Chapter

2

BIGHORN NATIONAL FOREST

Land and Resource Management Plan

Draft Environmental Impact Statement

The Alternatives

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Chapter 2

Introduction

This chapter describes the differences between the alternatives for revision of the 1985 Plan. It contains the following four discussions:

- Development of the alternatives.
- Description of each alternative.
- Alternatives considered but eliminated from detailed study.
- Comparison of the alternatives. This discussion also summarizes the effects of the alternatives described in detail in Chapter 3.

Development of the Alternatives

In November 1999, a Notice of Intent (NOI) to revise the 1985 Bighorn National Forest Plan was published in the Federal Register. The NOI contained a description of the Forest Service Proposed Action based on five major revision topics. Written comments on the NOI were received from the public and analyzed in alternative development.

A series of public meetings were held between October 2000 and January 2001 to solicit public input on revision issues. Newsletters and information posted on the internet generated additional public input. Based on public comment, the initial revision issues were modified as they appear in Chapter 1.

The Forest Service Revision Interdisciplinary (ID) team used the issues to develop a range of alternatives and to define the major differences between the alternatives. The ID team developed maps for three initial alternatives. Using an iterative process, the ID team discussed these alternatives with various groups and added additional alternatives based on these discussions. American Wildlands, Biodiversity Associates, Bighorn Forest Users Coalition, The Wilderness Society, Wyoming Outdoor Council, and the Wyoming Chapter of the Sierra Club presented the "Citizen's Conservation Alternative" for consideration, and the ideas were incorporated into the alternatives by the ID team.

The alternative maps were then presented to the public for review at a series of meetings, in a newspaper insert, and on the Internet in January 2003. Based on public comment, the alternatives were modified again.

Six alternatives were presented to the Regional Forester and key Regional staff in February 2003. Based on the major revision topics addressed by each alternative, comparison of

major differences between alternatives, responsiveness of the alternatives to the Forest Service mission and applicable laws and regulations, the Regional Forester approved a range of six alternatives to analyze in detail for the Draft Environmental Impact Statement (DEIS).

The DEIS summarizes the analysis and effects of 5 alternatives (A-E) and a No Action alternative. The sixth alternative approved by the Regional Forester, alternative G, has since become an alternative considered but not analyzed in detail because of the July 2003 US District Court ruling that enjoined the Roadless Area Conservation Rule from implementation. A baseline alternative (the No Action Alternative) is used as a benchmark and is summarized in the DEIS. Analysis results for these alternatives are displayed for the applicable topics in Chapter 3 of the DEIS.

Important Points About all Alternatives

All alternatives represent, to varying degrees, the philosophies of multiple use and ecosystem management. The alternatives provide basic protection for the forest resources and comply fully with environmental laws. All the alternatives are implementable and fully achievable. As directed by federal law, Forest Service policy and regulations, all the alternatives will do the following:

- Maintain soil, air, water, and land resources.
- Provide for a variety of life through management of biologically diverse ecosystems, though they differ in how they emphasize native plant and animal management.
- Provide recreation opportunities and maintain scenic quality in response to the needs of National Forest users and local communities. Protect heritage resources in accordance with applicable laws and regulations, while also providing recreational and educational opportunities.
- Sustain multiple uses, products, and services in an environmentally acceptable manner. This includes timber harvest, livestock grazing, locatable and leasable mineral extraction, and recreation uses.
- Improve financial efficiency for most programs and projects by minimizing expenses, recognizing that not all programs and projects produce revenue.
- Emphasize cooperation with individuals, organizations, Indian tribes, and other agencies to coordinate the planning and implementation of projects.
- Promote rural development opportunities to enrich rural cultural life, to enhance the environment, to provide employment, and to improve rural living conditions.
- In all alternatives (except for the No Action Alternative), use new management area prescription numbers to be consistent with other National Forests in Region 2.

Actual outcomes and practical results were estimated for each alternative using current budget levels, which assumes that future funding levels will keep pace with inflation. Historically, the Forest Service has not received the funds necessary to fully implement its management plans. The budgets were allocated between programs based on the theme of

each alternative, the expected goods and services provided, and the necessary actions and expenditures required to deliver those goods and services.

Management direction contained in the Revised Plan applies to all alternatives, except for the No Action Alternative, which has the direction from the 1985 Forest Plan.

The Preferred Alternative

The responsible official, the Regional Forester for the Rocky Mountain Region, has identified Alternative D as the preferred alternative in this Draft EIS. This does not represent a decision but rather an indication of the agency's preference at this stage of analysis. According to the Council on Environmental Quality, the "agency's preferred alternative" is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration, to economic, environmental, technical and other factors. Public comments on the effects analysis, new information, and additional analysis of effects is likely to result in refinement of this alternative in the Final EIS or selection of a different alternative in the Record of Decision.

Description of Each Alternative

Alternatives differ from each other in the way they respond to revision issues. They address changes to each component of the 1985 Plan: standards and guidelines, management area allocations, monitoring and evaluation, allowable sale quantity, oil and gas leasing stipulations, wilderness recommendations, identification of eligible wild and scenic rivers, and potential research natural areas.

For consistency with other Forests in the Rocky Mountain Region and surrounding regions, all alternatives (except the No Action alternative) include the new management area prescriptions. The following table compares the management area prescriptions in the 1985 Plan with the new prescriptions used in the Revised Plan. Not all of these prescriptions are used in all alternatives.

Table 2-1. Management area prescriptions.

New Management Area Prescriptions		Management Areas in the 1985 Plan
1.11	Pristine Wilderness	Same – per Plan Amendment 14, 8/1/98
1.13	Semi-primitive Wilderness	Same – per Plan Amendment 14, 8/1/98
1.2	Recommended Wilderness	-----
1.31	Backcountry Recreation Nonmotorized Use	3A Semi-primitive Nonmotorized Recreation 3B Primitive Recreation
1.32	Backcountry Recreation Nonmotorized Summer Use with Limited Winter Motorized Use	3A Semi-primitive Nonmotorized Recreation 3B Primitive Recreation
1.33	Backcountry Recreation with Limited Summer and Winter Motorized Use	----

New Management Area Prescriptions		Management Areas in the 1985 Plan
1.5	National River System – Wild Rivers	10D Wild and Scenic River Corridors
2.1	Special Interest Areas	----
2.2	Research Natural Areas	10A Research Natural Areas
3.1	Special Interest Area (Medicine Wheel)	10C Special Area
3.31	Backcountry Recreation Year-round Motorized Use	2A Semi-primitive Motorized Recreation
3.4	National River System – Scenic Rivers	10D Wild and Scenic River Corridors
3.5	Plant and Wildlife Habitat Management	4B Wildlife, Management Indicator Species (Unsuited Timber)
4.2	Scenery	2B Rural/Roaded Natural Recreation
4.3	Dispersed Recreation	----
4.4	National River System – Recreation Rivers	10D Wild and Scenic River Corridors
5.11	Forest Vegetation Emphasis	4B Wildlife, Management Indicator Species (Suited Timber)
5.12	Rangeland Vegetation Emphasis	6A Livestock Grazing, Improve Forage Composition 6B Livestock Grazing, Maintain Forage Composition
5.13	Forest Products	7E Wood Fiber Production
5.4	Plant and Wildlife Habitat	4B Wildlife, Management Indicator Species (Suited Timber)
5.41	Deer and Elk Winter Range	5A Non-Forested Wildlife Winter Range 5B Forested Wildlife Winter Range
5.5	Dispersed Recreation and Forest Products	----
8.22	Ski-based Resorts – Existing/Potential	1B Winter Sports Sites
Prescriptions used in No-Action and Alternative A only:		
8.21	Developed Recreation Complexes	1A Developed Recreation Sites
3.5	Plant and Animal Habitat Management (Unsuited)	4D Aspen Stand Management
5.11	Forest Vegetation Emphasis (Suited)	4D Aspen Stand Management
3.24	Riparian (Not in Regional Menu)	9A Riparian and Aquatic Ecosystem Management
5.21	Water Yield Increase	9B Increase Water Yield, Vegetative Management

New Management Area Prescriptions		Management Areas in the 1985 Plan
8.1	Water Impoundments – Twin Lakes, Tie Hack	9E Water Impoundment – Twin Lakes, Tie Hack
2.1	Special Interest Area	10C Preacher Rock Bog

Prescriptions are grouped in categories with similar management characteristics (see following table). Categories range from little human-caused alteration (Category 1) to substantial human-caused alteration (Category 8). Each alternative allocates land to management area prescriptions at various levels. For a more complete discussion of the categories and management area prescriptions, see Chapter 2 of the Revised Plan.

Table 2-2. Management area prescription categories.

Category	Included Management Areas
Category 1	Wilderness, Recommended Wilderness, Wild Rivers, Nonmotorized Recreation, Limited Winter Motorized
Category 2	Research Natural Areas, Special Interest Areas
Category 3	Backcountry Recreation, Scenic Rivers, Plant and Wildlife Habitat
Category 4	Scenery, Dispersed Recreation, Recreation Rivers
Category 5	General Forest and Rangelands, Forest Products, Deer and Elk Winter Range, Plant and Wildlife Habitat, Dispersed Recreation and Forest Products
Category 8	Ski areas

Desired Conditions Common to All Alternatives

The long-term desired conditions for each alternative are described in the following section. Each alternative has a slightly different desired condition; however, many similarities exist. For example, all alternatives have a desired condition of providing biodiversity, viable plant and wildlife populations, clean water and riparian areas in improved conditions, a variety of recreational opportunities, reasonable access to the forest, and a sustained flow of goods and services.

At the end of the first decade, changes in the overall character of the landscape, due to management activities, will be small. The Forest will appear very much as it does today. Subtle changes to the landscape will have been made through timber harvest, mechanical treatments for fuel reduction, and other vegetation treatments such as prescribed fire.

The processes and structures necessary to maintain the biological diversity of the Forest will have been provided for across the landscape as a whole. Riparian areas and wetland resources will be in good or improving condition, as the most important aspect of biodiversity overall. Important habitats identified through project planning and analysis, and implementation will be managed to perpetuate habitat conditions needed for threatened, endangered, and sensitive (TES) and non-TES plant and wildlife species.

The distribution of forested structural stages across the forest will be similar to existing conditions. Approximately 36% of the forested vegetation will be in late successional habitats, 62% in mid successional habitats, and 1-2% in early successional stages, if Forest Service management activities alone affected structural stages. There will likely be more early successional stages and less late successional stages than those shown due to wildfires, insects and disease, blowdown, and other mortality.

The character and qualities of the Bighorn NF, which draw visitors from around the country, will remain in place. Recreationists will continue to enjoy the scenery of both mountain forests and non-forested areas, focused largely on riparian corridors. A broad spectrum of recreation opportunities, ranging from primitive to developed, will be available. Both motorized and nonmotorized winter and summer recreation opportunities will be available. Unneeded roads will be decommissioned to reduce resource damage. Some of these unneeded roads will be converted to managed motorized and nonmotorized recreation trails. Others will be revegetated.

The Bighorn National Forest will produce a sustained flow of forest products and other commodity outputs. Oil and gas leasing has not been an important use of the Forest and is not expected to be a major activity in the near future. Collaborative planning efforts to develop projects and programs, which contribute to economic diversity, will be ongoing with local communities.

Human safety and community and property protection from wildfire will be improved by implementation of community wildfire protection plans. Personnel from all affected agencies, governments, tribal interests, and the public will address community wildfire protection needs.

After five decades of plan implementation, changes in the landscape will be more apparent and will vary by alternative. Effects of natural process will be more prevalent, regardless of alternative. While natural disturbance events are expected in the first decade, the possibility of large-scale disturbance events, such as wildfire and insect and disease epidemics, will increase with the passage of time. The degree to which these outbreaks occur is largely dependent on climatic conditions and upon vegetation conditions as ecosystems change.

Biological diversity will continue to be maintained across the Forest. Riparian conditions should be notably improved from management focus, as the key element in habitats and processes for biological diversity.

In managed stands, there will be a balanced distribution of forested age classes. Where timber and prescribed fire management do not occur, there is likely to be an uneven distribution of forest age classes, with large areas in late and early successional stages that vary in time and space across the landscape as natural disturbance events occur. Areas where timber harvest and other treatments to reduce fuels and the risk of wildfire occur will have a managed appearance. Areas of thinned trees will be visible. Lands suitable for timber production will have a generally balanced distribution of age and size classes.

Rangeland vegetation will include a mix of seral stages across the landscape. The majority of riparian areas across the Forest will be in good condition.

The physical setting and scenic beauty of the Bighorn National Forest will continue to draw visitors. Recreation opportunities ranging from primitive to developed will be available. Visitors will enjoy a variety of recreational opportunities on the Forest. A well-developed system of motorized and nonmotorized trails, which address recreational demand as well as protection of wildlife habitat and other resources, will exist. Both motorized and nonmotorized winter and summer recreation opportunities will be available on the Forest.

The Forest road and trail system will meet public and resource management access needs while maintaining valuable wildlife security areas. All system roads will be maintained to standard.

Key differences in desired conditions for the alternatives will primarily be tied to the mix of management area allocations for each alternative (described below).

The No Action Alternative – 1985 Forest Plan as Currently Implemented

The No Action Alternative reflects current forestwide direction. It meets the NEPA requirement (36CFR 219.12(f)(7) that a No Action Alternative be considered.

'No Action' means that current management allocations, activities, and management direction found in the 1985 Forest Plan would continue. The No Action alternative estimates approximately the current level of outputs and types of Forest Service management activities. The fifteen amendments to the 1985 Plan, changes in law, regulation, Forest Service policy, and other factors that affect current management are reflected in this alternative. The No Action Alternative retains the 1985 Forest Plan goals and objectives, standards and guidelines, and management area prescriptions, as amended.

This alternative serves as a baseline for comparison for the other five "action" alternatives. After reviewing the "What's Broken with the 1985 Forest Plan" document for several years, it is apparent that the No Action Alternative is not desirable, for several reasons, including, but not limited to:

- Species and habitat management direction and monitoring protocols have only been slightly amended since the 1985 Forest Plan and are not the direction the Bighorn NF desires to continue for the next 10 to 15 year planning period.
- Travel management direction does not reflect the changing technology since the early 1980s and the associated increase in motorized recreation use.
- The current plan is not up-to-date on fire and fuels management direction.
- There is no distinction between standards and guidelines in the 1985 Forest Plan.

