration harvest in these stands would improve the age-class/structural diversity in the analysis area by creating new stands at different time intervals, while providing a highly demanded wood product. Thinning areas are also placed between regeneration and visual treatments. This should enhance visual diversity by providing a variety of tree densities along the Loop Road corridor. Commercial thinning would occur where stands no longer provide snowshoe hare habitat[5] according to the Canada Lynx Conservation Assessment and Strategy (2000).

Aspen release would remove competing conifers from a remnant aspen clone. It would then be regenerated with the coppice method. Aspen along the Loop Road is being outcompeted by conifers due to successional processes and fire suppression. Aspen release and regeneration would ensure that aspen would remain a component of forested landscape.

Road Side Clearing. Trees (of all sizes) encroaching on the Loop Road, particularly along curves, that block motorist's sight distance down the road would be removed to improve

[4] Leaving trees at approximately 15 x 15 foot spacing.
[5]Self-pruning processes have eliminated snowshoe hare cover and forage availaiblity during winter conditions with average snowpack.

motorist's safety (*see* Appendix A, figures 18). This would mostly occur within proposed harvest units and extend approximately 10-15 feet into the unit from the road's edge. Road side clearing would also be performed in two places on the Loop Road outside of proposed harvest units.

Access and Logging Systems. Treatments would be conducted using standard ground based and road supported logging systems. There would be no net increase in roads, in accordance with ASQ amendment. Approximately 0.25 miles of temporary road may be necessary for access to some harvest units. All temporary roads would be obliterated, recontoured, and if necessary, seeded. The existing pullout at Fiddlers Lake would be relocated to the east side of the Loop Road. The existing pullout would then be closed. This is being done to reduce the amount of sediment entering the lake from the existing pullout. It is also being done to provide a landing area for wood and/or slash generated from the visual cut on the southeast side of Fiddlers Lake.

Sale Duration. The duration of timber sale activities would be two years. Slash and other post-sale treatments (i.e. aspen coppice, road side clearing of unmerchantable material, fill-in planting, etc.) should occur within five years of sale closure.

2.2 Mitigation

The proposed action and alternatives to it would be implemented using Forest Plan standards and guidelines. The following mitigation measures are implicit in meeting standards, and have been demonstrated to be effective at achieving their purpose. Unless otherwise specified, they would be included in all action alternatives. Forest Plan page numbers, standard and guideline reference codes, and/or references to other portions of the EA are used to associate the mitigation measure with appropriate direction.

2.2.1 Silviculture and Timber Harvest

Stump height within 100 feet of the Loop Road would be six inches or less (Forest Plan III-28 - A04).

Whole tree harvesting would be used in the visual cut on the southeast side of Fiddlers Lake and piled in the relocated turnout. Currently no room exists to dispose of slash from this harvest unit. Whole tree harvesting would facilitate slash disposal in the Loop Road corridor.

A minimum of two to three snags per acre would be left in all harvest units (Forest Plan III-20 – A00-0405-6021).

Fill-in or full planting would be scheduled as deemed necessary to achieve desired stocking levels and meet required regeneration requirements (ASQ ROD Appendix A, Page 5 and Forest Plan III-66-68 – E04).

2.2.2 Slash Disposal

Concentrations of slash following harvest would either be broadcast or jackpot burned as soon after sale closure as possible (Forest Plan III-28 – A04; Forest Plan III-96-97 – P11-14). In clear-cut with reserve tree units:

- Slash over two inches in diameter would be hand piled and burned within 100 feet of the Loop Road.
- Any remaining slash would not exceed 18 inches in depth within the 100-foot corridor.
- Beyond 100 feet from the Loop road, concentrations of slash would be burned, as along as reserve trees are not jeopardized.
- Slash that cannot be burned would be lopped to a depth of 18 inches or less in 100 feet from the Loop Road or to 24 inches or less beyond 100 feet from the Loop Road (Forest Plan III-28 – A04; Forest Plan III-96-97 – P11-14).

In thinning units and visual treatments:

- Slash over two inches in diameter would be hand piled and burned.
- Any remaining slash would not exceed 18 inches in depth within 100 feet of the Loop Road corridor or 24 inches in depth beyond 100 feet from the Loop Road (Forest Plan III-28 – A04; Forest Plan III-96-97 – P11-14).

Slash would be broadcast burned within the clear-cut units (Forest Plan III-28 – A04; Forest Plan III-96-97 – P11-14).

Scattered larger diameter material would be left on site to provide a source of larger downed woody debris to benefit seedling establishment and nutrient cycling (Forest Plan III-20 – A00-0405-0622).

2.2.3 Travel and Transportation

All temporary roads would be obliterated, recontoured, and, if necessary, seeded (ASQ ROD Appendix A, page 5 and Forest Plan III-88 – L01 & L20).

Forest Service roads (FSRs) used for timber access and haul shall be maintained to current standard and condition by the purchaser (Forest Plan III-91 – L19; *see* section 4.3).

Logging traffic/safety signing would be used along the Loop Road as appropriate (*see* section 4.3).

2.2.4 Recreation Resource Protection

Hauling would be limited to weekdays. No hauling would occur after 4 pm on Fridays and not on Saturdays and Sundays beginning July 1 through Labor Day weekend (*see* section

4.5).

Hauling would be restricted between December 1 and April 1 to not impact the snowmobile program unless snow levels are low enough that the winter snowmobile program is minimally affected by plowing the Loop Road to haul (*see* section 4.5).

2.2.5 Visual Resource Protection

Some individual treatment units would need to have islands of trees left for screening purposes to meet the VQO of partial retenetion.

2.2.6 Cultural Resource Protection

Standard practices used for the protection of cultural or heritage resources would be applied All known cultural resource sites would be avoided during timber sale design. If cultural resource sites are discovered after the sale is sold, the contract contains specific clauses to allow sales to be modified or cancelled, which would protect those sites (Forest Plan III-23 – A02).

2.2.7 Soil, Water, and Aquatic Resources Protection

Best management practices for soil and water conservation would be applied (*see* section 4.8).

Harvest activities would be restricted to periods of low soil moisture to prevent soil compaction and rutting (*see* section 4.8, Forest Plan III-86 – KA1, III-219 – KA-1).

Temporary road construction shall avoid areas of steep slopes where slumping could potentially occur (*see* section 4.8).

Operations would be subject to measures required to protect road and ground surfaces (Forest Plan III-86 – KA-1).

A 100-foot equipment buffer zone would exist from all water bodies; no heavy equipment would encroach in wetlands/water bodies and at least 80% of potential ground cover should be maintained within the buffer zone (*see* section 4.8, Forest Plan III-215 – F05 & F06).

Reclaim skid trials and landings by removing berms, covering with slash, installing water bars and seeding if necessary (*see* section 4.8.1).

2.2.8 Wildlife Habitat Protection

The Forest is currently considering expansion of the bear food storage order. If the sale is sold after implementation of this order, food and garbage storage regulations for bear use areas would be followed (Forest Plan III-50 – C01).

Focus regeneration harvests on areas that currently provide limited habitat for Canada lynx primary prey species (snowshoe hare and red squirrel) and that have the highest potential to rapidly produce snowshoe hare habitat (*see* Appendix C).

Retain existing large down woody debris during timber harvest and broadcast burning (Forest Plan III-20 – A00, *see* Appendix C).

If winter logging occurs, allow no increase in travel ways (plowed roads and groomed snowmobile routes) than is necessary for the activities that are occurring (*see* Appendix C).

In clear-cut harvest units larger than 20 acres, retain an island of large-diameter trees and down wood by grouping leave trees and snags for these units into uncut patches three to five acres in size on the down wind side of the units (*see* Appendix C).

2.3 Monitoring

The following items would be monitored after harvest activities are completed.

2.3.1 Silviculture and Timber Harvest

Harvest activities would be monitored to determine if they are having the desired results.

If signs of disease appear in these reserve trees after the project and regeneration is established, they would be girdled and left standing.

Natural regeneration would be monitored one, three and five years following harvest (ASQ ROD Appendix A, Page 5 and Forest Plan III-66-68 – E04).

2.3.2 Noxious Weeds

Monitoring of noxious weeds would be required due to the close proximity of the Loop Road, slash pile burns, and existing seeds that may be attached to any heavy equipment brought in to complete proposed work

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Chapter 3 Affected Environment

3.1 Introduction

This chapter describes the elements of the environment which have the potential to be affected by the proposed action and the alternatives to it. The affected environment generally is limited to the analysis area, unless otherwise specified.

3.2 Vegetation

The analysis area ranges in elevation from 8,300 to 10,500 feet. Approximately 73% of the Atlantic analysis area is forested. Approximately 22% is in grass/forb cover types and 2% is in shrub cover types. The remainder of the analysis area (3%) is in lakes or ponds. Mature timber, sagebrush openings, grassy open parks, rock outcroppings, and willow bottoms broadly characterize the analysis area. The majority grass/forb cover types are found on the western side of the analysis area as high alpine meadows. Some large meadows are also found on the eastern edge of the analysis area. Small grassy parks, willow/sedge flats, and kettle ponds are interspersed with mature stands of timber throughout the majority of the analysis area. The majority of the analysis however, is comprised of mature timber, with little diversity as described below.

3.2.1 Forest Cover

Table 3-1 displays the forested acres within the Atlantic analysis area by size class and species. Lodgepole pine stands dominate the forested acres, comprising over 58 percent of the forested area. Whitebark pine comprises approximately 34 percent of the forested acres and spruce-fir stands make up the remaining eight percent of the forested acres. Approximately 74 percent of these forested stands contain trees that average at least nine inches DBH and are classified as mature. The remaining 26 percent are classified as pole timber.

Table 3-1. *Forested acres by size class and species*

SPECIES	Seedling/Sapling <5.0 Inches	Pole size 5.0 to 8.9 Inches	Mature > 8.9 Inches	Acres By Species	Percent By Species
Lodgepole	0	3,704	4,616	8,320	58
Spruce-fir	0	69	1,106	1,175	8
Whitebark-limber	0	0	4,789	4,789	34
Aspen	0	0	0	0	0
Acres by Species	0	3,773	10,511	14,284	100
% by size class	0	26	74	100	

Larger diameter trees are generally older; Table 3-1 indicates that the current size-class distribution within the analysis area is toward older age stands with no young stands. This trend is largely attributable to an absence of fire and/or lack of other disturbance such as timber harvest. Consequently, aspen abundance has declined; fuel accumulation in most

stands has increased and dwarf mistletoe and commandra rust infection of lodgepole stands has become more severe.

While insects, disease and wildfire play a role in natural ecosystems, lack of disturbances has altered the natural occurrence of these disturbances beyond what would normally be considered endemic events. Forest Health Management Service Centers recognize that insect and disease incidence has become more periodic than cyclical in nature since natural disturbance processes such as fire have been suppressed. Consequently, the age and mortality seen in forested areas is much greater if natural disturbances occurred on a more frequent basis.

Diversity. Forest diversity is best judged from a landscape perspective. The Atlantic analysis area represents an appropriate context. Diversity is important primarily as an indicator of forest health, which relates to a variety of habitats for vertebrate and invertebrate animal communities, visual diversity for the forest visitor, and resistance to rapid, large scale changes over the landscape. A diverse forest comprises stands of different tree species with multiple canopy layers and or different ages and even aged stands of different age, size class, and acreage. Based on Table 3-1 above, the analysis area is totally lacking stands in the smallest size and age classes. Aspen stands are also notably lacking. These younger age-classes and species diversity are important to provide horizontal diversity and edge habitats required by many plant and wildlife species.

This is not to say that there are no young trees or aspen within the analysis area. Young trees do exist, but generally as suppressed seedlings and saplings in the understory of mature stands. These younger trees do contribute to vertical diversity in some stands, but even-aged stands of seedlings or saplings are also needed to provide horizontal diversity. Aspen exists as inclusions in mature conifer stands, but is being out competed due to fire suppression and lack of disturbance. Aspen would continue to decline in the absence of fire or other natural or man-made disturbance.

Lodgepole Pine. Mature lodgepole pine stands within the analysis area are in a general state of decline. Mortality exceeds growth in many stands due to commandra rust and dwarf mistletoe infection. This is because of the excessive age of most of the lodgepole stands (generally between 120-300 years old) and lack of stand replacing fire to periodically regenerate these stands. Younger stands are generally healthy and vigorous and have more resistance to disease. Commandra rust kills the top or seed-producing portion of trees while dwarf mistletoe, a parasitic plant living off the tree's energy, reduces vigor and the tree's ability to grow or produce cones. Both diseases have infected numerous stands. Consequently, the reproductive potential of lodgepole pine within the analysis area has been significantly reduced due to low seed production resulting from the proliferation of these two diseases.

A mountain pine beetle epidemic in the 1970s killed many larger lodgepole pine and whitebark pine within the analysis area. Gaps in the canopy created by beetle killed trees have allowed some regeneration to become established under the remaining live trees, but the

regeneration has generally become infected with dwarf mistletoe and commandra rust. There has been very little past timber management within the analysis area other than salvaging of beetle-killed trees for firewood.

Spruce-fir. Spruce-fir stands within the analysis area are healthy and vigorous compared to lodgepole pine. These stands tend be longer lived and are less susceptible to stand replacement by fire. Additionally, due to the relative shade tolerance of Engelmann spruce and subalpine fir, they are able to reproduce in the understory of mature stands. Consequently, in the absence of stand replacing disturbance, these stands are able to remain productive and perpetuate themselves as a climax vegetation type. Approximately eight percent of the forested stands within the analysis area are classified as spruce-fir.

Whitebark Pine. Within the analysis area approximately 34 percent of the forested vegetation is classified as whitebark pine. However, some lodgepole stands contain upwards of 40 percent whitebark, especially in the understory. In many instances this can be attributed to the Clark's nutcracker's (a bird) propensity to plant seeds either when these stands were established following fire or when openings were created by dying trees.

These disturbances play an important role in shaping the structure of whitebark pine communities. Natural disruptions are vital to the perpetuation of whitebark pine in habitat types where it is seral. The presence and dominance of whitebark pine depends on its environmental tolerances and its competitive abilities. Its relatively low capacity to compete typically restricts it to harsh sites where growth of more competitive trees is hampered by physical factors or, on better sites, by disturbance. This holds true for most stands within the analysis area. The colder, upper subalpine habitat types allow whitebark pine to assume dominance on many sites. In the lower subalpine habitat types whitebark pine occurs more as suppressed saplings (Arno et al., 1989).

