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Roadless Area Conservation

National Forest System Lands in Idaho

Vegetation Specialist Report

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Abstract

This report provides background and information analysis for the affected environment and environmental consequences of the alternatives analyzed for the Roadless Area Conservation; National Forest System Lands in Idaho (FEIS), August, 2008. It covers the affected resource environment, assumptions, data and analytical methods used, and the analysis of effects for forest vegetation, timber harvest/cutting, forest health, noxious weeds and climate change that are summarized and disclosed in Chapter 3 of the FEIS.

Inventoried roadless areas comprise approximately 9.3 million acres in Idaho, or approximately 45 percent of National Forest System (NFS) lands within the state. Inventoried roadless areas have inherent characteristics and values that are becoming scarce in an increasingly developed landscape nation-wide. In Idaho, inventoried roadless areas represent about 17 percent of the total land base. Inventoried roadless areas provide significant opportunities for dispersed recreation, sources of public drinking water, and large undisturbed landscapes that provide privacy and seclusion. In addition, these areas serve as bulwarks against the spread of invasive species and often provide important habitat for rare plant and animal species, support the diversity of native species, and provide opportunities for monitoring and research. For a more complete description of the background of the proposal, see Chapter 1, Purpose of and Need for Action, in the FEIS.

Annual timber offer volumes under the proposed action (Proposed Idaho Roadless Rule) are estimated to average 5.84 million board feet (MMBF) annually as a result of direction contained in the 5 management themes within inventoried roadless areas. This compares to estimated offer volumes of 3 MMBF for the 2001 Roadless Rule, 13.36 MMBF for Existing Forest Plans, and 5.04 MMBF for the Modified Idaho Roadless Rule.

Approximately 1.44 million acres of inventoried roadless acres are estimated at risk of serious insect and disease caused mortality. This is approximately 15 percent of the inventoried roadless acres in Idaho. This compares to an estimate of approximately 3.5 million acres at risk state-wide.

Noxious weed species have been inventoried on over 42 thousand acres of the State's Inventoried roadless areas, or approximately 0.5 percent of total roadless acres. Not all of the acres in Inventoried roadless areas have been inventoried. For NFS lands within the State of Idaho, approximately 333 thousand acres of noxious weeds have been inventoried.

Climate change is an important issue globally, nationally and regionally. Idaho's forests are an important source of carbon storage. Global climate changes have the potential to change the amounts of stored and released carbon, as well as other factors relating to forest communities and plant species, such as fire frequency and forest health. The actual magnitude of effects is currently uncertain.

Changes Between Draft and Final

- Based on public comment, additional information is provided about silvicultural practices, including timber harvest and its effect on forest health concerns; and the relationship of silvicultural practices to insects, disease, and fuel management.
- Old-growth definitions were revised to provide clarity and to align with regional Forest Service definitions – see Glossary.

- Inventory information for noxious weeds was updated in response to comments on the draft Environmental Impact Statement (EIS). This information is contained in the Noxious Weeds Affected Environment section.
- The climate change effects analysis was supplemented to include the effects of carbon dioxide emissions by alternative, including potential mineral development. Additional literature citations representing current research studies on this issue are provided in support of this analysis.
- Additional effects analysis for timber harvest, forest health, noxious weeds, and climate change was completed for alternative 4, the Modified Idaho Roadless Rule. The Modified Rule uses additional assumptions.
- Factual errors for timber harvest and road building projections for the 2001 Roadless Rule were corrected. The Proposed Rule and Modified Rule were updated based on this information. All assumptions were reviewed and adjusted for clarity if needed.

Introduction

Methodology and Information Used

Forest Vegetation

The Forest Inventory and Assessment (FIA) data base (Miles, 2007) was used to estimate the extant of forest cover types, and to display forest attributes, including volumes, size class, growth and mortality. This information was used at both the state and national forest scales. The most recent FIA inventory reflects FIA plot measurements on over 700 plots from 2004 and 2005, or 20 percent of the total plot grid. This information is updated annually; values for these attributes will change as additional plots are surveyed (10 percent plots inventoried yearly). While the current inventory is not complete, it does reflect general forest attributes that are usable for general context at the state and national forest land ownership scale.

FIA Cover Type Map was used to approximate the distribution of forest types in the inventoried roadless areas of the state (Ruefenacht et al, 2007). This information was used, in lieu of the inventory, because the inventory is not sufficient at this time to accurately reflect the existing cover types within these areas. As the inventory measures additional plots, this information will become more reliable.

The existing vegetation was used in conjunction with the forest health information to provide context and projections of risks from insect and disease agents that affect various tree species that constitute forest types.

Timber Harvest and Cutting

Timber cutting is defined here as any cutting of any trees for management purposes. Timber harvest is defined as the removal of trees for wood fiber use and other multiple-use purposes (Forest Service, 2006a). Timber cutting is the broader term, and encompasses timber harvest. Timber cutting, exclusive of timber harvest, could be used to support activities such as prescribe burning and timber stand improvement. However, due to the cost of these activities and public controversy within inventoried roadless areas, such cutting is projected to be limited.

Effects on national forest timber harvest in Idaho were compiled and evaluated using volume data provided by the national forests. The combination of volume harvested between 2001-2006, and projected to be harvested between 2007-2011, was used to estimate effects of timber harvest on roadless lands.

Forest Service Cut and Sold volume reports were used for the State of Idaho, 2002-2006. The Timber Information Management database (Intermountain Region) and Timber Program Statistics (Northern Region) was used for sale information. This data was used to compare the alternatives to the percentage of volume and acres cut.

Forest Health

Forest health effects analysis relied on forest insect and disease risk mapping data compiled and assessed by the Washington Office Forest Health Protection Staff. For this analysis, the 2006 version was used. A coarse, state and national forest ownership assessment of the effects of disease and insect high-risk areas within inventoried roadless areas on the national forests was completed using GIS overlay results provided by the Washington Office Remote Sensing and Application Center.

Additional information was summarized from annual forest health highlights from 2004 to 2006 for the state of Idaho. This information is published by the Intermountain and Northern Region Forest Health Protection Unit, in cooperation with the Interior West Forest Inventory and Assessment office of the Rocky Mountain Research Station. These results reflect the annual aerial detection flights for 2002-2003, and 2005-2006.

Noxious Weeds

The USDA Forest Service Natural Resource Information system (NRIS) database was used to display and analyze the noxious weed infestations within the inventoried roadless areas. Information was provided at national forest scale and inventoried roadless areas for context. This inventory is based upon reported noxious weed occurrences by the national forests in Idaho.

Carbon storage and Climate Change

A literature review was conducted to provide recent information related to global climate change and carbon storage. Washington Office draft NEPA guidance on addressing climate change was used to inform the analysis.

Assumptions

Forest Vegetation

The FIA Data base (Miles, 2007), is adequate to provide broad-scale inventory information for context at both the state and national forest ownership scale.

The FIA cover type map is adequate to provide estimated distribution and percentage of forest types within the inventoried roadless areas.

Forest Health

Forest health risk map is adequate to describe broad-scale conditions of Idaho's forests, and provides the best information available for forest health conditions across the state and national forests and inventoried roadless areas.

Insect and disease detection flights provide adequate context on past and current damages for selected forest cover types at the state scale.

Timber Harvest and Cutting

Table 1. Projected timber cutting by alternative

Projected timber cutting	2001 Roadless Rule	Existing Plans	Proposed Rule	Modified Rule
timber harvest yearly average (MMBF)	3	13.36	5.83	5.04
timber harvest yearly average (acres)	600	2,700	1,200	1,000

All alternatives:

- Vegetation management practices use many techniques to meet management objectives. Techniques may include:
  - Timber cutting[1], including silvicultural treatments to improve forest health, as well as timber harvest[2].
  - Slashing and cutting of vegetation, including the limbing of trees to break the laddering effect of fuels.
  - Prescribed burns and wildland fire use.
- Combinations of techniques may be used, where permitted by alternative and theme direction, to address management objectives.
- Any timber cutting under any alternative would be designed based on applicable forest plan components (for example, management direction that provides for protection of riparian areas or habitat needs for species).
- Future timber harvest done within Idaho Roadless Areas would focus on protecting at-risk communities and municipal water supply systems from adverse effects of wildland fire.
- Budgets would continue to be flat. Primary focus for the foreseeable future is responding to fire risk.
- The volume of timber harvested between 2001 and 2006 and projected to be harvested between 2007 and 2011 provides a reasonable basis for projecting the amount of trees to be cut under each alternative.

[1] Timber cutting is the overarching term for the cutting of any tree, whether or not is has commercial value.
[2] Timber harvest refers to the volume of trees with commercial value that are cut and removed from the forest.

Road Construction/Reconstruction

Table 2. Projected road construction/reconstruction; yearly average by alternative

Projected road construction/ reconstruction activities; yearly average	2001 Roadless Rule	Existing Plans	Proposed Rule	Modified Rule
Permanent - other	0.8	0.8	0.8	0.8
Temporary - other	0.2	0.2	0.2	0.2
Reconstruction - other	0.0	0.0	0.0	0.0
Total	1.0	1.0	1.0	1.0
Permanent – timber	0	4	0.0	0.0
Temporary – timber	0	2	1.5	1.2
Reconstruction - timber	0	5	1.5	1.1
Total	0	11	3	2.3
Grand Total	1	12	4	3.3

All Alternatives:

- Historic trends for developing inventoried roadless areas established over the past 20 years, under Existing Forest Plans would continue into this century. Currently, it is estimated that in areas allowing road development, less than 5 percent has been roaded. This represents less than 1 percent of the total roadless acres.
- High geothermal potential in the inventoried roadless areas would see limited road development within the planning horizon due to the availability of geothermal potential in more accessible areas.
- Roads developed to support timber harvest would generally be closed after the entry. Temporary roads constructed for timber harvest would be decommissioned as part of the contract package.
- Any road construction / reconstruction under any alternative would be designed based on applicable forest plan standards and guidelines.
- Road numbers for other activities are for actions such as access to rights-of way, locatable minerals and phosphates. They may also include an incidental amount for recreation or other needs.