Because of these and other reasons included in the project record, the Forest Supervisor determined that this was not an alternative that could guide the Bighorn National Forest for

the next 10- to 15-year period. Therefore, this alternative did not receive the full level of analysis as the other five "action" alternatives. Most notably, this alternative did not receive a detailed growth and yield modeling analysis. Timber harvest outputs shown in Chapter 3 are for comparative purposes and are based upon the following:

- The current level of timber outputs, which have been displayed in the annual Forest Plan monitoring reports since 1986.
- The modeling done for the ASQ amendment during the early 1990s.

Theme and Desired Conditions

As developed in 1985, the No Action Alternative increased dispersed and developed recreation emphasis, while maintaining the then existing level of resource outputs.

The desired condition for vegetation in the 1985 Forest Plan was that lands suited for timber production were healthy (e.g., free of insects and disease). Vegetation management emphasized recreation, viewing, wildlife habitat, wood products, water yield, and grazing.

The transportation system was to be managed to improve recreation opportunities and would be improved, as needed, for forest management.

The 1985 Forest Plan predicted that water yields would increase by 3,000 acre feet over then existing levels after the first decade, doubling to an increase of 6,000 acre feet after five decades. The plan envisioned that water quality would improve.

Additional developed recreation capacity would be supplied to meet 100% of demand. Dispersed recreation demand would be met. No additional wilderness was recommended, and it was anticipated that the demand would exceed supply by the 4th decade (2025).

Habitat for diversity needs would be met. The amount of habitat for old growth management indicator species would not decline, while the habitat for early successional species would increase.

The 1985 Forest Plan envisioned that actual range utilization would rise from the 134,000 AUMS permitted at that time to about 143,000 AUMs by 2035.

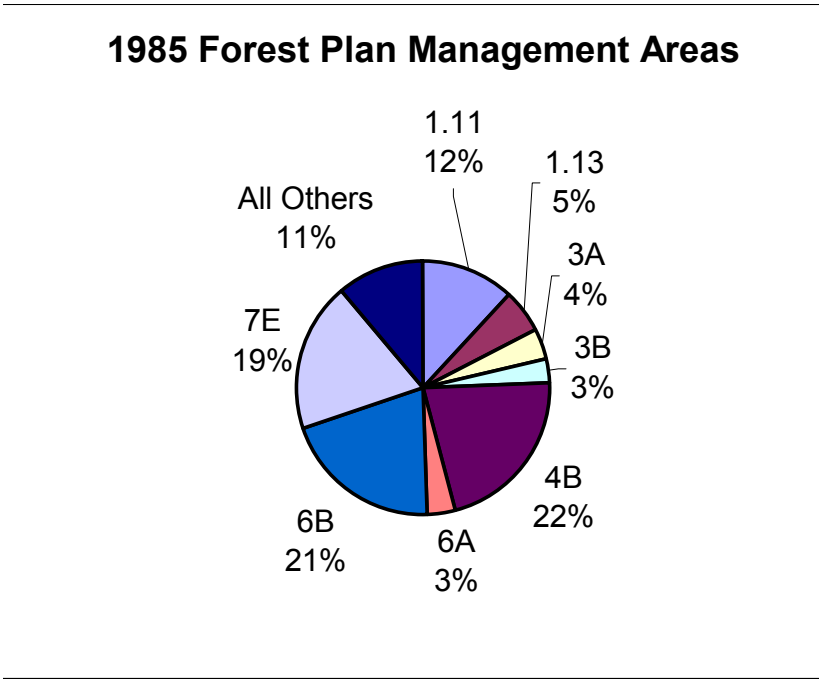
Relationship to Revision Topics

Biological and Habitat Diversity	Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 64% of the forested area (amount of unsuited forest land). Late successional habitats and natural processes occur at higher levels. Activities on 36% of the forested area work towards achieving a generally even distribution of age classes. Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Management Plans.
Timber Suitability and Management of Forested Lands	It is estimated that 900 MCF (thousand cubic feet), which is approximately 4.5 MMBF (million board feet) of live timber, sawtimber and products other than logs (POL), which comprise the Allowable Sale Quantity (ASQ) could be offered annually for sale from the suited timber base under this alternative in the future. The total sale program, which includes additional volume from non-suited lands, is estimated at 2,300 MCF (8.5 MMBF). Timber management activities are evident on the suited timber lands (262,062 acres), which comprise about 36% of the forested area (727,240 acres). Clearcutting is generally the optimum method for regenerating lodgepole pine. Silvicultural systems other than clearcutting are used to regenerate spruce-fir.
Recreation and Travel Management	74% of the Bighorn NF is potentially available for summer motorized recreation opportunities[1]. 72% of the Bighorn NF is available for winter motorized recreation opportunities. About 124,585 acres are available for summer motorized off-road travel, where resource damage does not occur. These are the "C" areas on the current travel map. See the Recreation Opportunity Spectrum (ROS) discussion later in this section for information regarding ROS composition.

[1] The 74% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

Special Areas	• Bull Elk Park and Shell Creek Research Natural Areas • The Preacher Rock Bog • Little Bighorn and Tongue Rivers as Wild and Scenic Rivers • The Medicine Wheel National Historic Landmark (existing Landmark area)
Roadless Areas and Wilderness Management	About 17% of Forest is in the Cloud Peak Wilderness. Roadless character outside of wilderness would be maintained on 7% of the Forest (90,604 acres, in the 3A and 3B Management Areas).

Figure 2-1. Management area allocations for the No Action Alternative (the 1985 Forest Plan as currently being implemented).



Alternative A

In this alternative, the boundaries of 1985 Forest Plan management areas, as amended, remain the same. However, all other direction has been updated: the goals and objectives, the standards and guidelines, the management area direction, and the monitoring plan. This alternative compares the desirability of retaining the smaller management areas

utilized in the 1985 Forest Plan with the larger management areas proposed under Alternatives B, C, D, and E.

Theme and Desired Conditions

Alternative A emphasizes active vegetation management, primarily through timber harvest and prescribed fire. Production of sawtimber, firewood, and other wood products and forage for livestock grazing is emphasized, as is managing to diversify wildlife habitat. A mix of recreation opportunities is provided. The program focus is similar to the 1985 Forest Plan since the current management area emphases are retained.

Relationship to Revision Topics

Biological and Habitat Diversity

Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 63% of the forested area (amount of unsuited forest land). Late successional habitats and natural processes occur at higher levels.

Activities on 37% of the forested area work towards achieving a generally even distribution of age classes.

Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Mgt. Plan NEPA decision. Noxious weeds and other non-native vegetation are aggressively managed.

Habitats important for emphasis species are managed to enhance habitat conditions. Aquatic resources, the most important biodiversity element, are improved through forest-wide standards and guidelines, and projects implemented to meet strategies.

Timber Suitability and Management of Forested Lands

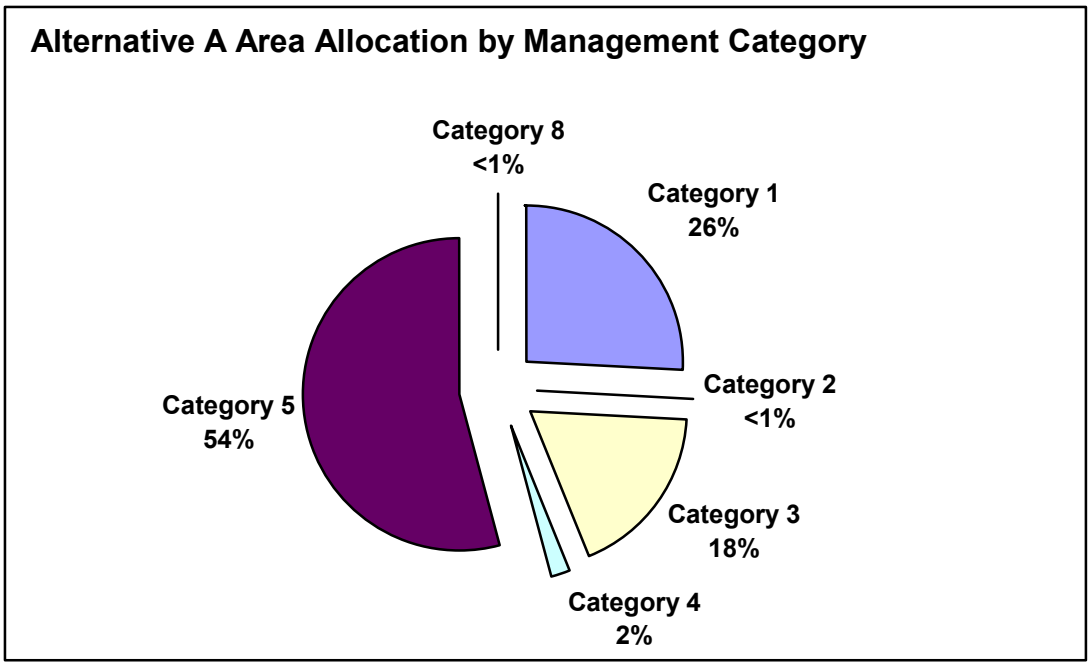
This alternative projects the second highest level of timber output with 3,356 MCF (11.0 MMBF) per year from suited lands (ASQ), and a total sale program of 3,809 MCF (12.5 MMBF) per year. Timber management activities are evident on suited timber lands (271,895 acres), which comprise about 37% of the forested area (727,240 acres).

Even-aged systems are generally the optimum method for regenerating lodgepole pine; uneven-aged harvest systems are generally used in spruce-fir forests.

Recreation and Travel Management	74% of the Bighorn NF is potentially available for summer motorized recreation opportunities[2]. 72% of the Bighorn NF is available for winter motorized recreation opportunities. All summer motorized travel occurs on designated roads and trails. There are no "C" areas (areas open to summer motorized off road travel) on the travel map. See the Recreation Opportunity Spectrum (ROS) discussion later in this section for information regarding ROS composition.
Special Areas	The following special areas are maintained. No new special areas are added in this alternative. • Bull Elk Park and Shell Creek Research Natural Areas • Preacher Rock Bog • Little Bighorn and Tongue Rivers as Wild and Scenic Rivers • The Medicine Wheel National Historic Landmark (existing Landmark area)
Roadless Areas and Wilderness Management	About 17% of Forest is in the Cloud Peak Wilderness. Roadless character outside of wilderness is maintained on 7% of the Forest (acres in Management Areas 1.32, 1.5, and 2.2).

[2] The 74% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

Figure 2-2. Alternative A management area allocations by management area category.



Alternative B

Alternative B was developed in response to public comment that the vegetation resources need active management to achieve biological and habitat diversity, while still providing a sustainable output of other forest uses. Relative to the other alternatives, this alternative places a higher priority on physical and biological resources than other uses.

Theme and Desired Conditions

Alternative B prioritizes management of vegetation types, including the use of timber harvest and fire, in order to improve wildlife habitat by allocating the most area to Management Area 3.5 compared to the other alternatives. Other areas of the Forest continue to be managed for wood products and livestock forage. This alternative explores the pros and cons of trying to improve plant and animal habitats with less road construction.

Relationship to Revision Topics

Biological and Habitat Diversity	Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 83% of the forested area (amount of unsuited forest land). Late successional habitats and natural processes occur at higher levels. Activities on 17% of the forested area work towards achieving a generally even distribution of age classes. Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Management Plan NEPA decision. Noxious weeds and other non-native vegetation are aggressively managed. Habitats important for emphasis species are managed to enhance habitat conditions. Aquatic resources, the most important biodiversity element, are improved through forest-wide standards and guidelines, and projects implemented to meet strategies.
Timber Suitability and Management of Forested Lands	This alternative provides the second lowest level of outputs, with an estimated 1,664 MCF (5.6 MMBF) per year from suited lands (ASQ), and a total sale program of about 2,209 MCF (7.4 MMBF) per year. Timber management activities are evident on suited timber lands 124,521 acres), which comprise about 17% of the forested area (727,240 acres). Even-aged systems are generally the optimum method for regenerating lodgepole pine; uneven-aged harvest systems are generally used in spruce-fir forests.
Recreation and Travel Management	68% of the Bighorn NF is potentially available for summer motorized recreation opportunities.[3] 68% of the Bighorn NF is available for winter motorized recreation opportunities. All summer motorized travel occurs on designated roads and trails. There are no "C" areas (areas open to summer motorized off road travel) on the travel map. See the Recreation Opportunity Spectrum (ROS) discussion later

[3] The 68% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

in this section for information regarding ROS composition.