Whitebark pine seed production is generally unpredictable. Large seed crops are produced at irregular intervals, with smaller crops and crop failures in between. Evidence indicates that seed planting by Clark's nutcrackers facilitates the regeneration and spread of whitebark pine. Despite its heavy wingless seed, this species often regenerates promptly on burned or clearcut areas where a seed source is locally absent. Moreover, whitebark pine seedlings often arise together in tight clumps containing two to five trees.

Aspen. There are presently no stands classified as aspen with the analysis area. Aspen stems are fairly common in the lower elevations of the analysis area, but nowhere are stands formed. Historically however, this species was probably much more common, evidenced by the scattered stems that can be found. The regular occurrence of fire or other canopy removing disturbance has been directly linked to aspen abundance in the interior west. Young aspen stems are found in areas where there have been minor disturbances, such as small groups of beetle-killed trees. Larger disturbances such as a stand replacement fire would likely create aspen stands in these same areas. Fire suppression efforts over the last 80-100 years have likely played a role in the decline of aspen stands within the analysis area.

3.3 Transportation and Travel Resources

An in-depth Roads Analysis for the Fiddlers Lake area was completed and is contained in the project file. It is incorporated into this document by reference. Copies of the Roads Analysis may be requested by contacting the person identified in the cover letter, or from the Internet.

Table 3-2 and the narrative below describe the Forest Service Roads that are contained within the Atlantic analysis area. All roads are open unless otherwise specified. *See* figures 2B and 2C for road locations.

FSR 300 – Louis Lake Loop Road. This road is a native-surfaced, lane-and-a half road, with turnouts, approximately 4.5 miles in length within the analysis area. The objective is to maintain it for passenger cars. It is a Forest arterial that provides primary access onto the Washakie District. Built in the 1930s by the Civilian Conservation Corps, current motorized recreation use is moderate to high with vehicle use in the summer and snowmobile use in the winter. The road also provides critical access for resource management and administration.

Most of the travel that occurs within the analysis area occurs on the Loop Road. The number of size of vehicles using this road currently is greater than what is was designed for. Road maintenance and improvements have not kept pace with growing use. A road condition survey, performed in 1999, documented millions of dollars of deferred maintenance needs on the entire length of the Loop Road. Work needs identified included additional and replacement drainage structures, intervisible turnouts, roadside clearing, and placement of aggregate that would bring the road to its standard and identified maintenance level for passenger car use. Repair and improvements to the Loop Road are necessary to safely accommodate the mixed use that occurs along this road.

While the Loop Road has previously received spot surfacing, very little remains due to inadequate surface maintenance and replacement, erosion of roadway materials, growing use of the road and loss of binder material in surfacing. Boulders and native materials are common within the roadway. Constructed ditches have disappeared due to erosion, sedimentation, and inadequate maintenance. This is evident at the old Christina Lake Trailhead at the south end of Fiddlers Lake along the Loop Road and on FSR 307; several areas exist where the ditch of the in-sloped road and the road itself drains directly into the creek or lake.

There are both too few culverts and undersized culverts. This has resulted in plugged culverts, erosion of roadway materials, and sedimentation in waterways. This is generally associated with snow melt or heavy rain on steeper grades. This is particularly evident along the Loop Road in the vicinity of Canyon Creek.

While periodic road maintenance has occurred along the Loop Road to clean out plugged culverts, overall maintenance is inadequate. This is a result of a lack of funds to properly maintain the road and periodically restore it to its road standard. As the road deteriorates, there becomes less surface material to maintain, which affects ditch depth and ability of

ditches to drain properly. User comfort declines as more and finer material erodes away, leaving protruding rocks. Functionality of culverts declines as there is less material to cover them, resulting in physical damage to the culvert. All of this results in plugged culverts and sedimentation into waterways. Current lack of maintenance funding also prevents adding additional culverts necessary to handle water flow.

Some of the fill slopes along the Loop Road show mass wasting, which can occur on glacial morainal soils when they are over-steepened.

Roadside vegetation has intruded upon the road corridor, creating safety sight distance concerns and roadside hazards.

There are four closure gates on FSR 300 that affect seasonal access - one at the end of the asphalt in Sinks Canyon, one just beyond the intersection with FSR 302, one near Louis Lake and the final one near the intersection with WY 28. The purposes of the gates are for resource protection and road damage prevention during spring thaw.

Table 3-2. *Description of FSRs within the Atlantic analysis area. All Roads are open unless otherwise specified*

Road Number *(Name)*	Length (miles)	Surface/Lanes	Suitable or Maintained Use
300.1G *(Blue Ridge Spur Road)*	0.30	Native/Single	High clearance vehicles
300.2B	0.10	Native/Single	High clearance vehicles
300.2E *(Popo Agie Campground Road)*	0.25	Native/Single	Passenger cars
300.5T *(Christina Lake Trailhead Road)*	0.20	Aggregate/Single	Passenger cars
306 *(Blue Ridge Lookout Road)*	0.50	Native/Single	High clearance vehicles
307 *(Fiddlers Lake Campground Road)*	0.80	Aggregate/Single	Passenger cars
355 *(Christina Lake Road)*	1.20*	Native/Single	High clearance vehicles
915	0.60	Native/Single	High clearance vehicles

**Length within the analysis area*.

FSR 200.E accesses the Popo Agie Campground where the Loop Road crosses the Little Popo Agie River. Beyond the campground vehicles have crossed the valley bottom creating tracks with six or more wetland crossings that drain into the wetland. FSR 355 to Christina Lake has deteriorated in some areas to multiple tracks, rills, and gullies, which cross through and drain directly into wetlands and streams.

Additionally, there are 1.40 miles of existing two-tracks that are open to high clearance vehicles. There are 0.60 miles of road that have been closed to wheeled motorized vehicles within the Atlantic analysis area. Some of these are mostly to completely revegetated.

3.4 Range Resources

The analysis area boundary is the same as the Atlantic sheep and goat grazing allotment, which is currently vacant. Historical use generally occurred in the higher elevations of this allotment. The project area, which is located at a lower elevation, is comprised of predominately forested sites that do not support adequate forage for livestock.

3.5 Recreation Resources

The analysis area and the proposed harvest units are accessible by vehicles on the Louis Lake Road from about June 20 to October 15 each year. Most use occurs July 1 through the Labor Day weekend in early September. Weekends are the peak use periods with increases due to surrounding local communities. July 4th and Labor Day weekends are by far the peak periods. The snowmobile season runs from December 1 to April 1 each year.

Fishing and hunting are popular activities in the analysis area but occur in limited amounts in the immediate (0.25 mile) area of the proposed units. Fishing opportunities are limited to Cow Lake, a small kettle pond one eighth of a mile east of the Louis Lake Road and about one eighth of a mile from one of the proposed units in Alternative 3. Cow Lake is known only to locals and has no trail or signing. Fiddlers Lake located on the Louis lake road is very popular for locals and others. The Little Popo Agie River flows south of the proposed units and is a popular fishery. Hunting is limited in the immediate area due to the lack of natural open areas, the lack of parking areas and due to the heavy travel by vehicles on the Louis Lake Road during the hunting season.

There are three developed sites in the analysis area. All three (Fiddlers Lake Campground, Little Popo Agie Campground, and the Christina Lake Trailhead) are within a quarter mile of portions of the proposed units. All three of these sites experience high levels of use during the July 1 to Labor Day period. The Little Popo Agie Campground has only four units, is not a fee area, and has no water supply. Fiddlers Lake Campground has 19 units and is a full service campground with water supplies and daily fee collection. Generally, at least one half of the units are occupied July 1 to Labor Day. The Christina Lake Trailhead serves as an access point to the southern tip of the Popo Agie Wilderness. This is a small trailhead with relatively little use since the area it serves is also quite small compared to other developed trailheads for the Popo Agie Wilderness.

A major use of the area in the immediate vicinity of the proposed sale areas is vehicle use on the Louis Lake Road in summer and snowmobile use in winter. Summer traffic by most types of vehicles including cars and recreational vehicles is high. A large amount of the use is driving for pleasure and viewing wildlife and scenery. The sale areas are scattered along approximately 1.5 miles of the Louis Lake Road with little scenery for viewing due to an essentially continuous stand of lodgepole timber on either side of the road. Firewood gathering occurs along the Louis Lake Road within the analysis area. Winter snowmobile use is light to moderate during the week and moderate to heavy on weekends.

3.6 Visual Resources

The Louis Lake Loop Road is the premier road for recreation, riding for pleasure, and wildlife viewing on the Washakie District. It is accessible to a broad range of visitors. The road crosses over moraines and evidence of glacial scouring. Large granitic boulders provide a repetitive backdrop, as are the towering mountain peaks. Portions of the Wind River range are not easily seen from the road because it is screened from view by lodgepole pine stands. Small riparian areas and kettle ponds (glacial remnants), which are dotted with lily pads in the summer, are interspersed among these lodgepole stands. Moose and other wildlife frequent these ponds and provide wildlife viewing opportunities. For the most part the road is lined with even aged stands that provide minimal structural diversity and create monotonous viewing. Understory vegetation is sparse and the extent of tree mortality gives many stands a gray and glaring appearance.

Forest Plan direction is to maintain the desired landscape character of retention. Forest Plan 2B management area direction states not to exceed the visual quality objective of partial retention. Forest Plan general direction states that the desired VQO should be achieved within one year after project completion. Retention means that the valued landscape character must appear intact. Deviations may be present but must repeat line, form, color, texture, and pattern common to the landscape character so completely and at such a scale that they are not evident. Partial retention means that changes appear visually pleasing and blend with the surrounding natural landscape while remaining visually subordinate to the adjacent characteristic landscape (slightly altered).

The desired landscape character is one with healthy vigorous vegetation, a mosaic of age classes, and high amounts of edge for visual diversity and wildlife habitat. It is recommended that the Loop Road and associated recreation sites and lakes be managed with a VQO of retention. In consideration for the current condition of stands along the road, it is recommended that the VQO of retention be met within five to 10 years. The retention VQO recognizes the importance of this scenic backcountry roadway while the long time period to achieve the VQO allows vegetation management that will enhance visual quality (Forest Plan Direction for Visual Quality Objectives, 2002).

This section of the Loop Road has received minimal management in the past and fire activity has been suppressed. Consequently, portions of the desired landscape character are not complying with retention due to excessive lodgepole pine mortality and lack of tree age and size class diversity. Efforts to increase visual diversity, highlight natural features of this ecosystem, and dramatically open distant mountain vistas would benefit visual quality.

3.7 Cultural Resources

Cultural resources are a record of human presence in the Forest, often providing the sole indication of former inhabitants and ways of life. Cultural resource surveys of the project were completed during the 2001 field season. The Wyoming State Historical Preservation Office (SHPO) has reviewed the project survey report and provided the necessary clearance

in April, 2002. All known cultural resource sites would be avoided during timber sale design. If cultural resource sites are discovered after the sale is sold, the contract contains specific clauses to allow sales to be modified or cancelled, which would protect those sites.

3.8 Soil, Water, and Aquatic Resources

The Atlantic analysis area's geographic setting is within the Wind River Mountain section (M331J) and the Eastern Wind River Mountain subsection (M331Jd) (McNab, 1994; Houston 1999). This area represents the headwaters of the Little Popo Agie River, including its named tributaries Atlantic Creek, Silas Creek, Fiddlers Creek, and Hidden Creek. There are also numerous named lakes within the analysis area, including Christina Lake, Gustave Lake, Windy Lake, Atlantic Lake, Thumb Lake, Upper and Lower Silas Lakes, Tomahawk Lake, and Fiddlers Lake, as well as hundreds of kettle ponds.

3.8.1 Geology and Soils

Precambrian granite (Louis Lake granodiorite) is the geologic parent material in the analysis area. Late Wisconsin Age Quaternary glaciers have sculpted the mountain divides into cirque walls and hanging valleys in the headwaters to the west, scoured the valley where the Little Popo Agie River now flows, and deposited a piedmont moraine at its toe to the east, all within the analysis area. The project area is located mostly in the granitic glacial till (Qmg) of the moraine, although one proposed harvest unit is mapped located on bedrock Quartz diorite near Fiddlers Lake.

The project is within the boundaries of the Fremont County Soil Survey - Lander area. This survey is in need of updating and requires reevaluating interpretations and classifications. The areas considered for harvest are all found in map unit 21. The forest soil in this map unit is the Frisco series, which is classified as a loamy skeletal Typic Cryoboralf. In the 8th edition of soil taxonomy (NRCS, 1999) this soil would be classified as a Eutric Haplocryalf. Frisco is a very deep, well-drained soil with a gravelly loam surface texture, a weak very gravelly clay loam sub soil, and very gravelly loam to sandy loam substratum. Coarse fragments make up 35% or more of this soil. Soil pHs are acidic but base saturations remain greater than 50%. Frequently there are areas of surface boulders and stones within this map unit. Erosion hazard is slight on 0-14% slopes and moderate on 15-35% slopes (NRCS 1997). Soil compaction and rutting hazards are slight to moderate and can be avoided by restricting activities to periods of low soil moisture (NRCS 1997; R2 Soils Group, 1999).

Seedling mortality refers to the probability of the death of naturally occurring or planted tree seedlings, as influenced by kinds of soil or topographic conditions. Too much water (soil wetness or too little water (soil droughtiness) causes seedling mortality. The Frisco soil has been rated as having slight to moderate seedling mortality rating due to the potential of droughty sandy textured soils.

The climate of the analysis area is in the 30 to 40 inch mean annual precipitation zone. Most of this comes in the form of winter snows. The mean annual air temperature is about 32

degrees.

The primary forest vegetation types include habitat types from the subalpine fir and whitebark pine series. Understories are typically of the depauperate elk sedge or heartleaf arnica habitat types and grouse whortleberry habitat types. Wetlands are scattered within the greater project boundaries. Soil productivity is considered low to low moderate based upon the habitat type data (Steele et al, 1983).

