

Alternatives 1 through 4

No alternative precludes the use of inventoried roadless areas for future research and monitoring. The No Action Alternative would reduce the opportunity for long-term study where comparisons of natural settings are needed since many inventoried roadless areas would be subject to commodity production and development. Alternatives 2 and 3 place progressively greater limits on human activities, which will narrow the range of possible management experiments. For example, under Alternative 3, clearcutting experiments would be unacceptable since this alternative promotes stewardship related activities. Alternative 4, which does not allow timber harvest including thinning before prescribed fire, places the most limits on the range of possible management experiments. Alternative 4 would affect ongoing research projects that require mechanical vegetation treatments. Alternative 4 would place greater limits on research than Alternatives 2 or 3.

Human Uses

Timber Harvest

Affected Environment

American forests have a wide variety of forest types and ages, including old-growth stands, naturally regenerated forests, and planted forests. Areas of old growth remain in the Pacific Northwest, parts of California, and much of the Rockies. East of the 100th meridian (Figure 1-1), most of the forests are second growth, naturally regenerated stands. In some cases, these lands were never fully converted to agricultural use, but selective logging was common. The tree species found in these stands are usually similar to those that would have existed there before European settlement. Even in most forest plantations, the species composition mimics the forest that would have naturally regenerated there (Sedjo 1991).

Of the 747 million acres of forestland in the United States, about 490 million acres are considered commercial forestland, capable of growing 20 cubic feet or more per acre per year. About 72% of all commercial forestland is found in the Eastern United States and 28% is found in the West. Private lands account for 71% of the total commercial forestland. National forests account for another 19% of the total commercial forestland, the remaining 10% are in other public or Tribal ownerships. The volume of timber on all forestlands has been increasing since 1952 when inventory data first became available. Much of the hardwood timber volume is in the East, while much of the softwood volume is in the West. In the West, 46% of the softwood timber resource is on NFS lands (USDA Forest Service 1999j).

In 1997, the volume of growing stock on all NFS lands was approximately 1,260 billion board feet. Net annual timber growth in 1996 on all NFS lands was about 20.5 billion board feet. Removal of timber volume from all NFS lands due to harvest, mortality, or land clearing for the same year totaled about 4.1 BBF. Removal for 1996 was

approximately 20% of growth (USDA Forest Service 1999j). While the 1996 removal is not a current annual average, it is indicative of an ongoing substantial net increase in volume of wood fiber on NFS lands.

Trends in Consumption, Production, and Import of Wood Products – A significant effect of the reduction in Federal timber harvest between 1987 and 1997 (from about 13 BBF to 4 BBF annually) has been to transfer harvest to private forest ecosystems in the United States and to forest ecosystems in Canada (MacCleery 2000). For example:

- Since 1990, United States softwood lumber imports from Canada rose from 12 to 18 BBF, increasing from 27% to 36% of United States softwood lumber consumption. Much of the increase in Canadian lumber imports has come from the native old-growth boreal forests. In Quebec alone, the export of lumber to the United States has tripled since 1990. The increased harvesting of the boreal forests in Quebec has become a public issue there.
- Harvesting on private lands in the southern United States also increased after the reduction of Federal timber in the West. Today, the harvest of softwood timber in the southeastern United States exceeds the rate of growth for the first time in at least 50 years. Increased harvesting of fiber by chip mills in the southeastern United States has become a public issue regionally.

Total national production of lumber, plywood, and all other timber products in the United States has been relatively stable over the past decade, averaging slightly more than 18 billion cubic feet annually from 1987 to 1999. Total national consumption of timber products during the same period has averaged about 20 billion cubic feet annually. Softwood lumber production is the largest category within the totals above. National production has not been keeping pace with demand. Production averaged 35 BBF while consumption averaged 45 BBF annually.

Suitable Lands – Of the 93 million acres of commercial forestlands on NFS lands, an estimated 47 million acres (51%) 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 cost of timber production are justified by the ecological, social, or economic benefits.

Through the land management planning process, each national forest and grassland determines the location and amount of suitable acres. Of these suitable acres, approximately 9 million acres (roughly 20%) are located in inventoried roadless areas where existing land management plans would allow timber harvest and road construction to occur. Most of the acres of commercial forestland in inventoried roadless areas occur in the Western United States and Alaska. Table 3-37 shows the approximate amount of suitable acres of commercial forestland in inventoried roadless areas by region.

Table 3-37. Estimated acres (in thousands) of forestland suitable for timber production in inventoried roadless areas, by Forest Service region.

Region	Acres suitable for timber production
Northern (1)	2,274
Rocky Mountain (2)	1,317
Southwestern (3)	63
Intermountain (4)	1,598
Pacific Southwest (5)	394
Pacific Northwest (6)	1,701
Southern (8)	332
Eastern (9)	85
Alaska (10)	1,274
Total	9,038

(USDA Forest Service 1994)

Allowable Sale Quantity (ASQ) – The quantity of timber that may be sold from an area (usually a national forest) covered by a land management plan during a period specified by the plan. It is usually expressed as an average annual volume that is suitable for timber production, which may be sold from the forest’s 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 3-38 summarizes this information for forests that have revised land management plans or have published draft plan revisions through 1999. In the Pacific Northwest Region, forests are operating under probable sale quantities (Table 3-37) until their next land management plan revisions calculate new ASQs. As land suitable for timber production and ASQ volumes continue to decrease, it is likely that timber harvest volume from non-suitable lands will increase because of the need to meet fuel reduction and other non-timber vegetation management objectives of land management plans.

This downward trend in ASQ volume is assumed to be continuing throughout all NFS lands, not just inventoried roadless areas. This is partly due to changing management emphasis in inventoried roadless areas. The change in emphasis can be traced to the emergence of ecosystem management in the early 1990s, development of the Northwest Forest Plan and other similar regional plans, and the Forest Service Natural Resource Agenda. ASQ volume applies only to that volume scheduled to be removed from land suitable for timber production. Additional unscheduled timber volume has been and will continue to be harvested to restore, improve, or maintain ecosystem health.

Table 3-38. Changes in allowable sale quantity (ASQ) in recent land management plan revisions.