Special Areas

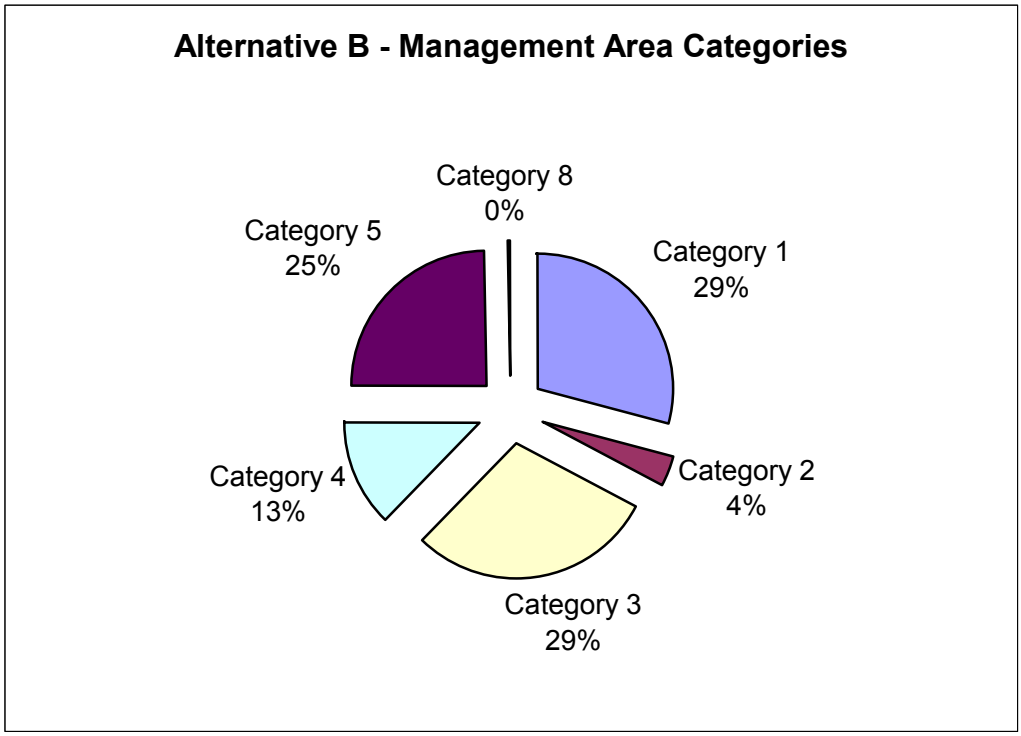
- Research Natural Areas:
  - Existing: Bull Elk Park and Shell Creek
  - New: Mann Creek, Leigh Creek, Pheasant Creek, Lake McClain (2% of NF)
- Wild and Scenic Rivers:
  - Existing: Tongue and Little Bighorn Rivers
  - New: Paintrock Creek, South Rock Creek, Porcupine Creek
- Special Interest Areas (Archeological):
  - Medicine Wheel (Historic Preservation Plan area, 2% of NF)
  - New: Elephant's Foot, Buck Creek Vees (2% of NF)

Roadless Areas and Wilderness Management

About 17% of Forest is in the Cloud Peak Wilderness.

Roadless character outside of wilderness would be maintained on 11% of the Forest (118,676 acres in Management Areas 1.31, 1.32, 1.5, and 2.2).

Figure 2-3. Alternative B management area allocations by management area category.



Alternative C

Alternative C was developed in response to public comment that the undeveloped land on the Forest should remain undeveloped to provide for nonmotorized opportunities, natural processes, minimal recreational facilities, and undeveloped recreational settings.

Theme and Desired Conditions

Alternative C emphasizes natural processes to sustain ecological systems, including fish and wildlife habitat. Lands identified for timber production are in a general forest management area (5.11), rather than in a timber production management area (5.13). The 5.11 areas are on land where timber harvest has occurred in the past, and the road system is in place.

Forested habitat successional changes will be dictated more by nature (fire, insects, and diseases) than in the other alternatives, which will result in large, contiguous blocks of either early or late successional stages. This alternative has the highest amount of National Forest System land recommended for Congressional designation as either Wild and Scenic River or wilderness.

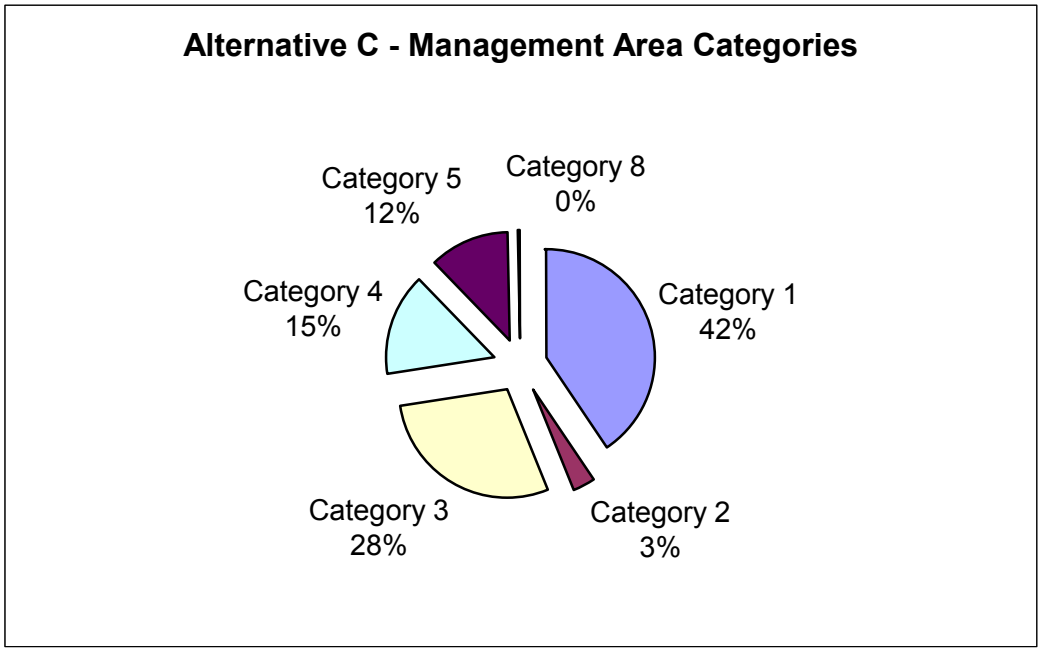
Relationship to Revision Topics

Biological and Habitat Diversity	Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 91% of the forested area (amount of unsuited forest land). Late successional habitats and natural processes occur at higher levels. Activities on 9% of the forested area work towards achieving a generally even distribution of age classes. Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Management Plan NEPA decision. Noxious weeds and other non-native vegetation are aggressively managed. Habitats important for emphasis species are managed to enhance habitat conditions. Aquatic resources, the most important biodiversity element, are improved through forest-wide standards and guidelines, and projects implemented to meet strategies.
Timber Suitability and Management of Forested Lands	This alternative provides the lowest level of timber output, with 782 MCF (2.6 MMBF) per year from suited lands (ASQ), and a total sale program of about 1,068 MCF (3.6 MMBF) per year. Timber management activities are evident on suited timber lands (62,093 acres), which comprise about 9% of the forested area (727,240 acres). Even-aged systems are generally the optimum method for regenerating lodgepole pine; uneven-aged harvest systems are

	generally used in spruce-fir forests.
Recreation and Travel Management	57% of the Bighorn NF is potentially available for summer motorized recreation opportunities.[4] 61% of the Bighorn NF is available for winter motorized recreation opportunities. All summer motorized travel occurs on designated roads and trails. There are no "C" areas (areas open to summer motorized off road travel) on the travel map. See the Recreation Opportunity Spectrum (ROS) discussion later in this section for information regarding ROS composition.
Special Areas	Research Natural Areas: o Existing: Bull Elk Park and Shell Creek o New: Mann Creek, Leigh Creek, Pheasant Creek, Lake McClain (2% of NF) Wild and Scenic Rivers: o Existing: Tongue and Little Bighorn Rivers o New: Paintrock Creek, South Rock Creek, Porcupine Creek Special Interest Areas (Archeological): o Medicine Wheel (Historic Preservation Plan area, 2% of NF) o New: Buck Creek Vees (1.5% of NF)
Roadless Areas and Wilderness Management	About 17% of Forest is in the Cloud Peak Wilderness. Wilderness designation recommendations would be made on an additional 11% of the NF in five areas: Rock Creek, Walker Prairie, Devil's Canyon, Medicine Lodge Canyon and Little Bighorn. Roadless character outside of wilderness or recommended wilderness would be maintained on 10% of the Forest (114,714 acres in Management Areas 1.31, 1.32, 1.5, and 2.2).

[4] The 57% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

Figure 2-4 Alternative C management area allocations by management area category.



Alternative D

Alternative D was developed by reviewing past forest plan monitoring reports and adjusting management area boundaries and forest plan direction to reflect the changes in human uses, technologies, and scientific information that has occurred since the mid-1980s.

Theme and Desired Conditions

This alternative emphasizes active vegetation management, primarily through timber harvest and prescribed fire; providing sawtimber, firewood, and other wood products; livestock grazing; and diversifying wildlife habitat. There is a mix of motorized and nonmotorized recreation opportunities.

A mix of wildlife habitat will be provided. In managed forested areas, a more even distribution of structural stages will be provided through active management. In other areas, successional pattern and habitats will be dictated by natural events, including insects, disease and fire, and larger contiguous blocks of similar habitat conditions will occur.

Relationship to Revision Topics

Biological and Habitat Diversity	Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 75% of the forested area. (amount of unsuited forest land) Late successional habitats and natural processes occur at higher levels. Activities on 25% of the forested area work towards achieving a generally even distribution of age classes. Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Management Plan NEPA decision. Noxious weeds and other non-native vegetation are aggressively managed. Habitats important for emphasis species are managed to enhance habitat conditions. Aquatic resources, the most important biodiversity element, are improved through forest-wide standards and guidelines, and projects implemented to meet strategies.
Timber Suitability and Management of Forested Lands	This alternative provides about 2,134 MCF (7.2 MMBF) per year from suited lands (ASQ), and a total sale program of about 2,557 MCF (8.6 MMBF) per year. Timber management activities are evident on suited timber lands (184,606 acres), which comprise about 25% of the forested area (727,240 acres). Even aged systems are generally the optimum method for regenerating lodgepole pine; uneven-aged harvest systems are generally used in spruce-fir forests.
Recreation and Travel Management	74% of the Bighorn NF is potentially available for summer motorized recreation opportunities.[5] 69% of the Bighorn NF is available for winter motorized recreation opportunities. All summer motorized travel occurs on designated roads and trails. There are no "C" areas (areas open to summer motorized off road travel) on the travel map. See the Recreation Opportunity Spectrum (ROS) discussion later in this section for information regarding ROS composition.

[5] The 74% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

Special Areas

- Research Natural Areas:
  - Existing: Bull Elk Park and Shell Creek
  - New: Mann Creek, Leigh Creek, Pheasant Creek, Lake McClain (2% of NF)
- Wild and Scenic Rivers:
  - Existing: Little Bighorn River (The Tongue River is removed from this classification in this alternative.)
  - New: None
- Special Interest Areas (Archeological):
  - Medicine Wheel (Historic Preservation Plan area, 2% of NF)
  - New: None

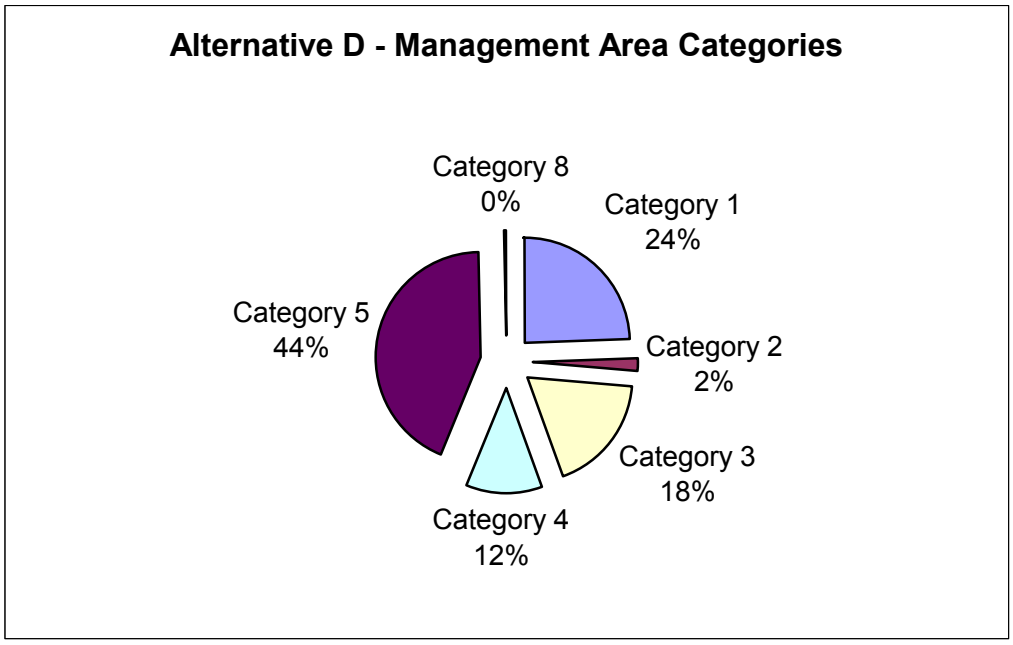
Roadless Areas and Wilderness Management

About 17% of Forest is in the Cloud Peak Wilderness.

No additional areas are recommended for wilderness.

Roadless character outside of wilderness would be maintained on 8% of the Forest (93,091 acres in Management Areas 1.31, 1.32, 1.5, and 2.2).

Figure 2-5 Alternative D management area allocations by management area category.



Alternative E

Alternative E was developed in response to public comment to assure a substantive timber output. Under this alternative, nearly all of the tentatively suited timber areas are made suited for timber production.

Theme and Desired Conditions

This alternative maximizes timber harvest opportunities. Forested vegetation desired conditions include minimal damage to commercial wood products from insects, disease, and fire. Wildlife habitat structural stages will occur in a relatively balanced distribution, with more early structural stages than in the other alternatives.

Roaded recreation opportunities will predominate in this alternative, although there will be areas of nonmotorized recreation in the areas not allocated to timber harvest emphasis.

Relationship to Revision Topics

Biological and Habitat Diversity

Forest vegetation patterns and successional condition will generally be influenced by natural disturbance processes such as fire, insects, and diseases on 58% of the forested area (amount of unsuited forest land). Late successional habitats and natural processes occur at higher levels.

Activities on 42% of the forested area work towards achieving a generally even distribution of age classes.

Non-forested areas are managed for a mix of seral stages (early, middle, and late) depending on direction in Allotment Management Plan NEPA decision. Noxious weeds and other non-native vegetation are aggressively managed.

Habitats important for emphasis species are managed to enhance habitat conditions. Aquatic resources, the most important biodiversity element, are improved through forest-wide standards and guidelines, and projects implemented to meet strategies.

Timber Suitability and Management of Forested Lands

This alternative provides the highest level of timber output with about 3,541 MCF (12.0 MMBF) per year from suited lands (ASQ), and a total sale program of about 4,339 MCF (14.7 MMBF) per year.