The Wyoming Geologic Survey has mapped the geologic hazards on the Forest (Case, 1989). None are located within the affected areas of the project area. No geologic hazards were identified and mapped by Case (1989). However, soil movement can occur on unstable road cut slopes.

3.8.2 Water Resources

Wetlands. Riverine and palustrine[6] system wetlands occur throughout the analysis area. In the lower portion of the analysis area, the Little Popo Agie Piedmont Moraine contains at least 150 kettle ponds in the depressions of the hummocky surface of the moraine. These ponds are apparently interconnected by groundwater in the permeable unconsolidated sediments of the moraine. The hydrologic function of this area not only serves as a probable groundwater recharge area, but also offers wildlife and recreation value, and scientific interest. A portion of the Little Popo Agie Piedmont Moraine has been proposed for designation as Special Interest Area for its exceptional flora and fauna, and geologic attributes.

Water Uses. There is one water-related special use permit within the Atlantic analysis area. The Christina Lake Dam was built around the turn of the century as a reservoir for mining interests near South Pass. Since the late 1930s, the Little Popo Agie Irrigation District has operated the Christina Lake Dam under Special Use Permit. Water from the reservoir is brought down the Little Popo Agie River to several ditches, including the Taylor, Lyons, and Millard ditches, which divert water outside the Forest boundary. The Dam was last inspected in 1989 and was found in no danger of sudden failure. The Forest Service maintains the Fiddlers Lake Campground water systems. The Fiddlers Lake Dam, an earthen berm, was constructed by the Forest Service, and was inspected in 1989.

Regulatory Framework. The Forest Service is directed by five major federal laws, as amended, to protect watersheds through sound management (USFS 1996). Other federal laws and regulations complement these five major laws. The Forest Service must also comply with the Wyoming Environmental Quality Act (WYDEQ 1973) and regulations pursuant to it.

State-classified water uses, and the water quality they need, must be sustained to comply with antidegradation policy, unless the State decides that vital economic and social development justify impacts. Streams in the analysis area within wilderness are designated by the State of

[6] Rivers, streams, and marshes.

Wyoming as Class I water, while non-wilderness streams are designated Class 2 (WYDEQ 1990). Beneficial uses within and downstream of the analysis area include agriculture, protection and propagation of fish and wildlife, human consumption (after treatment), recreation, and scenic value. Water rights exist downstream of the analysis area that are directly tied to these beneficial uses. They include rights primarily for irrigation use and stock watering. Water is also used in the watershed by recreationists for human consumption and stock watering.

Floodplains and wetlands within the analysis area are regulated by Executive Orders 11988 and 11990 (Carter 1997). All riparian areas are managed under Forest Plan Management Area Direction 9A.

The Atlantic analysis area does not contain any potential watersheds of concern (Forest Plan Allowable Sale Quantity Amendment FEIS 1994).

3.8.3 Fisheries Resources

Streams. Atlantic Creek is located in a steep canyon on the edge of the Little Popo Agie piedmont moraine that drains into the Little Popo Agie River on the southern portion of the analysis area. In this area it currently contains eastern brook trout (EB) with a few rainbow trout (RBT). The upper Little Popo Agie River is a low gradient, meandering stream that drains the moraine area. In this area it currently contains EB and RBT.

The headwaters of Canyon Creek are located on the northern portion of the analysis area. It is a small, low gradient, meandering stream that drains into a marsh area just downstream of the Loop Road. Below the marsh, flow increases and it again has a defined stream channel. Upstream of the marsh the stream is fishless. Downstream of the marsh Canyon Creek contains EB.

Lakes. There are many small lakes, ponds, swamps, and marshes present in the analysis area. Only two are known to currently contain fish. Fiddlers Lake is located on the north end of the analysis area adjacent to the Loop Road. It has about 56 surface acres and was enlarged by an earthen dam. It is shallow and does not overwinter rainbow trout on an annual basis. As a result, it is planted annually by Wyoming Game & Fish (G&F) with catchable rainbow trout. It also has a small, resident self-sustaining population of eastern brook trout. Non-game fish include lake chubs. It has developed campgrounds, a boat ramp, and is a high use recreational fishery.

Cow Lake is a six-acre natural lake located in the moraine on the southern portion of the project sale area. It is periodically stocked by G&F and is managed as a trophy brook trout fishery.

Yellowstone Cutthroat Trout. Before white settlers, accessible streams without upstream migration barriers in the Little Popo Agie drainage contained Yellowstone cutthroat trout (YSC). They have been reduced to a fraction of their historical range in the entire Yellowstone River Basin from introduction of non-native fish species, habitat

modification/degradation and past overfishing. As a result, they are on the Region 2 sensitive species list. They have recently been petitioned for listing under the Endangered Species Act. Over the years, various species and subspecies of fish have been introduced in the Little Popo Agie River drainage. Only introduced or hybridized fish species are currently known to inhabit this drainage. There currently are no known pure populations of YSC in the analysis area.

3.9 Wildlife Resources

3.9.1 Management Indicator Species

Seventeen wildlife species, in addition to game trout, were selected during the forest planning process to be management indicators. The management indicators species (MIS) for the Forest include five featured species that are hunted, five recovery species, and seven ecological indicator species *(see* table 3-3). Methods used to select indicator species or groups of species are explained in detail in the planning records for the Forest Plan.

The following discussions will focus only on the MIS that relevant to the scope of the proposed action, i.e., their habitat is present in or near the project area. *See* table 3-3 for rationale of MIS selected for this analysis. Some MIS relevant to this analysis are proposed, threatened, or endangered species. Some MIS are listed on the Rocky Mountain Region's list of sensitive species (Forest Service Manual 2600, Supplement 2600-94-2). Proposed, threatened, endangered and sensitive wildlife species are addressed in section 3.9.2 of this chapter.

Because of the potential effects of this project on elk and their habitat, most of the discussion on featured species will focus on elk.

A variety of other wildlife groups also occur within the Atlantic analysis area. They include small game, predators, raptors, furbearers, and nongame mammals, birds, and amphibians. No crucial habitats for these species have been delineated in the Atlantic analysis area.

The analysis area is providing habitat for several species of neotropcial migratory birds. The Wyoming Partners In Flight list of priority species was considered when evaluating effects for this project. Only two Level One[7] priority species that uses the habitat in the treatment area is the goshawk and bald eagle. These species are discussed in sections 3.9.2 and 4.9.2.

[7] The level where conservation action is needed.

Table 3-3. *Management Indicator Species selected for the Forest. Those selected for the Fiddlers Lake project area are shaded. Species marked with an * are on the Rocky Mountain Region's list of sensitive species. Species marked with two asterisks (**) are proposed, threatened, or endangered species. The latter species are discussed under that heading.*

Shoshone Forest LMP Management Indicator Species	Group or Habitat Requirement	Rationale for selection as MIS for this project
Elk	Featured species, economically important	Habitat present
Mule Deer	Featured species, economically important	Habitat present
Bighorn Sheep	Featured species, economically important	No habitat and species not present in project area
Moose	Featured species, economically important	Habitat present
Mountain Goat	Featured species, unique and limited habitat	No habitat and species not present in project area
Black-footed Ferret**	Recovery Species, threatened and environmentally sensitive	No habitat and species not present in project area
Gray Wolf[8]**	Recovery Species, non-essential, experimental and environmentally sensitive	Habitat present
Grizzly Bear**	Recovery Species, threatened and environmentally sensitive	Habitat present
Canada Lynx**	Recovery Species, threatened and environmentally sensitive	Habitat present
Bald Eagle**	Recovery Species, threatened and environmentally sensitive	No habitat and species not present in project area
Marten*	Ecological indicator, restrictive habitat requirements in late successional conifer stages	Habitat present
Goshawk*	Ecological indicator, sensitive to disturbance in nesting areas and representative of late successional conifer stages of large acreages	Habitat present
Beaver	Ecological indicator, representative of special and limited riparian habitat that may be influenced by management practices	No habitat and species not present in project area
Ruffed Grouse	Ecological indicator, representative of multi-storied aspen communities	Habitat present
Blue Grouse	Ecological indicator, limited habitat and population numbers that be affected by vegetation treatment	Habitat present
Hairy Woodpecker (Addressed in discussion of Primary Cavity Excavators)	Ecological indicator, representative of late succession aspen communities, snag dependent species	Habitat present
Brewer's Sparrow	Ecological indicator, representative of sagebrush communities	No habitat and species not present in project area

[8] The gray wolf (Canis lupis), which was formally listed as threatened, was reclassified as non-essential, experimental in the Yellowstone area with the publication of the Final Rules in the Federal Registrar (November 22, 1994; Vol. 59, No. 244).

Elk. Elk that use the 19,618-acre analysis area are part of the South Wind River Herd Unit. The proposed project occurs within the spring, summer, and fall range of this population. The post-season population objective for this herd is 3,300 animals. The Wyoming Game and Fish Department has had this population objective in place since at least 1985 (Annual Big Game Herd Unit Reports, 1989). Elk numbers were maintained at or near this level from 1987 through 1991. Since then, examination and analysis of Annual Big Game Herd Unit Reports reveals a growing trend in this particular herd (*see* Table 3-4).

Table 3-4. *Population estimates, harvest, licenses, hunter success, and recreation days per elk harvested since 1985 for the South Wind River Herd Unit*

Five Year Average	86-90	87-91	88-92	89-93	90-94	91-95	92-96	93-97
Population Estimates[9]	3,140	3,420	3,376	3,278	3,290	3,509	3,712	3,711
Post-Hunt Trend Count For Last Year in five year period	848	1,543	1,340	1,327	2,227	2,208	2,152	2,364
Harvest	434	505	566	598	619	574	602	637
Limited Quota Licenses For Last Year in five year period	875	875	925	1,025	1,025	975	975	1,075
Hunters	1,622	1,649	1,725	1,850	1,909	1,955	1,948	1,945
Percent Hunter Success	26.1	29.8	32.4	32.6	32.4	29.6	30.9	32.7
Recreation Days Per Elk Harvested	25.3	22.6	18.3	18.6	19.0	22.1	20.3	20.7

The Annual Big Game Herd Unit Reports for 1997 and 1998 estimate the post-hunt elk population size at 3,555 and 3,668, respectively. Based on these figures, it was estimated that as of January 1999 a minimum of 3,600 elk were wintering within the herd unit.

This estimate of 3,600 elk is above the population objective of 3,300. The current estimate is larger, but is not substantially larger, than the actual numbers during 1986-1990. The number of elk, licenses available, harvest, and hunter success has not declined since the 1986-90 period; some have even increased.

Elk Habitat. No winter range occurs within this analysis area. While elk do not generally winter in this analysis area, they migrate through during the spring and fall periods. No distinctive migration corridors have been identified in the analysis area. The timing of the migration is generally dependent on weather conditions.

The analysis area contains numerous small meadow areas surrounded by open to dense timber stands as well as many lakes of various sizes. The predominant vegetation type is lodgepole. These lodgepole stands are interspersed with small, riparian kettle ponds (glacial remnants). The lower meadow areas and open hillsides provide foraging areas for elk and the

[9] Population estimates based on population modeling.

higher timbered areas of adequate density provide necessary hiding cover. Timbered areas with meadows interspersed, provide both forage and cover. A small population of elk uses these same sites during the spring through fall periods as well as higher elevation alpine meadows and timber cover during the summer period.

Table 3-5 displays the total miles of all roads and trails in the analysis area, except roads considered obliterated. The conventional method of determining road density is displayed.

Table 3-5. *Miles of road, trail, and snowmobile trails within the Atlantic analysis area and the total road density within this area*

	Atlantic Analysis Area
Road or Trail Category	**Miles**
Total Roads	10.47
Snowmobile Trail	9.65[10]
Non-Motorized Trails	7.67
Summer Motorized Trail	0
	Density Calculations
Total Road and Motorized Trail Miles	10.47
Total Square Miles	30.65
Density mi./sq. mi.	0.34

Open motorized route density includes all open roads and open motorized trails. Table 3-6 displays open road and motorized densities for the winter and non-winter periods in the analysis area.

Table 3-6. *Miles of open road and motorized trail within the Atlantic analysis area and the open road density within this area*

	Atlantic Analysis Area
Road or Trail Category	**Miles**
Open Road	9.85
Snowmobile Trail	9.65
Summer Motorized Trail	0
	Density Calculations
Total Open Road and Trail Miles (Non-Winter)	9.85
Open Trails (Winter)	9.65
Total Square Miles	30.65
Density mi/sq mi (Non-Winter)	0.32
Density mi/sq mi (Winter)	0.31

[10]Also includes existing roads.

Mule Deer. The analysis area provides habitat for a deer population that is distributed throughout the analysis area in summer. In winter, deer move down from the higher elevations and concentrate along stream bottoms and adjacent foothills outside of the analysis area. The analysis area provides spring, summer, and fall deer habitat. In 1998, the deer population in the South Wind River Herd Unit was estimated at 13,362 animals (Annual Big Game Herd Unit Reports, 1998). This level is slightly above the objective population level of 13,000 animals.

Moose. Moose population estimates in the Lander Herd Unit have been above the population objective (450) since at least 1996 (Annual Big Game Herd Unit Reports 1998). The number of moose licenses, hunters, and harvest has increased since 1993.

There is no moose habitat classified as yearlong in this analysis area. All of the analysis area is spring, summer, and fall habitat for moose. During the spring through fall period, use is scattered throughout the area with heaviest use in kettle ponds, bog or wet areas and heavy timber patches.

Forest Grouse. The analysis area provides habitat for both blue and ruffed grouse with blues being the predominate species. Ruffed grouse are heavily dependent on aspen stands or mixed deciduous/conifer stands year round. However during stormy winter weather, they often resort to coniferous stands for cover and may remain there for several days. Blue grouse nesting areas are often in open timber stands along the outskirts of forested cover. Brooding habitat for both species is near meadows or other open areas that provide many opportunities for the chicks to feed on insects. Blue grouse are heavily dependent on coniferous needles for winter food and usually migrate higher in elevation during the late fall period.