Region	Forest	Year plan revised	Previous ASQ (MMBF ^a)	New ASQ (MMBF ^a)	Reductions (%)
Rocky Mountain (2)	Arapaho-Roosevelt	1997	30	7	-77
	Black Hills	1997	152	87	-43
	Rio Grande	1996	36	23	-36
	Routt	1998	38	38	0
Intermountain (4)	Targhee	1997	86	8	-91
Pacific Northwest (6)	Deschutes	1994	99	63	-36
	Gifford Pinchot	1994	334	65	-81
	Mt. Baker Snoqualmie	1994	108	7	-94
	Mt. Hood	1994	189	65	-66
	Okanogan	1994	63	45	-29
	Olympic	1994	111	10	-91
	Rogue River	1994	120	26	-78
	Siskiyou	1994	160	24	-85
	Siuslaw	1994	335	12	-96
	Umpqua	1994	334	78	-77
	Wenatchee	1994	136	20	-85
	Willamette	1994	491	116	-76
	Winema	1994	45	37	-18
	Southern (8)	Francis Marion	1996	59	17
George Washington		1993	38	33	-13
NFs in Texas		1996	112	113	1
NFs in Florida		1999	107	86	-20
Kisatchie		1997 (Draft)	128	51	-60
Alaska (10)	Tongass	1999	450	187	-58

^a Million board feet

(Forest Service Ecosystem Management Coordination Staff 2000)

Estimates of expected timber offer and harvest quantities over the short- and long-term are provided in this section as effects under each alternative. The ASQ for existing land management plans will be recalculated at the time of the next plan revision.

National Forest Timber Harvest – Timber harvest is the process by which trees with commercial value are cut and removed from the forest. 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 and the 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.

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 or decommissioned or converted to a classified road. Even helicopter sales may require some classified road construction, reconstruction, or temporary roads to access landings for hauling logs.

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 production rates that affect skidding and yarding costs. Generally, wider road spacing or increased distance from the nearest road means longer skidding and yarding distances, which requires larger yarders and wider road widths (USDA Forest Service 1999p).

The trend in silvicultural practices is shifting away from **even-aged management** toward management of **uneven-aged** stands primarily due to public controversy and management concerns about non-timber resources. These multi-story and multi-age stands 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 1999p). Nationally, clearcutting has decreased from 31% to total harvested acres in 1989 to 10% in 1997 (USDA Forest Service 1998b), with the downward trend expected to continue.

National Forest Timber Trends – Figure 3-31 displays volume of **timber sold** from national forests from 1905 to 1999.

The volume of timber sold from NFS lands declined from more than 11 BBF in 1987 to 2.2 BBF in 1999. The average annual **volume sold** from 1993 to 1999 was 3.2 BBF.

Nationally, this reduction was offset by an increase in Canadian and other foreign imports and harvesting on private lands.

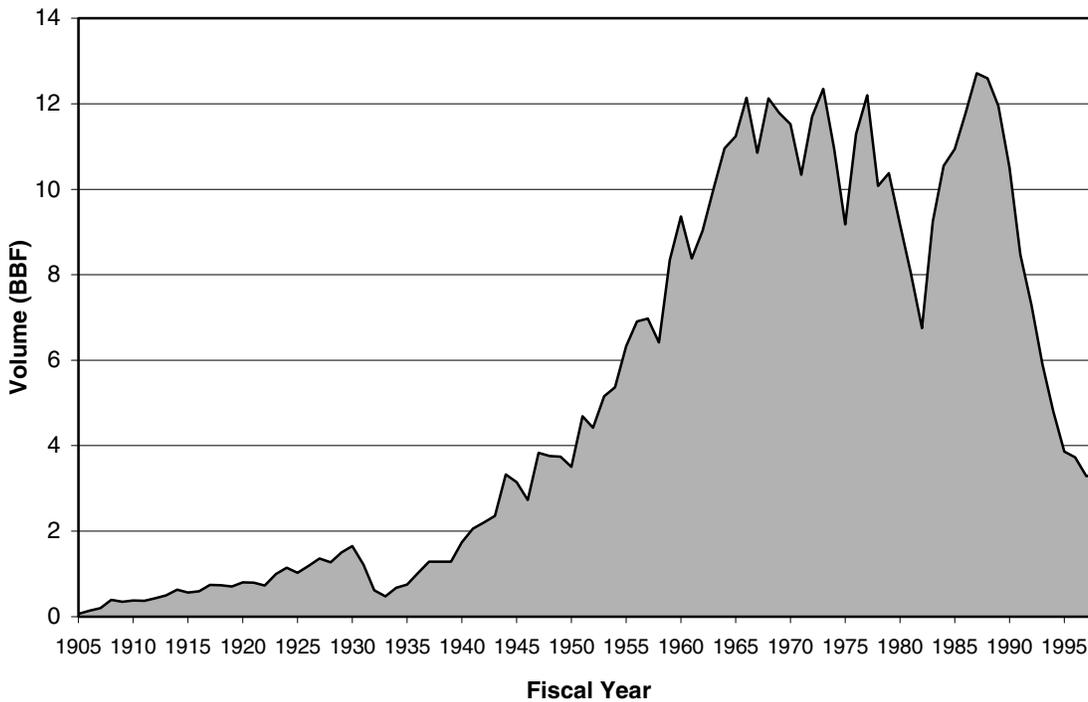


Figure 3-31. Long-term trend in volume of timber harvested from the national forests.

Table 3-39 shows the recent national trends in area harvested and volume offered as part of the NFS timber sale program. Timber offered is the volume of timber advertised for sale. Volume sold is the amount of timber actually purchased, which is usually less than offered volume because some sales are judged as economically marginal by prospective purchasers, and they receive no bids. Volume harvested is the actual volume removed from the forest in a given year, which may be higher or lower than volume sold depending on market conditions. Most harvest volume was actually sold 1 to 3 years earlier. Refer to the Timber Harvest and Forest-dependent Communities portions of the Social and Economic Factors section of this chapter for a more detailed discussion regarding market influences, employment, Payments to States, and dependent communities.

Table 3-39. National trends in National Forest System timber sale program.