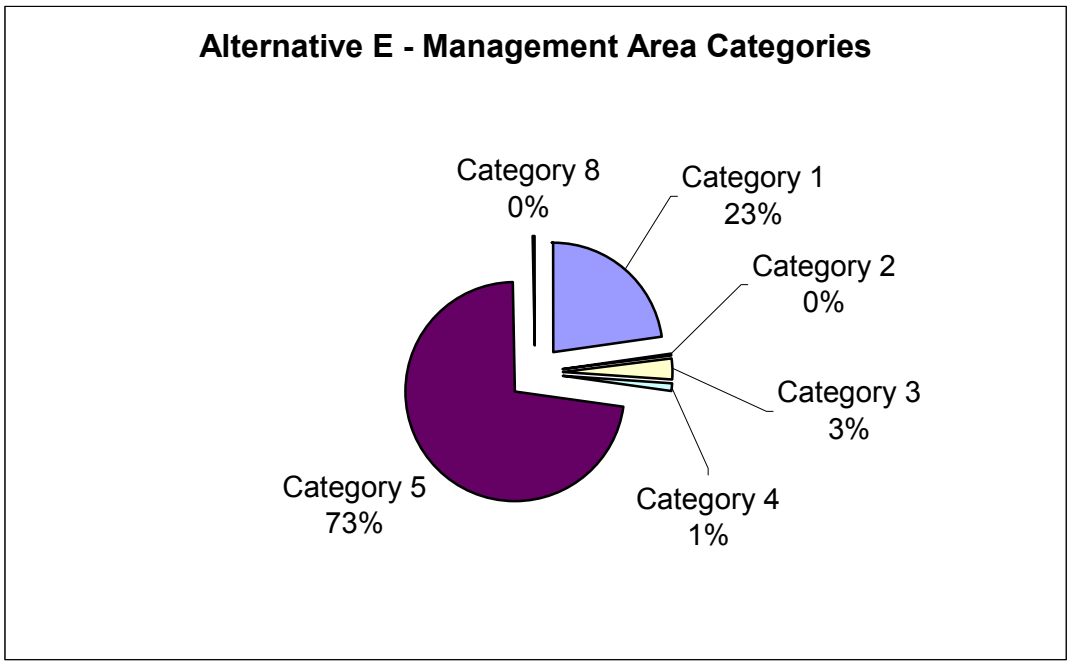
Timber management activities are evident on suited timber lands (305,535 acres), which comprise about 42% of the forested area (727,240 acres).

Even-aged systems are generally the optimum method for regenerating lodgepole pine; uneven-aged harvest systems are generally used in spruce-fir forests.

Recreation and Travel Management	77% of the Bighorn NF is potentially available for summer motorized recreation opportunities.[6] 72% of the Bighorn NF is available for winter motorized recreation opportunities. All summer motorized travel occurs on designated roads and trails. There are no "C" areas (areas open to summer motorized off road travel) on the travel map. See the Recreation Opportunity Spectrum (ROS) discussion later in this section for information regarding ROS composition.
Special Areas	• Research Natural Areas: o Existing: Bull Elk Park and Shell Creek o New: None • Wild and Scenic Rivers: o Existing: Little Bighorn River (The Tongue River is removed from this classification in this alternative.) o New: None • Special Interest Areas (Archeological): o Medicine Wheel (Historic Preservation Plan area, 2% of NF) o New: None
Roadless Areas and Wilderness Management	About 17% of Forest is in the Cloud Peak Wilderness. No additional areas are recommended for wilderness. Roadless character outside of wilderness would be maintained on 4% of the Forest (47,212 acres, in Management Areas 1.31, 1.32, 1.5, and 2.2).

[6] The 77% represents the total proportion of the Bighorn National Forest that is within a management area where motorized recreation opportunities are allowed. That does not mean that the entire 'available' area currently has motorized recreation opportunities; some of this area could currently be unroaded/untrailed. In addition, it does not mean that roads or motorized trails will be constructed to access the entire area – motorized routes *could potentially* be constructed, but that would be based upon a site-specific NEPA analysis.

Figure 2-6. Alternative E management area allocations by management area category.



Alternatives Considered, but Not Analyzed in Detail

Several alternatives were considered and eliminated from detailed study during the planning process. Following is a discussion of these alternatives and the reasons why they were eliminated.

Non-Commodity Based Alternatives

During scoping, some people suggested that sawtimber harvest and livestock grazing be discontinued on the Bighorn National Forest. This alternative was considered but not analyzed in detail because not allowing timber harvest or livestock grazing does not meet several laws, including the Multiple Use Sustained Yield Act of 1960. National Forests were established and are managed for a variety of multiple uses. Furthermore, grazing and timber harvest suitability analyses were conducted to identify what areas on the National Forest are legally available and suitable for these uses. Finally, no scientifically credible rationale was provided by the commenters requesting these actions as to why these resource uses should be discontinued other than personal preference of which uses they think National Forests should be managed for.

No Sheep Grazing Alternative

During scoping, no domestic sheep grazing was proposed for consideration to enhance bighorn sheep populations by minimizing potential disease transmissions among the two. This alternative was considered, but not analyzed in detail, because the small existing bighorn sheep population in Shell Canyon can be exposed to domestic sheep on winter ranges off of the National Forest. In addition, recent cooperative efforts between the Wyoming Game and Fish Department and US Forest Service has resulted in domestic sheep being moved to the Bighorn NF from the Shoshone NF where bighorn populations are a higher State priority. Finally, it is believed that a forage mineral deficiency may be at least partially to blame for the Shell Canyon bighorn population decline. Rangeland vegetation guidelines in the Revised Plan require that domestic livestock allotment management plans consider minimizing disease interaction possibilities with bighorn sheep, particularly during vacant allotment analysis.

Alternative with Predetermined Timber Harvest Outputs

At least one resolution was presented that requested a certain level of timber harvest (11 million board feet annually).

This alternative was considered but not analyzed in detail because ecosystem management precepts that have guided National Forest management philosophy for at least the past decade begin with the capabilities of the land to provide for multiple resource benefits, with output levels determined at the end by an objective driven process. That is, the Forest ID team developed alternatives in response to past forest monitoring and implementation, coupled with people's input as to desired conditions. Direction and maps were developed taking into account past management, resource capabilities, and people's input. The maps of Alternatives A-E were developed to meet a range of potential desired conditions, but were "constrained" to be within the likely range of management decision space. The final outcome of such an alternative development process is the outputs, as opposed to the suggestions in the resolutions, which start with an outcome, and maps a forest to achieve that result.

A position paper was presented that cited an "optimal sustainable harvest" of 21.84 MMBF. This harvest level was not considered to be optimal for a balanced multiple use approach that considered other resource uses, based on analyses conducted for the 1985 Forest Plan and the early 1990s ASQ amendment. The calculation deriving that figure used a straight area regulation concept, assuming the current suited land base, a rotation of 120 years, and full regulation.

Alternatives with Predetermined Livestock Grazing Outputs

At least one resolution was presented that requested a return to the 1985 Forest Plan projected level of livestock grazing (about 143,000 Animal Unit Months).

This alternative was considered but not analyzed in detail because ecosystem management precepts that have guided National Forest management philosophy for at least the past decade begin with the capabilities of the land to provide for multiple resource benefits, with output levels determined at the end by an objective driven process. Livestock AUM's are an outcome of implementation of the objectives, standards and guidelines of the Forest Plan and site specific planning, along with the level and quality of permittee management. They are an implementation outcome, not a target. There are a number of factors influencing the number of AUMs that are beyond the control of the Forest Service, including livestock markets, weather conditions, and the ability and desire of permittees to manage for higher levels of use.

Increase Water Yield Alternative

The theme of this alternative is to increase water yield by reducing the density of forest canopy through timber harvest. Research at the Fraser Experimental Forest in Colorado has shown that if 25% or more of the basal area of a forested watershed is removed, net stream flow can be increased.

This alternative is predicated on the ability to be able to conduct large, intensive timber harvests in localized areas. The 1985 Forest Plan included 9B, Water Yield Increase, Management Areas. Review of past management practices on the Bighorn NF and throughout the Rocky Mountain west has shown that this intense level of management has not been attained, and we project it will not be attainable in the foreseeable future.

The "Citizen's Conservation Alternative"

This alternative was presented to the Bighorn NF by American Wildlands, Biodiversity Associates, Bighorn Forest Users Coalition, The Wilderness Society, Wyoming Outdoor Council, and the Wyoming Chapter of the Sierra Club. The primary feature of this alternative would put the 'roadless' areas on the Forest into special area designation, as wilderness, wild/scenic river, or Research Natural Areas. Approximately 53% of the Bighorn NF that is roadless according to the 2000 Roadless Area Conservation Rule (RACR) would be placed in these categories.

This alternative was not analyzed in detail for the following reasons: 1) it does not provide for multiple use objectives; 2) during RACR public meetings there was considerable public input that the roadless areas *not* be maintained as roadless; and, 3) the many of the ideas in this alternative were incorporated into Alternative C. We incorporated protection of roadless areas into Alternative C by assigning a Category 1 or 2 management area to most of the RACR roadless areas. The forest plan revision ID team believes that such designation protects the roadless character of these areas, thus achieving many of the objectives of this alternative. We also considered other public input and the history of Congressional designation of forest system lands on the Bighorn NF.

The 1985 Forest Plan

This alternative was considered as the ID team was developing a No Action Alternative. This alternative is identical to the No Action Alternative – 1985 Plan as Currently Being Implemented, which was described previously, except that the outputs would remain the same as the 1985 Forest Plan. For example, the ASQ would be as shown on page II-13 (Errata 1) of the 1985 Forest Plan.

This alternative was considered, but not analyzed in detail, because it has been apparent since the 1987 monitoring report that the timber outputs projected in the 1985 Plan could not be achieved while meeting the standards and guidelines. The No Action Alternative provides a better baseline for comparing existing forest plan outputs to Alternatives A-E outputs than does this alternative.

Alternative E – Original Draft

This alternative, as released in January 2003 public meetings, was modified to incorporate two new management prescriptions that now appear in Alternative E. The original Alternative E had a maximum amount of management prescription 5.13 to highlight opportunities for commercial timber harvest. As the allocation of management categories, particularly Category 5, remained largely the same, the alternative was not renamed. The new management prescriptions were added in response to Steering Committee input in January 2004. In addition, the Medicine Wheel area was changed to reflect the Historic Preservation Plan boundary in the new Alternative E.

Alternative F – the Roadless Rule

This alternative placed the 'roadless' 53% of the Bighorn NF into management area categories 1, 2, or 3. It was considered and presented during the January 2003 public meetings in response to internal, informal, Forest Service direction (dated late December, 2002) indicating the Roadless Area Conservation Rule injunction set by the Idaho Federal District Court had been lifted by the Ninth Circuit Court of Appeals. Alternative F was developed over a very short time frame in order to have a 'Roadless Area Conservation Rule' alternative for consideration at the January meetings. This alternative was dropped from consideration because it was developed very hastily in order to have it ready for the January public meetings. It can be considered a 'forerunner' of Alternative G.

Alternative G – 2003 Roadless Inventory and Roadless Rule

This alternative was developed to display the effects of the 2001 Roadless Area Conservation Rule (RACR). It implemented the RACR with specific standards, guidelines and management areas compatible with the RACR. The Forest identified areas that were "substantially altered" by road construction or timber harvest since the RACR inventory (1983). It differed from Alternative F in that areas outside of the updated roadless inventory acres were placed in a timber harvest emphasis management prescription (e.g.,

Management Area 5.13 or 5.13.1 for the inventoried roadless areas that had been substantially altered). This alternative was carried through the initial effects analysis, and had timber harvest output levels similar to those for Alternative B.

The US District Court for Wyoming enjoined the RACR from implementation in a July 2003 ruling. For purposes of the DEIS and draft plan, this alternative was dropped from detailed analysis and consideration. If the RACR is put back in force it will become applicable to all the alternatives; a "rule" is not an alternative. In addition, this will save money and will expedite public comment and analysis.

No Oil and Gas Leasing

Title 36 CFR 228.102(c)(2) requires a leasing analysis to identify alternatives "including that of not allowing leasing." Because regulations require both the availability and specific lands decisions before the BLM can issue leases on National Forest System lands, and no such analysis has been conducted on the Bighorn National Forest prior to this analysis, the No Action Alternative is equivalent to the alternative of not allowing leasing. All lands under this alternative are not administratively available for leasing.[7] Because only about 5% of the Bighorn NF has any potential for oil and gas resources, that potential is considered low because of the past history of non-activity, and the Forest Plan has never been amended to include a leasing decision, we did not consider this alternative in detail because we want to be able to make the required leasing decisions in this forest plan revision.

Recommendation of All Eligible Rivers

The ID team considered including all eight rivers eligible for inclusion into the National Wild and Scenic Rivers System in one or more alternative(s) analyzed in detail. The current array of alternatives analyzed in detail includes some combination of all but three eligible rivers (Crazy Woman Creek, Tensleep Creek, and Cedar Creek), which were left out because the ID team determined that:

1. While these rivers meet the minimum eligibility criteria, there are traits of each of the three rivers that make them low priority candidates:
   - Crazy Woman Creek: An ecological evaluation was conducted for the Crazy Woman Creek area. This creek was not suitable under any alternative due to the presence of a high-risk road with a frequent wash-out history in the waterway as well as an infestation of weed species.
   - Tensleep Creek: Tensleep Creek was not deemed suitable under any alternative because of the topographical location and proximity of highways on both sides of the

[7] Only lands with oil and gas resource potential are carried in this analysis. The Bighorn NF has only a small strip of land along the southeast boundary of the Forest that has any oil and gas potential. Lands with no known oil and gas potential are not analyzed. Should a proposal to lease any lands with no known oil and gas resource potential be received, a site-specific NEPA analysis would be required to develop stipulations and determine consistency with the Land and Resource Management Plan.

river. In addition, there is an impoundment upstream from the segment under consideration, and there a massive infestation of hounds tongue throughout the Tensleep Creek corridor.

- Cedar Creek: The ecological characteristics of this river are already represented in the alternatives analyzed in detail by other, higher quality, rivers – Porcupine Creek, Tongue River, and Little Bighorn River.

2. There were other future, potential uses of the land and water that could be foreclosed or curtailed if the areas were included in the National System.
3. Finally, because Congress has not yet acted upon the Forest Service's 1989 Little Bighorn River Wild and Scenic recommendation, the ID Team felt that it would be prudent to feature the five highest quality representative waterways on the Forest in the alternatives analyzed in detail.