Primary Cavity Excavators (e.g. Hairy Woodpecker). Standing dead and dead and down trees are components that occur throughout the various forested vegetation types. These habitat components can occur in the forested areas in all successional stages, but are usually more prevalent in the later successional stages. Standing dead (snags) provide a portion of the life support systems for many species of invertebrates, birds, and mammals. Wildlife species that use snags include those that excavate their own cavities (primary cavity excavators), those that occupy existing cavities, and those that forage on and in snags and down wood material. In the Rocky Mountains, snags are used to some degree by 65 bird and 19 mammal species. At least 20 bird species (primary cavity excavators) are dependent on snags, or at least dependent on standing dead or excavatable wood.

There are 19,618 acres in the Atlantic analysis area. Subtracting the acres of wilderness, lakes, and other non-forested areas leaves 9,881 acres, or 50 percent of the analysis area that have potential to have, or have had, dead and defective tree habitat impacted by management activities. There have been 30 acres (0.3 percent) of the non-wilderness, forested habitat impacted by management activities in the past, not counting the construction of the existing roads nor the removal of firewood along those existing roads. The impacts from timber harvest and firewood gathering include reduced amounts and distribution of this habitat.

Generally maintaining amounts of this kind of habitat for species viability has not been a problem but having that habitat well distributed across the landscape so that individuals can interact with each other might be. Other benefits, in addition to viability, from maintaining good distribution and quality of dead and defective tree habitat are recreational, non-consumptive uses, and forest insect control.

There are 9.85 miles of road open to firewood gathering in the analysis area (*see* table 3-6). These roads and a variable area on both sides of these roads have, for the most part, been affected by past firewood gathering. Using 200 feet above each road and 50 feet below each road as an average for the actual area affected, results in 317 acres (3.2 % of the non-wilderness, forested habitat) where wildlife habitat has been and is impacted by firewood gathering. Some areas along the roads may not be affected to 250 feet because of steep terrain or adjacent non-forested areas, such as meadows. Other areas may be affected by more that 250 feet because of gentle terrain. Generally because of limited access, the influence of firewood gathering downhill from roads tapers off beyond 200 feet on 20 percent slopes. This area influenced by firewood gathering is probably a conservative estimate because this estimate does not include all of the area accessed by user-built roads that are pioneered by the firewood gathering public.

In the Atlantic analysis area there are currently 14,285 acres of forested vegetation types or 73 percent of the analysis area. The majority of the forested vegetation types (74 percent) are in the later successional stages that would have potentially more snags and down dead material. However, there are earlier successional lodgepole pine stands that have high degree of dead tops from disease that also provide dead standing wood.

The proposed stands for harvest currently do provide habitat for primary cavity excavators, including such species as the hairy, black-backed, and northern three-toed woodpeckers. They utilize dead and dying trees for both nesting and foraging for insects. These species inhabit lodgepole pine, Douglas-fir, and Engelmann spruce-subalpine fir forests in Wyoming, especially those forests that have burned.

3.9.2 Proposed, Endangered, Threatened, and Sensitive Wildlife Species

An in-depth description of the affected environment for proposed, endangered, threatened, or sensitive wildlife species associated with the Fiddlers Lake project area can be found in the Fiddlers Lake Biological Assessment/Biological Evaluation (BA/BE). The BA/BE can be found in Appendix C.

Table 3-7 summarizes the list of proposed, threatened, endangered, or sensitive wildlife species analyzed for the Fiddlers Lake project. Additional information on Yellowstone cutthroat trout can be found in section 3.8.3.

Table 3-7. *Summary of proposed, threatened, or endangered wildlife species analyzed for the Fiddlers Lake project area.*

Species	Habitat Present
Threatened or Endangered Species	
Gray wolf[11]	Yes
Grizzly bear	Yes
Canada lynx	Yes
Bald eagle	No
Sensitive Wildlife Species	
Dwarf shrew	Possibly
Water vole	No
Marten	Yes
Fisher	unlikely
Wolverine	unlikely
Northern Goshawk	Yes
Boreal owl	Marginal
Black-backed woodpecker	Yes
Northern three-toed woodpecker	Yes
Tiger Salamander	Yes
Boreal toad	Yes
Northern leopard frog	Yes
Yellowstone Cutthroat trout	No

3.9.3 Sensitive Plant Species and Noxious Weeds

Table 3-8 lists the regionally sensitive plants that occur on the Forest. The project area only includes potential habitat for two of these sensitive plants, pink agoseris and Fremont's bladderpod. The habitat of these two species is non-forested openings (Fertig, 1994). Within the affected proposed cut areas the probability of either species occurring is extremely low.

[11] The gray wolf (Canis lupis), which was formally listed as threatened, was reclassified as non-essential, experimental in the Yellowstone area with the publication of the Final Rules in the Federal Registrar (November 22, 1994; Vol. 59, No. 244).

Table 3-8. *Sensitive plants on the Forest*

Species Name	Vegetation Type	Soil Type	Habitat Present in Project Area	Project Area Method of Survey	Species Present in Project Area	Notes
Pink agoseris (*Agoseris lackschweitzii*)	Wet Montana/subalpine meadows	Variable	Yes	Literature cited	Possibly	Meadows
Round-leaved orchid (*Amerorchis rotundifolia*)	Coniferous bogs	Calcareous	No	Literature cited	No	Swamp Lake area primary occurrence
Red manzanita (*Arctostaphylos rubra*)	Coniferous bogs	Calcareous	No	Literature cited	No	Swamp lake area primary occurrence
Upward-lobe moonwort (*Botrychium ascendens*)	Wet meadows/willow	Alluvium	No	Literature cited	No	Willow riparian
Livid sedge (*Carex livida*)	Floating mats, bogs, fens	Calcareous	No	Literature cited	No	
Wyoming tansymustard (*Descurainia torulosa*)	Rocky slopes and ridges	Volcanic	No	Literature cited	No	Endemic to Absaroka Mountain Range
Kirkpatrick's ipomopsis (*Ipomopsis spicata spp. robruthii*)	Alpine scree	Volcanic	No	Literature cited	No	
Fremont bladderpod (*Lesquerella fremontii*)	Barren slopes and ridges	Calcareous	Yes	Literature cited	Possibly	Meadows
Hall's fescue (*Festuca hallii*)	Montane grassland	Calcareous	No	Literature cited	No	
Marsh muhly (*Muhlenbergia glomerata*)	Bogs, floating mats, fens	Calcareous	No	Literature cited	No	Swamp Lake area primary occurrence
Naked-stemmed parrya *(Parrya nudicaulis*)	Alpine	Calcareous	No	Literature cited	No	
Greenland primrose (*Primula egalikensis*)	Bogs, fens	Calcareous	No	Literature cited	No	Swamp Lake area primary occurrence
Absaroka goldenweed (*Pyrrocoma carthamoides var. subsquarrosa*)	Montane meadows, grasslands	Calcareous	No	Literature cited	No	
Myrtleleaf willow (*Salix myrtillifolia var. myrtillifolia*)	Floating mats, bogs, fens	Calcareous	No	Literature cited	No	Swamp Lake area primary occurrence
Rolland bulrush (*Scirpus rollandii*)	Floating mats, bogs, fens	Calcareous	No	Literature cited	No	Swamp Lake area primary occurrence
Shoshonea (*Shoshonea pulvinata*)	Calcareous Soils & Rock outcrops	Calcareous	No	Literature cited	Unlikely	
North Fork easter daisy (*Townsendia condensate var. anomala*)	Rocky slopes and ridges	Volcanic	No	Literature cited	Unlikely	Endemic to Absaroka Mountain Range

Noxious weeds are unknown in the project area at this time. Known populations of leafy spurge, Canada thistle, and musk thistle occur in the lower portions of Sinks Canyon and along the lower switchbacks. A weed risk assessment rating (found in the project file) was used to address potential spread, consequences, and adverse effects. The project area has a low risk rating.

3.10 Social and Economic Environment

Social and economic concerns relative to the project are symptomatic of general trends occurring in much of the western United States. Issues revolving around access, private lands and ownership rights, regulation, resource impacts, multiple use, growth and development, economic dependency, county and local jurisdiction, et al could enter the discussion. However, any resolution of these issues is beyond the scope of the analysis for a single timber sale. Feelings are likely to run high on both sides of any issue locally, concerning this project.

3.11 Environmental Justice

Presidential Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued in February 1994. This directed federal agencies to consider as part of the NEPA analysis process, how their proposed actions or projects might affect human health and environmental conditions on minority and/or low-income communities.

Two fundamental questions are posed by the CEQ (Council of Environmental Quality) to help agencies address these and related factors: 1) "Does the potentially affected community include minority and/or low-income populations?" and, 2) "Are the environmental impacts likely to fall disproportionately on minority and/or low-income members of the community and/or tribal resources?"

In answering the first question we used 1990 Census data to examine the minority and low-income populations in Fremont County, the county where the proposed action occurs. The minority populations for Fremont County represent less then 20.2 percent of the total population for the county. This compares to 5.8% minority populations for the whole of Wyoming. CEQ guidance identifies a minority population as one where either: a) the minority population of the affected area exceeds 50 percent or b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. For this analysis the affected area is identified as Fremont County and the state of Wyoming is used as the geographic reference for the general population. Fremont County meets the second condition. Further investigation of the census data indicates that Native Americans make up 18.5% of the population of Fremont County. It is assumed that a majority of this population is located on and near the Wind River Reservation. For the purposes of this analysis the Native American population on and near the Wind River Reservation is identified as a minority population.

The percentage of persons below the poverty level for Fremont County is 19.1 percent as compared to 11.9 percent for Wyoming. Based upon the known demographics of the county it is assumed that a large percentage of these persons are located on and near the Wind River Reservation. For this analysis this population is identified as a low-income population.

3.12 Specially Designated Lands

In September 1993 the Little Popo Agie Piedmont Moraine was proposed as a Geological/ Botanical Special Interest Area. This proposal stemmed from an agreement that evolved from a proposed timber sale in the Maxon Basin area. The proposal would be revisited with the up coming revision of the Forest Plan. The Little Popo Agie Piedmont Moraine is located within the Atlantic Creek analysis area.

There are 7,497 acres designated as wilderness and 9,593 acres of inventoried roadless areas. *See* Appendix A, figure 19 for map of inventoried roadless and wilderness areas.

Chapter 4 Environmental Consequences

4.1 Introduction

The direct and indirect effects of the proposed action and alternatives to it are disclosed in this chapter for each potentially affected resource. Direct effects are caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or farther removed in distance. The magnitude of the potential effect is described either in direct or relative terms. The need for mitigation is justified and displayed relative to the potential effects. A summary of all mitigation is included in Chapter 2. Cumulative effects for each resource area are disclosed separately under that title at the end of this chapter.

The effects are conveyed by an assessment of how well the alternative meets the essential purpose and need for action.

4.2 Effects on Vegetation

4.2.1 Alternative 1

Properly applied, both the clear-cut and clear-cut with reserve tree methods can be expected to regenerate into healthy, vigorously growing, productive stands.

Acres that would be treated using the traditional clear-cut method can be expected to eliminate the dwarf mistletoe and commandra rust infections within the harvest units. The harvested stands would be monitored for regeneration and any signs of reinfection, particularly from dwarf mistletoe. Mistletoe can be expected to slowly infect the stands from adjacent untreated infected stands. With monitoring and appropriate treatments, infection levels can be expected to be held to lower levels than exist in present stands. There would always be a danger of reinfection from commandra rust, as the fungus is spread by airborne spores and would infect trees if conditions were right.

Harvest units using the clear-cut with reserve tree method would have to be monitored closely for any latent dwarf mistletoe infections not noticed while designating the reserve trees. If these harvest acres are placed in stands where mistletoe infections are light anyway, the chance for infection of the regenerating stands can be kept to a minimum. Lodgepole pine stands that are heavily infected with dwarf mistletoe are not recommended to be harvested with the clear-cut with reserve tree method as the chance of infection of the regenerated stand would be very high.

The effects of dwarf mistletoe in thinning units and visual treatments would be the same for reserve tree cuts; partial cutting can intensify the level of mistletoe infection. To counteract this, sanitation/salvage would be used in conjunction with thinning and visual treatments to minimize the incidence of the disease within the stand. The overall effect should be a reduction in mistletoe infection.

Lodgpole pine growing in single-storied stands is generally windfirm when left as a single-storied stand. Partial cutting in these stands, such as would occur in visual treatments where varying densities are left, can lead to wind throw of residual trees. The same would be true for any trees left on undulating edges between groups that are visually treated. The potential for wind throw along these edges is greater than if straight edges were left.

Horizontal diversity for the analysis area would be increased by approximately 48 acres through clear-cut and reserve tree harvests. This is a slight change considering the entire analysis area is over 19,000 acres. Even this relatively small percentage change in the acres in younger age classes has value, as the greater the age class distribution is, the more able a forest is to recover from natural disturbances and provide habitat for a wider variety of plant and wildlife species.

Approximately 26 acres of visual treatments and 17 acres of thinning would increase vertical diversity by providing a variety of tree densities across the road corridor. Openings created in visual treatments would begin to regenerate, providing more vertical structure within stands. These treatments would maintain visual quality along the road corridor, reduce disease incidence and capture existing mortality occurring in the stands, and reduce fuel loadings.

Favoring trees other than lodgepole pine as reserve trees would increase tree species diversity. Any conifer harvest units that already have a minor component of aspen can be expected to see at least a slight increase in aspen stems present. The aspen release/coppice would have a noticeable increase in the aspen stems currently present.

4.2.2 Alternative 2

Under this alternative no silvicultural treatments would take place. Trees in existing stands can be expected to sustain increased mortality form a variety of causal agents including dwarf mistletoe, commandra rust, mountain pine beetle, and white pine blister rust in whitebark pine. There would be some lodgepole pine regeneration in the understory as holes are created in the forest canopy by the death of overstory trees. These lodgepole seedlings would become infected by dwarf mistletoe from infected trees remaining in the overstory. Mistletoe infected lodgepole seedlings would grow very slowly and have very poor form, creating stands that are not as productive or as visually pleasing as the present stands. Increasing numbers of dead trees would also detract from visual qualities and increase fuel loading.