Noxious Weeds

Noxious weeds are correlated to site disturbances that produce bare mineral soil, including activities associated with timber cutting, prescribe fire, road construction / reconstruction, and mineral activities.

Appropriate noxious weed strategies and treatments, as authorized by individual Forest's NEPA decision document, are used to control noxious weed infestations when such activities occur.

Carbon Storage and Climate Change

Climate change is currently occurring and will continue into the future.

Uncertainty in the magnitude, rapidity, and landscape effects are recognized concerning climate change.

Affected Environment

Over 21.4 million acres of the total Idaho land area consists of forest land, which is land that is at least 10 percent stocked, or formerly having such cover, by forest trees of any size and not currently developed for non-forest use. These forests vary from the very dry pinyon-Juniper woodlands to cold alpine forest types at high elevations. Approximately 76 percent of the forest land in Idaho is administered by national forests. Table 3 displays the approximate forest type acreage in the state and within national forests in Idaho.

Table 3. Forest Cover Types for State of Idaho and National Forests in thousand of acres[1]

Forest Type	State	National Forest
Pinyon/Juniper	739	143
Douglas-fir	6,543	5,296
Ponderosa pine	1,539	1,076
Spruce-fir[2]	3,826	3,426
Lodgepole pine	2,273	2,095
Grand fir/Cedar/hemlock[3]	3,182	1,792
Western larch	167	100
Other Softwoods	473	458
Aspen/Birch/Cottonwood	862	541
Other Hardwoods	207	106
Nonstocked	1,621	1,348

[1] *Forest Inventory Analysis data base (Miles 2007)*

[2] *Includes mountain hemlock*

[3] *Includes western white pine*

The predominant forest types in the state are Douglas-fir (31 percent), Spruce-fir (18 percent), Grand fir / Cedar / hemlock (15 percent), and lodgepole pine (11 percent). The tree species found in these forests are generally similar to those that would have existed prior to European settlement, however, extant of individual forest types and species has changed substantially in some areas. Examples of forest types that have increased from historic conditions include Douglas-fir and the moist grand fir and hemlock forests of north Idaho. Those forests that have reduced acreage compared to historic conditions include ponderosa pine, western larch, western white pine, whitebark pine. Douglas-fir has been reduced in coverage in the Central Idaho Mountains, and aspen has had steep declines in Eastern Idaho (Quigley, 1997, pages 629, 888, 890 & 892). Wildfire suppression, introduced exotic diseases (i.e. white pine blister rust), and past harvesting practices all contributed to these shifts in cover type amounts.

Acres of forest cover types from the forest inventory for roadless areas are not currently available However, a cover type map, modeled from the inventory data, is available. The cover type map appears to overestimate certain cover types (e.g. Douglas-fir).

Noting this difference, the inventoried roadless area cover type abundance is approximately 40 percent Douglas-fir, 20 percent spruce-fir, and lodgepole at 8 percent. All other forest types are less than 5 percent each. The non-forest types within the inventoried roadless areas are estimated to be 18 percent, including other vegetation types (grasslands, shrublands, meadows, etc.), and barren areas (rock, ice, etc.)

Approximately 16.2 million acres of forest land in Idaho are considered timberlands, or those non-reserved lands (not withdrawn from timber production by statue or regulation) that are capable of growing 20 cubic feet per acre per year or more of wood. The most recent inventory for the state (2004-2005)[6] estimates net volume of sawtimber trees at 189 billion board feet, an average annual net growth of over 4 billion board feet, with average annual mortality of 1.7 billion board feet over the same time period. Approximately 80 percent of the net volume, 65 percent of the net growth, and 94 percent of the mortality occurs on national forest lands (Miles, 2007).

Most of Idaho's timberlands are 9 inch average diameter or more (68 percent), with the 5-8.9 inch class (10 percent), and those less than 5 inch diameter stands (17 percent). Non-stocked areas contribute the remaining 5 percent of the size class total. National forest size classes are similar to the state averages (Miles, 2007).

A complete inventory for of old growth forests (also termed late successional forests) is currently not available across all national forest lands in Idaho. These forests form a portion of the acres within the 9 inch and more size class above.

Timber Harvest

From 1947 through the late 1960's, harvest on all forest lands nearly doubled, from 950 million to 1.8 billion board feet. National Forest system (NFS) lands were the primary contributor to the increase, quadrupling harvest from 250 million to over 1 billion board feet in 1969. During this time, the harvest from national forests increased from less than 30 percent of the total harvest in the 1960's to 60 percent in the late 1960's. Timber harvest peaked in Idaho in 1976 at 1.9 billion board feet. At the same time, harvest from national forests declined slightly, the difference came mostly from private timberlands. National forest harvests contributed 50 percent of the total harvest at that time (Morgan et. al, 2004).

The 1980's saw a sharp decline in total harvest, as the timber industry went into depression. By the late 1980's harvest had recovered to an average level of 1.635 billion board feet, but national forest contributions had been reduced to 45 percent. Harvest from private lands increased to 45 percent, other public lands to 10 percent (Morgan et. al, 2004).

The volume of timber on all forest lands in Idaho has declined since the early 1990's and has continued since 2002, when the latest state-wide data was available. During this period, national forest timber harvest levels declined to only 7 percent of the total harvest within the state, or approximately 73 million board feet. The proportion of the private lands contribution continued to increase to 72 percent of the total harvest by

[6] 2nd measurement of 10 year annualized cycle. 10 percent of the states plots are inventoried each year. Currently, over 740 plots have been measured.

2001. The remainder of the harvest was from other public lands (Idaho Department of Lands and Bureau of Land Management) for about 21 percent of the total harvest (Morgan et. al, 2004). Figure 1 displays harvest trends in Idaho from 1949 to 2001 (from Morgan et. al, 2004).

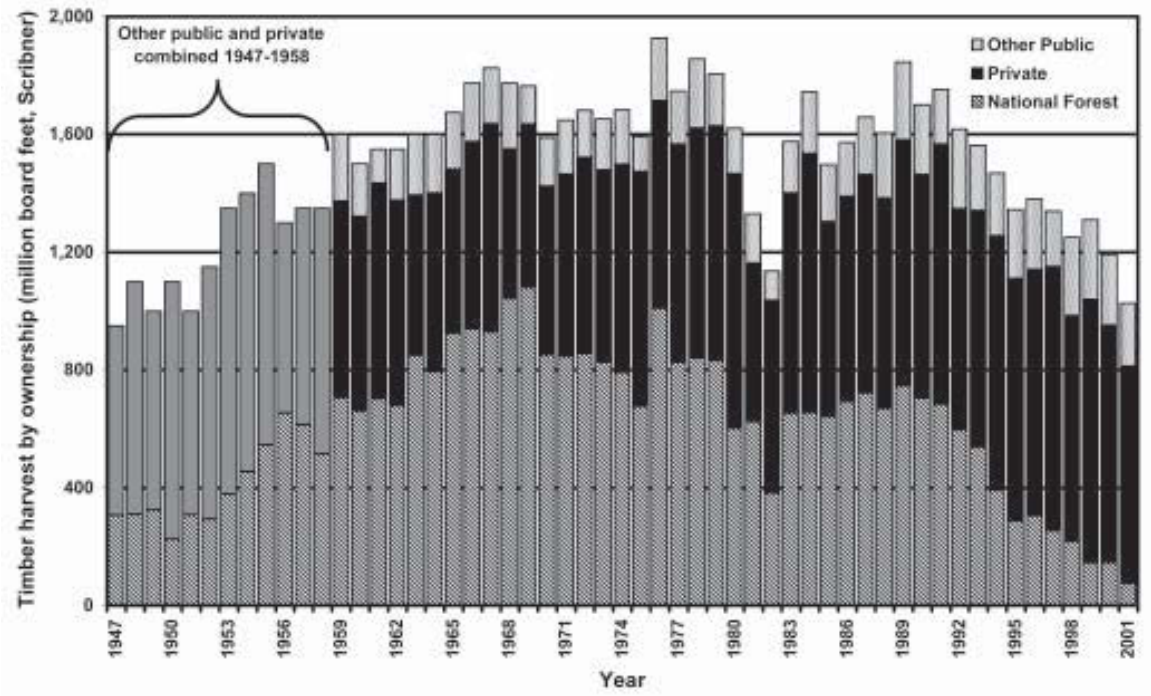

Figure 1. Timber harvest by ownership; by year

National forest harvests have been fairly consistent for the period of 2002 to 2006, averaging 122 million board feet per year (USDA Forest Service, Intermountain and Northern Region Cut and Sold Reports, 2002-2006), occurring on average 9,928 acres per year (USDA Forest Service, Intermountain and Northern Region data bases, 2002-2006).

Approximately 16.2 million acres of forest land in Idaho are considered timberlands, or those non-reserved lands (not withdrawn from timber production) that are capable of growing 20 cubic feet per acre per year or more of wood. The Forest Service manages approximately 12 million acres of timberland within the state (74 percent of the state total). The most recent inventory for the state (2004-2005) estimates net volume of sawtimber trees at 189 billion board feet, an average annual net growth of over 4 billion board feet, with average annual mortality of 1.7 billion board feet over the same time period. Approximately 88 percent of the mortality occurs on national forest lands (Miles, 2007).