Fiscal year	Timber offered (MMBF ^a)	Volume sold (MMBF ^a)	Volume harvested (MMBF)	Acres harvested (thousands)
FY 1997	3,999	3,688	3,285	458
FY 1998	3,388	2,955	3,284	526
FY 1999	2,300	2,200	2,939	449
FY 2000	1,800	1,700	2,522	385

^a Million board feet
(USDA Forest Service 1998b, WO Forest Management Staff estimates)

Timber Sale Purpose – Timber sales are used to achieve a variety of vegetation management objectives. Under the Timber Sale Program Information Reporting System (TSPIRS), timber is sold for one of three purposes: 1) forest stewardship, 2) timber commodity, or 3) personal use. The main objective of **stewardship-purpose timber sales** is restoring, improving, or maintaining ecosystem health. The main objective of commodity-purpose timber sales is to provide a sustainable yield of forest products to meet the nation's demands. Personal use sales are made primarily to supply firewood, Christmas trees, and other miscellaneous forest products to individuals for their own consumption. Most timber sales (90% or more of the national volume sold) are for either stewardship or commodity purposes, or they may include volume for both purposes within the same sale.

During fiscal year 1997, 52% of national forest timber harvested was for commodity purposes, down from 71% during 1993. Timber harvested for stewardship purposes in 1997 was 40%, compared to 24% during 1993, and this increase is expected to continue. Timber harvest for personal use purposes remained stable in the 5% to 8% range over the same period (USDA Forest Service 1998b).

Roadless Areas Timber Harvest Trends – From 1993 to 1999, national forests sold 783 MMBF from approximately 80,000 acres (an average of 112 MMBF and about 11,000 acres per year) from inventoried roadless areas. This is less than 4% of the average annual volume sold from all national forests during the same period. About one-third of that volume was salvage from trees killed by fire, insects, and disease.

Timber volumes planned from inventoried roadless areas on all national forests during fiscal years 2000 through 2004 were evaluated. Table 3-40 summarizes current planned volume, acres to be harvested, and miles of road construction planned. The proposed rule would not apply to fiscal year 2000 sales already sold, and may not apply to much of the volume in fiscal years 2001 and 2002 where projects are more likely to have approved environmental decisions before final rule implementation date. However, the data represent a reasonable estimate for the first 5 years under full implementation of the final rule.

Alternative 1 – No Action

Under Alternative 1, timber harvest in inventoried roadless areas would continue under the direction of current land management plans and national and regional policy. Given the recent trend of increased stewardship-purpose timber sales, 60% or more of the acres and 50% to 60% or more of volume offered is likely to be stewardship-purpose timber sales. About 30% to 40% of volume offered would be commodity-purpose timber sales, and roughly 5% to 10% of volume offered would be personal-use purpose sales. The full range of silvicultural and harvest systems would be considered to accomplish vegetation management objectives.

Both even-aged and uneven-aged silvicultural systems may be used under this alternative. Methods will be determined at local levels based on further site-specific analysis. When even-aged management is used, **shelterwood** and seed-tree prescriptions are more likely

Table 3-40. Projected timber offer and planned road construction in inventoried roadless areas for 5 years, by Forest Service region. Construction mileages include new, reconstructed, and temporary roads.

Region	Projected timber offer (MMBF ^a)	Projected acres harvested (thousand acres)	Projected timber- related road construction (miles)
Northern (1)	85	10	52
Rocky Mountain (2)	48	7	58
Southwestern (3)	3	0.6	3
Intermountain (4)	201	25	117
Pacific Southwest (5)	33	4	10
Pacific Northwest (6)	87	17	19
Southern (8)	30	6	26
Eastern (9)	78	11	47
Alaska (10)	539	14	291
Total	1,104	94.6	623

^a Million board feet
(Roadless Database 2000)

to be used than clearcutting, except in Alaska where clearcutting is expected to be the most commonly used harvesting practice. **Uneven-aged management** uses single tree or **group selection**, or a combination of these systems. Pre-commercial and commercial thinning would be used in both even- and uneven-aged systems. Salvage and **sanitation** cutting under both even- and uneven-aged systems would be used where consistent with other resource needs, such as the retention of standing dead or large, down woody material. Logging systems are likely to include ground-based (tractor, forwarder), cable and helicopter.

Substantially more salvage harvest is likely to occur over time in inventoried roadless areas under this alternative, as road construction and timber harvest may be used to recover the usable volume from fire, insect, disease, and wind damage and to reduce fuel loading. This alternative is likely to result in more **pre-commercial thinning**, intermediate thinning, and other silvicultural treatments to manage forested landscapes for a variety of purposes over time than Alternatives 2 through 4.

Approximately 90,000 to 95,000 acres are likely to be harvested in inventoried roadless areas over the first 5-year period. This is an annual average of about 18,000 to 19,000 acres harvested from a suitable land base of approximately 9 million acres within inventoried roadless areas. About 15% of the volume and harvest acres are within 2.8 million acres where roads already exist.

Nationwide, approximately 1.1 BBF could be offered in inventoried roadless areas over the first 5-year period. It would be necessary to construct or reconstruct about 445 miles of classified road, and about 177 miles of temporary road to harvest about 800 MMBF. The remaining could be harvested without the need for new or reconstructed roads. This alternative would result in the highest potential level of road construction and timber

harvest of all alternatives. During this first 5-year period, timber harvest and road construction could occur on approximately 0.3% of the total inventoried roadless areas nationwide on the land base where current land management plans allow road construction to occur.

From past Agency experience, the estimated volume of 1.1 BBF could be reduced by as much as 30% before harvest due to results of site-specific analyses, statistical variation in inventories and volume estimates, NEPA process delays, litigation, or difficulties in completing the sale preparation process.

Tongass National Forest – The Tongass National Forest would offer nearly half of the national timber sale program in inventoried roadless areas. This would be 539 MMBF from approximately 14,000 acres, over the next 5 years, primarily using clearcutting. This is about 0.4% of the inventoried roadless area acres on the Tongass National Forest where road construction is permitted by the current land management plan. All of this volume would be considered commodity-purpose timber harvest.

Long-term Effects on Timber Harvest – Projections of future harvest beginning in 2005, are made for Alternative 1 recognizing that there are high levels of uncertainty about the Agency's ability to continue harvesting timber for any purpose from these areas. Approximately 130 to 160 MMBF of timber would be sold each year from 2005 through 2040 from 13,000 to 15,500 acres in inventoried roadless areas. The Tongass National Forest would account for about half to two-thirds of the projected volume.

Alternative 2

Under Alternative 2, timber harvest consistent with land management-plan prescriptions, standards and guidelines would continue, while road construction and reconstruction would be prohibited within all inventoried roadless areas. A split between commodity, stewardship, and personal use timber-sale volumes similar to that under Alternative 1 is expected under this alternative. The full range of silvicultural and harvest systems would be considered to accomplish vegetation management objectives.