Age class distribution would be further reduced as stands mature and move toward later successional stages. Horizontal and tree species diversity would decrease as stands mature and vertical diversity can be expected to slowly increase. Fuel loading of dead trees can be expected to increase as tree mortality increases. Increasing fuel loading over a broad area increases the likelihood of a difficult to control wildfire, which could in turn create large burned areas that are difficult to regenerate due to lack of an adequate seed source. Without any major disturbance, aspen stems and stands can be expected to decline further. Engelmann

spruce and subalpine fir can be expected to increase in numbers on the moister sites where a seed source exists.

4.2.3 Alternative 3

The overall effect on vertical and tree species diversity under this alternative would be similar to implementing Alternative 1, as similar acreages are proposed for clear-cut, reserve tree, and aspen release/coppice. Vertical diversity would increase by 20 acres over Alternative 1 as more visual treatments are proposed with this alternative. This alternative would be the least effective in controlling or supressing mistletoe infection because of the increased partial cutting, but would create the most effective firebreak of either action alternative by removing fuels from the greatest length of road corridor. This alternative could also lead to great wind throw potential.

4.3 Effects on Travel and Transportation Resources

An in-depth Roads Analysis for the Fiddlers Lake area was completed and is contained in the project file. It is incorporated into this document by reference. Copies of the Roads Analysis may be requested by contacting the person identified in the cover letter, or from the Internet.

Harvest units in both action alternatives lie in the general corridor of the Loop Road and, for the most part, can be accessed by this road. No construction or reconstruction is planned in the action alternatives except for moving the existing pullout at Fiddlers Lake to the east side of the Loop Road. Up to 0.25 miles of temporary road construction may be necessary in order to access portions of units that are blocked from the Loop Road by terrain or physical barriers. The beginning portions of FSRs 307 and 300.5T might also be used to access timber. FSRs used for timber access and haul shall be maintained to current standard and condition by the purchaser. Logging traffic/safety signing would be used along the Loop Road as appropriate.

Since neither of the action alternatives (or the no action alternative) can fund identified deferred maintenance and improvement needs along the Loop Road, plugging and washing of culverts may still occur under any of the alternatives, particularly near Canyon Creek. Road drainage could still occur into Fiddlers Lake from the Loop Road and from FSR 307. Neither of the action alternatives, therefore, would result in increased water quality or aquatic resource degradation. The reconstruction of the existing pullout at Fiddlers Lake, however, may reduce the amount of sediment entering the lake.

Sight distance would be improved along the Loop Road under the action alternatives since encroaching trees would be removed from the corridor. This would improve motorist safety.

4.4 Effects on Range Resources

The proposed action and alternatives to it would have no effect on livestock grazing.

Monitoring of noxious weeds would be required due to the close proximity of the Loop Road, slash pile burns, and existing seeds that may be attached to any heavy equipment brought in to complete proposed work.

4.5 Effects on Recreation Resources

4.5.1 Alternative 1

The effects of the proposed action on recreation would be minimal. No significant increases or decreases in short-term or long-term recreation use would be expected due to the sale, although the cumulative effect of sales and other methods to intentionally open up vistas and other openings along the road may encourage some increases in use because the visuals along the Louis Lake Road would be visually enhanced. Specific activities affected this way might be viewing scenery, wildlife, hunting, and other dispersed activities. Recreation use patterns would not change significantly from the proposed action. Backcountry and wilderness uses would be unaffected except at and near the developed trailhead as discussed below. Firewood gathering would essentially be unaffected by any of the alternatives.

Some short-term effects of noise and hauling on the Louis Lake Road would be experienced. There would be some noise from the sale operations although it would be minimal due to the distances and sound screening to developed recreation facilities including Fiddlers Lake Campground and the Christina Lake trailhead. Sale activities, particularly hauling, would be limited so major recreation time periods (i.e. summer camping, winter snowmobiling) would be less impacted (*see* mitigation section in Chapter 2).

The opening up of vistas and diversifying the continuous lodgepole corridor with natural appearing openings would overshadow the short-term effects of recently disturbed areas. These openings would also have positive effects affording wonderful views of the high peaks to the west, which are not seen in very many places along the road. The challenge would be to continue a program of harvest and/or other methods to maintain openings and vistas along the length of the Louis lake Road for the long-term as regeneration and opening encroachment by trees would continue over time.

This proposed harvest would not significantly affect the experience of the area's hunters and anglers. There may be some short-term inconveniences of noise and haul vehicles on the road, but with no anticipated long-term affects.

4.5.2 Alternative 2

This alternative would have little or no effects on recreation use short or long-term. Short-term noises from operations and hauling on the Louis Lake Road would not exist. Additional vistas and openings would not exist.

4.5.3 Alternative 3

The effects of this alternative would essentially be the same as in Alternative 1. The differences would be in visual resources as discussed in the next section.

4.6 Effects on Visual Resources

The affected area of most concern are the areas within the foreground of the Loop Road. Effects on visual quality vary by alternative and are evaluated accordingly below. Short- and long- term effects are evaluated by alternative. Short-term refers to one to three years. Long-term refers to the length of time beyond three years.

4.6.1 Action Alternatives 1 and 3

Both action alterntives treat both diseased trees and provide consideration for scenery. Alternative 3 contains more acreage of visual cuts and reserve-tree cuts and fewer acreage of clear-cuts (*see* table 2-1). Alternative 1 compartmentalizies treatments more than Alternative 3. Alternative 3 would be more effective to produce visually pleasing effects in the long-term because treatments would be more connected and undulating.

A conscious effort would also be made to open up scenic views of the dramatic mountains to the west, vistas of Fiddlers Lake, and increased wildlife viewing opportunities would exist equitably in both action alternatives. Additionally, harvest units in or near remnant aspen stands would encourage aspen regeneration in both action alternatives. Currently, the trees grow very close to the road creating an unnatural tunnel appearance. Both action alternatives would create openings mimicking what one would see naturally in nearby meadows and other natural mosaic patterns in the area

The short-term result of both action alternatives would be evidence of disturbance through the Loop Road corridor. Slash would be treated to meet Forest Plan standards and guidelines (*see* section 2.2.2). However, approximately 41 acres of clear-cut and clear-cut with reserves in both action alternatives would exceed the VQO of partial retention (effects of the openings would not recover within one year). The clear-cuts and reserve tree cuts would be designed to remove the dead and dying trees in patches. The short and long-term result would be openings dispersed throughout the corridor. The long-term (beyond 10-15 years) result would be improved long-term forest health and, with additional carefully planned entries, a much more visually diverse scene. In the short-term the appearance of the clear-cuts and reserve tree cuts would be somewhat visually disruptive in the foreground with varying levels of contrast to the adjacent natural appearing landscape. Some visual disparity and segmented continuity would be created throughout the scenic corridor in the foreground detracting from a continuous flowing scenic travelling experience, which would serve to emphasize the clear-cuts even further. This effect may exist for up to 10-15 years. The tradeoff, however, is that the background view would be enhanced; the Wind River Mountains would be seen in more places from the Loop Road (*see* Appendix A, figure 17).

The remaining units, including the remaining acreage of clear-cuts and reserve tree cuts, would meet partial retention in the short- and long-term. To meet this, some individual units would need site specific mitigation, including leaving islands of trees for edge and screening.

4.6.2 Alternative 2

In the short-term, the no action alternative may result in more decadent and visually undesirable forest setting with increased fuels build-up and a continued and increased risk of wildfire. An uncontrolled burn of the scenic corridor would be extremely undesirable. In the long-term, these conditions will continue to exacerbate and the potential for a wildfire will increase.

4.7 Effects on Cultural Resources

Under all alternatives, known cultural resource sites would be protected through avoidance.

4.8 Effects on Soil, Water, and Aquatic Resources

4.8.1 Effects on Geology and Soils

Geologic Hazards. No geologic hazards were identified and mapped by Case (1989). However, soil movement can occur on unstable road cut slopes. Temporary road construction should avoid areas of steep slopes where slumping could potentially occur.

Soil Health and Long-Term Productivity. Regional guidelines for protecting the soil resource (FSH 2509.18-92-1) state that no more that 15% of an area would be left in a detrimentally compacted, displaced, puddled, severely burned, and/or eroded condition. Under Alternatives 1 and 3 harvest would be at a time of moderate to low soil moisture conditions. The Frisco soil has sandy loam textures and is considered well drained. Compaction, displacement, and puddling, when soil conditions are above the plastic limits or during low soil moisture conditions, should be minimal within the sale area.

Skid trails and temporary roads would experience short-term detrimental conditions. Following harvest operations skid trials and landings would be reclaimed by removing berms, covering with slash, installing water bars and seeding if necessary. Temporary roads would be obliterated by removing culverts and reestablishing natural drainage configuration to the degree possible by constructing permanent water bars/cross drains, outsloping and ripping the road surface, seeding, spreading slash over disturbed areas, and blocking to normal vehicular traffic.

Soil fertility depends on organic matter and nutrients. Soil productivity can be degraded if humus and topsoil, or even excess leaves and limbs, are taken offsite. Under Alternative 1, coarse woody debris would be left at the rate of four to six tons/acre. In Alternative 3, coarse woody debris would be left at the rate of six to eight tons/acre. This material would provide source material for decomposition.

Both Alternatives 1 and 3 would have low intensity broadcast burning. In Alternative 1 it is estimated 60 to 80 percent of the units and in Alternative 3, 40 to 60 percent would be affected. This activity would lead to a flush release of nitrogen that would be rapidly used by new plant growth. However, some of this rapid release would be in a volatile state and lost in the atmosphere while the rest may become soil mobile moving offsite. The movement offsite would be minimal given the low severity of the prescribed fire. The ground cover left in Alternative 1 is estimated at 20%. In Alternative 3 this is estimated to be 50%.

Soil Erosion. Under Alternatives 1 and 3 surface erosion amounts would be minimal until forest cover is reestablished. Using the Water Erosion Prediction Project (WEPP) model (Elliott, 2000) the amount of on-site erosion for both alternatives has been calculated (*see* table 4-1; actual model data can be found in the project file). The WEPP model is a complex computer program that describes the processes that lead to erosion. These processes include infiltration, runoff, soil detachment, transport and deposition; and plant growth, senescence, and residue decomposition. The model daily calculates the soil water content in multiple layers and plant growth/decomposition. However, it must be noted that WEPP is only a model and it is only a comparison tool. Proportions rather than exact amounts should be compared.

WEPP estimated values were found to be less than two tons/acre for Alternatives 1 and 3. To put this data in perspective, 1/10 of an inch of soil lost over an acre is estimated at 16 tons/acre. It is estimated after five years with adequate tree regeneration the surface erosion rate would be negligible. If the broadcast burning results in a severe fire, surface erosion would increase to 2.51 tons/acre.

Table 4-1. *WEPP model predicted erosion*

	Alt 1	Alt 2	Alt 3
Upland Erosion (Tons/Acre)	1.61	0.0	0.82

Implementation of Wyoming's Silviculture BMPs (located in the project file) would minimize the potential erosion predicted above.

Under Alternative 2 impacts to soil would be negligible.

4.8.2 Effects on Water Resources

Wetlands. Wetlands control runoff and water quality, recharge ground water, and provide special habitats. Actions that may alter their ground cover, soil structure, water budgets, drainage patterns, and long-term plant composition can impair these values. None of the proposed activities would result in changes to the hydrologic regime and the capability of the wetlands to function as a water quality filter and facilitate groundwater recharge. No wetland acreage would be harvested or crossed by new roads in any of the alternatives. Moisture conditions within the wetlands should not be affected by the proposed activities because of

the location of the harvest units and the burn prescriptions for prescribed fire.

Sale layout would include a one hundred foot equipment buffer zone from all water bodies to implement Forest Plan standard and guidelines (III-215). No heavy equipment would encroach in wetlands/water bodies and at least 80% of potential ground cover would be maintained within the buffer zone.

Floodplains. Floodplains are natural escape areas for floods that temper flood stages and velocities. No new road construction would occur in flood prone areas nor are any of the units proposed for treatment located in flood prone areas. Streams in the project area have access to their floodplains, and flood hazard would not be affected by the proposed activities.

Riparian Areas. Riparian ecosystems provide shade, bank stability, fish cover, and woody debris to aquatic ecosystems. They also provide key wildlife habitat, migration corridors, sediment storage and release, and surface-ground water interactions. Composition and structure of riparian vegetation can be changed by actions that remove certain species and age classes.

None of the proposed activities would occur within riparian areas, however, selected trees may be designated for removal adjacent to riparian areas. Harvest operations in these areas would be subject to contractual provisions to protect wetlands and riparian areas and would be implemented in accordance the Soil and Water Best Management Practices found in the project file. Consequently, the action alternatives would have minimal to no effect on riparian ecosystems. The proposed action alternatives would indirectly benefit riparian habitat over the long-term by reducing fuel loading and risk of catastrophic fire in the area.

Streams and Lakes.

Sediment. Most sediment delivered to streams comes from a source zone along streams whose width depends on topography, soils, and ground cover. The connected disturbed areas like roads and other disturbed soils near streams can deliver sediment during runoff events. Sediment deposits in streambeds harm insect populations and fish reproduction.

Alternatives 1 and 3 include the construction of up to 0.25 mile of additional temporary road. The use of proven conservation practices reduces the risk of sediment delivery to streams and wetlands for all alternatives to an acceptable level. These Best Management Practices focus on proper road layout to disconnect the transportation system from the stream network, to fit roads to topography and restrict road construction to low to moderate slopes, to avoid wet meadows and ephemeral drainages (by at least 100’), to use minimal construction and ground disturbance and utilize outsloped roads or insloped roads with ditches and cross-veins, to use slash windrows to the road to trap sediment, and to obliterate the temporary roads upon completion of the proposed project. Temporary road construction shall avoid areas of steep slopes where slumping could potentially occur.

None of the alternatives carry a substantial risk of sediment delivery from the acreage being

silviculturally treated, due to the location of the units and the types of silvicultural and slash treatment being proposed. Erosion and sedimentation would either not occur or would be adequately buffered either from slash or location.

Bed and Bank Stability. Bed and bank stability can be damaged from trampling by animals or humans, vehicle impact, degraded bank vegetation, or excessive flow augmentations. Streams can be made wider and shallower, pools and overhanging banks can be destroyed, and much sediment can be added to streams. None of the alternatives propose any new stream crossings, so there is no additional risk to the existing condition for bank destabilization and bank vegetation damage.