Not all timberlands within National Forests are considered suitable for timber production. Lands that are suitable for timber production are those that are capable of reforestation within 5 years of harvest, able to be harvested without irretrievable damage to soils or watershed, and are not in an area reserved by Congress or otherwise determined to be unavailable for timber production. Responsible officials may establish timber production as a multiple-use land management plan objective for lands where costs of timber production are justified by the ecological, social, or economic benefits.

The allowable sale quantity (ASQ) is the quantity of timber that may be sold from a national forest as determined by the forest land management plan during the period specified by the plan. It is usually expressed as an average annual volume which may be sold from the forest's suitable (for timber production) land base. Timber may be sold from lands that are not identified as suitable for timber production in the land management plan if necessary to achieve desired vegetation conditions; however, this volume is generally not included within the ASQ.

As land management plans have been revised, a trend of substantial decreases in ASQ has been appearing. Table 4 summarizes this information for forests in Idaho that have revised land management plans as of 2007. The Clearwater, Idaho Panhandle and Nez Perce are currently revising their plans. Planned timber harvest volumes from these forests are likely to decrease from the original plans also. As land suitable for timber production and timber harvest limitation volumes continue to decrease, it is likely that timber harvest volume from non-suitable lands will increase to meet fuel reduction and other non-timber vegetation management objectives of land management plans.

Table 4. Changes in allowable sale quantity (ASQ) in recent land management plan revisions.

Region	Forest	Year plan revised	Previous ASQ (MMBF [4])	New ASQ (MMBF)	Reductions (%)
Intermountain	Targhee	1997	86	8	-91
	Boise	2003	85	45	-47
	Payette	2003	60	32.5	-46
	Sawtooth	2003	15.7	6	-62
	Caribou	2003	6	2.8	-53

[4] *Million board feet*

(Data from Boise, Caribou, Payette, Sawtooth and Targhee Forest Plans)

Estimates of expected timber offer and harvest quantities are provided in the Environmental Consequences section as effects described under each alternative.

National Forest Timber Harvest – Timber harvest is the process by which trees with commercial value are cut and removed from the forest (USDA Forest Service 2006a). Timber sale refers to a contractual process of selling the timber to a purchaser and implementing a series of harvesting requirements for what type, how and when the trees are removed. For purposes of this analysis, these terms are used interchangeably.

Timber sales are often used as a least-cost method (revenue is returned to the Federal treasury to offset the costs of preparing and carrying out the timber harvest) of managing vegetation to meet resource objectives or to achieve desired ecosystem conditions. These objectives or desired conditions include improving wildlife habitats, reducing fuels that may increase fire risk, recovering timber value from natural disasters, such as windstorm or fire, reducing impact of insect and disease, and improving tree growth in addition to producing timber from the national forests.

Roads are required to support a timber sale, and frequently they must be constructed or reconstructed to meet timber harvest or other resource management objectives. Roads are needed to move equipment into the area and to haul logs or other forest products to the community where they will be processed. While timber can be harvested using helicopters or cable yarding systems from existing roads, the use of these methods

depends on the value of the timber being removed, the terrain, and the distance to an existing road. Each timber sale contract specifies the yarding method and any permanent or temporary road construction and reconstruction required.

Timber purchasers may be required to complete needed road reconstruction to ensure public safety and to mitigate the damage to the environment from logging traffic. When the Forest Service determines that roads are needed for other multiple-use activities, the roads are constructed to meet appropriate road specifications and retained for future use after the timber sale. By law (16 USC 1608 (b)), temporary roads are used only for the duration of the timber sale and then closed, decommissioned or converted to a classified road. Even helicopter sales may require some classified road construction, reconstruction, or temporary road construction to access landings for hauling logs (USDA Forest Service 2000 and 2000d).

Road spacing and distance from the nearest road have a direct effect on yarding costs of wood fiber. As the road spacing or distance from the nearest road increases, so does the average yarding distance for a given harvest unit. This affects turn speeds and production rates which affect yarding costs. Frequently, the edge of a harvest unit furthest from the road reflects the maximum external yarding distance. External yarding distance dictates the size class of the yarding equipment needed to retrieve the material. This in turn determines the road width needed for that size equipment. Generally, wider road spacing means longer yarding distances, which requires larger yarders and wider road widths. The location of a road is particularly important in an area planned for cable logging. Roads located at the break (where the side slope changes from gentle to steep) provide better cable deflection, which results in larger payloads and less ground disturbance (USDA Forest Service 1999b).

The trend in silvicultural practices is shifting away from traditional even-aged management to even-aged management with leave trees, two-aged management, and uneven-aged managed stands. This is primarily due to public controversy and management concerns about non-timber resources. These multi-story and multi-age stands often require thinning and other silvicultural treatments with greater frequency, thus needing road access more often. Thinning to remove excessive forest fuels, before using prescribed fire, or to treat diseased or insect infested stands is often economically feasible only if a road system is present (USDA Forest Service 1999b). From 2002 to 2006, clearcutting on Idaho's national forests accounted for only 7 percent of the total cutting method used on the 49.6 thousand acres harvested (USDA Forest Service, Intermountain & Northern Region data bases, 2007). This level is expected to continue into the future.

Forest Health - Insects and Disease

Insect and disease populations can fluctuate base upon a number of circumstances, including warm and dry weather conditions, low vigor trees due to overcrowding, and trees damaged by fires. Frequently, several factors combine to weaken trees and increase their risk to insect and disease damage.

All forest trees in Idaho are subject to certain insect and disease agents. Most are native, with the exception of white pine blister rust, an introduced exotic. Insects and disease conditions become a forest health concern when they operate outside of their historical references, usually in response to changes in the forest composition and structure.

Insects and disease require suitable hosts (e.g. tree species, size, forest structure) to successfully attack and damage trees. Climate and weather conditions can trigger or exacerbate outbreaks and intensify mortality. Because insects and disease require certain forest types and conditions to operate successfully, usually a landscape with appropriate tree species, of varying age and structure, are considered more resilient to large-scale outbreaks and mortality. Management options vary by agent, but usually include silvicultural options (thinning to reduce density, establishment of non-host trees, change in stand structure), preventative controls (e.g. tree spraying) or suppression activities.

Risk Mapping - In 1996, the Forest Service initiated a mapping effort to evaluate forest health risk on all forested lands in the United States. A geographic information system database was created that displays NFS lands most at risk of mortality from insects and diseases. It is used in combination with fire regime condition class layer (see fire / fuels report) to help set priorities at the national scale for addressing forest health problems (Lewis 2000). The forest health composite map was updated using the 2006 insect and disease risk map (USDA Forest Service, 2007h). The 2006 risk map is used in this report (USDA Forest Service 2007h). Methods and results and discussion of the effort are contained in Krist et al., 2007.

Approximately 3.5 million acres of forestland in Idaho are estimated to be at risk to serious insect and disease mortality. About 3.2 million of those acres occur on national forests. The most recent estimates include over 1.44 million acres within roadless areas where 25 percent or more tree mortality can be expected over the next 15 years. It should be noted that the predicted risk for the NFS lands outside of roadless and the Idaho Roadless Areas are approximately the same, from 16 percent to 19 percent, respectively. The forest cover types described earlier in this document are susceptible to a suite of insects and diseases. The forest types most susceptible to damage by insect and / or disease agent include (USDA Forest Service 2004, 2005, 2006b):

Douglas-fir Cover Type – Forests composed of Douglas-fir are subject to a wide variety of damaging agents that may cause extensive damage. In north Idaho (north of the Salmon River), Douglas-fir is very susceptible to mortality from root disease. Douglas-fir bark beetle often interacts with disease, fire and low vigor trees to increase populations. During outbreaks, the bark beetle can cause substantial mortality on the landscape, particularly in larger diameter trees, even those appearing to be healthy. Recent outbreaks have been associated with wildfires, particularly after the severe wildfires of 2000. Recent estimates indicate that populations are declining due to moist conditions that returned in 2005. However, because of the large amount of Douglas-fir cover type and stand structures susceptible to the beetle, risk of future outbreaks remains. Western spruce budworm can create heavily defoliation, and repeated infestations create mortality. Forests south of the Salmon River are currently experiencing increasing budworm infestations.

Lodgepole Pine Cover Type – The mountain pine beetle continues to be the most damaging bark beetle in Idaho. Lodgepole pine forests are particularly susceptible when trees reach an average diameter of 8 inches, 80 years old and relatively high densities. Mortality levels have exceeded 2.5 million trees as recently as 2002. Recent estimates indicate lower mortality figures, and in some areas the beetle populations may be decreasing as suitable host trees become limited.

Whitebark Pine Cover Type – although this cover type is restricted to cold environments in Idaho, limiting its extant, whitebark pine is an important species ecologically. Recently, the combination of mountain pine beetle infestations and white pine blister rust has created substantial mortality in larger diameter, cone bearing trees. Recent surveys in North Idaho have inventoried blister rust infection rates of up to 90 percent in regeneration as well.

Grand Fir Cover Type – Grand fir forests have been experiencing increased infestations by western spruce budworm. The fir engraver bark beetle has recently declined in population, but as recently as 2002 and 2003 surveys was estimated to have killed between 120,000 to 130,000 trees in Idaho. Much of this mortality was in Grand fir forests.