Eight Roadless Areas Recommended for Wilderness

All eight roadless areas determined to be capable and available for wilderness were considered by the ID team and five areas – Little Bighorn, Rock Creek, Medicine Lodge, Walker Prairie, and Devil's Canyon – are recommended for wilderness in Alternative C. Three roadless areas – Lodge Grass, Cedar Creek, and Pete's Hole – are not included in an alternative considered in detail. The full set of eight capable and available areas represents the extreme potential for wilderness recommendations. It does not fall within the range of alternatives considered in detail. Needs analysis identified the preservation of lower elevation ecosystems as a need for additional wilderness. The Lodge Grass, Cedar Creek and Pete's Hole areas do not add significantly to the lower elevation ecosystem attributes represented by Little Bighorn, Rock Creek, Medicine Lodge, Walker Prairie, and Devils Canyon areas. For this reason, they were not included in an alternative considered in detail.

Restoration Alternative

A restoration alternative was not developed nor analyzed in detail for the following reasons:

1. Many restoration activities are already occurring and are projected to continue to occur under any alternative. These activities include:
    - Stream restoration (e.g., South Tongue – Dead Swede area).
    - Road decommissioning.
    - Aspen retention.
    - Reintroduction of fire (Little Bighorn Burn area).
    - Fuels treatments (Story project)
2. 'Restoration' is not as applicable to Bighorn NF ecosystems as it may be to other forests ecosystems. For example:

- Fire/disturbance ecology shows that stand densities and fuel loadings in low intensity, frequent fire regime ecosystems (e.g., ponderosa pine) have been altered by fire suppression to a point where ecosystem values are at risk of uncharacteristically large and intense wildfires. The same logic does not apply to the subalpine forests that cover the vast majority of the Bighorn NF, as larger, stand-replacing fires are normal for this type of system.
- While there is not a large diversity in structural stages on the Forest, again due to the longer fire return interval, the current conditions are not outside the Historic Range of Variability. There is a predominance of mature/late successional structural stages, as well as pole sized stands across the Forest. Risk of change from natural disturbance processes are elevated but remain within the natural variability and do not "require" treatment, though fuels treatments around developments are needed, as allowed in all alternatives. Areas that may exhibit large acreages of monocultures could be treated for system resiliency and diversity, as allowed under existing alternatives though methods of treatment differ (mechanical vs. wildland fire use or prescribed fire).

The ID team felt a better approach was to identify alternative themes based on the major issues, with the ideas and concepts of restoration being applied to achieve the objectives of each theme.

Variations in Elk Security by Alternative

The Forest considered a proposal to vary elk security by alternative; i.e., in alternatives with greater emphasis on timber production, elk security habitat would be reduced. The Forest currently has less elk security habitat than when the 1985 Plan was implemented. Because other Forest species (see the wildlife section in DEIS Chapter 3 for more information) are also dependent on this habitat, the Forest deemed it desirable to maintain current habitat levels.

Full Budget Level Alternative

Many Forest Plan revisions have considered a "full" budget level in the projection of outputs and analysis of effects. This "full" budget level was typically said to be 150% of the actual budget anticipated for the Plan period. Since implementation of the first round of Forest Plans, this budget level has not been realized. Recent Bighorn National Forest budget experience has shown that while program emphases shift between resource areas, the overall annual budget to the Forest is relatively constant, as adjusted for inflation. The ID team considered national shifts in programs priorities, national Forest Service budget trends, and the current and anticipated Federal budget deficit and decided to not analyze a "full" budget level of outputs and effects.

Nonmotorized management area in vicinity of Coffeen Park Campground

The ID Team considered placing the area around Coffeen Park Campground into a nonmotorized management area allocation, but decided against it based on the following rationale:

1. There is a history of motorized access to this site predating the 1985 Plan.
2. Instead of utilizing Coffeen Park, with its existing hardened sites and toilet, users would be displaced to already well-used dispersed camp sites or create new sites.
3. The Forest has a capital investment at this site in terms of improvements and wishes to see continued public use of and benefit from it.

Keeping the "C" Areas on the Travel Map

Currently, the Bighorn National Forest has approximately 124,000 acres shown as area "C" on the travel map, where summer motorized travel is allowed off of designated roads and trails. The proliferation of off-road vehicles and changing technology since the 1985 Forest Plan was developed has resulted in resource damage and user conflicts on the Bighorn NF, as documented elsewhere in this DEIS. At a national scale, the Chief of the Forest Service has identified "unmanaged recreation" as one of the four main threats to National Forest System lands. It was not considered responsible public land management to continue to allow summer off-road travel during the next planning period, so this alternative was not considered in detail. Currently ongoing travel management planning in the Clear Creek/Crazy Woman Creek area, that will provide for motorized road and trail recreation opportunities in an area where summer off-road travel will be discontinued, is indicative of the Bighorn National Forest's intent to continue to provide motorized recreation opportunities.

Comparison of Alternatives

This section is designed to help the reader understand and compare the land allocations, the activities and outputs, and the environmental effects of the alternatives considered in detail. This discussion focuses on factors that display measurable differences among alternatives, summarizing more detailed information that is found in Chapter 3. Additional material and information on the alternatives and effects are in the project record, on file at the Forest Supervisor's Office in Sheridan. This summary is organized by the five major revision issues:

- Timber Suitability and Forest Management
- Special Areas – Wild and Scenic Rivers and Research Natural Areas
- Roadless/Wilderness
- Dispersed Recreation and Travel Management
- Biological and Habitat Diversity

Other topics are discussed briefly following the discussion on the five major issues.

Timber Suitability and Forest Management

Identification of lands suitable for timber production is one of the key decisions made in a forest plan. The process to determine timber suitability will be described in detail in Appendix B of the DEIS. Roughly, areas found to be tentatively suited for timber production can be considered to be those lands 'legally available' for allocation to land *suited* for timber production. Lodgepole pine, Engelmann spruce, subalpine fir, and Douglas-fir were species considered as tentatively suited. Suited land was only placed in Management Areas 5.11, 5.12, 5.13, 5.4, and 5.5 to keep management objectives and desired future conditions more straightforward. The following table shows the acres of tentatively suitable and suitable timber by alternative.

Table 2-3. Timber suitability (acres) by alternative.

	No Action	Alt A	Alt B	Alt C	Alt D	Alt E
Tentatively Suitable	351,916	340,589	340,589	340,589	340,589	340,589
Suitable	262,062	271,895	124,521	62,093	184,606	305,535

Source: GIS Data layers.

Acres identified as suitable for timber production were processed to determine timber outputs using the *Woodstock*© timber modeling suite. Based on modeling constraints, derived from standards and guidelines, and growth and yield information, the model schedules acres of appropriate harvest and uses these acres and yield tables for estimating harvest levels. Based on the constraints, the acres scheduled for harvest are reduced from the initial suitable acres input into the model. Not all suited acres are scheduled for harvest in this planning horizon (150 years[8]). Economic considerations, such as the value of timber available in an area not covering road costs, are the primary reason why some suited acres are not scheduled. The following table displays suitable and scheduled acres by management prescription for each alternative over the 150-year period modeled by *Woodstock*©. Alternatives E, A, and D have the highest levels suitable and scheduled timber.

Table 2-4. Total suitable and scheduled for the 150-year period modeled.

	Alt A	Alt B	Alt C	Alt D	Alt E
Suited acres	271,895	124,521	62,093	184,606	305,535
Scheduled acres	231,290	111,677	54,222	159,224	238,972

Source: Woodstock© Model

The allowable sale quantity (ASQ) is the maximum quantity of timber that may be sold from the area of suitable land covered by the forest plan during the time period specified

[8] Forest plans must be revised every 10 years, or no later than 15 years, according to the National Forest Management Act. In order to insure long-term sustainability, timber models are typically run for 150 years, in order to study whether or not the short-term, in this case 10-year projections, are sustainable over the long term. This is referred to as the planning horizon.

by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity" (36 CFR 219.3)." The ASQ for each alternative was formulated by considering the tentatively suitable timber land base, other multiple-use objectives, and the management requirements in the NFMA regulations. A discussion of the analysis process and use of model constraints can be found in Appendix B of the DEIS.

The following table displays the ASQ for each alternative. ASQ includes sawtimber and products other than logs (POL). ASQ was calculated in the *Woodstock*© model using cubic feet, and converted to equivalent board feet.

Other Vegetative Management (OVM), may includ some timber harvest in other management areas for the resource objectives of that management area; for example, wildlife improvement projects in MA 3.5 (Wildlife and Plant Habitat Management) or fuels treatment projects in recreation sites in MA 4.3 (Dispersed Recreation). Harvest in these areas for does not contribute towards the ASQ but contributes towards the total sale program (TSP) level. Salvage of dead or damaged timber may be harvested from both the suitable and unsuitable land base but only counts towards the ASQ if harvested from the suited land base. The total of harvest contributing to ASQ and volume removed for other vegetation management is included in the Total Sale Program (TSP). The following table shows the anticipated average TSP for the first 10 years of plan implementation.

Table 2-5. Average total sale program quantity for first decade.

	1985 Plan (pg III-13)	No Action[9]	Alt A	Alt B	Alt C	Alt D	Alt E
Sawtimber ASQ\ MCF/year	3,800	900	2,723	1,387	640	1,774	2,956
POL ASQ\ MCF/year	100	-	633	277	142	360	585
Total ASQ MCF/year	**3,900**	**900**	**3,356**	**1,664**	**782**	**2,134**	**3,541**
Equivalent MMBF/year	*15.1*	*4.5*	*11.0*	*5.6*	*2.6*	*7.2*	*12.0*
Firewood MCF/year	370	600	280	200	200	250	280
OVM MCF/year		800	173	345	86	173	518
Equivalent MMBF/year		4.0	0.6	1.2	0.3	0.6	1.8
TSP MCF/year	**4,270**	**2,300**	**3,809**	**2,209**	**1,068**	**2,557**	**4,339**
Equivalent TSP MMBF/year	*16.5*	*8.5*	*12.5*	*7.4*	*3.6*	*8.6*	*14.7*

Source: Woodstock© reports and other vegetation management assumptions.

Forest Management: Management areas are grouped into those where natural processes dominate and those where active management is included in the desired future condition.

[9] Administrative direction from Regional Forester dated December 17, 1996.

The table below further aggregates the management areas into primary emphasis categories.

Table 2-6. Management areas for primary emphasis categories.

Natural Processes Predominate	Managed for Recreation Use	Managed to Meet Ecological and Human Needs
MA 1.11, MA 1.13	MA 4.2	MA 5.11
MA 1.2, MA 1.5	MA 4.3	MA 5.12
MA 2.1, MA 2.2	MA 4.4	MA 5.13
MA 3.1, MA 3.23	MA 8.22	MA 5.4
MA 3.31, MA 3.4, MA 3.5		MA 5.41
		MA 5.5

The following table displays the management area allocation in the primary emphasis categories (see previous table) by alternative. Alternative E allocates the greatest amount of land to active management to meet the ecological and human needs, then in order, alternatives A, D, B, and then C. Part of the goal of active management to meet the ecological and human needs is to establish and maintain a more even distribution of age classes to provide a sustainable and even-flow of goods and services, including more age class diversity, over time. This more even distribution of age classes is different than what currently exists on the forest and different than the variation in age classes that would be created exclusively by natural process. However, natural processes would continue to dominate the variation in age classes and diversity on the Forest.

Table 2-7. Acres allocated by management areas for primary emphasis categories.

Alternative	Natural Processes Predominate	Managed for Recreation Use	Managed to meet ecological and human needs
A	485,831	20,364	598,821
B	686,628	145,133	273,253
C	800,989	170,662	133,366
D	492,394	130,561	482,060
E	289,385	13,341	802,288

Management activities, such as prescribed fire and mechanical treatment from unsuited lands, were estimated as shown in the following table. These figures are based upon historic output levels and anticipated future budget capabilities.

Table 2-8. Other vegetation management estimates by alternative.

	Alternative				
	A	B	C	D	E
Aspen	10	20	10	20	20
Forested Mechanical treatment	100	400	100	400	600
Forested prescribed fire	500	1,100	250	1,050	250
Non-Forested prescribed fire	2,000	3,000	1,500	2,500	2,500
Total	2,610	4,520	1,860	3,970	3,370
Total prescribed burning	2,500	4,100	1,750	3,550	2,750

Roadless/Wilderness

Roadless Areas: 36 CFR 219.17(a) states that "…roadless areas within the National Forest System shall be evaluated and considered for recommendation as potential wilderness during the forest planning process."

There have been several roadless inventories since Roadless Area Review and Evaluation efforts in the 1970s. The 1985 Forest Plan included a roadless inventory in Appendix M of the DEIS. That inventory was used for the 2001 Roadless Area Conservation Rule (RACR). The RACR and previous roadless inventories included many miles of system roads. In 2003, the Forest conducted a new roadless inventory which deleted areas where Forest system roads occur. The following table shows the acres of inventoried roadless area on the Forest based on the most recent inventories.

Table 2-9. Recent roadless inventories on the Bighorn National Forest.

	Acres	% of Bighorn NF
Roadless Area Conservation Rule (1985/2001)	623,014	56%
2003 Roadless Inventory	377,471	34%

The alternatives provide varying levels of protection for maintaining existing roadless areas, as defined by the 2003 roadless inventory. In general, management areas in category 1 and Management Area 2.2 would retain roadless area characteristics as defined by the RACR. The following table shows how much of the existing Bighorn NF roadless area (2003 roadless inventory) will retain roadless area characteristics under each alternative.

Table 2-10. Percent of existing Bighorn National Forest roadless area that would retain roadless characteristics.

	No Action	Alt A	Alt B	Alt C	Alt D	Alt E
Acres and percentages retaining RACR roadless characteristics	34,000	76,300	142,256	254,240	94,024	53,891
	3%	20%	37%	67%	25%	15%

Wilderness: Currently, the Cloud Peak Wilderness (189,039 acres) is the only wilderness on the Bighorn National Forest. Alternative C would provide 5 additional wilderness areas: Rock Creek, Walker Prairie, Devil's Canyon, Medicine Lodge, and Little Bighorn. The following table shows the approximate acreage of these areas. The total roadless area included in the 1.2 management areas is 115,149 acres.