Flow Regimes. Flow regimes can be altered by major changes in cover type or ground cover, dense road networks, or water projects. Water temperature and chemistry, sediment transport, aquatic habitats, and aquatic life cycles can be degraded. Hydrologically, the amount of acreage being treated or disturbed is minimal (from zero to less than 1% of the total analysis area). The proposed additional 0.25 mile of temporary road in each action alternative would be disconnected from streams, including ephemeral drainage swales, lakes, and ponds. These temporary roads would be physically closed, with any cut and fill areas recontoured and revegetated upon completion of the project such that the possibility of stream network extension is minimized. Because of this, effects on flow regimes are minor with proper administration, compliance, and monitoring.

Temperature and Oxygen. Removing shade or damaging banks so streams are wider and shallower decreases winter water temperature and increases summer water temperature. Dissolved oxygen (D.O.) is usually reduced when summer water temperature is increased significantly, especially above 65 degrees Fahrenheit. Such impacts can impair or destroy the suitability of water bodies for aquatic biota. Due to the high elevation, snowpack and cool mountain temperatures, summer warming of streams, especially above 65 degrees, is not a concern with mechanical timber harvest in this area. Mountain streams are typically supersaturated with D.O. due to the mixing action and exchange with ambient air. As a result, low D.O. levels are not a concern. Cold winter temperatures and stream icing reducing overwintering habitat can be a concern if streams become wider and shallower than natural and/or if excessive vegetation is removed from stream banks.

Because of the type of silvicultural treatments, small size of the units, dispersion of the units and distance from streams there would be no effect on cooling stream temperatures, icing, or the stream aquatic biota.

Water Purity. Water purity can be degraded by placing concentrated pollutant sources near water bodies, applying harmful chemicals in or near water bodies, or intercepting hazardous rock strata by roads. Degraded water purity can impair or destroy use of the water by aquatic biota and humans. Alternative 3 carries a slightly greater risk than Alternative 1 because it involves somewhat smaller and more discontinuous areas with a greater number of entries. There is minimal risk associated with the fueling and servicing of equipment at areas at least 150’ from wetlands, riparian areas, and stream channels, and by using berms to contain

potential spills at fueling sites, and disposing of used oil and fuel properly.

Aquatic Life. Migration barriers, changed flow regimes, riparian damage, or significantly increased sediment can degrade aquatic life or chemical loads. With proper administration, compliance and monitoring of the Watershed Conservation Practices, Best Management Practices, and mitigation measures in this document the effects of timber harvest and roads on riparian habitat and aquatic biota that use them would be insignificant.

4.8.3 Effects on Fisheries Resources.

Overall, either action alternative would have no adverse impacts on perennial streams, riparian areas, and lakes with fish including Fiddlers and Cow Lakes. Only one proposed unit is located adjacent to Fiddlers Lake. The lake, however, should not be impacted because slash would be placed on the opposite side of the Loop Road and BMPs would be adhered to. There is adequate filtering and drainage to prevent sediment introduction into live streams and lakes. For the proposed action, approximately 103 acres would be harvested and scattered over 13 units. Units would be planted if natural regeneration does not meet specified standards. A total of 0.25 miles of temporary road may be necessary for access to some harvest units. All temporary roads would be oblitereated, recontoured, and if needed, seeded. Also, proper administration, compliance, and monitoring of Watershed Conservation Practices (WCPs), Best Management Practices (BMPs), and mitigation measures contained in this document would minimize any potential adverse riparian and fisheries resouce impacts.

Thus, Yellowstone cutthroad trout would not be affected by either action alternative.

Either Alternative 1 or 3 would be beneficial to these resources in the long-term. The no action alternative carries risk to fisheries since the existing stands are dead and dying. Timber harvest would somewhat help prevent catastrophic wild fires in these stands and adjacent areas which would also help reduce the threat of significant post fire erosion and excessive sediment introduction into streams significantly above natural levels.

4.9 Effects on Wildlife Resources.

All vegetation management activities have some impact either negatively or positively on wildlife species. Vegetative manipulation that favors earlier successional vegetation would provide habitat for and benefit early successional wildlife species. Activities that maintain late successional vegetation would favor species that are dependent on habitat provided by those vegetative species and the structure they provide.

4.9.1 Management Indicator Species

Effects on Elk. Big game, particularly elk, use forested stands in the analysis area for hiding or security cover, migration, and travel corridors. Vegetation treatments usually cause a shift in how big game animals use their altered habitat. Harvesting forested stands that

provide hiding/security cover or travel/migration corridors decreases those stands ability to function in that capacity but usually increases forage in those areas in the short-term. A forested stand's ability to function as hiding cover for security or during migration for elk and other big game decreases as the amount of timber removed using logging in that stand increases. Building roads through forested stands also eliminates those stands ability to function as hiding/security cover. Increased indirect effects to elk from more successful predation can occur when hiding cover is reduced. Effects of the amount of hiding/security cover lost through timber harvest are determined in this analysis by comparing the acres of cover lost through timber harvest and road construction between alternatives.

Road construction, road use, and harvest activities into previously unroaded big game areas usually cause some disturbance and displacement of big game, particularly if the animals have not habituated to these activities. This disturbance and displacement can also be direct and indirect and usually is short-term, but could be long-term depending on the magnitude of adverse impacts and if the roads are left open to motorized travel after the vegetative treatment activities are completed. The differences between alternatives, both during the treatment activities and after, consider the size of the area affected (acres potentially affected and miles of road constructed and open) and the length of time the area is affected. The more area treated, acres clearcut, miles of road constructed and open, and time until activities are completed, the greater the potential impacts to these species that prefer less disturbed habitats.

As mentioned above, habitat conditions generally influence the distribution of big game populations, or how and where they use their habitat on the landscape, and indirectly their vulnerability to hunters and predators. Big game population numbers, however, are often most affected by the severity of winters, the number of hunting licenses sold, the timing and length of hunting seasons, hunter success, and the number of animals actually harvested.

Action Alternatives 1 and 3. Alternatives 1 and 3 would harvest approximately 103 and 123 acres of timber respectively, which is less than one percent of the analysis area. Silvicultural treatments under these alternatives include a combination of clear-cut, clear-cut with reserve tree, commercial thinning, visual treatments, and aspen release/coppice. Depending on the harvest method, slash may be hand-piled and burned, scattered and left, or broadcast burned. These treatments would eliminate or reduce these stands ability to function as hiding cover for elk security cover and travel corridors during the short-term (20 years).

Both action alternatives would construct approximately 0.25 miles of temporary road to access some of the harvest units. Road construction through forested stands would eliminate hiding cover in those areas of the stands. However, less than one acre of cover would be eliminated if this amount of temporary road were constructed through forested stands that currently provide cover. For the most part, temporary roads would be placed within existing harvest units. The amount of cover lost due to temporary road construction, therefore, is negligible.

Eliminating or reducing 103 or 123 acres of hiding cover and converting it to forage areas would change how and when elk use these habitats. The new forage areas would likely have more use during the early evening, night, and early morning portions of the day and less use during the middle of the day, just reverse of when these areas were hiding cover. It is unlikely that the amount of conversion from cover to forage in each action alternative would measurably affect elk numbers or effective elk habitat, especially with the close proximity of the treated areas to the Loop Road and minor amount of temporary roads constructed and closed after the project is completed.

What does this mean for elk use in this landscape? If one subscribes to the cover/forage ratios (40:60) recommended in the literature for elk habitat in other areas (Thomas 1979, Hoover and Wills 1984), then these alternatives would probably not have much effect on elk habitat. This analysis area would still have hiding cover above these recommended levels for elk and other big game to use for security both during activities and after, especially since only minor amounts of temporary roads are planned and would be obliterated after activities are completed in this alternative. The remaining cover would still be well distributed on the landscape, which would provide travel and migration across this landscape. After the project, the open road density would remain the same as existing (*see* Tables 3-5 and 3-6).

The amount of big game cover affected in each action alternative is minimal. Under the no action alternative, 43.1% of the analysis area is in big came cover, Alternatives 1 and 3 leave 42.6% and 42.5%, respectively. Alternative 3 has the highest potential to cause disturbance and/or displacement to big game, while Alternative1 has the lowest, however, the differences are minor. This is because Alternative 3 treats more acreage.

Alternative 2. With no harvest of timber planned in this landscape, the habitat for big game would remain relatively unchanged in the short-term (20 years). Areas that currently are providing hiding cover would probably continue to function in that capacity in the short-term. Foraging areas should also continue to supply forage during that period.

Elk would continue to use this landscape for spring, summer, and fall habitat and would continue to move through it on their way to and from winter and other summer ranges. As natural stand succession continues without disruption, forested stands and foraging areas may continue to provide similar habitats for elk and other big game beyond 20 years. Beyond this time period, the oldest forested stands would have less canopy closure and more down woody material due to trees that are dying and falling over. If these openings do not regenerate, multiple age classes and canopy cover would not be present. This could reduce elk use due to the overall reduction of cover. In addition, these areas would be more difficult to travel through because of the large amounts of down material.

It is possible that in the short or long-term one or more disturbances could occur in this landscape. These disturbances, including high wind events, insect and disease epidemics, and natural or human-caused wildfire have the potential to alter large portions of this landscape. Generally, wind thrown trees and insect or disease killed timber predisposes those areas to fire later. The direct and indirect effect of these types of disturbances result in earlier

successional vegetation, which mentioned earlier, would favor early successional wildlife species possibly to the detriment of wildlife species dependent on late successional habitats, depending on the extent of the altered landscape.

Non-hunted elk populations would be considered early successional species and respond favorably to large landscapes of early successional vegetation, similarly to what has happened in Yellowstone National Park since the fires of 1988. However, the South Wind River Elk herd is a hunted population and may be adversely affected by large amounts of lost hiding cover for security and migration during the hunting season. It is likely these major changes in the habitat on this landscape could lead to higher hunter success and elk harvest which over time could reduce elk numbers below population objectives and eventually lead to fewer elk licenses and shorter seasons to again raise the population numbers up to objective levels.

If the extent of this altered landscape is large, if a mosaic pattern of remaining cover is not retained, and if large patches of cover are removed, potentially fragmenting cover for travel and migration through this landscape, then these large early successional vegetation areas would dominate the landscape and any remaining cover may not be well distributed on the landscape. Large created openings across this analysis area may likely change how, where, and when elk travel from summer range to winter ranges, especially during the elk hunting season. These changes could involve delayed or later migration (elk remain in the higher elevations, more remote areas), or move during night across these burns. If a catastrophic event occurs and alters large portions of this landscape, the effects are potentially greater in this alternative than the action alternatives, because an event of this nature has the greatest potential to bisect and possibly disrupt elk movements from the west to the east in this landscape. However, a catastrophic event could occur regardless of alternative, even though the action alternatives are designed to help reduce potential effects from such an event.

Effects on Mule Deer and Moose. There would be modifications to the structure of the forested stands and the landscape after the proposed treatments in both action alternatives and after any potential natural disturbances. There would be a reduced forested setting, from clear-cuts with snags to selectively harvested areas, which reduces vertical and physical structure in the stands and increases horizontal diversity in the landscape in the short-term.

Similar effects described above for elk by alternative would apply for deer and moose.

Effects on Forest Grouse. All alternatives that promote vegetative and horizontal diversity across this landscape would benefit both ruffed and blue grouse. Any efforts to promote or enhance aspen regeneration and thus various age classes would be especially beneficial to ruffed grouse. However, there would be a short-term loss of habitat from the harvest and temporary road construction while these areas are revegetating. None of the proposed alternatives would significantly affect these species.

Effects on Primary Cavity Excavators (e.g. Hairy Woodpecker). The harvesting of these stands can impact primary cavity excavators by removing habitat, particularly the dead

and dying trees. It is likely that Alternative 3 which removes more of habitat (dead and dying trees) from a greater area would adversely affect more habitat than the other alternatives. Alternative 1 would result in reducing habitat but not as greatly as Alternative 3, since more forested canopy would be left after harvest. However, the trend on the forest has been toward a late-successional stage, mature conifer environment, which includes mid to high-level densities of dead and dying trees. This higher level of mature and older structural stages would favor these cavity dependent species.

Neither action alternative is likely to result in a significant loss or reduction in habitat. The reduction in potential primary cavity excavator habitat in the analysis area is 0.98 percent and 1.17 percent for Alternatives 1 and 3, respectively. Because both action alternatives occur within close proximity to the Loop Road where firewood gathering has been occurring and are relatively linear in context on the landscape, neither alternative would significantly affect distribution of that habitat in the analysis area over the existing situation.

4.9.2 Proposed, Threatened, Endangered, and Sensitive Wildlife Species

An in-depth analysis and evaluation process for the determination of effects to threatened, endangered, and sensitive wildlife species was completed for this EA; the analysis is documented in a biological assessment/biological evaluation (BA/BE). The BA/BE is found in Appendix C.

Table 4-3 summarizes the findings of the BA/BE. For additional information on Yellowstone cutthroat trout, *see* Section 4.8.4.

A finding of "is not likely to jeopardize" was concluded for the gray wolf. A finding of "no effect" was concluded for the grizzly bear. A finding of "not likely to adversely affect" was concluded for Canada lynx.

Table 4-3. *Summary of determinations of effects to threatened, endangered, or sensitive species relevant to the proposed action, taken from the analysis in the BA/BE.*

Species	Habitat Present	Alternative 1 Proposed Action	Alternative 2 No Action	Alternative 3
Threatened or Endangered Species				
Gray wolf[12]	Yes	Is not likely to jeopardize	No effect	Is not likely to jeopardize
Grizzly bear	Yes	No effect	No effect	No effect
Canada lynx	Yes	Not likely to adversely affect	No effect	Not likely to adversely affect
Bald eagle	No	No effect	No effect	No effect
Sensitive Wildlife Species				
Dwarf shrew	Possibly	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide	No impact	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide
Water vole	No	No impact	No impact	No impact
Marten	Yes	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide	No impact	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide
Fisher	unlikely	No impact	No impact	No impact
Wolverine	unlikely	No impact	No impact	No impact
Northern Goshawk	Yes	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide	No impact	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide
Boreal owl	Yes	No impact	No impact	No impact
Black-backed woodpecker	Yes	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide	No impact	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide
Northern three-toed woodpecker	Yes	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide	No impact	May adversely impact some individuals, but is not likely to result in a loss of viability on the planning area, not cause a trend toward federal listing or loss of species viability rangewide
Tiger Salamander	Yes	No impact	No impact	No impact
Boreal toad	Yes	No impact	No impact	No impact
Northern leopard frog	Yes	No impact	No impact	No impact
Yellowstone Cutthroat trout	No	No impact	No impact	No impact

[12] The gray wolf (*Canis lupis*), which was formally listed as threatened, was reclassified as non-essential, experimental in the Yellowstone area with the publication of the Final Rules in the Federal Registrar (November 22, 1994; Vol. 59, No. 244).