Both even-aged and uneven-aged management may be used under this alternative. Shelterwood and seed-tree prescriptions are more likely to be used than clearcutting, except in Alaska where clearcutting is expected to be the most commonly used harvesting practice. Timber harvest objectives and silvicultural prescriptions would generally be the same as those under Alternative 1. Helicopter yarding may be more prevalent under this alternative than under Alternative 1 due to the prohibition on road construction.

Nationally, about 300 MMBF would likely be offered from about 40,000 acres in inventoried roadless areas over the first 5-year period. About 0.1% of the acres in inventoried roadless areas where current land management plans allow timber harvest would be harvested. This timber offer-volume reduction of slightly more than 800 MMBF (73%) over the 5-year period from Alternative 1 would be due to the prohibition on road construction and reconstruction. The estimated offer volume of 300 MMBF could be reduced before harvest by as much as 30% due to results of site-specific

analyses, NEPA process delays, litigation, or difficulties in completing the sale preparation process.

The effects of a prohibition on road construction on the mix of stewardship and commodity purpose-timber harvest are largely unknown. Salvage volume could be removed when consistent with land management plan direction, though only areas near existing roads, high volumes per acre, or high-value species within a mile of the nearest road that could be yarded with helicopters would be economically feasible to harvest. Consequently, with no opportunity for new road construction, substantially less salvage volume from fire, insect, disease, and wind damage is expected under this alternative than under Alternative 1. This alternative is likely to result in much less pre-commercial thinning, intermediate thinning, and other silvicultural treatments to manage forested landscapes for a variety of purposes.

The largest reductions in volume offered and area harvested over the 5-year period would occur in Region 10 (512 MMBF and about 13,000 acres harvested) and Region 4 (134 MMBF and about 17,000 acres harvested). Prohibition of road construction would have the greatest volume impacts on the Tongass National Forest in Alaska, the Idaho Panhandle and Payette National Forests in Idaho, the Dixie and Manti-La Sal National Forests in Utah, and the Superior National Forest in Minnesota.

Timber harvest objectives and silvicultural prescriptions would generally be the same as those under Alternative 1. The prohibition on road construction and reconstruction would increase timber harvest costs or costs of silvicultural or fuels reduction activities normally accomplished by service contract or means other than timber sale contract. In the Pacific Northwest, logging costs for helicopter yarding are three to five times higher than for tractor yarding the same ground; cable yarding costs are twice that of tractor yarding costs under the same conditions (Reutebuch personal communication). In Montana, the cost of cable yarding is roughly twice that of tractor skidding and approximately 50% higher than using forwarders. Helicopter yarding is roughly three times the cost of tractor yarding and twice that of using forwarders (Keegan and others 1995). Helicopter timber harvest feasibility depends on many factors, including value, log size, and volume per acre of timber removed. Generally, helicopter yarding is not feasible at distances of more than one-half to three-quarters of a mile from the nearest road. Topography and location of existing roads directly affects the feasibility of timber harvest when using helicopters or cable systems.

Approximately 40,000 acres could be harvested in inventoried roadless areas over the first 5-year period. This is an annual average of about 9,000 acres harvested from a land base suitable for timber production of approximately 9 million acres in inventoried roadless areas. Roughly one third of the volume and harvest acres are within 2.8 million acres of inventoried roadless areas where roads already exist.

Tongass National Forest – Under the road construction and reconstruction prohibitions of this alternative, the forest would likely offer 27 MMBF harvested from about 700 acres. This is a 95% volume reduction to the Tongass National Forest from Alternative 1.

Harvests would be accomplished primarily using clearcutting. All of this volume would be considered commodity-purpose timber harvest.

Long-term Effects on Timber Harvest – Projections of future harvest beginning in 2005 are made for Alternative 2 recognizing that there are high levels of public controversy and uncertainty about the Agency's ability to continue harvesting timber from these areas. Approximately 35 to 44 MMBF of timber would be sold each year from 2005 through 2040 from between 3,000 and 4,200 acres in inventoried roadless areas. Most of the volume and area harvested would be within the roaded portion of inventoried roadless areas. The Tongass National Forest would continue to harvest only a minor proportion of the total national volume from inventoried roadless areas after 2004.

Alternative 3

Under Alternative 3, road construction and reconstruction would be prohibited, while timber harvest would be used only for stewardship purposes in inventoried roadless areas. This alternative differs from Alternative 2 in that commodity-purpose timber sales would not be allowed in inventoried roadless areas. Approximately 90% to 95% of timber harvest would be for stewardship purposes; 5% to 10% would be for personal use, such as firewood cutting. Both even-aged and uneven-aged management may be used under this alternative.

Timber harvest objectives within inventoried roadless areas would focus on restoration of sustainable vegetation conditions, improving forest health, reducing excessive fuels and associated wildland fire risk and intensity, reducing insect and disease conditions that are outside the natural range of variability, and improving habitat for wildlife. The same kinds of silvicultural prescriptions as described under Alternatives 1 and 2 are likely to be used under this alternative, with a higher proportion of thinning being used to accomplish stewardship objectives. Salvage, when used to accomplish one or more of the objectives under this alternative, is likely to be used most often for excessive fuels reduction and insect and disease suppression.

An estimated 160 MMBF would be offered for sale in inventoried roadless areas nationwide during the first 5-year period. This is approximately 0.07% of the inventoried roadless areas with land management plan directions that allow road construction. This 85% reduction from 1.1 BBF harvested over the first 5-year period under Alternative 1 is due to the prohibition on road construction, reconstruction, and commodity-purpose timber harvest.

Approximately 22,000 acres could be harvested in inventoried roadless areas over the first 5-year period. This is an annual average of about 4,400 acres harvested from a land base suitable for timber production of approximately 9 million acres currently available in inventoried roadless areas. About half of the volume and harvest acres are within 2.8 million acres of inventoried roadless areas where roads already exist.

Impacts on Costs and Accomplishment – Under this alternative, unit costs for contracts designed to reduce fuels through mechanical thinning and prescribed burning in

inventoried roadless areas would be higher than those under Alternatives 1 and 2. The smaller diameter trees that are removed and sold would have lower value and would cause the sale to be less economically feasible than if commodity-purpose timber harvest is available. Fewer acres of thinning will be accomplished using timber sale contracts under this alternative than are likely under Alternatives 1 and 2. While thinning may also be accomplished through service contracts, cost per acre is expected to rise in direct proportion to distance from the nearest road.