Table 2-11. Roadless Areas and Acres of Roadless Area Recommended for wilderness in Alternative C.

Inventoried Roadless Area Name	Inventoried Acres Assigned to the 1.2 – Recommended Wilderness Management Area
Little Bighorn	40,938
Devil's Canyon	4,506
Walker Prairie	44,075
Rock Creek	20,326
Medicine Lodge	5,304

Special Areas – Wild and Scenic Rivers and Research Natural Areas

The Wild and Scenic Rivers Act was enacted by Congress to preserve select rivers in a free-flowing condition and to protect other river-related values. The Wild and Scenic River Act provides the following direction for classifying:

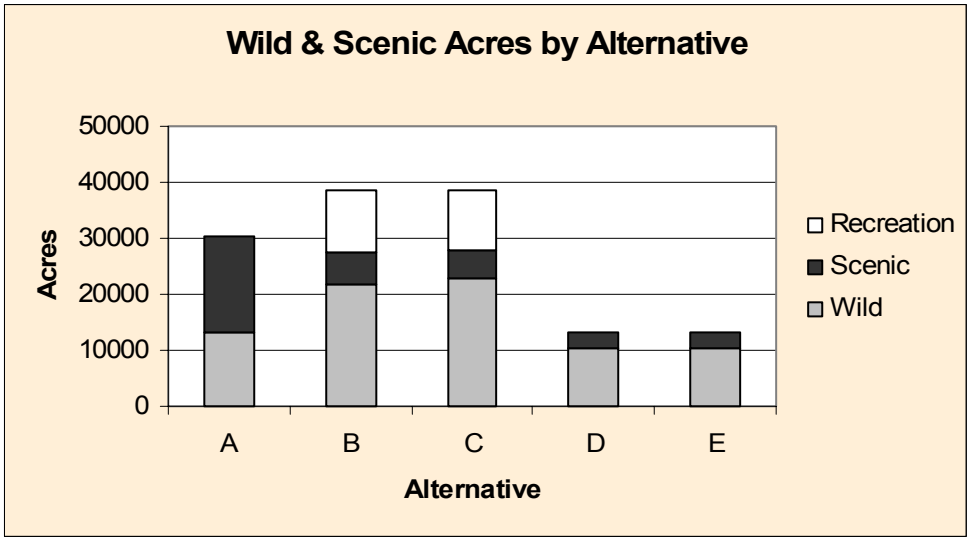
- **Wild rivers:** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.
- **Scenic rivers:** Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- **Recreational rivers:** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The Tongue and Little Bighorn Rivers were identified as eligible for potential inclusion into the National Wild and Scenic River System (NWSRS) in the 1985 Forest Plan. In the

1989 Wild and Scenic River Study Report and Final EIS on the Little Bighorn River, 19.2 miles of river were found suitable. The area was recommended for Congressional designation in August 1990, however Congress has not acted on this recommendation. Both the Little Bighorn and Tongue Rivers remain within the 1985 Plan's Management Area 10D,[10] their unique qualities safeguarded by specific standards and guidelines.

The following figure and table summarize Wild and Scenic River recommendations by alternative, classification, and miles. Piney Creek, Lodge Grass Creek, Shell Creek, and Medicine Lodge did not meet the eligibility criteria.

Figure 2-7. Wild and scenic management area acres by alternative.



Note: Acreages may vary slightly due to information derived from GIS data source.

Table 2-12. Miles of wild and scenic river recommendations by alternative (in miles).

River/Stream	Classification	A	B	C	D	E
Little Bighorn	Wild	20.01	15.9	15.9	15.9	15.9
	Scenic		4.11	4.11	4.11	4.11
Tongue	Wild		8.1	8.1	NR*	NR
	Scenic	32.85				
	Recreational		21.75	21.75		
South Rock	Wild	NR	13.04	16.28	NR	NR
	Scenic		3.24			
Porcupine	Wild	NR	6.25	6.25	NR	NR
Paintrock	Wild	NR	9.05	9.05	NR	NR
	Scenic		5.8	5.8		

[10] This management area encompassed both wild and scenic classifications; the 1985 Plan did not differentiate between them.

River/Stream	Classification	A	B	C	D	E
Total by Class	Wild	20.01	52.34	55.58	15.9	15.9
	Scenic	32.85	13.15	9.91	4.11	4.11
	Recreational		21.75	21.75		
	Total	52.86	87.24	87.24	20.01	20.01

* - NR = Not Recommended

Research Natural Areas (RNAs) are selected to provide a spectrum of relatively undisturbed areas representing important natural ecosystems and environments. They serve as natural laboratories in an otherwise managed world by providing a baseline to determine whether or not management activities are sustainable. There are currently two RNAs on the Bighorn: Bull Elk Park and Shell Canyon. The table below shows the RNA allocations by alternative.

Table 2-13. Acres of RNAs by alternative.

Research Natural Area	No Action	Alt A	Alt B	Alt C	Alt D	Alt E
Bull Elk Park	720	720	720	720	720	720
Shell Canyon	729	729	729	729	729	729
Lake McClain	0	0	2302	2302	2302	0
Leigh Canyon[11]	0	0	1200	1200	1200	0
Mann Creek	0	0	7000	7000	7000	0
Pheasant Creek	0	0	9090	9090	9090	0
Total Acres of Management Area 2.2[12]	NA	1,618	21,190	21,188	21,190	1,618

Source: Bighorn NF GIS database

Recreation and Travel Management

Recreation Opportunity Spectrum (ROS): The following table indicates the foreswide adopted ROS composition, by alternative.

[11] Ecological evaluation is labeled as "Tensleep Canyon". However, Tensleep Canyon itself is not suitable, due to highway, old highway, exotic species, and cattle trailing.
[12] This is the GIS calculated size of the 2.2 Management Area for each alternative.

Table 2-14. Adopted ROS by alternative.

ROS Category*	1998 Forest ROS inventory	Alternative				
		A	B	C	D	E
P	181,232	154,769	178,190	190,827	173,219	148,674
SPNM	278,105	185,277	223,212	262,605	175,920	96,785
SPM	372,549	172,972	331,361	385,763	180,471	61,953
RM	106,532	454,766	203,017	89,022	394,429	631,486
RN	140,393	127,327	139,813	147,774	148,337	159,850
R	32,544	9,906	29,422	29,025	32,641	6,269

**P = primitive, SPNM = semiprimitive nonmotorized, SPM = semiprimitive motorized, RM = roaded modified, RN = roaded natural, R = rural*

This represents the potential maximum amount of change based on management area – actual changes will likely be more subtle based on past management history. The greatest amount of shift from the more pimitive end of the ROS spectrum to the more developed end will occur in alternative E followed by A, D, B. Alternative C would retain an ROS composition most similar to the 1998 Forest ROS map.

Developed Campgrounds: No new campgrounds are proposed under any alternative and management of developed recreation facilities would be a project level action. The recreation program is dependent on budget and prioritization. Whether operated under concessionaire permit or not, developed recreation is a considerable public investment, and currently, the Forest does not anticipate increases in budget that would allow for additional campground infrastructure. Crowding during peak summer months will continue to occur at popular campgrounds irregardless of alternative.

Dispersed Camping: The amount of existing dispersed campground opportunities does not vary by alternative. Under all alternatives, forestwide standards and guidelines will address the issue of dispersed camping within riparian areas and in areas adjacent to developed campgrounds. Across all alternatives, the plan will restrict, or address through mitigation, as much as 8408 acres to dispersed camping (in addition to existing Special Orders already in place).

Summer Motorized Trail Travel and Travel Management: Only a slight variance among alternatives is expected based on the amount of system motorized trails. Alternative C, through allocation of recommended Wilderness areas (126,569 acres) would affect the existing motorized use of 14 miles of trail.

In all alternatives the revised Plan will restrict, forestwide, all motorized travel (with the exception of over-snow travel) to system roads and trails. Currently, 11.1% of the Forest is designated as a "C area" on the travel map which allows for travel off of system routes. The amount of anticipated annual trail construction / maintenance does not vary by alternative.

Given that motorized travel will be restricted to system routes on a Forestwide basis, differences across alternatives in terms of motorized travel opportunities will generally be subtle, especially in the earlier years of the Plan. Most timber roads will be closed to public use with the potential exception being the road into the Piney/Rock area in alterantives A and E if it were to be built. Decommissioning of existing system roads is projected to be 4 miles per year across all alternatives.

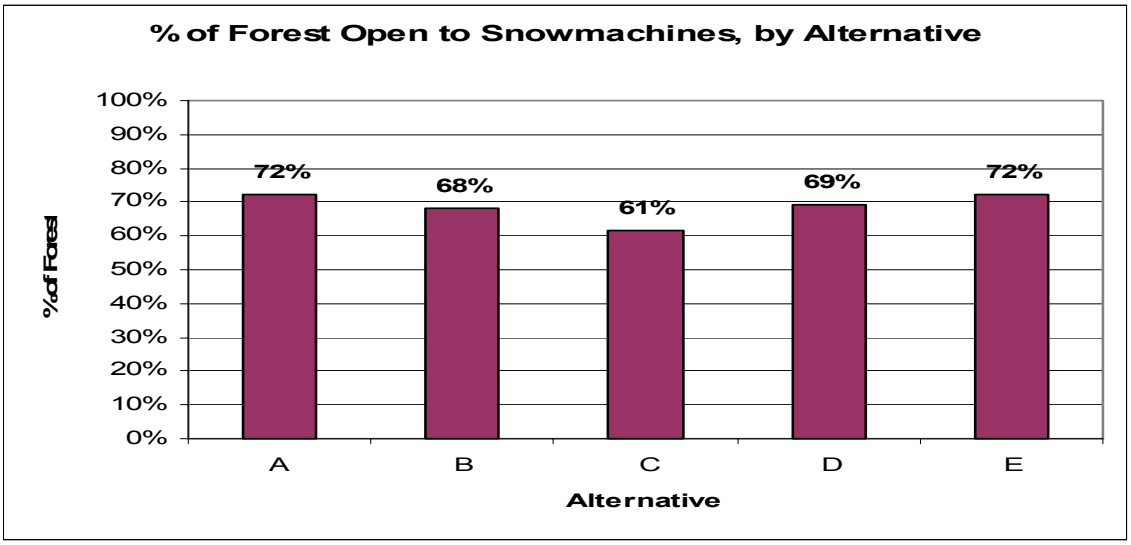
Long-term potential for construction of new motorized routes would be greatest in alternative E (based on the amount of motorized adopted ROS class acreage), followed by alternatives A, D, B and C. Conversely, the long-term potential for maintaining the greatest amount of nonmotorized recreation opportunities will be highest in alternative C, followed by alternatives B, D, A and E.

Big game hunting: While the Forest proposes to maintain or improve elk security areas (seen as important contributors to hunter success and satisfaction), these areas would be at more risk in Alternatives E and A due to an increase in road construction associated with a more active timber management program, would be at less risk in Alternative D, remain somewhat similar to existing levels in Alternative B, and possibly increase in Alternative C.

Dispersed winter recreation: Restrictions to winter motorized use varies by alternative based on management area allocations as several management areas prohibit or restrict winter motorized recreation.

When mapped winter range is combined with relevant management areas, the total amount of winter motorized and nonmotorized acreage (including Cloud Peak Wilderness) can be compared by alternative. Total percentage of the Bighorn National Forest open to snowmachine recreation by alternative is shown in the following figure.

Figure 2-8. Percentage of Forest open to snowmachine travel by alternative (including existing special orders).



Ski areas: Alternative A would maintain the existing ski area boundaries shown as management area 8.22. Alternatives B, C, D, and E would expand the 8.22 boundaries to the extent of their combined approved master plans of nearly 2,600 acres. A small nonmotorized backcountry ski area (Salt Creek area) is included in Alternative C. These activities and others are discussed in more detail in the Recreation section of the DEIS Chapter 3.

Biological and Habitat Diversity

Biological and habitat diversity is the full variety of life in an area along with the processes that maintain it. In response to growing concern over loss of habitats and ecosystems and species extinction, biological and habitat diversity was identified as a revision topic. Significant revision of the management direction (goals, objectives, standards, guidelines, and monitoring) within the Revised Plan occurred to reflect changed conditions from the 1985 Plan.

Opportunities identified for management activities in this next planning period to enhance biological and habitat diversity include watershed restoration (e.g. road and stream/riparian interactions), effective travel management (road density concerns), livestock administration for non-forested vegetation and riparian area improvement, aspen enhancement, vegetation treatments for habitat diversity primarily in pole sized lodgepole pine stands and cover types that have missed fire cycles, and prevention and reduction of undesirable non-native species (vegetative and non-vegetative). All alternatives accomplish these measures to some level, some through more mechanized treatment options versus natural processes. The opportunity for wildland fire use will also help address needed changes. The Revised Plan was designed to incorporate both ecosystem processes and individual species needs as identified in the goals, objectives, standards, guidelines, and monitoring sections. Sources for these measures include more recent scientific findings and reports encompassing ecosystem processes and individual species requirements.

Biological and habitat diversity was assessed by:

- The ecosystem and single species analyses described in the biodiversity section of Chapter 3.
- Other effects components shown in the aquatics, forested vegetation, terrestrial wildlife, fire and fuels, insects and disease, and rangeland vegetation sections of DEIS Chapter 3.
- The Biological Assessment of threatened and endangered species (DEIS Appendix F), and the Biological Evaluation of Forest Service sensitive species (See Project Record).
- Additional information on selection of emphasis species including MIS, viability assessments, and individual species assessments, on file in the administrative record.

Summarized Results of Ecosystem Analysis (Biodiversity Section).

The key indicators for the ecosystem assessment were the *compositions of habitats* (vegetative and non-vegetative cover types), the *Habitat Structural Stages* (HSS) of forested vegetation, trends in *coarse woody debris and snags*, and *connectivity/fragmentation* of vegetation including road densities. Indicators from the aquatics (e.g. stream crossings), forested and rangeland vegetation sections would also apply.