4.9.3 Effects on Sensitive Plant Species and Noxious Weeds

The Fiddlers Lake project includes potential habitat for two regionally designated sensitive plants, pink agoseris and Fremont's bladderpod. The habitat of these two species is non-forested openings (Fertig, 1994). Within the affected proposed cut areas the probability of either species occurring is extremely low.

A potential for noxious weed spread from the Sinks Canyon area to the project area could occur due to the amount of traffic currently traversing the Loop Road. This could occur from project related or non-project related traffic.

4.10 Effects on the Social and Economic Environment

The scale of this project is such that there would be no measurable impact on social or economic systems in Fremont County, Wyoming. Social and economic concerns relative to the project are symptomatic of general trends occurring in much of the western United States. Issues revolving around access, private lands and ownership rights, regulation, resource impacts, multiple use, growth and development, economic dependency, county and local jurisdiction, et al, could enter the discussion. However, any resolution of these issues is beyond the scope of the analysis for a single timber sale. Feelings are likely to run high on both sides of any issue locally, concerning this project. The discussion of economic and social effects is tiered to the Forest Plan, as amended by the Allowable Sale Quantity EIS and ROD.

Possible changes in the social or economic environment are unmeasurable at this scale of activity in a way that would allow some comparison between alternatives. The relative financial feasibility of each alternative, in terms of cost efficiency, is a different economic measure. The cost efficiency determination is addressed below.

Management of the project area to achieve the desired forest condition would provide a mix of multiple use goods and services that maximize net public benefit from the Shoshone National Forest. This mix of goods and services requires attaining and maintaining specific ecosystem conditions for maximizing net public benefit. Actions such as the proposed vegetation treatments are deemed necessary to achieve the desired forest conditions and maintain these through time over an area large enough to enhance such items as wildlife habitat, vegetative and habitat diversity, visual diversity and quality recreation experiences.

Table 4-4 below summarizes the results of the financial analysis conducted by alternative for the proposed silvicultural treatments. This financial analysis is based strictly on market values (quantitative). Non-market (qualitative) values, such as wildlife habitat, scenic quality, and watershed protection, are difficult to assign values to. The financial analysis displayed in Table 4-4 and effects discussion elsewhere in this chapter must be reviewed concurrently so that a decision can be made taking into consideration both quantitative and qualitative resource values.

Table 4-4. *Financial analysis by alternative*

	Alternative 1	Alternative 2	Alternative 3
Present Value benefits	$89,317.46	$0.00	$93,783.34
Present Value costs	$83,022.10	$15,000.00	$88,991.27
Net Present Value	$6,295.36	-$15,000.00	$4,792.07
B/C Ratio	1.08	0.00	1.05

The analysis of strictly revenues and costs for Alternatives 1 and 3 reveals a positive present net value and associated benefit/cost (B/C) ratio of greater than 1[13]. From a strictly financial perspective Alternative 1 is a slightly better choice then Alternative 3. All costs are deemed necessary and appropriate to move the vegetation in the analysis area towards the desired condition using silvicultural treatments while taking into consideration necessary design criteria and mitigation. Detailed economics analysis can be found in Appendix D.

4.11 Environmental Justice

In considering potential environmental justice concerns, we evaluated the potential effects on the Native American population on and near the Wind River Reservation. Given the small size of this project, the socioeconomic effects are insignificant at the county scale. In addition we do not believe those effects would be disproportionately larger or smaller on the population of concern. In summary, we do not believe there are any environmental justice concerns with this project.

4.12 Specially Designated Lands

Proposed treatment areas lie outside of roadless and wilderness areas. Therefore, there should be no effect to these lands.

4.13 Cumulative Effects

4.13.1 Analysis Process

Cumulative effects are impacts on the environment that result from the incremental impact of an action when added to other past, present and reasonably foreseeable actions regardless of what agency or person undertakes such actions (40 CFR 1508.7). The following procedure described for cumulative effects analysis is consistent with Council On Environmental Quality guidance. The assumptions used in identifying possible cumulative effects are:

- Mitigation measures and guidelines for prescribed management activities would be followed and implemented for all present and future proposed activities

[13] Net present value is the discounted benefits minus discounted costs of a project. A value that is greater than zero shows that benefits are greater than costs. A benefit cost ratio is obtained by dividing the anitcipated discounted benefits of a project by its anticipated discounted costs to obtain a measure of expected benefits per unit of cost. A B/C ratio greater than 1 indicates a postive return on a project. The higher the ratio, the greater the benefits over cost.

- There would be no net increase in the miles of roads

The Area Potentially Subject to Cumulative Effects. Cumulative effects are a function of the types of impacts in relation to resources of concern, the duration of impacts, and distances that impacts can travel. Unless otherwise stated, the area of concern for each resource area is the Atlantic analysis area.

Potential Sources of Impact. Sources of impacts or change are those activities, developments, or events that, cumulatively, have the potential to change the biological or physical character of a given area. Sources of change include forest management activities that alter vegetation, such as timber sales, or developments that cause increases in use, such as road construction. Other sources of impact that might be associated with adjacent land use are subdivision developments, oil and gas development, and wildfires. Past sources of impact are described for each resource of concern addressed below. Other possible sources of impact are indicated in each resource area subject to cumulative effects.

Total Cumulative Impact on the Resource of Concern. For each resource of concern, considering the area subject to cumulative effects and the applicable sources of impact, the total effect of these sources plus the proposed action are evaluated. The total effect is described in relative terms of intensity (e.g. negligible, unmeasurable, small, moderate, major, extensive).

4.13.2 Cumulative Effects on Vegetation

Area Considered. Besides the Atlantic analysis area, other areas of concern include the condition and connectivity of forest vegetation in adjacent analysis areas.

Potential Sources of Impact. Past timber management activities in the Atlantic analysis area have taken place in recent years. There was one eleven acre seed cut of a two step shelterwood harvest that was completed in 1995 as part of the Louis Lake Salvage Sale in the southeast corner of the anlaysis area. Required regeneration surveys are ongoing. A 17-acre visual enhancement clear-cut, approximately one mile north of Fiddlers Lake was completed in 1998 and the slash was burned in 1999. This visual cut will be planted to whitebark pine in the summer of 2002. The Atlantic Creek Salvage Sale was sold in 1999. This sale consists of 64 acres of clear-cut units spread among three harvest units near the southern boundary of the analysis area. Scheduled completion date in March 2003. Dead timber make up over 60% of the volume sold in both the Louis Lake and Atlantic Creek Salvage Sales.

Reasonably foreseeable future vegetative management within or adjacent to the Fiddlers Lake project area include the Blue Ridge Whitebark Pine project. This project would include both mechanical treatment and prescribed fire to restore young whitebark pine stands along Blue Ridge.

Other potential sources of impact include wildfire or insect epidemic. A pine beetle outbreak ccurred in the 1970s as described in Chapter 3. As described in previous chapters, disease is

already prevalent throughout the project and analysis area. Only two wildfires have occurred in the analysis area in the last 40 years: the Maxon Basin Fire in 1970 (115 acres) and the Silas Lake Fire in 1962 (250 acres).

Total Effect on the Resource. The total effect of the proposed action, alternatives to the proposed action, and other vegetative treatments that have or will occur in or adjacent to the analysis area would have a minimal impact on the vegetative resource as a whole. Given that the analysis area is mature (*see* table 3-1), past rotation age, heavily diseased, has had few acres disturbed (as from fire), and that this and adjacent anlaysis areas contain large, continuous blocks of dead and dying trees, the potential for a large wildfire is high. As discussed earlier in this chapter, only a small percentage of the analysis area would be treated under this proposal. The improved health and greater structural diversity of completed and proposed treatment areas, however, particularly as they lay within the Loop Road corridor, could act as a fuelbreak if a wildfire should burn in this area. This could slow fire spread. This would also be true of any treatments performed along Blue Ridge as part of the whitebark pine restoration project.

For additional discussion on forest strucutral diversity, *see* the Total Effect on Sensitive Species discussion later in this chapter.

4.13.3 Cumulative Effect on Travel and Transportation Resources

Area Considered. Open roads within the Atlantic analysis area. The Loop Road Environemtal Impact Statement (EIS) proposes to reconstruct the Loop Road between sinks Canyon and the Worthen Meadows turnoff.

Potential Sources of Impact. Weather conditions causing excessive runoff, additional and repeated use of the road, lack of maintenance funds.

Total Effect on the Resource. Road conditions would continue to deteriorate as no reconstruction of roads, except those outlined in Chapter 2 for the action alternatives, is expected to occur in either action alternative. Other funding would be needed to improve road conditions under any of the action alternatives.

Under all alternatives, a portion of the Loop Road is proposed for reconstruction. The portion being reconstructed is outside of the analysis and project areas. Effects from this project are discussed in the Loop Road EIS. After reconstruction of this portion of the road would be more suitable for haul.

4.13.4 Cumulative Effect on Range Resources

There are no measurable cumulative effects on the range resource.

4.13.5 Cumulative Effect on Recreation Resources

Potential Sources of Impact. All past vegetative treatments within the Loop Road corridor are considered sources of impact.

Total Effect on the Resource. The cumulative effect of sales and other methods to intentionally open up vistas and other openings along the Loop Road may encourage some increases in use because the drive through the road would be enhanced. Specific activities affected this way might be viewing scenery, wildlife, hunting and or other dispersed activities.

4.13.6 Cumulative Effects on Visual Resources

There are no measurable cumulative effects on the visual resource other than the long-term effects described in section 4.6.

4.13.7 Cumulative Effects on Soil, Water and Aquatic Resources

Potential Sources of Impact. For potential sources of impact, refer to the Transportation and Travel and Soil, Water, and Aquatic Resources sections of Chapter 3 for a discussion of past and current activities within the Atlantic analysis area. Also see section 4.12.3 above.

Total Effect on the Resource. The effect of the proposed action, or alternatives to it, would not add to the cumulative effect of other sources of impact in any measurable way relative to water quality at the Forest boundary.

Numerous factors particularly related to watershed cumulative effects were considered during analysis. Consideration was given to the following:

- Additive effects of past, present, and reasonably foreseeable activities
- Location of proposed disturbances relative to sensitive areas and degraded systems
- Timing, severity, and duration of disturbances and their effects
- Effects on State-classified water uses
- Effects on stream health and aquatic life limiting factors
- Overall effects on functions of the riparian and wetland network
- Long-term soil productivity
- Use of this project to assist recovery of existing watershed condition

Watersheds experience periodic disturbance events that vary in size, duration, intensity, and frequency. Because these events are random, some level of risk is implied. This risk is a product of event probability. Alternative 3 proposes slightly more risk than Alternative 1 due to a slightly larger amount of acreage proposed for treatment and a larger number of return entries to accomplish objectives.

Each alternative carries the risk of sediment delivery from the existing transportation system

to the drainage network's streams, lakes, and ponds. Existing erosion and sedimentation problems that exist for the analysis area described in Chapter 3 are beyond the scope of this analysis. Corrective measures would need to be performed through some other means than this project's mitigation. The annual road maintenance program and Watershed Improvement Needs Inventory program are potential funding sources to address these needs.

As previously discussed in Chapter 3, review of the analysis area indicates past and present activities have not created a watershed cumulative effect concern, nor would reasonably foreseeable activities contribute substantial concerns.

Proven conservation techniques, management requirements, and any special mitigation measures (located in the project file) provide adequate control to mitigate the potential effects of the alternatives with proper administration, compliance, and monitoring. Thus, any contribution to watershed cumulative effects, provided disturbance events exceeding the design storm (10-year, 24-hour) do not occur, have either been eliminated or minimized. However, if a lower probability, higher magnitude event were to occur, any of the three alternatives could contribute to watershed cumulative effects.

In the short-term, impacts to fisheries would be negligible. In the long-term, conditions would be improved under the action alternatives due to the reduced risk of catastrophic fire, as discussed earlier in this chapter.

4.13.8 Cumulative Effects on Wildlife Resources

Endangered Species Act Cumulative Effects. There are no other private or State permitted activities that are expected to occur within the project influence zone that would result in significantly modifying the conclusions in Chapter 4 or in the BA/BE, regarding anticipated effects on species or their habitat. No other private land occurs within close proximity to the project sites. The primary State permitted activity in the area are regulated wildlife hunting/trapping and fishing seasons. The proposed project is not expected to have any influence on or be affected by these non Forest Service permitted or regulated activities.

Area Considered. Besides the Atlantic analysis area, the following areas of concern exist for the species listed below.

- *Elk.* Area considered includes winter range off the Forest for the South Wind River Unit elk herd. On Forest, this herd uses the Bayer Mountain, Louis Lake, Maxon Basin, and Ed Young Basin analysis areas.

- *Primary Cavity Excavators.* No other areas besides the Atlantic analysis area.

- *Canada Lynx.* LAU number 18. The Atlantic analysis area falls entirely within this LAU.

- *Sensitive Species.* Their respective habitats on the Forest.

Potential Sources of Impact. Past sources of impact in the wildlife areas of concern include domestic livestock grazing, commercial timber harvest, precommercial thinning, hunting, horseback riding, fishing, commercial outfitting, personal use firewood gathering, camping, recreational driving, and general dispersed recreation. Some of these past activities have occurred over a long period and many presently occur. Past modifications to wildlife habitat have come primarily from the establishment of roads, harvest of timber, grazing of livestock, residential development adjacent to National Forest System lands, developed recreation sites and suppression of wildfire.