Tongass National Forest – Under this alternative, the Tongass National Forest would not offer any volume and no acres would be harvested in inventoried roadless areas since timber harvest in the Tongass is not for stewardship purposes. This is a reduction of 539 MMBF over the 5-year period.

Long-term Effects on Timber Harvest – Projections of future harvest beginning in 2005 are made for Alternative 3 recognizing that there are high levels of public controversy and uncertainty about the Agency's ability to continue harvesting timber from these areas. Approximately 12 to 15 MMBF of timber would be sold each year from 1200 to 1400 acres in inventoried roadless areas.

Alternative 4

Under Alternative 4, road construction, reconstruction, and all forms of timber harvest would be prohibited in inventoried roadless areas.

No timber volume would be offered in inventoried roadless areas during the first 5-year period or beyond. This potential reduction of 1.1 BBF and 90,000 to 95,000 harvest acres from Alternative 1 (100%), would be due to the prohibition of road construction, reconstruction, and all timber harvest.

Other Indirect and Cumulative Effects on Timber Harvest

Past and Present Actions-Timber Trends – The National Forest System contribution to the nation's need for wood products has been in decline during the past decade. Sawtimber harvest on national forests has dropped from a 1988 high of 27% of the nation's softwood lumber production to approximately 5% of that production in 1999. The harvest level of the 1980s was found not to be sustainable in light of public issues and conflicts with other management objectives. The Agency believes that its annual contribution will stabilize between 3 and 4 BBF. During this decline in available timber resources from the National Forests, softwood consumption nationally has increased.

Suitable Lands – Land management plan revisions in recent years have shown a decreasing trend in acres suitable for timber production due to allocations to other uses or environmental concerns. Examples of these uses and concerns include endangered species, water quality, wildlife habitat, scenic quality, recreation, and reforestation capabilities. Total acres suitable for timber production on all NFS lands, including

inventoried roadless areas, have dropped from approximately 63 million acres in 1987 to roughly 47 million acres in 1999.

It is reasonably foreseeable that this trend will continue. Acres suitable for timber production will be recalculated during each national forest's next land management plan revision. As those plan revisions are made, certain areas within inventoried roadless areas are likely to be dropped from the suitable land base under Alternatives 1, 2, and 3 due to the same concerns mentioned in the previous paragraph. Under Alternatives 2 and 3, additional areas are likely to be dropped from the suitable base because of lack of access and economic feasibility. With the prohibition on all timber harvest under Alternative 4, land management plan revisions are likely to determine that there are no suitable acres within inventoried roadless areas.

Forest Plan ASQ – In the past, it has been difficult for the Agency to harvest timber in roadless areas. Concerns have been expressed that this could lead to increased and disproportional harvest on roaded lands to meet ASQ levels. The importance of the roadless area volume to a forest's ASQ depends on when the area was scheduled to be harvested in the land management plan. If most of the volume uncut on a forest is in roadless areas, these areas may be critical to meeting current ASQs. However, regardless of this rulemaking, it is unlikely that there will be any substantial increase in road miles constructed or timber volume sold within inventoried roadless areas due to the current pattern of public controversy, appeals, and litigation. Table 3-38 displays the results, in terms of declining ASQ, of recent land management plan revisions. It is reasonably foreseeable that, as land management plans are revised, ASQ may be adjusted downward in response to changes in suitable acres as previously discussed.

Softwood Lumber Production, Import, and Consumption – National consumption of softwood lumber has steadily increased from 1990 (45.7 BBF) to 1999 (54.5 BBF). While the average family size in the United States has decreased 16% since 1970, the average single-family home being built today has increased by 48% (MacCleery, 1999). The difference between production and the higher levels of consumption are accounted for by increases in timber product imports from other countries. Softwood lumber imports have risen from 14.2 BBF in 1987 to 19.2 BBF in 1999. More than 95% of current softwood lumber imports are from Canada.

Present Actions – NFS lands contribute approximately 5% of the nation's total timber harvest from all ownerships. 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). Implementation of Alternatives 2, 3, or 4 will add to that shift. Volume reductions (an average of 160 MMBF per year in the first 5-year period as a result of the proposed action, half of which would come from the Tongass National Forest) from national forest roadless areas in the short term are likely to be offset by increases in timber harvest on private lands in the United States and in other countries.

Longer term, given the increasing demand (roughly 1% to 3% annually) for wood products in the United States, the situation is more uncertain. The anticipated Agency

timber program (timber volumes sold and harvested are assumed to be equal) projected out through 20 and 40 years with a prohibition on road construction in inventoried roadless areas, is estimated at roughly 130 to 160 MMBF per year. This estimate recognizes that large areas of currently suitable lands in the inventoried roadless areas, which may have larger ASQs under land management plans now, may be unavailable for future timber harvest due to continuing public controversy (over entering these areas under the No Action Alternative).

Compared to Alternative 1, the indirect and cumulative effects of Alternative 2, and to a greater degree Alternative 3, are likely to include a decrease, over time, in acres treated for fuels reduction and other stewardship purposes, and a corresponding reduction in timber volume offered, sold, and harvested. This is due to the cost increase for thinning and other forest-health improvement treatments done without road access, and the negative effect those cost increases are likely to have on future funding priority and actual acres accomplished. However, this decrease may occur because of other agency actions. The Cohesive Strategy, for example, would place priority for fuel treatment on the wildland-urban interface, readily accessible municipal watersheds, and T&E species habitat. Inventoried roadless areas, because they are generally not near areas of human habitation, would rarely receive high priority for fuels reduction given these other priorities.

Other Federal Initiatives – Other agency and Federal proposals will continue to affect the Forest Service timber program at both the national and local levels. Current emphasis like that found in the Interior Columbia Basin Ecosystem Management Project, the Sierra Nevada Framework, and the Cohesive Fire Strategy calls for a mix of longer rotation periods to increase old-growth characteristics, and thinning treatments that would continue the removal of small diameter trees. Other strategies like the Lynx Conservation Assessment and Strategy call for preservation of early seral stage habitat that would preclude some future thinning activities. The balancing and stabilizing of the timber program will happen locally through the collaboration processes envisioned in the Agency's planning rule at the land management plan- and project-level. Overall, it is anticipated that the national program will remain between 3 and 4 BBF, with periodic variations due to salvage after major natural disasters that temporarily increase timber harvest, or emerging issues that decrease certain harvest activities until an appropriate solution can be developed.