Subalpine Fir Cover Types – Western spruce budworm, fir engraver and western balsam bark beetle are considered threats to subalpine fir trees. Older trees are particularly susceptible to mortality. The balsam bark beetle has declined recently with increasing precipitation in the last few years, however, trees affected in 2002 and 2003 averaged approximately 150,000 trees killed within the state. Increasing populations are occurring in southern Idaho.

Aspen decline – A single causal agent for aspen mortality have not been identified. Rather, a combination of disease, insects and droughty conditions appear to be responsible.

Table 5 displays the estimated acres infested by principal damaging agent as recorded from aerial detection flights, 2002-2003, and 2005-2006.

Table 5. Principal insect and disease damaging agents in Idaho, as recorded from aerial detection flights, affected acres 2002-2006.

Damage Agent	Acres Affected (thousands)			
	2002	2003	2005	2006[1]
Mountain Pine Beetle	339.3	344.4	519.5	307.3
Ips Beetle	1.2	3.8	Nd[2]	nd
Western Pine Beetle	8.6	16.7	nd	1
Spruce Beetle	.5	.8	nd	nd
Douglas-fir Beetle	52.8	49.2	47.1	14.3
Fir Engraver	112	152.1	56.8	12.9
Western Balsam Bark Beetle	74.8	99.4	86.5	40.8
Western Spruce Budworm	82.2	160.2	137.3	281
Aspen Decline	nd	nd	9.8	nd

Incomplete data; not all areas were surveyed in Idaho. Underestimates of areas affected
No data collected

Forest Health - Noxious Weeds

Although the exact acreage is unknown, it is estimated that over 8 million acres of Idaho lands are severely infested by one of the state designated weeds in 1999 (IDSA, 1999). Currently, there are 57 listed noxious weed species in the state of Idaho. Noxious weeds can influence ecosystem health in several ways. Noxious weeds contribute to declining native plant communities by (USDA Forest Service, 2000):

- Decline in aquatic-riparian and terrestrial habitat for wildlife;
- Reduction in forage for grazing;
- Potentially increasing water runoff, sediment delivery, and soil erosion;
- Potential decline in water quality;
- Reduction in biological diversity;
- Negative impacts in native plants associated with American Indian tribal interests or rights, and;
- Increase costs associated in maintaining quality of recreation.

Noxious weeds become established where suitable environments exist. Frequently, suitable habitats are created by soil disturbance where native vegetation is temporarily removed or reduced and weeds invade the site. Even intact ecosystems without disturbance, such as bunchgrass ecosystems, can be invaded successfully by certain species of noxious weed. Areas such as road cut and fills, mining, timber harvest sites, and gravel pits can serve as long-term vectors that aid the spread of noxious weeds. Noxious weeds can spread through many mechanisms, including motor vehicles, other off-road motorized equipment, wildlife, livestock and humans. Once established, noxious weeds can be very difficult and expensive to control, and almost impossible to eradicate. Chemical, cultural, mechanical and biological control methods are available for control measures, effectiveness depending on the targeted weed species.

Of the estimated 8 million acres of noxious weed infestation in Idaho, about 332,700 acres on NFS lands have been geo-referenced and reported in the USDA Forest Service Natural Resource Information System (NRIS) database (USDA Forest Service, 2008). Major weed species include meadow hawkweed on the north Idaho National Forests, rush skeletonweed in central and southwestern Idaho, and several thistles in southeastern Idaho. Spotted Knapweed occurs on most forests.

Over 42 thousand acres of infested with noxious weeds exist in Idaho Roadless Areas. This is about 0.5 percent of the roadless acres, compared to 2 percent considering all NFS lands. However, it should be noted that not all Idaho Roadless Areas and national forests have been surveyed for noxious weeds and reported to the NRIS database.

Carbon Storage and Climate Change

Evidence that climate is changing is compelling. Ongoing climate change research has been summarized in reports by the United Nations Intergovernmental Panel on Climate Change (www.ipcc.ch). These reports have confirmed that accelerated climate change is

already occurring, that it will accelerate in the future, and that human greenhouse gas emissions, primarily carbon dioxide emissions, are the main source of accelerated climate change. Since vegetation management operations usually involve use of fossil fuels and release of carbon dioxide, and since forests are part of the carbon cycle, this issue is pertinent to the management of Idaho Roadless Areas.

Coniferous forests contain large amounts of carbon, stored as biomass both in the above ground biomass, and soil component (Smith et al. 2004). Forests accumulate carbon through the process of photosynthesis, the conversion of sunlight and water to carbon. Because the majority of forest ownership is on national forest lands in Idaho, national forests are an important source for carbon storage.

Forests in the United States are thought to have been in approximate carbon balance from 1600-1800. A large pulse of carbon release occurred during the 1800's, largely due to utilization of forests (cutting) and land conversions, primarily to agricultural uses. The last century saw a re-growth of forests that were harvested and the re-establishment of forests on abandoned agricultural lands. This resulted net carbon storage, even while intensive harvesting practices were occurring simultaneously. In the west, the effects of fire suppression are thought to been a contributor to this increase (Bridsey et al. 2006). This sequence of events was more prevalent in the east and south United States than the west, including Idaho. Current forest carbon density in Idaho is estimated to range from 36 to 45 tons / acre. Carbon storage is thought to be increasing on Idaho forestlands from 0 to 0.4 tons per acre as recently as 2005 (Woodbury et al. 2007).

Forests that have stand-replacing fire regimes can change amount of carbon released in the atmosphere. Stand replacing fires switch forest ecosystems from a carbon sink to a net source of carbon to the atmosphere as decomposition exceeds photosynthesis. One study in Yellowstone National Park indicated that equilibrium values of carbon storage were resistant to large changes in fire frequency (intervals between fires) because these forests regenerate quickly and the current fire intervals are long. The most rapid changes in carbon storage occur in the first century following fire and carbon storage is similar for stands of different ages. However, modeled conversions of vegetation states from forests to non-forest vegetation could have a large impact on landscape carbon storage, and this process is likely to be important for many forests (Kashian et al. 2006).

Global climate change effects on forest types and species distribution has become an important issue as the warming of the global climate has become indisputable (Thomas et al. 2001; Walher et al. 2002; Parmesan and Yohe 2003; Root et al. 2003). Forest Service research results from one analysis predicted that existing forested ecosystems and their constituent species are projected to change in spatial location, extant, and abundance in the western United States, including Idaho (Rehfeldt et al. 2006).

Exact magnitude and rapidity of climate change is uncertain, especially at finer scales such as landscapes within a forest. General conclusions in the western United States include temperature and precipitation increases, but also high variability in annual precipitation, including severe drought (Fenn et al. 2006). Modeling indicates the importance of the periodicity of precipitation and of the interactions between temperature and precipitation controlling the distribution of plant communities and their species. Finer scale modeling of potential climate change effects on vegetation is needed (Rehfeldt et al. 2006).

Environmental Consequences

See chapter 2 of the FEIS for a description of the alternatives, including the proposed action (Proposed Idaho Roadless Rule).

Timber Harvest and Cutting

2001 Roadless Rule

Under the 2001 Roadless Rule, timber cutting meeting one of the exceptions found at 36 CFR 294.13(b) and not requiring road construction and reconstruction would be used to address forest health improvement objectives (for example, suppressing insect infestations, reducing the spread of disease, or thinning to improve vigor and fuels reduction).

The focus on restoration of habitat and ecosystems would drive harvest prescriptions, and the retention of structure and canopy coverage would be retained in each unit in varying degrees. The result of these prescriptions would be a more natural appearance of the forest types treated with their adjacent plant communities, especially as plant succession occurs over time.

Helicopter yarding would be the principal yarding method under this alternative. Ground base and cable yarding would only occur adjacent to existing roads that do not require reconstruction. Most lands within one-quarter to one-half mile of an existing road would continue to be managed using timber harvest or other methods of treatment where appropriate. However, cost per acre would increase substantially and proportionally with distance of the project from the nearest road. Because of the cost associated with helicopter yarding, combined with the applicable restrictions for timber harvest discussed above, this alternative is projected to have the least average yearly harvest removals of all alternatives considered, projected from 2007-2011, averaging 3 million board feet a year. This amount of harvest volume is 2 percent of the average harvest on all national forest lands that occurred from 2002-2006.

Annual harvest acres are projected to average approximately 600 acres per year or 9,000 acres over 15 years. This is minute fraction of the total inventoried acres, even over the next 15 years. Compared to the average harvest acreage on all national forest lands in Idaho from 2002-2006, this amount is approximately 6 percent of the annual total harvest. Compared to average state-wide harvests (including both private and other public lands), the amount of harvested volume and acres would be the least of all alternatives.

Forest health objectives could be completed using means other than timber sale contracts, but these would require appropriated funds. Because of the lack of road access, timber cutting (exclusive of timber sales) designed to meet forest health objectives is likely to be minimal because of the high cost of treatment and available appropriated funds for such work. Acres treated to meet the objective of limiting unwanted wildfires by timber harvest would most likely be confined to the WUI. The least amount of areas of insect and disease, or overall forest health acres, could be treated through timber harvest with this alternative.