The current conditions within the areas of concern are a result of a combination of past and present activities, both natural and human-caused. For the purposes of this analysis, the management activities and natural events considered as having potential influence during the past, present, or reasonably foreseeable future are identified below:

- road construction
- timber harvest
- natural disturbances
- residential development
- off-road vehicle use
- recreation use

Activities within the above categories were considered for all ownerships within the areas of concern, including lands managed by the Bureau of Land Management, the State of Wyoming, and private individuals or corporations.

Besides those sources of impact listed above for the Atlantic analysis area including the proposed timber harvest, additional sources of impact for the following species include:

- *Elk.* Prescribe burning in the Limestone Mountain, Black Mountain, Ed Young Basin areas; recreational activity in Louis Lake and Fiddlers Lake campgrounds and Louis Lake Resort; proposed improvements to the Loop Road.

- *Primary Cavity Excavators.* Improvements to the Loop Road and continual pioneering of roads by the public for firewood removal. Any wildfires that may start within the Atlantic analysis could potentially have either adverse or beneficial impacts.

- *Canada Lynx.* Prescribed burning within the LAU and improvements along the Loop Road.

- *Sensitive Species.* No additional sources other than those described above for the Atlantic analysis area.

Total Effect on the Resource.

Elk. Past human activities in and near the area of concern have contributed to the existing conditions in this area. Previous timber harvest and road building activities have occurred within the area of concern. In the Atlantic analysis area, that activity was been very limited. Within other portions of the area of concern, the majority of the harvests were predominately clear-cuts that are, for the most part, restocked and provide hiding cover for big game species. These past management activities have contributed to the stand and landscape characteristics that have made this desirable habitat for big game species. Recreation activities have increased in the area of concern in the last 30 years. The amount of livestock grazing has declined on National Forest System lands in the same area during the same period, while livestock grazing on BLM, State, and private lands adjacent to the Forest has probably been relatively constant. Some illegal off-road vehicle use has occurred in this area, primarily associated with hunting seasons during the fall. At the same time elk, deer, and moose populations have increased. As mentioned earlier, numbers of big game are most affected by the severity of the winters, the number of hunting licenses sold, the timing and length of hunting seasons, hunter success, and the number of animals actually harvested. Habitat conditions generally influence the distribution of these populations on the landscape.

Previous sources of impacts, along with the proposed timber harvest, can add to the cumulative effects on elk and other big game and their habitats. The proposed actions should enhance the horizontal diversity of vegetation on the landscape in both the short and long-term. The treatment of a relatively small portion of the forested area of the Atlantic area may modify where elk would use this forested cover in the short-term, but they would not abandon this area. The proposed activities in any action alternative would not significantly add to the cumulative effects on elk or other big game habitat in the Atlantic analysis area or the larger area of concern.

Roads, open or closed, generally decrease habitat effectiveness for wildlife, particularly species that prefer less disturbed habitat, like elk. It is recognized that, apart from the direct habitat loss, it is not the road itself but the human activity associated with the road that is of concern. Since road construction and the use connected to it and its effects on elk are often significant issues, road density, both total road density and open road density, are good measures of effects on these species. And because roads are related to past, present, and these proposed projects' activities, these density measurements before and after project activities are a good measure of cumulative effects. There is no new road construction proposed with either action alternative. Temporary road construction would be minimal and the total and open road densities would not change from existing densities after the project due to either action alternative. There would be no additive cumulative effects due to the access portion of this project.

There are only minor differences in effects between these projects' alternatives because there would not be any increase in open road miles after completion of project activities. Cumulative effects to big game and their habitat are small at the landscape level. There are minor differences between alternatives in how elk may utilize this area in the short-term

because of the different modifications to habitat at the stand level between the alternatives. This project, as designed with mitigation, would not significantly add to the cumulative impacts on elk.

Primary Cavity Excavators. The impacts from timber harvest and firewood gathering include reduced amounts and distribution of this habitat. There have been 30 acres (0.3 percent) of the non-wilderness, forested habitat impacted by management activities in the past, not counting the construction of the existing roads nor the removal of firewood along those existing roads within the Atlantic analysis area.

When the construction and use of the existing roads is included there is an estimated additional 317 acres (3.2 percent of the non-wilderness, forested habitat) where wildlife habitat has been and is impacted by firewood gathering. Some areas along the roads may not be affected to 250 feet because of steep terrain or adjacent non-forested areas, such as meadows. Other areas may be affected by more than 250 feet because of gentle terrain. This area influenced by firewood gathering is probably a conservative estimate because this estimate does not include the area accessed by user-built roads that are pioneered by the firewood gathering public. Regardless, the extent of past activities that have influenced primary cavity excavator habitat have been minor in the analysis area (3.5 percent of the non-wilderness, forested habitat or 2.4 percent of the forested vegetation).

In the Atlantic analysis area there is currently 14,284 acres of forested vegetation types or 73 percent of the analysis area. The majority of the forested vegetation types (74 percent) are in the later successional stages that would have potentially more snags and down dead material. However, there are earlier successional lodgepole pine stands that have high degree of dead tops from disease that also provide dead standing wood. The trend on the forest has been toward a late-successional stage, mature conifer environment, which includes mid to high-level densities of dead and dying trees. This higher level of mature and older structural stages would favor these cavity dependent species.

The reduction in primary cavity excavator habitat in the non-wilderness, forested habitat is 1 and 1.2 percent or 0.72 and 0.86 percent of the forested vegetation in the analysis area for Alternatives 1 and 3 respectively. Because both action alternatives occur within close proximity to the Loop Road where firewood gathering has been occurring and are relatively linear in context on the landscape, neither alternative would significantly affect distribution of that habitat in the analysis area over the existing situation. Also neither harvest alternative is likely to add significantly to the cumulative effects on this habitat or change the trend toward late-successional habitat.

Canada Lynx. Numerous past activities in the area of concern have created the existing habitat and conditions for lynx. These activities include:

- Conversion of and disturbance to lynx habitat from residential development on the periphery of the Forest.
- Roaded access to higher elevation, remote habitat which provided easier access for

past trapping and other disturbances to lynx.
- Increases in snowmobile access into lynx habitat that also allowed easier access for past harvest and disturbance to lynx by both humans and other lynx predators and competitors.
- Fire suppression and natural succession that has created a disproportionate amount of late-successional habitat at the expense of early successional habitats which lynx also need.
- Regeneration from timber harvest 20 to 40 years ago that has provided potential snowshoe hare habitat and lynx foraging habitat.

The direct and indirect effects of the proposed action and alternatives to this action are disclosed in the BA/BE as being insignificant and short-term negative impacts. Considering existing and foreseeable impacts to lynx over the area of concern, either action alternative, with mitigation, would not significantly add to the cumulative effects and the habitat manipulations should benefit lynx in the long-term. And based on the above analysis, the determination is that the proposed action and the other action alternative "are not likely to adversely affect lynx."

Sensitive Species. It is not likely that any of the alternatives would result in eliminating any biological communities or sensitive species populations. Although the quantity or number of acres of any given plant and animal assemblage could be slightly lowered, the overall community variation across the Forest is expected to remain the same. Similarly, species diversity would not decrease unless species occurring on the Forest were to be eliminated because of implementing any of the alternatives. This possibility is very unlikely. The objective of maintaining habitat for viable populations of all existing wildlife and plant sensitive species is still attainable.

The term wildlife habitat diversity as used in the Forest Plan generally relates to the successional or structural stages of plant communities, and their relative abundance and arrangement across the Forest environment (horizontal diversity). It also relates to the layering from top to bottom of vegetation within plant communities or stands (vertical diversity). It is recognized that other non-vegetation factors such as rock, scree, talus, and water environments provide habitat and contribute to diversity. However, the intent of the following discussion is to focus on vegetation horizontal diversity across the forest.

The Forest Plan description of broad vegetation types included alpine, coniferous forest, montane meadow-parkland, sagebrush-grassland and riparian. The ASQ ROD listed the following seven broad types of forested wildlife habitats; Engelmann spruce, subalpine fir, limber pine, whitebark pine, Douglas-fir, lodgepole pine, and aspen. That document also stated that these types are often grouped into the spruce-fir forest, mixed conifer forest, lodgepole forest, and aspen forest, with the mixed conifer typically dominated by Douglas-fir mixed with other conifers. The recently completed EA for 36 Range Allotments analysis listed the following broad vegetation types for Forest rangelands: riparian, meadow, sagebrush/grass, grassland, conifer with forage, aspen/forb, alpine/grassland, and transitory range. For this analysis, forest vegetation was broadly defined as it currently exists in the

database by the following types structural types: grass/forb, shrub/seedling, sapling/pole, mature forest, and old growth forest.

An examination of the available forest-wide vegetation data was made to determine the existing situation in terms of vegetation types and structural stages. The data was also split by Ranger District to examine the distribution of habitat diversity/structural stages across the Forest. The overall results of that analysis are shown in Table 4-5.

Table 4-5. *Estimated acres of wildlife habitat structural states on the Shoshone National Forest*

	Habitat Structural Stages*					
District	**1**	**2**	**3**	**4**	**5**	**Total**
Clarks Fork	131,114	31,390	33,072	250,708	5,250	451,534
Greybull	145,561	25,669	5,905	132,155	652	309,942
Washakie	59,670	27,488	95,453	100,891	1,682	285,184
Wapiti	171,931	41,219	17,808	512,052	4,442	747,452
Wind River	145,739	46,553	52,537	251,364	10,508	506,701
Forest-Wide	654,015	172,319	204,775	1,247,170	22,534	2,300,813
Percent	29	7	9	54	1	

** Stage 1= grass/forb; Stage 2= shrub/seedling; Stage 3= sapling/pole; Stage 4= mature forest; Stage 5= old growth*

Of the total acres on the Forest that have vegetative cover of any kind and have been classified (2,300,813 estimated acres) over half (54 percent) are classified as mature forest. The vast majority of that is mature coniferous forest, as only slightly more than 5,000 acres of the 10,000 plus acres of forest hardwoods is currently estimated as mature hardwoods; aspen or cottonwoods. An additional 29 percent of forest-wide vegetation is currently in the grass/forb stage, of which approximately 40 percent is on lands that would ultimately succeed to forested lands while approximately 60 percent is permanent grasslands of various types. The remaining forest-wide vegetated acres are comprised of an estimated 7 percent shrub/seedlings, 9 percent sapling/poles, and 1 percent old growth. While the estimated amount of forested area currently classified as old growth forest is very low, it must be remembered that, while extensive acres of mature forest occur on each district, a considerable amount would logically succeed to old growth forest over time. A relatively small amount of habitat currently exists in the shrub/seedling and sapling/pole stages, and a relatively small amount currently exists in the grass/forb stage as potential replacement for shrub/seedlings and sapling/poles.

The present status of wildlife habitat diversity as measured by the type and relative abundance of structural stages should not be too surprising. Historically, disturbance agents, particularly wildfire, played a much more significant role in shaping the vegetation type, pattern, and structure across the forest than in the recent past or present times. That and insect and disease activity combined with the variation in terrain, aspect, and Forest geology resulted in the presence of a wide variety of vegetative structure with varying stand densities and a high amount of edge. This described a very diverse wildlife habitat situation.

In the past decade, the Clover Mist and Unit 40 wildfires in 1988 burned approximately

130,000 acres. Although burn intensity and other characteristics were different from many historic burns, if it were not for these events, the amount of mature forest habitat would be even higher and earlier successional stages lower. The amount of designated wilderness, highly dissected nature of the terrain, and other factors limit options for manipulating timber stands through conventional logging systems. With the Forest Plan ASQ amendment, current timber harvest affects only about 690 acres on the Forest each year. The majority of treatments on these acres are shelterwood harvests which often help provide for vertical diversity, but do not alter the structural stage in terms of setting back succession similar to treatments like clear-cuts or seed tree harvests.

On forested lands, it is likely that the trend toward a late successional forest would continue unless the historic role fire has played in the past can be re-instituted to some degree. Thus many of the sensitive wildlife species that favor late-successional habitats would benefit from this trend. Because of the trend towards late successional forests, the value of a natural mix of intermingled non-forest plant communities with the various forest structural stages becomes even more apparent when considering the needs of species that prefer earlier successional habitat stages.

Cumulative effects to wildlife habitat must consider the past, present and foreseeable future actions near the proposed actions. The future rate and amount of new road construction and timber harvest in these areas of concern would probably be much lower than in the past, even though technology has and would improve and the demand for wood products has and would increase. The reason for the decline from the past levels, in part, has been the reductions in Allowable Sale Quantity in the original 1986 Forest Plan and the 1994 ASQ amendment to the Forest Plan.

A large portion (74 percent) of the forested landscape in this analysis area is large (9 to 16 inch diameter) and very large (>16 inch diameter) tree size classes. The forest landscapes in these areas of concern, including the previously treated stands, would continue to mature and become more homogeneous in stand structure, diversity, and fuel loading thereby making successful fire suppression more difficult. As stated above, this type of landscape would favor late-successional species that have large home range requirements of contiguous habitat. Landscape biodiversity would decline.

Looking out over the next several decades, the fire disturbance regime would probably have the most significant cumulative effect on habitat for late-successional species. Grazing by domestic livestock in the Forest portions of these areas of concern has declined over historic levels and would remain at these lower levels, since the decision on the EA for the 36 Grazing Allotments on the Forest was made. Thus, there is a potential for ungulate use of the grasses and forbs to decrease, thereby causing an increase for fine fuels available for starting wildfires. This potential increase in fine fuels in the non-forested areas and the increase in amount and continuity of fuels in the forested landscapes would make man-made and natural caused fires more numerous, harder to control, and potentially much larger in size and intensity than in the past. Depending on the size of the fire disturbances, these landscapes may then favor early-successional species and biodiversity could be low again until the

stands and landscapes recover from wildfire and follow ecological processes.

The prededing processes would probably occur in the future regardless of what management takes place in these areas of concern because of the small scale and amount of management or treatment that can occur over time in these large areas. When considered at the landscape scale, these small scale modifications to habitat in both the short- and long-term would not significantly add to the cumulative effects of or impact species which utilize late-successional habitats over relatively large geographic areas.

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