Reasonably Foreseeable Future Actions – Natural disasters, such as wildland fires, windstorms, and insect outbreaks, will continue to occur, and the Agency is likely to continue salvaging a portion of the dead and dying trees. These salvage sales usually become the highest priority for harvest. This is usually due to two factors: biological and economic. The biological factor is the need to control secondary insect outbreaks, like Ips beetle, southern pine beetle and spruce bark beetle, whose populations would increase rapidly by attacking damaged trees and then spreading into the surrounding healthy trees. The economic factor is the rapid deterioration of the dead material due to insect damage, stains, rots, and checking. If they are not salvaged quickly, there will be nothing to salvage.

Timber salvage sales generate vegetation management work accomplished and receipts from the sale of usable trees. A portion of the money collected from the resulting timber salvage sales is used to help cover the costs of essential rehabilitation and reforestation. If the Agency elects to reduce the use of timber salvage sales because of continuing public controversy, the use of service contracts funded by appropriations must increase to accomplish fuels reduction or other desired vegetative treatments. Net cost per acre to achieve desired conditions rises over that associated with use of timber harvest.

Wildland fires and other natural disasters, especially during a wildland fire season like the one experienced in 2000 in the West, will also eliminate or devalue the timber on some timber sales under contract and some that were planned but not offered for sale. However, it is anticipated that the timber volumes lost will be recovered or slightly increased due to salvage operations over the next 2 years. This will create a slight rise in the Agency's timber offer, similar to the period of 1995 to 1997. A proportionate decrease in timber offer would occur after those 2 years as the individual forest shifts from the salvage emphasis back to its regular timber planning cycle.

It is also anticipated that America's lumber consumption trend will continue to rise over the next 40 years and beyond at a rate of increase of 1% to 3% annually, as will its consumption of all wood products. With the Forest Service sustaining an average harvest level of between 3 and 4 BBF for the next 40 years, the Agency's volume contribution to the nation's lumber supply will remain stable as consumption increases. This means that harvest levels will continue to increase on private forestland to help meet the demand. The RPA Assessment projections for the next 30 to 40 years indicate that the South will continue to be the main source of increased softwood production nationally in the future to the point that softwood lumber imports may decline slightly. Transition is projected to take place between the years 2000 and 2020 (Darr personal communication).

Imports are expected to continue to increase from Canada's boreal forests, especially from Quebec, Alberta, and the Atlantic Provinces, as there is no anticipated decline in American consumer demand for wood products for construction and pulp in the future. There is no anticipated substitution of hardwood imports for softwood imports. Therefore, the prohibition alternatives would not cause an indirect or cumulative effect to tropical hardwood forests like the Amazon, and Southeast Asia. Exports are expected to remain near or below the current level. Any increase in importing to meet demand would proportionately increase the nation's trade deficit.

Recreation

Recreation provides tangible benefits for individuals, families, communities, and society as a whole (Driver and others 1991). NFS lands support a vast array of recreational activities, ranging from hiking in remote areas to snowmobiling on groomed trails to camping in developed sites. These activities, and many others summarized in Table 3-41, occur along a continuum, or Recreation Opportunity Spectrum (ROS).¹² ROS is divided

¹²The Recreation Opportunity Spectrum (ROS) was developed to provide a framework for classifying and defining segments of outdoor recreation environments, activities, and experience opportunities. The ROS Users Guide provides guidance for inventorying, planning, and managing the recreation resource.

into 6 classes: (P) Primitive, (SPNM) Semi-Primitive Non-Motorized, (SPM) Semi-Primitive Motorized, (RN) **Roaded Natural**, (R) **Rural**, and (U) **Urban** (USDA Forest Service 1982). These classes were created for management and conceptual convenience. They are mixes or combinations of activities, settings, and probable experience opportunities. The class names (e.g., Primitive, Rural) were selected and used because of their descriptiveness and use in land management planning and other management application. This classification system provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies that portion of the spectrum a particular national forest might be able to provide.

Inventoried roadless areas are characterized mainly by Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes. In approximately 3 million acres of the inventoried roadless areas, classified roads, recreation sites, and other facilities have been constructed, causing, in some cases, a shift to the more developed end of the ROS. These classified roads would be allowed to remain and be maintained, however, reconstruction of them would most likely be restricted.

Dispersed Recreation Activities

Affected Environment

Inventoried roadless areas are remnants of vast landscapes substantially unmodified by high-intensity management activities (e.g., timber harvesting, mineral extraction, developed recreation). In the past, unroaded areas were viewed as a bank, holding lands in reserve for future resource development. Over time, other allocations, uses, and designations have withdrawn lands from the bank, creating a situation where the remaining relatively undisturbed landscapes have retained increasingly valuable roadless characteristics.

Some of the value of these lands lies in their unique Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized recreation opportunities. Activities that are prohibited in designated Wilderness and not readily available in areas with classified roads can occur on these lands. For example, Wilderness areas prohibit mechanized and motorized uses like OHV, mountain bikes, chainsaws, snowmobiles, and helicopters. Wheelchairs designed for pedestrian use in urban areas are allowed, but trails in Wilderness areas seldom accommodate these devices.

Primitive and Semi-Primitive Non-Motorized settings are characterized by large natural-appearing landscapes (refer to Table 3-42 and Table 3-43 for size and setting criteria), with little evidence of other people or management restrictions. They have many Wilderness-like attributes, yet allow mountain bikes and other mechanized conveyances, and they have fewer restrictions on motorized tools, search and rescue operations, and aircraft use.