Each alternative varies in terms of how it provides for ecosystem processes, with either more natural processes affecting management by a dominance of management categories 1 – 3, or more management induced changes via categores 4 and 5. Alternatives C and B have the most natural processes, ranging to A and E that have the most of categories 4 and 5. RNA's can provide a level of baseline information and land areas managed for ecosystem processes. Alternatives B, C, and D propose 4 new RNAs, while A and E have none. Wild and Scenic Rivers and wilderness areas may also provide heightened management emphasis for ecosystem processes, however some compromise of this occurs due to the focal use of recreation that these areas often attract. Alternatives C and B provide additional designations of wilderness and/or wild and scenic rivers.

Noxious weeds were deemed to be the biggest risk to *habitat composition*, with transport mechanisms (vectors) of livestock grazing, timber harvest, and recreation/travel management identified as factors influenced by management activities. Risk of weed expansion is greatest at lower elevations on the Forest. It is also assumed that moderate levels of urban development would continue on lands adjacent to the Forest, increasing the potential for noxious weeds and other non-native species to spread onto the Forest. The loss of "open space" or native habitats adjacent to the Forest would presumably place a higher value of retaining existing amounts and composition of habitat on the Forest for maintaining ecosystem processes and species viability.

Recreation use would likely increase regardless of alternative. The risk of habitat loss or alteration by management activities would vary directly with new road construction and increased recreation use, which would lead to a direct loss of some habitat. There would likely be minimal new development of hiking trails or facilities (campgrounds, lodges, etc.) regardless of any alternative. It is estimated that approximately 4 miles of road per year would be decommissioned under all alternatives, largely focused on user-created roads. With the removal of areas available to summer off-road travel, a reduction in the amount of user-created roads should occur, particularly in riparian areas.

Key composition elements including riparian areas, aspen, and spruce-fir would not likely vary by alternative. Riparian areas would likely continue to slowly improve with implementation of livestock grazing standards and guidelines. Road density and stream crossing density reductions in riparian areas would also provide improved conditions, though alternatives that increase this potential (such as A and E) may prevent some challenges. Aspen would continue to mature with a lack of regeneration disturbance at the forest-wide scale due to higher levels of wildlife and continued livestock herbivory, though livestock herbivory is more easily managed through standards and guidelines. The amount

of spruce-fir habitat type will not change under any alternative. However, some areas of spruce-fir cover type will be set back to an earlier successional stage due to wildfire, insects and disease, or blowdown. White Pine Blister Rust, a non-native disease, will cause the continued loss of limber pine.

Habitat Structural Stages (HSS) of forested vegetation was the second key indicator of the ecosystem assessment. In general, the natural disturbance processes of fire and insects and disease will continue to be the dominant forces in changing structural stages on the Bighorn NF under all alternatives. Based upon past events, there is approximately a 67% chance that fires may burn 10,000 acres in the next decade, with additional changes from insects and disease. These figures, combined with the maximum anticipated timber harvest in Alternative E, may not meet the diversity objective of 5% in young or early structural stages at the forest-wide scale. Mature conditions would continue to predominate and continue for the next decade, likely allowing for the old growth objective (10-15%) to be met at the forestwide scale. All of the alternatives would still meet a range within HRV for this ecosystem element.

Fragmentation and connectivity of vegetation and habitats were assessed with regards to patch sizes, disturbance processes, and road densities. Where more areas of natural processes determine the structural stages of forested areas, sizes of openings would continue largely the same as historical levels. Where timber harvest occurs, a trend may continue with smaller patch sizes. Timber harvest and new roads would be greatest in Alternative E, followed by A, D, B, and then C, though new roads for timber sales would most likely not remain open following harvest. An exception to this may be in Alternatives A and E assuming that access into Piney and Rock Creek areas remains open. Road densities, another indicator of fragmentation, would have the potential to increase the most in Alternatives E and A, followed by Alternatives D, B, and C. Road densities would increase in proportion to new construction levels, affecting all vegetation types and associated species. Current fragmentation literature cautioned land managers to be cautious and conservative in allowing any increases in road construction due to the number of factors from roads affecting habitat and species.

Coarse woody debris and snags were the next components of biodiversity assessed. At the forestwide scale, the availability of snags and coarse woody debris would be influenced primarily by natural processes; however, there would be localized small-scale reductions as a result of timber harvest over the long term, and in fuelwood harvest areas in particular. Coarse woody debris and snags should not become a limiting habitat feature under any alternative, as mature and decadent conditions would likely continue to dominate the stand structures.

Summarized Results of Single Species Analysis (Biodiversity Section)

The focus of this analysis was on emphasis species of concern from a viability perspective. These included threatened, endangered, and Forest Service sensitive species (TES), and species of local concern. Both habitat and population factors were incorporated into a variety of assessments used. The key indicators were the *viability outcomes* and biological

(species-specific) *determinations.* This analysis tiered to the ecosystem analysis by incorporating elements of risk or limiting habitats factors to the emphasis species that were more specific than could be addressed under the ecosystem analysis.

More in-depth analysis accompanied TES species, resulting in species-specific *determinations* of effects and persistence. The threatened and endangered species are addressed in the Biological Assessment (Appendix F). There were no candidate or proposed species currently identified to potentially occur on the Forest, so the only two species were the bald eagle and the Canada lynx, both threatened species. The ongoing lynx amendment process (Amendment #16, DEIS released 1/16/04) determined that National Forest management activities were likely to adversely affect the lynx. Similarly, the Forest determined that all alternatives *"may affect, likely adversely affect" the lynx*. However, timber harvest modeling did not indicate that suitable habitat elements would be exceeded under any of the alternatives, and the Forest chose a worst-case scenario determination.

Management activities from any of the alternatives "*may affect, but would not adversely affect" the bald eagle*, due to a lack of habitat (winter roosting or nesting) on the Forest.

Sensitive species were analyzed in the Biological Evaluation (See Project Record). No species were determined to be adversely affected by alternatives. Management activities under most alternatives "may affect individuals or habitat, but but are not likely to cause a trend to federal listing."

From a combination of species assessments, broad-scale ecosystem assessments, and the viability assessment contained in the project record, a total of 14 "threats" to habitats and species were identified. Most of these threats are addressed by goals, objectives, standards, and guidelines in the Revised Plan, which minimizes potential effects on species. Four of these threats were varied in alternative design, either by guidelines or by use of management prescriptions, or both. These included road development, timber harvest, motorized recreation, and habitat diversity (structural stages). The use of this threat analysis corresponded to the determinations made with the viability outcome statements described in the single species analysis in Chapter 3. Species-specific summaries with regard to *viability outcomes* and the factors involved occurred within the single species assessment. In general, species which were identified as having higher risks from road development had less certain confidence in persistence in the future in Alternatives A and E. Road developments are anticipated to increase less with Alternative D, followed by Alternatives B, and C. Several species, such as the Yellowstone cutthroat trout and three amphibians may face declines in the near future, largely due to influences from non-native species, regardless of alternative.

Many rare species are identified due to a lack of current information on either their habitat or population controlling factors, particularly plants. The past levels of management activities on the Forest are not known to have caused a decline in habitat for any one species, with the exception of bighorn sheep associated with diseases from domestic sheep both on and off Forest. There are other factors associated with population mechanisms of species, largely outside of Forest Service control, that led to declines in some species.

Should a greater level of activities occur (more roads, more harvest, more motorized recreation), as compared to the level of activities conducted in the past decade, the risk of affecting species viability would presumably increase. This could be evidenced in Alternatives A and E. Lower levels than current, such as in Alternatives B and C may provide some future flexibility with regard to species habitats and maintenance processes. Livestock grazing was not measurably altered by Alternative. The use of Research Natural Areas (RNAs) may also provide biological reserves for species viability. Four new RNAs were considered for addition in all but Alternatives A and E. While wilderness areas may also provide some biological reserve, they also have traditionally involved an increase in recreation use, which may not allow the areas to function as a biological reserve.

The revised plan includes a strategy and monitoring items for rare plant species. 1985 Plan implementation showed that a program of field inventory, to identify which suspected rare plants warranted conservation consideration, followed by monitoring populations and project effects, was effective in increasing our knowledge base on relatively unknown species. Ongoing plant monitoring efforts include population monitoring of *Rubus acaulis*, and project monitoring on the Story and Little Bighorn fuels projects. The strategy for the Revised Plan provides for rare plant conservation and species viability.

Other Biodiversity Related Topic Summaries

Aquatics and Fisheries

Considerable improvements in aquatics and fisheries management have occurred since the 1985 plan, including specific improvement projects as well as overall knowledge of the resource on the Forest. Watershed improvements were incorporated into the goals and objectives in the Revised Plan for all alternatives. In addition, considerable improvements were made to the standards and guidelines for these resources to reflect increased scientific understanding and management needs. The aquatics and riparian resource is the most important habitat and ecosystem process element of biodiversity.

Potential effects to water and aquatic habitats, including fisheries are the result of past, current, and future disturbances, both natural and human-caused. Key indicators for this topic included similar parameters described above, and included the rainbow trout as an MIS. Timber harvest is not anticipated to affect water quality, due to implementation of Revised Plan standards and guidelines. Stream crossings and roads located in riparian areas can often have a negative effect on riparian areas, and these and both overall road densities would increase under the higher harvest alternatives, including A and E. At times, planned harvest activities can also be designed to improve riparian areas by providing the impetus to remove road corridors from riparian areas.

The Revised Plan includes the use of Best Management Practices (BMPs) and implementation of the direction in the Watershed Conservation Practices handbook. These measures would reduce potential for adverse effects regardless of alternative. Improvements in livestock grazing administration over time would also allow for continued improvement in riparian area resources. No changes in population levels for rainbow trout (MIS) at the forestwide scale would likely occur as the result of any

management activity associated with an alternative, but habitat parameters should improve slowly over time. Similarly, few changes in habitats or populations for demand species (sport fish) would likely occur as the result of any alternative.

Terrestrial Wildlife

Wildlife are affected by both changes in habitat and from potential disturbances from human activity. Five terrestrial MIS were chosen to assess wildlife affects from the alternatives. Habitat for the red squirrel and red-breasted nuthatch (snags and coarse woody debris, mature timber) were discussed under the biodiversity section.

Elk security areas were chosen to represent those species that would benefit from interior forest conditions combined with less human disturbance, as security areas are at least 250 acres in size and they are greater than ½ mile from open roads and motorized trails. Several of the Forest's sensitive species may prefer this type of habitat. This type of habitat also serves as an indicator of open road and motorized trail densities for each geographic area.

While the Forest proposes to maintain or improve security areas as identified by the forestwide objective in the Revised Plan, this would be the most difficult under Alternatives E and A due to the predicted timber harvest levels requiring new road construction. The maintenance of elk security would be challenging under Alternative D, and easier under Alternatives B and C. The challenge to managers will be in effectively closing roads, and gaining public acceptance of road closures in currently open areas to allow new road construction in new harvest areas. Commodity output levels under Alternative D also approximate the output levels that were recommended in the preferred alternative under the previous ASQ plan amendment (unsigned), which also used elk as a MIS with regards to road densities and manipulations to cover. The table below indicates the level of overlap between suited acres managed for timber production and existing elk security areas. As acres of overlap increase, the potential for retaining existing levels of security may decrease. Elk security areas may also be used to manage for old growth structural stages of forested vegetation as directed by the forest-wide biodiversity guideline.

Table 2-15. Acres of suited timber within elk security areas.

Alternative	Suited Acres in Existing Elk Security	Suited Acres in Potential Elk Security
A	51,235	107,025
B	14,171	36,863
C	4,694	13,113
D	21,949	56,122
E	60,508	124,454

The Brewer's sparrow was the MIS identified for sagebrush areas, and there would not likely be a significant difference among alternatives in the level of its habitat provided at

the forest –wide scale. Manipulations to the habitat would be primarily from prescribed burning, which varies by up to 1,000 acres by alternative, not enough to make a difference by alternative. Populations are likely to be more dependent on other factors, including habitat influenced by wildfire.

Beaver were selected as both a terrestrial and aquatic MIS. There would not likely be a difference in habitat available under any alternative as livestock grazing is the primary determinant of riparian habitat condition, along with roads and road crossings in riparian areas. The potential for increased stream crossings from roads under Alternative A and E may provide opportunities for conflict, depending on the locations of those crossings with regard to beaver populations. If culverts cannot be properly retrofitted for beavers, beaver are often removed. Beaver are not of viability concern but of ecological concern as they are primary engineers for retaining higher water tables and riparian functioning. Reintroduction efforts may lead to population increases.

Population trends for all of the MIS are anticipated to remain stable in terms of affects from potential management activities, regardless of alternative.

Wildlife demand species (hunted species) would not be measurably affected through any of the alternatives. Black bears may prefer habitat similar to elk security areas, though other components (den sites) are also necessary.

Other Topics

Rangeland Vegetation

Rangeland vegetation would likely continue with similar conditions as in the past few decades. Prescribed burning may alter successional stages of both grasslands and shrublands, though the forest-wide amount will likely be less than what occurs naturally through wildfires. Livestock grazing would continue to influence vegetative composition and condition, with little difference among alternatives. With administration to forest-wide standards and guidelines in the Revised Plan, vegetative conditions and composition should continue to improve. Wildlife use, including deer, elk, and moose will continue to alter conditions, with potential conflicts with wildlife in localized areas. Noxious weeds, as described above, would likely be the greatest risk to rangeland ecosystems. The draft Revised Plan contains forestwide weed prevention, and suppression strategies that would occur regardless of alternative.

Forested Vegetation

Over the life of the plan there will be an increase in the amount of mature habitat structure stages (4A to 5) for all alternatives. Those alternatives with the greatest mount of timber harvest (A and E) show the least increase in the amount of the mature structural stages.

Natural disturbance events and succession will continue to operate regardless of the alternative, however the amount of land upon which natural processes operate as the primary disturbance agents varies by alternative. The composition of the forest vegetation

will continue to be primarily influenced by the same succession and disturbance processes that shaped it, although invasive species are likely to be an increasing influence. White Pine Blister rust is expected to dramatically reduce the amount of limber pine. Although the vegetation will change with time, cover types will remain relatively stable, with exceptions to influences by non-native insects, diseases, and weeds noted elsewhere.