Existing Forest Plans

Timber harvest objectives within inventoried roadless areas are governed by the management prescriptions of Existing Forest Plans. Management prescriptions similar to the General Forest, Rangeland and Grassland (GFRG) theme generally allow areas to be managed for timber production. Road construction / reconstruction is allowed to support timber harvest and cutting, and roadless area characteristics would not have to be maintained. Harvest and timber cutting may be used to address a variety of issues, and there are no restrictions on the type of silvicultural tools available to achieve them. However, it is likely that residual stand structure would be retained commensurate with the objectives to be achieved through harvest and cutting. Both even-aged and uneven-aged management may be used. Intermediate harvests could occur with either system. Prescriptions would not have to maintain roadless characteristics. Since the frequency of harvest would be greatest with this management theme, and the amount of acres allocated under Existing Forest Plans is greatest for this alternative, the result of these prescriptions would be more evident over time on the forest types treated on the landscape.

Management prescriptions similar to the Backcountry / Restoration (Backcountry) theme would be managed similarly and have the same effects as that described for the 2001 Roadless Rule. However, rather than the entire 9.3 million acres of Idaho Roadless Areas managed as Backcountry, approximately 4.4 million acres of the Existing Forest Plans would be under the Backcountry theme.

The Primitive theme restricts timber harvest and cutting similar to Backcountry areas, usually in response to a threat. Since road construction and reconstruction associated with timber is not allowed, and only existing roads can be used, the costs of harvesting or cutting timber is substantially higher than GFRG areas. Furthermore, the objective of providing primitive recreation opportunities and maintaining roadless characteristics, combine with the high costs, would rarely permit harvesting and tree cutting to occur. The evidence of timber harvest would be even less than those associated with the Backcountry theme.

A mix of yarding systems would be used under this alternative. Ground based and cable yarding would mostly be used in the GFRG theme, mostly helicopter in the Backcountry and Primitive themes. This alternative is projected to have an approximate annual average of 13.36 MMBF harvested annually, the most average yearly harvest removals of all the alternatives considered. Road construction and reconstruction associated with timber harvest would average 11 miles yearly, mostly in the GFRG theme. This amount of harvest volume is 11 percent of the average harvest on all national forest lands that occurred from 2002-2006.

Annual harvest acres are projected to average approximately 2,700 acres per year or 40,500 acres over 15 years. This is about 0.4 percent of the total inventoried acres over 15 years. Compared to the average annual harvest acreage on all national forest lands in Idaho from 2002-2006, this amount is approximately 27 percent of the total annual harvest acres. Compared to recent average state-wide harvests (including both private and other public lands), the amount of harvested volume and acres would be the most of all alternatives.

The ability to construct roads with timber harvest within GFRG, and in some areas Backcountry, also reduces the cost of other methods (such as mechanical treatment and vegetation cutting other than timber harvest) that also contributes to meeting forest health objectives. However, road construction still requires the use of appropriated funding that is currently limited for such projects.

Acres treated to meet the objective of limiting uncharacteristic or unwanted wildfires would be more likely to occur both within and outside of the WUI, as necessary to support strategic fuel treatments. More acres that are designed to treat insect and disease problems, and overall forest health, could potentially occur under this alternative.

Proposed Idaho Roadless Rule (Proposed Action)

Under the Proposed Idaho Roadless Rule, the Primitive and Backcountry themes would permit timber cutting to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition and structure; or to reduce the significant risk of wildland fire effects. In the Backcountry theme, roads could be constructed or reconstructed to address these limited forest health components. The principal objective is to protect at-risk communities and municipal water supply systems, as well as to address: (1) areas where wind throw, blowdown, ice storm damage, or the existence or imminent threat of an insect and disease epidemic is significantly threatening ecosystem components or resource values that may contribute to significant risk of wildland fire; and (2) areas where wildland fire poses a threat to, and where natural fire regimes are important for, threatened and endangered species or their habitat.

Fewer acres would be managed under GFRG theme by the Proposed Rule than under the Existing Forest Plans. In the GFRG theme, timber cutting and road construction and reconstruction would be permissible. The areas identified within the GFRG theme would have the most potential to be treated, since all forms of treatment, including both timber harvest and timber cutting are allowed, and supporting road construction / reconstruction can occur. Because this theme permits a full range of silvicultural harvest and cutting methods, the evidence of effects of these activities would be more evident than the other themes. However, since fewer acres are managed under this theme as compared to the Existing Forest Plans, over the landscape as a whole, the evidence of activity is less.

Timber cutting in the Backcountry theme would be done on a limited basis and would be done to retain roadless characteristics and meet specific forest health objectives. Timber cutting in Primitive would rarely be done and would maintain roadless characteristics. Cutting in these areas would be for stewardship purposes (fuels reduction, forest health) and would be light on the land (focusing on what is left behind, not what is removed).

The combination of GFRG Backcountry and Primitive themes (where timber harvest and cutting is allowed under varying circumstances), this alternative is projected to have an approximate annual average of 5.84 MMBF harvested annually. Road construction / reconstruction associated with timber harvest would average 3 miles yearly. This amount of harvest volume is 5 percent of the average annual harvest on all national forest lands that occurred from 2002-2006.

Annual harvest acres are projected to average approximately 1,500 acres per year, or 18,000 acres over 15 years. This is about 0.2 percent of the total inventoried acres over 15 years. Compared to average harvest acreage on all national forest lands in Idaho from 2002-2006, this amount is approximately 15 percent of the annual harvest acres. Compared to recent average state-wide harvests (including both private and other public lands), the amount of harvested volume and acres would be more than the 2001 roadless rule, but less than the other alternatives.

Modified Idaho Roadless Rule (Preferred Alternative)

Under the Modified Idaho Roadless Rule, the Primitive theme would permit timber cutting to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition and structure; or to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply system (see also Fuel Management Specialist Report). Only existing roads or aerial systems may be used. Timber cutting in the Primitive theme would rarely be done and would maintain roadless characteristics.

In the Backcountry theme in the Modified Rule, the Proposed Rule was changed to permit road construction or reconstruction only to facilitate timber harvest within a community protection zone (CPZ). Some roads could be constructed outside the CPZ for activities done to reduce the significant risk of wildland fire to communities and municipal water supply systems. However, these activities are likely to be limited because of the additional conditions that have to be met. Timber cutting methods, other than timber harvest, would likely be used in areas away from existing roads, or outside the CPZ because of the limitations on road construction.

The combination of GFRG, Backcountry and Primitive themes (where timber harvest and cutting is allowed under varying circumstances), this alternative is projected to have an approximate annual average of 5.04 MMBF harvested annually. Based on the management direction, about 2.3 miles of road construction / reconstruction associated with timber harvest are yearly. This amount of harvest volume is 4 percent of the average annual harvest on all national forest lands that occurred from 2002-2006.

Annual harvest acres are projected to average approximately 1,000 acres per year, or 15,000 acres over 15 years. This is about 0.2 percent of the total inventoried acres over 15 years. Compared to average harvest acreage on all national forest lands in Idaho from 2002-2006, this amount is approximately 10 percent of the annual harvest acres. Compared to recent average state-wide harvests (including both private and other public lands), the amount of harvested volume and acres would be more than the 2001 Roadless Rule, but less than the other alternatives.

The ability to construct roads with timber harvest in the GFRG theme, and to a very limited degree in the Backcountry theme, also reduces the cost of other methods (such as timber cutting exclusive of timber harvest and mechanical) that may contribute to forest health objectives. However, this would still require the use of appropriated funding that is currently scarce for such projects.

Other Indirect and Cumulative Effects on Timber Harvest

Past and Present-Timber trends - Idaho National Forests contribution to the state's harvest level has declined steeply since the early 1990's. It appears that national forest harvests state-wide have stabilized around 120 million board feet per year in the first-half of this decade.

Suitable lands and ASO – Revised plans in recent years have shown a decreasing trend in both suitable acres and ASO. It is reasonably foreseeable that this trend will continue with the 3 plans currently under revision (Clearwater, Idaho Panhandle and Nez Perce).

Old growth forests[4] (late successional) will be managed as described under individual forest plans on national forest lands in Idaho. This includes all of the inventoried roadless acres. Further, other laws, such as the Healthy Forests Protection Act (HFRA), contain provisions for management of old growth stands, including a review of pertinent scientific information concerning potential treatments. This review would occur when HFRA projects are developed (HFRA, Section 102(e)(2)(3)(4), 2003).

Present Actions – NFS lands contribute approximately 5 percent of the nation's total timber harvest from all ownerships (USDA Forest Service, 2000). In the face of stable or increasing per-capita consumption in the United States, the effect of the shift to ecological sustainability on United States public lands has been to shift the burden and impacts of that consumption to ecosystems somewhere else – to private lands in the United States or to lands of other countries (MacCleery, 1999). This shift has occurred in Idaho as well. Considering the alternatives, the 2001 Roadless Rule will add more burden of this shift, as compared to the Existing Forest Plans, Idaho Roadless Rule and Modified Rule. However, compared to the national and state-wide harvests on all land ownerships, the volume anticipated from roadless areas is very small considering all of the alternatives.

Reasonable Foreseeable Actions – It's reasonably foreseeable that wildfires will continue to occur on NFS lands, including roadless areas. Salvage harvest is frequently a priority for harvest due to both social and economic reasons. The occurrence of such events may shift individual national forests programs to concentrate on the sale and harvest of salvage material. To the extent that this volume occurs, some increase in timber offer volume may occur for several years, likely decreasing in subsequent years as the sale program re-adjusts to the regular planned program.

While national lumber consumption is expected to increase in the future (USDA Forest Service, 1999), the volume harvested on NFS lands in Idaho is not expected to increase substantially to fill this need. Other timber producing lands in Idaho are not likely to increase in the future either, based upon the harvest trends since the early 1990's. This would mean that increase harvests would need to come from a combination of harvest in other areas of the U.S., or imports from other nations.