Areas characterized by Semi-Primitive Motorized settings feature large natural appearing landscapes and other attributes similar to Semi-Primitive Non-Motorized, yet allow motorized activities, such as OHV use, motorboats and helicopters, chainsaws, and other

Table 3-41. Recreation opportunity spectrum activity characterization.^a

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
<p>Land based (includes aircraft): Viewing scenery Hiking and walking Horseback riding Camping (all) Hunting (all) Nature study (all) Mountain Climbing General information</p>	<p>Land based (includes aircraft): Viewing scenery Automobile (off-road use) Motorcycles and scooters Specialized landcraft Aircraft (motorized) Hiking and walking Horseback riding Camping (all) Hunting (all) Nature study (all) Mountain climbing General information</p>	<p>Land based (includes aircraft): Viewing scenery Viewing activities Viewing works of humankind Automobile (inc. off-road use) Motorcycles and scooters Specialized landcraft Train and bus touring Aircraft (motorized) Aerial trams and lifts Hiking and walking Bicycling Horseback riding Camping (all) Organization camping (all) Picnicking Resort and commercial services Resort lodging Recreation cabin use Hunting (all) Nature studies (all) Mountain climbing Gathering forest products Interpretive services (all)</p>		<p>Land based (includes aircraft): Recreating cabin use Hunting (all) Nature studies (all) Mountain climbing Gathering forest products Interpretive Services (all) Team sports Individual sports Games and play</p> <p>Land based: Viewing scenery Viewing activities Viewing works of humankind Automobile (inc. off-road use) Motorcycles and scooters Specialized landcraft Train and bus touring Aircraft (motorized) Aerial trams and lifts Aircraft (non-motorized) Hiking and walking Bicycling Horseback riding Camping (all) Organization camping (all) Picnicking Resort and commercial services Resort lodging</p>	
<p>Water based: Canoeing Sailing Other non-motorized watercraft Swimming Fishing (all)</p>	<p>Water based: Boating (powered) Canoeing Sailing Other watercraft Swimming Diving (skin or scuba) Fishing (all)</p>	<p>Water based: Tour boat and ferry Boat powered Canoeing Sailing Other watercraft Swimming and water play Diving (skin and scuba)</p> <p>Water skiing and water-sports Fishing (all)</p>		<p>Water based: Tour boat and ferry Boat powered Canoeing Sailing Other watercraft Swimming and water play</p> <p>Diving (skin and scuba)</p>	

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
					Water skiing and water sports Fishing
Snow and ice based: Snow play Cross country skiing/snow shoeing	Snow and ice based: Ice and snow craft Skiing, downhill Snow play Cross-country skiing/snow shoeing	Snow and ice based: Ice and snow craft Ice skating Sledding and tobogganing Downhill skiing Snow play Cross-country skiing/snow shoeing			Snow and ice based: Ice and snow craft Ice skating Sledding and tobogganing Downhill skiing Snow play Cross-country skiing /snow shoeing

^a These characteristics are illustrative only and may vary within a ROS class depending on local situations. (USDA Forest Service 1982)

Table 3-42. Recreation opportunity spectrum size criteria.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
5,000 acres ^a	2,500 acres ^b	2,500 acres	No size criteria.	No size criteria.	No size criteria.

^a May be smaller if contiguous to Semi-primitive Non-motorized Class.

^b May be smaller if contiguous to Primitive Class.

(USDA Forest Service 1982)

Inventoried roadless areas also provide outstanding opportunities for other dispersed recreation activities using motorized tools. Access is greatly enhanced for persons with disabilities in Semi-Primitive Motorized settings, such as hiking, fishing, camping, horseback riding, hunting, picnicking, wildlife viewing, cross-country skiing, and canoeing. While these activities can also occur in areas managed for ROS classes on the developed end of the spectrum, they typically result in different types of settings and produce different experiences. Roaded Natural, Rural, and Urban classes are characterized by more interactions with people, more sights and sounds of human development and activity, more restrictions and controls, and more landscape modification from other resource management activities.

The SPM and Primitive experiences become increasingly more remote (Table 3-44) without evidence of **motorized equipment**, requiring more isolation, self-reliance, and challenge. The remoteness criteria in this table can be modified to conform to natural barriers and screening, or other relevant features of local topographic relief and vegetative cover. This fits the criteria to the actual forest landscape. As shown in Table 3-45, the SPM experience is characterized by moderate isolation, independence, and closeness to nature, tranquility, and self-reliance. Motorized equipment is allowed in an

Table 3-43. Recreation opportunity spectrum setting characterization.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
<p>Area is characterized by essentially unmodified natural environment of fairly large size. Interaction between users is low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.</p>	<p>Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted.</p>	<p>Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.</p>	<p>Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized provided for construction standards & design of facilities</p>	<p>Area is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.</p>	<p>Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.</p>

(USDA Forest Service 1982)

Table 3-44. Recreation opportunity spectrum remoteness criteria.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
An area designated at least 3 miles from all roads, railroads, or trails with motorized use.	An area designated at least ½-mile but not further than 3 miles from all roads, railroads or trails with motorized use; can include the existence of primitive roads and trails if usually closed to motorized use.	An area designated within ½-mile of primitive roads or trails used by motor vehicles; but not closer than ½-mile from better than primitive roads.	An area designated within ½-mile from better than primitive roads, and railroads.	No distance criteria.	No distance criteria.

(USDA Forest Service 1982)

environment of challenge and risk. The experiences described in this table are highly probable outcomes of participating in recreation activities in specific recreation settings. Scoping revealed a wide range of conflicting opinions on motorized recreation use in unroaded areas. This is an important issue because motorized and non-motorized dispersed recreation use is highly variable throughout the country and dependent on distinct social and environmental conditions.

Prohibiting all activities, including motorized recreation, was considered (see Alternatives Considered but Eliminated from Detailed Study, Chapter 2), but was eliminated from further consideration because decisions of this nature are better made through local planning and collaboration processes.

Of the 58.5 million acres of inventoried roadless areas, 41% are covered by land-management plan prescriptions that restrict road construction and reconstruction. The other 59% are not. Those inventoried roadless areas open to road construction could be affected in the short term, and even those with prescriptions that currently prohibit roading could be affected over the long term as local conditions and situations lead to a change in management prescriptions.