Insects and Disease

Control of insects and disease is directly related to active management area prescriptions and timber harvest activities. Natural processes are more heavily emphasized in Alternatives C and B; therefore these alternatives would likely have the most potential for epidemic (larger scale) levels of insects and disease. Alternatives E, A, and D have higher levels of active management and more acres of suitable timber; the potential for large-scale insect and disease outbreaks would be lower in these alternatives. With a maturing forest occurring regardless of alternative, insects and disease would likely continue to be a major disturbance process influencing the forested structural stages

Fire and Fuels Management: Under Alternatives C and B, natural processes are emphasized and there is increased acceptance of wildfire in these areas. Under Alternatives E, A, and D, less of the forested area would be managed under natural processes, and there would be more acres actively managed for protection from wildfire. Large wildfires will still occur under all alternatives because the majority of the Bighorn NF is subalpine forests where fire occurrence and size is more related to weather conditions than fuel loading or fuel configuration. Stand size and fuel diversity in harvest units and road systems allowing easier access and quicker fire management response should lead to smaller wildfires. However, additional access may increase the risk of human-caused fires.

Fire – Appropriate Management Response: Fire has historically and will continue to play, a role in the structure, occurrence, and condition of vegetative communities of the forest. Under the 1985 Bighorn Land and Resource Management Plan, the only management response to an unplanned ignition is a suppression strategy. One of the objectives of this revision is to establish a range of acceptable Appropriate Management Response (AMR) actions. The three AMR strategies allowed for the Bighorn NF are defined below:

> **Direct Control** is to immediately and completely extinguish a wildfire. It is associated with high value areas, such as housing and other urban development, campgrounds, administrative sites, ski areas, and areas with high natural resource values. Immediate suppression action needs to be taken in these locations throughout the fire season. Fuels treatment for hazard reduction and pre-suppression planning is a high priority where this strategy is utilized.
>
> **Perimeter Control** is a strategy that seeks to confine the active zone responsible for fire spread. Perimeter control considers site-specific values at risk. Firelines, whether natural or constructed, are used to confine the active zone of spreading fire. Direct or indirect fireline locations are selected to minimize the cost of suppression while recognizing the values that could be lost to the fire. The time of season and forecasted

weather are important considerations affecting fireline location. Near private property, fuels projects are likely to be directed at defensible space to protect structures while in the more remote areas, ecological values would be emphasized.

Prescription Control emphasizes use of wildland fire for resource benefits. This strategy uses natural unplanned ignitions within specific geographic areas, allowing fire to play its ecological role. Because prescription control emphasizes the natural role of fire in the environment, human caused fires cannot be managed for resource benefit. Under prescription control, a fire is considered controlled as long as it burns within specified geographic boundaries and predetermined burning parameters. Parameters for this strategy are contained within a written prescription documented in the Fire Management Plan.

An AMR will be assigned to every area on the Forest with burnable vegetation. AMR parameters will be outlined in the FMP (Fire Management Plan). When the FMP has been completed and approved, management of all ignitions will consider the full range of management options available, depending upon resource management objectives presented in the FMP. The AMR for each alternative, expressed in acres and percent, is displayed in the following table. The only AMR in the no action alternative is direct control.

Table 2-16. Appropriate management response (acres/percent) by alternative.

Alt.	Direct		Direct or Perimeter		Direct, Perimeter or Prescription	
	Acres	Percent	Acres	Percent	Acres	Percent
A	1,358	0.1%	598,678	54.2%	504,977	45.7%
B	2,580	0.2%	273,251	24.7%	829,180	75.1%
C	2,580	0.2%	133,366	12.1%	969,068	87.7%
D	2,575	0.2%	482,328	43.7%	620,110	56.1%
E	2,540	0.2%	802,288	72.6%	300,186	27.2%

Acres of Fuels Treatment (mechanical and prescribed burning) by Alternative: An estimate was made for the number of acres of fuels treatment attainable annually under each alternative. This was based on values at risk, historic funding level experienced by the Forest, objectives of the Revised Plan, and management objectives for each alternative. The highest priority for mechanical treatments will be adjacent to high-value areas and/or communities at risk. Because fires in long return interval fire regimes are typically of high intensity stand replacing fires, fuel treatments adjacent to high-values in those areas would likely concentrate on defensible space. Among the high value areas on the Bighorn NF are lodges, resorts, primary residences, summer homes/summer home groups, campgrounds, and ski areas.

The following table displays the percentage of acres of Condition Classes 2 and 3 and acres of high and extreme hazard classes (see Chapter 3 Existing Condition for Fire/Fuels

for definitions) being treated over a ten-year planning period, for each alternative. It is important to note that, while prescribed burning results in benefits to the fuels profile and/or condition class, often a goal of the burn will be to improve wildlife habitat or range condition for domestic livestock.

Table 2-17. Acres of fuel treatment annually by alternative.

	Alternative				
	A	B	C	D	E
Annual Acres of Treatment	2,610	4,520	1,860	3,970	3,370
Maximum Percent of Condition Class 2 & 3 Treated per Decade	2%	4%	2%	4%	3%
Maximum Percent of High and Extreme Hazard Ratings Treated per Decade	39%	68%	28%	59%	50%

Acres identified for treatment under Alternative A display an average level of treatment under the 1985 Plan. Alternative B shows a 1,900 acre increase over the historic average. This is primarily due to the increased emphasis placed on fuel treatments by the National Fire Plan and Healthy Forests Restoration Act, both in urban interface zones and across the landscape with prescribed fire to improve wildlife habitat.

Fire and Fuels Management

The Revised Plan was updated with appropriate management response strategies. Where these are applied relates largely to the management area prescription. In general, there would be little difference by alternative in the amount of wildfire that occurs. There is a 75% chance that wildfires will cumulatively burn over 5,000 acres fire in the next planning period. Large fires (over 10,000 acres) are less likely due to both terrain features (natural breaks of rocks, meadows, streams) and recent fire history indicating a lack of these large fires in the past several decades. Fire would remain the largest factor responsible for changing vegetative conditions on the Forest. Where additional roads are constructed, such as in Alternatives E and A, fire suppression access may be improved, but more man-caused fires may result. Fuels treatments would continue with relatively minor differences among alternatives.

Wildland fire use may become a more dominant strategy for remote areas of the Forest in the next planning period. As long as the fire burned within specific geographic boundaries and predetermined conditions, these naturally ignited fires would be managed to allow continued burning, and there would be very little variation between alternatives.

Scenery

Each alternative developed for the draft forest plan revision provides a range of management area prescriptions and each management area prescription is assigned the proposed scenic integrity objective(s) based on the desired condition of management area. Scenic integrity objectives assigned to management area prescriptions guide the amount, degree, intensity, and distribution of management objectives needed to achieve the desired condition of the landscape.

Table 2-18. Percent of Bighorn National Forest area in each Scenic Integrity Objective.

SIO	No Action	Alt A	Alt B	Alt C	Alt D	Alt E
Very High	15%	12%	12%	23%	12%	12%
High	32%	17%	21%	21%	17%	14%
Moderate	28%	45%	55%	50%	49%	37%
Low	15%	26%	12%	6%	22%	37%
Very Low	10%	0%	0%	0%	0%	0%

The 4.2 management area provides for active vegetation management and recreation development for public enjoyment. The scenic byways provide 120 miles of scenic travel opportunity on the National Forest and host over 2 million travelers viewing scenery annually.. They are important in marketing the area for recreation and tourism. The Alternatives rank D, B, C, A, and E with D providing the most active management of scenic byways and other recreation areas.

Table 2-19. Management Area 4.2 - Scenery (in acres) and Miles of Scenic Byway in MA 4.2 - by alternative.

	Alt A	Alt B	Alt C	Alt D	Alt E
Acres in M.A. 4.2	19,147	95,418	93,294	102,083	6,007
Miles of Byway in M.A. 4.2	46.38	103.78	100.17	113.81	7.75

Livestock Grazing

Under all alternatives, livestock grazing would likely remain similar to existing levels over the next ten years. This is because the standards, guidelines, and monitoring strategies adopted in the revised plan are the same as being implemented now. In addition, the specific decisions that most affect the stocking levels, such as on/off dates, pasture rotation, permitted numbers, etc., are made at the Allotment Management Plan level as described in the introduction to Chapter 3 (role of site specific vs. programmatic plans). It is impossible to make those decisions at the forest planning level, where over 100 permittees and allotments are involved.

Cultural Resource Management

Special Interest Areas (MA 2.1) are designated for historical values. Within these areas, motorize and mechanize travel are prohibited where necessary to protect the values for which the individual area was proposed or established. Recreation use is allowed which emphasizes interpretation, education, and inspiration when it does not threaten the values for which the area was identified. The adopted ROS class is either semi-primitive nonmotorized or semi-primitive motorized, depending on the specific area. New roads or trails are allowed when they are consistent with the values of the SIA. Alternative B includes two 2.1 management areas (Elephant Foot and Buck Creek Vees), while Alternative C contains only one, Buck Creek Vees. The table below shows SIA designation by alternative.

In addition to MA 2.1, designation of the Medicine Wheel Special Interest Area (MA 3.1) also varies by alternative. Within MA 3.1, the area is managed as provided in the Historic Preservation Plan. The following table shows the acres allocated to Management Areas 2.1 and 3.1 by alternative.

Table 2-20. Management Area 2.1 and 3.1 designations by alternative (in acres).

	Alt A	Alt B	Alt C	Alt D	Alt E
Management Area 2.1	89	20,004	17,024	0	0
Management Area 3.1	61	20,863	20,865	20,863	20,863

The 3.1 MA boundary in alternatives B-E approximates the boundary defined in the Historic Preservation Plan for the Medicine Wheel boundary, but it is slightly larger due to mapping differences.

Table 2-21. Summary of key land allocations: management area prescriptions in acres.

	Management Areas	Alt A	Alt B	Alt C	Alt D	Alt E	1985 Forest Plan Nearest Equivalent	No Action
1.11	Pristine Wilderness	130,799	130,803	130,798	130,798	130,808	Same – per Plan Amendment 14, 8/1/98	131,222
1.13	Wilderness, Semi-primitive	61,098	61,094	61,100	61,100	61,090	Same – per Plan Amendment 14, 8/1/98	60,676
1.2	Areas Recommended for Wilderness	0	0	125,569	0	0		0
1.31	Backcountry Recreation, Nonmotorized	0	34,273	235	24,711	7,702	3A Semi-primitive nonmotorized recreation. 3B Primitive Recreation	78,993
1.32	Backcountry Recreation, Nonmotorized Summer with Limited Winter Motorized	58,943	42,342	71,209	36,939	27,472	3A Semi-primitive nonmotorized recreation. 3B Primitive Recreation	
1.33	Backcountry Recreation with Limited Summer and Winter Motorized Use	20,053	32,546	36,901	6,099	15,224		
1.5	National River System-Wild Rivers	13,217	20,871	22,082	10,251	10,420	10D Wild and Scenic River Corridors	13,217
2.1	Special Interest Areas (outside Wilderness)	89	20,004	17,024	0	0		0
2.2	Research Natural Areas (outside Wilderness)	1,618	21,190	21,188	21,190	1,618	10A Research Natural Areas	1,618
3.1	Special Interest Area, Medicine Wheel	61	20,863	20,865	20,863	20,863	10C Special Area	150
3.24	Riparian and Aquatic Ecosystem Management	931	0	0	0	0	9A Riparian and Aquatic Ecosystem Management	931

	Management Areas	Alt A	Alt B	Alt C	Alt D	Alt E	1985 Forest Plan Nearest Equivalent	No Action
3.31	Backcountry Recreation, Year-round Motorized	25,464	118,242	193,877	82,733	12,719	2A Semi-primitive Motorized Recreation	25,455
3.4	National River System - Scenic Rivers (outside Wilderness)	17,110	5,815	4,817	2,887	1,470	10D Wild and Scenic River Corridors	17,110
3.5	Plant and Wildlife Habitat Management	156,448	178,587	95,325	94,823	0	4B Wildlife Management Indicator Species (unsuited timber)	148,064
4.2	Scenery	19,147	95,418	93,294	102,083	6,007	2B Rural/Roaded Natural Recreation	19,147
4.3	Dispersed Recreation	0	36,234	63,888	25,558	4,794		0
4.4	Recreation Rivers	0	10,901	10,900	74	0	10D Wild and Scenic River Corridors	0
5.11	General Forest and Rangelands – Forest Veg. Emphasis	93,160	89,657	92,484	170,454	190,161	4B Wildlife Management Indicator Species (suited timber)	88,206
5.12	General Forest and Rangelands – Rangeland Veg. Emphasis	263,636	72,155	19,557	182,092	51,428	6A Livestock Grazing Improve Forage Composition 6B Livestock Grazing Maintain Forage Composition	263,298
5.13	Forest Products	210,213	83,228	0	100,930	198,977	7E Wood Fiber Production	210,217
5.13.1	Forest Products, RACR 4(b) exceptions	0	0	0	0	0		0
5.21	Increase Water Yield, Vegetative Management	3,991	0	0	0	0	9B Increase Water Yield, Vegetative Management	3,991
5.4	Plant and Wildlife Habitat	0	0	0	0	134,374		

	Management Areas	Alt A	Alt B	Alt C	Alt D	Alt E	1985 Forest Plan Nearest Equivalent	No Action
5.41	Deer and Elk Winter Range	27,680	28,213	21,325	28,852	29,638	5A Non-forested Wildlife Winter Range 5B Forested Wildlife Winter Range	28,037
5.5	Dispersed Recreation and Forest Products	0	0	0	0	197,710		
8.21	Water Impoundment – Twin Lakes, Tie Hack	141	0	0	0	0	9E Water Impoundment – Twin Lakes, Tie Hack	
8.22	Ski-based Resorts: Existing/Potential	1,217	2,580	2,580	2,575	2,540	1B Winter Sports Sites	1,217
		0	0	0	0	0	1A Developed Recreation Sites	0
		0	0	0	0	0	4D Aspen Stand Management	13,368
		0	0	0	0	0	10C Preacher Rock Bog	0
	Total	1,105,016	1,105,016	1,105,018	1,105,012	1,105,015		1,104,981