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[4] Old growth Forest definitions are included in the FEIS glossary, and are from Green et al., 1992 (errata corrected 02/2005; updated 2007) for the Northern Region and Hamilton, 1993 for the Intermountain Region.

Forest Health – Insects and Disease

Silvicultural Practices—General Effects

Silvicultural practices are vegetation management activities that are applied to forests to meet identified management objectives (Smith et al. 1997). Practices may include timber harvest, other mechanical treatments (such as timber cutting for thinning, slashing, and pruning); fuel reduction activities (both mechanical and prescribed burning); and reforestation activities (such as site preparation and planting). Silvicultural practices are planned as a sequence of treatments to address site-specific management objectives, including forest health.

Silvicultural practices can influence successional pathways that affect forest health by reducing the density of overcrowded forests, promoting insect- and disease-resistant tree species, modifying canopy structure, and selecting for vigorous individuals for large tree development. Silvicultural practices may also influence fire behavior through modifications of fuel characteristics within a stand (including live and dead ground and aerial fuels, canopy density and base height of crown canopy, and retention and promotion of large, fire resistant trees). Many times several objectives can be addressed simultaneously, and a sequence of treatments can be developed to address multiple objectives.

A sequence of practices is planned through the development of a silvicultural prescription. Prescriptions determine the treatment need(s) and define the frequency, intensity, and specifications of treatments in a logical order to satisfy defined objectives. Silvicultural prescriptions—since they are objectively driven based upon inherent site capabilities, existing condition, and measurable management objectives—are completed for specifically defined areas of the forest that are being analyzed for treatment during project development.

This section addresses general silvicultural practices, including timber harvest and other vegetation management activities that are considered effective to address forest health issues, including insect and disease agents and unwanted wildfire behavior. This reflects the large body of literature that addresses this topic (Agee 2007, Baumgartner and Mitchell 1984, Fettig et al. 2007, Graham et al. 1999, Graham et al. 2004, Jain and Graham 2007, Johnson et al. 2007, Kalabokidis and Omni 1998, Peterson et al. 2005, Pollet and Omni 2002, Skinner et al. 2004, Scott and Reinhardt 2007, USDA Forest Service 2008b). Also, Forest Service Forest Health Protection evaluations and reports are conducted and evaluation reports are available for site-specific information to land managers (USDA Forest Service 2008c). No attempt is made to address every possible combination of site factors and biotic agents that can occur in Idaho roadless forests and that influence forest health. Those conditions, because of reasons provided above, must be addressed during project development.

All Alternatives

Timber cutting. Timber cutting is defined here as any cutting of any trees for management purposes. Timber harvest is the process by which trees with commercial value are cut and removed from the forest to meet management objectives. Timber sale refers to a contractual process of selling the timber to a purchaser and implementing a

series of harvesting requirements for what type, and how and when the trees are removed as specified by the Forest Service.

Timber cutting is a broad term and includes timber harvest (removal of commercial products) as well as other actions that result in the cutting of a tree with no removal of a commercial product, such as slashing, chipping, mulching, precommercial thinning, or personal use firewood. Timber cutting could be used to support activities such as trail maintenance, prescribed burning, and timber stand improvement. However, because of the cost of these activities, such cutting is projected to be limited.

Timber sales are often used as a least-cost method (revenue is returned to the Federal treasury to offset the costs of preparing and carrying out the timber harvest) of managing vegetation to meet resource objectives or to achieve desired ecosystem conditions. These objectives or desired conditions include improving wildlife habitats, reducing fuels that may increase fire risk, recovering timber value from natural disasters such as windstorm or fire, reducing impact of insects and disease, and improving tree growth in addition to producing timber from the national forests.

Prescribed burning. Prescribed burning is another tool that may be used to reduce insects and disease and address general forest health concerns. However, prescribed burning often cannot be done without removal of some of the ladder fuels through thinning or limbing the lower branches, particularly in those forests that are overly dense. If some of the biomass is not removed it may be difficult to control the prescribed burns, or the burns may burn too hot. None of the alternatives would preclude the use of prescribed burning.

2001 Roadless Rule

Under the 2001 Roadless Rule, timber cutting meeting one of the exceptions found at 36 CFR 294.13(b) and not requiring road construction and reconstruction would be used to address forest health improvement objectives (for example, suppressing insect infestations, reducing the spread of disease, or thinning to improve vigor and fuels reduction).

Fewer acres of forest health treatment would be accomplished under this alternative (compared to the Existing Forest Plans and Proposed Idaho Roadless Rule and Modified Rule) through timber harvest because treatment cost per acre would be substantially higher due to the road construction prohibition and lower timber harvest acreage projections. About 9,000 acres are projected to be treated over the next 15 years.

Forest health objectives would have to be completed using other means than timber sale contracts, which would require appropriated funds. However, due to the lack of access, timber cutting (exclusive of timber sales) that are designed to meet forest health objectives are likely to be minimal because of lack of access and the associated high cost of treatment, and general over-all constraint on appropriated funds available for such work. Almost all the 1.44 million acres identified to incur more than 25 percent mortality loss over the next 15 years would remain untreated (table 6). These areas would continue to decline in forest health and would become less resilient to large-scale outbreaks.

Table 6. Acres at high risk of insect and disease by alternative

	Wild Land Recreation	Primitive	Backcountry	GFRG	FPSA	SAHTS
2001 Roadless Rule	0	0	1,444,300	0	0	0
Existing Plans	177,400	274,000	755,800	187,500	49,600	0
Proposed Rule	193,700	224,700	939,400	25,600	49,600	11,200
Modified Rule	213,900	253,000	877,000*	39,600	49,600	11,200

Existing Forest Plans

Under this alternative, timber harvest and road construction / reconstruction would be used, consistent with forest plan direction, to treat a portion of the high priority forest health improvement objectives (e.g., suppressing insect infestations, reducing the spread of disease, thinning to improve vigor, and fuels reduction) in management prescriptions similar to the GFRG and Backcountry themes. Most acres of forest health treatment would be accomplished under this alternative (compared to the 2001 Roadless Rule, Proposed Rule and Modified Rule) because more acres are in the GFRG theme than the Proposed Rule and Modified Rule, and road construction reduces the cost of treatment as compared to the other themes that do not allow roads.

Of the 1.44 million acres at risk to insect and disease mortality, approximately187,500 acres are within the GFRG theme and 755,800 acres are in the Backcountry theme (table 6). This provides more opportunities to treat high priority insect and disease areas through timber harvest, since up to 40,500 acres are projected to be harvested under this alternative over the next 15 years. Most of the timber cutting on these acres would be to done to improve forest health conditions and treat hazardous fuels.

The ability to construct roads with timber harvest within GFRG theme, and in some areas in the Backcountry theme, also reduces the cost of other methods (e.g. timber cutting exclusive of timber harvest and mechanical) that may contribute to forest health objectives. However, this would still require the use of appropriated funding that is currently scarce for such projects.

It is unlikely that any substantial impact would occur on forest health conditions over the short-term. However, over the longer-term, considering the amount of GFRG and Backcountry lands projected for timber harvest, this alternative is likely to be the most effective in addressing forest health concerns in the roadless areas.

Proposed Idaho Roadless Rule (Proposed Action)

Under this alternative, the GFRG, Backcountry and Primitive management themes would permit, in descending order of frequency, some level of timber cutting that could treat a portion of the acres identified as high risk to insect and disease mortality.

The areas identified within the GFRG theme would likely have the most potential to be treated, since both timber harvest and timber cutting are allowed, and road construction / reconstruction can occur. More acres of forest health treatment would be accomplished under this alternative than the 2001 Roadless Rule, and Modified Rule, but less than Existing Forest Plans). Timber cutting in the Backcountry theme would be

done on a limited basis and would be done to retain roadless characteristics and meet specific forest health objectives. Timber cutting in Primitive would rarely be done and would maintain roadless characteristics. Cutting in these areas would be for stewardship purposes (fuels reduction, forest health) and would be light on the land (focusing on what is left behind, not what is removed). Timber cutting is projected to occur on about 18,000 acres over the next 15 years.

Of the 1.44 million acres at risk to insect and disease mortality, approximately 26,500 acres are within the GFRG theme and 939,400 acres are in the Backcountry theme. This provides some opportunities to treat high priority insect and disease areas through timber harvest, since up to 18,000 acres are projected to be harvested under this alternative over a 15 year period, most of which would occur in the GFRG theme and some in the Backcountry theme.

The ability to construct roads with timber harvest in GFRG, and to a limited degree in the Backcountry theme also reduces the cost of other methods (e.g. timber cutting exclusive of timber harvest and mechanical) that may contribute to forest health objectives. However, this would still require the use of appropriated funding that is currently scarce for such projects.

It is unlikely that any substantial impact would occur on forest health conditions over the short-term (next 5 years). However, over the longer-term (15 years), considering the amount of GFRG and Backcountry lands projected for timber harvest, this alternative is likely to be the more effective in addressing forest health concerns in the roadless areas than the 2001 Roadless Rule and Modified Rule, but less than the Existing Forest Plans.

Modified Idaho Roadless Rule (Preferred Alternative)

Under the Modified Idaho Roadless Rule, the Primitive theme would permit timber cutting to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition and structure; or to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply system (see Fuel Management Specialist Report). Only existing roads or aerial systems may be used. Timber cutting in the Primitive theme would rarely be done and would maintain roadless characteristics.

In the Backcountry theme in the Modified Rule, the Proposed Rule was changed to permit road construction or reconstruction only to facilitate timber harvest within a community protection zone (CPZ). Some roads could be constructed outside the CPZ for activities done to reduce the significant risk of wildland fire to communities and municipal water supply systems. However, these activities are likely to be limited because of the additional conditions that have to be met. Timber cutting methods, other than timber harvest, would likely be used in areas away from existing roads, or outside the CPZ because of the limitations on road construction. Timber cutting is projected to occur on about 15,000 acres over the next 15 years.

Of the 1.44 million acres at risk to insect and disease mortality, approximately 39,600 acres are within the GFRG theme and 877,000 acres are in the Backcountry theme (table 6). About 56,600 acres are in the Backcountry CPZ. This provides some opportunities to treat high-priority insect and disease areas through timber harvest, since up to 15,000

acres are projected to be harvested under this alternative over a 15-year period, most of which would occur in the GFRG theme and in the CPZ in the Backcountry theme.

The ability to construct roads with timber harvest in the GFRG theme, and to a limited degree in the Backcountry theme, also reduces the cost of other methods (such as timber cutting exclusive of timber harvest and mechanical) that may contribute to forest health objectives. However, this would still require the use of appropriated funding that is currently scarce for such projects.

It is unlikely that any substantial impact would occur on forest health conditions over the short term. However, over the longer term, considering the amount of GFRG and Backcountry lands projected for timber harvest, this alternative is likely to be the more effective in addressing forest health concerns in the roadless areas than the 2001 Roadless Rule, but less than the Existing Forest Plans and Proposed Rule.

Other Indirect and Cumulative Effects on Insects and Disease

Past Actions – The combined incremental effects of wildland fire suppression and reductions in timber harvest from federal lands have led to a change in vegetation structure and species composition and an increasing accumulation of forest fuels over large landscapes of most of the interior West, including inventoried roadless areas (USDA Forest Service 2000). Average annual removal of timber from NFS lands in Idaho from 2002-2006 was approximately 20 percent of estimated growth for 2006 (USDA Forest Service 2007). The primary impacts of past management under all alternatives have been increases in older forested stands susceptible to insect and disease effects.

Present Actions - Due to the past effects, the Forest Service prioritizes for vegetation management stands affected by or susceptible to insect and disease mortality. This priority is tempered by limitations of decreasing budgets and road access. Prohibition of road construction / reconstruction within Idaho Roadless Areas under the 2001 Roadless Rule, and in all themes other than the GFRG theme and to some degree the Backcountry theme for the Existing Plans, Proposed and Modified Rules, would further increase the large proportion of the roadless areas remaining largely inaccessible (because of lack of economic feasibility) to equipment necessary to accomplish vegetation management for forest health objectives.

Some of these lands are unsuitable for timber production; on other lands, road construction is not currently economically feasible. Most lands within one-quarter to one-half mile of an existing road would continue to be managed using timber harvest or other methods of treatment where appropriate. However, cost per acre would increase substantially and proportionally with distance of the project from the nearest road.

Trees inside these economically inaccessible portions of inventoried roadless areas that are killed by insects, disease, windthrow, or fire would deteriorate and add to fuel loading. Wildland fires that subsequently burn these areas may cause severe impacts to soil and water resources because higher concentrations of natural fuels would cause the fire to burn hotter. However, even if road construction / reconstruction in inventoried roadless areas were permitted, it may not be possible to treat many of these acres because of resource concerns and the high cost of road construction (USDA Forest Service, 2000).

Reasonably Foreseeable Future Action - It is reasonably foreseeable that global climate change will have potential effects on fire frequency, severity and forest insect and disease relationships. Increased fire activity has been linked to effects of warming climate, as has certain insect infestations in the western United States and Canada (USDA Forest Service, 2007a). Depending on the magnitude of change, increased risk from insects and diseases could occur in Idaho forests. If this occurs, areas under the GFRG theme are more likely to be treated, whereas Backcountry and Primitive themes are less likely to be treated.

Other Forest Service and other government proposals will continue to affect the Forest Service timber program, and insect and disease occurrence, at the State and Federal levels. Implementation of the Forest Service Forest Service Roads Policy and Travel Management Rule, combined with site-specific projects that decommission old roads, would limit road access to and into roadless areas, making insect and disease treatments more expensive. The emphasis in the National Fire Plan, Healthy Forests Initiative, and Healthy Forests Restoration Act encourage addressing insect and disease issues and provide direction for Forest Service projects; however, none of these policies determine site-specifically where actions should be taken. This environmental analysis used projections based on implementing these policies. It also considered the other cumulative actions described in Appendix N.

Forest Health - Noxious Weeds

All Alternatives

Wildfires are likely to continue in the roadless areas. Wildfires can create suitable habitat for noxious weeds and other invasive plants, especially those in the grasslands, shrublands and dry forest types (e.g. ponderosa pine and some of the Douglas-fir type). This can increase the potential for introductions of noxious weed and invasive plants, in addition to management activities described above.

It is reasonably foreseeable that global climate change will have potential effects on noxious weeds and fire frequency / severity. Increased fire activity has been linked to effects of warming climate (USDA Forest Service, 2007b). Depending on the magnitude of change, increased risk of noxious weed establishment could occur in Idaho forests, since fire temporarily removes native vegetation and can provided suitable conditions for noxious weed establishment, or expansion of existing populations. Additionally, future plant communities may become more or less susceptible to noxious weeds. However, due to the uncertainty of the actual climate conditions that may vary across the state, it is not possible to predict the actual outcomes at this time.

2001 Roadless Rule

Under the 2001 Roadless Rule, road construction / reconstruction is generally prohibited. About 15 miles are projected to be constructed over the next 15 years under the 2001 Roadless Rule, primarily to access existing mineral developments. Based on the general prohibitions and the limited amount of roads that are projected to be constructed in the future in Idaho Roadless Areas, there would be a limited noxious weed to spread under the 2001 Roadless Rule.

Existing Plans

The Existing Plans generally prohibit road construction / reconstruction in management prescriptions similar to Wild Land Recreation and Primitive themes. It is likely there would be minimal of noxious weeds in these areas (about 3.22 million acres).

Under Existing Plans, road construction / reconstruction is allowed in management prescriptions similar to the GFRG theme and in some areas in the Backcountry theme, increasing the likelihood of introducing and spreading road-transported noxious weeds and other invasive species. Survey records (USDA Forest Service 2008) indicate that of the 1,263,200 acres of GFRG, about 5,170 acres currently have noxious weeds. About 180 miles of road construction / reconstruction are projected. It is likely these activities would be dispersed across Idaho Roadless Areas. Noxious weeds and other invasive plants are likely to expand in these areas. Areas within GFRG themes would have the most potential for introduction and spread, followed by Backcountry and then Primitive themes.

Existing Plans permit road construction and reconstruction to access about 13,620 acres[5] of unleased phosphate deposits. In addition, the plans permit in some places—and prohibit in others—access to oil and gas and geothermal resources. Any increase in mineral or geothermal development could potentially increase the introductions of weeds, due both to road access needs and to the disturbance at individual sites themselves. It is anticipated that best management practices, including appropriate weed treatment strategies, would be used to mitigate this potential adverse impact.

Proposed Idaho Roadless Rule (Proposed Action)

The Proposed Idaho Roadless Rule would prohibit road construction / reconstruction in the Wild Land Recreation, Primitive, and Special Areas of Historic and Tribal Significance (SAHTS), except for access to valid existing rights. It is likely there would be no spread of noxious weeds in these areas (about 3.1 million acres). Survey records (USDA Forest Service 2008) indicate that of the 609,600 acres in GFRG about 2,750 acres currently have noxious weeds. Timber harvest and road construction would be allowed in GFRG and to a more limited degree in Backcountry; therefore, these areas have the most potential for weed spread. About 61 miles of road construction / reconstruction over 15 years to support all activities allowed are projected. Areas where roads are constructed would provide disturbed and exposed soil for weeds to expand to. Under the Proposed Rule it is likely there would be minimal increase in weed spread.

The Proposed Rule prohibits road construction / reconstruction to access new mineral lease areas, other than phosphate deposits in all themes except GFRG. Over more than 50 years about 13,190 acres[6] of phosphate deposits could be developed. Any increase in oil and gas or geothermal development could potentially increase the introductions of weeds, due both to road access needs, and the disturbance at individual sites

[5] Based on past history, phosphate mining could occur on an additional 1,910 acres around unleased KPLAs (see Minerals and Energy Specialists Report).
[6] Based on past history, phosphate mining could occur on an additional 1,850 acres around unleased KPLAs (see Minerals and Energy Specialists Report).

themselves. It is anticipated that best management practices, including appropriate weed treatment strategies, would be used to mitigate this potential adverse impact.

Modified Idaho Roadless Rule (Preferred Alternative)

Like the Proposed Rule, the Modified Idaho Roadless Rule would prohibit road construction / reconstruction in the Wild Land Recreation, Primitive, and SAHTS themes, except access to valid existing rights. It is likely there would be minimal spread of noxious weeds in these areas (about 3.25 million acres). In the Modified Rule, the Proposed Rule was changed to focus road construction / reconstruction in the 442,000 acres of CPZ in the Backcountry theme. About 50 miles of road construction / reconstruction over 15 years to support all activities allowed are projected. Survey records (USDA Forest Service 2008) indicate that of the 405,900 acres in GFRG about 3,070 acres currently have noxious weeds.

The Modified Rule prohibits road construction / reconstruction to access oil and gas and geothermal development in all themes. This prohibition would limit the potential increase in the introduction of noxious weeds. Road construction / reconstruction would be permitted to access about 5,770 acres[7] of phosphate deposits in the GFRG theme. It is anticipated that best management practices, including appropriate weed treatment strategies, would be used to mitigate this potential adverse impact.

Other Indirect and Cumulative Effects of Noxious Weeds

Roads are often the primary vectors for noxious weed establishment and spread. Current State and Federal activities and authorities (such as the Idaho Invasive Plan [IDA 2005] and the National Strategy and Implementation Plan for Invasive Species Management [USDA Forest Service 2004a]) address some invasive species and their prevention and spread. Other programmatic policy and management direction can also indirectly influence the ability to construct roads. The Roads Policy and Travel Management Policy can provide information on what roads are needed and unneeded, and which roads would remain open or closed. As noted in the Roads Management Specialist Report, Road Construction / Reconstruction, roads are being decommissioned more than they are being constructed; therefore cumulatively there are fewer roads on the landscape. As roads are decommissioned, fewer roads are constructed and with additional emphasis on noxious weed management and prevention, there would be little cumulative effects from the alternatives.

Carbon Storage and Climate Change

Since the allocations of specific themes by alternative do not mandate or direct to propose or implement any action, there are no direct effects of any of the alternatives on climate change. However, there could be indirect and cumulative effects of the proposed action and alternatives as activities occur pursuant to the rule.

Environmental consequences are presented by two different analyses: (1) estimates of carbon dioxide release effects from management activities based on projected timber

[7] Based on past history, phosphate mining could occur on an additional 810 acres around unleased KPLAs (see Minerals and Energy Specialists Report).

cutting and road building projections and the potential development of mineral leasing by each alternative, and (2) the differences between conservation and active management and its effect on forest vegetation in the context of a changing climate.

Carbon Dioxide Emissions – All Alternatives

Vegetation management activities involve the release of carbon dioxide through the use of fossil fuels during forestry operations when mechanical equipment or prescribe fire is used. Additionally, vegetation not utilized for wood products in a timber harvest operation would release carbon through decomposition, subsequent fuel reduction activities (i.e. burning), or by some other method of disposal after the initial activity is completed. The release of greenhouse gases into the atmosphere will contribute to the global pool of greenhouse gases which are resulting in climate change.

Simultaneously, these activities would also initially reduce the amount of total carbon stored within an activity area because they focus on some level of tree removal to meet management objectives (such as fuel reduction, forest health, etc.). This reduction in carbon storage is directly related to the immediate removal of photosynthetic area available for carbon assimilation. However, when vegetation management activities include commercial timber harvest operations, much of the carbon removed from the activity area would be stored as wood products off-site.

Longer term indirect effects are associated with forest re-growth after a management activity is completed. This involves the re-growth of tree crowns and other forest vegetation removed or reduced in extent during the activity. The amount of time that the vegetation re-establishes to pre-activity levels is a function of the initial condition of the forest prior to treatment, intensity of prescribed treatment, productivity of the particular site and, in the cases of regeneration harvests, how quickly and successfully tree seedlings are established on the site once the harvest has been completed. As forests develop, younger forests absorb more carbon then they release, until which time equilibrium is reached (carbon absorption equals release due to individual tree mortality) in older forests.

The development of minerals and energy resources produces green house gasses through the expenditure of fossil fuels during development and processing. See section Minerals and Energy Specialists Report, for a description of the types of activities associated with leasable and saleable mineral materials; and Appendix I of the FEIS for a scenario for geothermal development.

2001 Roadless Rule (No Action)

This alternative would release the least emissions due to vegetation management and potential mineral development activities, based upon the projections of limited timber harvest for this alternative and the potential additional activity associated with mineral resource development. Additional release of atmospheric carbon dioxide would also occur through timber cutting (non-commercial) and prescribed burning activities; however, the amount of these activities is likely to be limited due to lack of access and associated costs.

Existing Plans

This alternative would release the most emissions due to vegetation activities and potential additional mineral resource development, based on the projections of timber harvest, road building and potential mineral development activities. Additional release of atmospheric carbon dioxide would also occur through timber cutting (non-commercial) and prescribe burning activities; however, the amount of these activities is likely to be limited, but more frequent than the 2001 Roadless Rule alternative.

Proposed Idaho Roadless Rule (Proposed Rule)

This alternative would release more emissions than the 2001 Roadless Rule alternative, but less than the Existing Plans alternative, based on the projections of timber harvest, road building and potential mineral development activities. Additional release of atmospheric carbon dioxide would also occur through timber cutting (non-commercial) and prescribed burning activities; however, the amount of these activities is likely to be limited, intermediate between the 2001 Rule and Existing Plans.

Modified Idaho Roadless Rule (Preferred Alternative)

This alternative would release more emissions than the 2001 Roadless Rule alternative, but less than the other alternatives, based on the projections of timber harvest, road building and potential mineral development activities. Additional release of atmospheric carbon dioxide would also occur through timber cutting (non-commercial) and prescribe burning activities; however, the amount of these activities is likely to be limited, similar to the Proposed Rule.

Climate Change Effects on Forest Vegetation

Active management includes adaptive responses as additional information on forest vegetation is accumulated and monitoring results of actual management effects are evaluated. Active (adaptive) management strategies would generally promote human intervention to mitigate climate change effects and proactively participate with evolutionary processes through management (Tchebakova et al. 2005). Because of the uncertainty and complexity of the effects of climate change, predictive models pinpointing locations where plant communities and species can be sustained will need to be developed (Rehfeldt et al. 2006).

Passive management includes reserve networks that generally promote natural processes. As they relate to carbon storage and climate change, these strategies would include permitting plant communities and their species to be allowed to adapt to the changing circumstances, relying on evolutionary processes to control re-assemblage of species and genotypes within species, with the new climatic conditions presented (Noss 2001).

This evaluation of effects is in line with the general scenarios presented under the Columbia River basin analysis in 1997 (Quigley et al., 1997).

2001 Roadless Rule

The 2001 Roadless is the most similar to the passive strategy, with modifications that include seven exceptions for road construction / reconstruction and four exceptions for timber harvest and cutting. One of the exceptions does include restoration of ecosystems, so this alternative does allow some human management. However, due to the lack of access anticipated due to limited road development, restoration costs could potentially be the highest considering all alternatives. Only about 9,000 acres are projected to be actively treated for restoration purposes over the next 15 years. Most of the Idaho Roadless Areas plant communities and species would be allowed to re-adjust to the changing climatic conditions without human intervention.

Existing Plans

Existing forest plans more closely align with active management strategies. This is due to the potential access provided considering management opportunities present under the GFRG theme. Providing access through road construction / reconstruction should reduce the cost of potential restoration activities. About 40,500 acres are projected to be harvested over a 15 year period, generally to restore ecosystems or reduce fire risk. Although more of the inventoried roadless areas plant communities and species could potentially benefit from active management, most of the acres would not likely be available for management considering the amount of acres that are in management prescription similar to Backcountry, Primitive, SAHTS and Wild Land Recreation themes. Plant communities and species within those themes would most likely be allowed to re-adjust to the changing climatic conditions without human intervention.

Proposed Idaho Roadless Rule (Proposed Action)

This alternative incorporates both passive and active management strategies. Passive management strategies are reflected in the Wild Land Recreation, Primitive and SAHTS. Active management is reflected in the GFRG theme and to a lesser degree in the Backcountry theme. About 18,000 acres over 15 years are projected to restore ecosystems or reduce fire risk. Most of the plant communities and species within Backcountry, Primitive, SAHTS and Wild Land Recreation themes would most likely be allowed to re-adjust to the changing climatic conditions without human intervention.

Modified Idaho Roadless Rule (Preferred Alternative)

The Modified Rule incorporates both passive and active management strategies. Passive management strategies are reflected in Wild Land Recreation, Primitive, and SAHTS themes. Active management is reflected in GFRG, and to a lesser degree in Backcountry. About 15,000 acres over 15 years are projected to undergo active management, generally to restore ecosystems or reduce fire risk and potentially subject to adaptive management strategies. Most of the plant communities and species within Backcountry, Primitive, SAHTS, and Wild Land Recreation themes would most likely be allowed to re-adjust to the changing climatic conditions without human intervention.

Other Indirect and Cumulative Effects on Carbon Storage and Climate Change

Reasonable Foreseeable Actions – It is reasonably foreseeable that global climate change will have potential effects on fire frequency, severity and forest insect and disease relationships. Increased fire activity has been linked to effects of warming climate, as has certain insect infestations in the western United States and Canada (USDA Forest Service, 2007a). This could potential lead to increase emissions of carbon dioxide and other greenhouse gases from wildfires and possibly to decrease stored carbon in western forests and rangelands (USDA Forest Service, 2007b).

In a general sense, as long as fire-affected ecosystems recover at the same rate as fires consume biomass and surface fuels, the net effect of fire on the carbon in the atmosphere or stored in ecosystems will be approximately neutral. If the frequency, extent or severity of fire increases due to changing climate or management practices, then terrestrial carbon storage will decrease, and the carbon in the atmosphere will increase (USDA Forest Service, 2007b).

Under a changing climate, the trajectories of vegetation recovery after fire may also change, leading to different potentials for ecosystem carbon storage. The exact mechanisms and magnitude of this change are still under research (USDA Forest Service, 2007b).

Future research, combined with effective strategies that include increased carbon storage capabilities, could help offset the increase in greenhouse gases. These strategies could also address climate change effects of national resources (USDA Forest Service, 2007c,d,e,f,g). These strategies are just beginning to be developed (USDA Forest Service 2008a [Chief's Letter]).

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