Existing or future trails would not be affected by the proposed prohibitions in inventoried roadless areas. Decisions regarding trail planning, construction, reconstruction, decommissioning, or maintenance would be made at the forest level based on local environmental and social conditions. A trail is a commonly used term denoting a pathway for purposes of travel by foot (or wheelchair), stock, or trail vehicle (FMS 2353.06(6)). Trail widths may vary and are not limited to 50 inches. Examples of activities associated with foot travel are hiking, skating, cross-country skiing, snowshoeing, backpacking, and rock climbing. Examples of stock animals are horses, llamas, mules, and goats. Examples

Table 3-45. Recreation opportunity spectrum experience characterization.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
Extremely high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers a high degree of challenge and risk.	High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk.	Moderate probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Opportunity to use motorized equipment while in the area.	About equal probability to experience affiliation with other user groups and for isolation from sights and sound of humans. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities associated with more primitive type of recreation are not very important. Practice and testing of outdoor skills might be important. Opportunities for both motorized and non-motorized forms of recreation are possible.	Probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. These factors are generally more important than the setting of the physical environment. Opportunities for wild-land challenges, risk-taking, and testing of outdoor skills are generally unimportant except for specific activities like downhill skiing, for which challenge and risk-taking are important elements.	Probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. Experiencing natural environments, having challenges and risks afforded by the natural environment, and the use of outdoor skills are relatively unimportant. Opportunities for competitive and spectator sports and for passive uses of highly human-influenced parks and open spaces are common.

(USDA Forest Service 1982))

of trail vehicles are bicycles, motorcycles, snowmobiles, watercraft, 4x4s, and all terrain vehicles.

A key characteristic of inventoried roadless areas has been their ability to supply P, SPNM, and SPM settings for a wide range of dispersed recreation activities. Unroaded areas are the last relatively undisturbed landscapes outside Wilderness areas. As these lands are developed or put into a restrictive designation, the supply of unroaded lands available for other multiple-use activities continues to decline. At the same time, demand for motorized and non-motorized dispersed recreation opportunities is increasing (Cordell and others 1999b).

The alternatives are compared by their relative ability to maintain the existing supply of inventoried roadless areas available for dispersed recreation opportunities. Those that create safeguards to maintain the most NFS lands in an unroaded condition are rated high; conversely, those alternatives that maintain the fewest acres in an unroaded condition are rated low.

Recreation use data has not been collected specifically for inventoried roadless areas. As a result, estimates of environmental consequences based on use cannot be made with any degree of precision. Comparison of the alternatives is based on known factors, such as trends in recreation use and road construction, availability of supply to meet demands, and conditions that influence shifts in recreation patterns.

Alternative 1 – No Action

An underlying assumption in Alternative 1 is that inventoried roadless areas, outside of Wilderness and other designated areas, would be available for resource management activities that may degrade their unroaded characteristics. Road construction, timber harvesting, and other resource management activities in inventoried roadless areas (where land management plan prescriptions allow it) would reduce the supply of land available for dispersed recreation opportunities in the SPM, SPNM, and P classes. Since national prohibitions do not apply to this alternative, it has a relative low ranking for its ability to maintain a supply of unroaded areas.

Demand for SPM, SPNM, and P dispersed recreation opportunities is increasing (Cordell and others 1999b) in an environment of diminishing supply. The supply of lands suitable for these activities would continue to decline under this alternative, along with opportunities to resolve controversy about the appropriate balance between motorized and non-motorized dispersed recreation activities.

Alternatives 2 through 4

Because the national prohibitions are applied to the highest number of total acres, these alternatives would maintain the highest relative supply of lands with dispersed recreation potential. Availability of unroaded areas for forest visitors seeking primitive and semi-primitive recreation opportunities would remain high. Minor shifts in recreation use might occur because of timber harvesting allowed in Alternatives 2 and 3. For example, hunting or berry picking could be enhanced in timber harvest areas; lands that were avoided because of insect infestations could draw backcountry uses once they are treated.

These shifts, however, would have little or no effect on the overall supply or availability of inventoried roadless areas maintained for P, SPNM, and SPM recreation opportunities; therefore, Alternatives 2, 3, and 4 are barely distinguishable. This cluster of alternatives is rated high because they would provide considerable and immediate stability to the level of supply; whereas, Alternative 1 is rated low because it would allow for continued reduction in the supply of inventoried roadless areas maintained in an undeveloped condition.

Demand for SPM, SPNM, and P dispersed recreation opportunities is increasing (Cordell and others 1999b) in an environment of diminishing supply. Since Alternatives 2, 3, and 4 would maintain higher levels of supply, they would provide more opportunities to resolve the issue of balance between motorized and non-motorized dispersed recreation activities. Controversies might be considerably fewer than under Alternative 1 and might have a higher probability of being resolved over time.

Some level of certainty for the dispersed recreation opportunities available on NFS lands would be added under these alternatives, although minor shifts would occur as use patterns, local priorities, and environmental conditions change. Under these alternatives, approximately 44% of NFS lands would be available for road-based and developed recreation (primarily U, R, and RN) and 56% would be available for dispersed recreation (primarily P, SPNM, and SPM). The lands available for dispersed recreation would include acres of designated Wilderness, inventoried roadless areas, and acres outside inventoried roadless areas and Wilderness that restrict road construction and reconstruction by land management plan prescription.

Creating a level of certainty regarding land uses on Federal lands would assist **gateway communities** in making sound economic, social, and land planning decisions. Recreation and tourism is a growing segment of the United States economy, which can contribute to the economic base in communities associated with NFS lands. Increasing demand for recreation on NFS lands will continue to provide economic opportunities for businesses and local communities. These recreation opportunities also contribute to the quality of life and **sense of place**.

In the past, communities could base decisions on the developed and **road-based recreation** opportunities; however, dispersed recreation opportunities were more unpredictable. Selection of Alternatives 2 through 4 would define the Agency's position regarding the value of inventoried roadless areas and would set the stage for continued maintenance of dispersed recreation opportunities.

Forecasting continued availability of dispersed recreation opportunities would assist communities in determining where to place their priorities. Examples of where this has benefited communities in the past are:

- Towns and villages along the Appalachian Trail have created a service infrastructure for millions of people that hike through their areas;
- Moab, Utah has shifted to a mecca for mountain bikers and OHV use;
- Sedona, Arizona provides extensive 4-wheel drive touring services to explore the spectacular red rock country;
- Hood River and The Dalles in Oregon cater primarily to wind surfers; and
- Ely, Minnesota, is shifting to a more diversified economic base by supporting increasing demands for canoeing opportunities.

From a national perspective, areas with roadless characteristics will become increasingly more important as the nation's population grows and the country becomes more intensely developed. Besides reversing the decline in the number of acres of roadless areas, Alternatives 2, 3, and 4 would more sharply focus the management emphasis in these

areas on roadless characteristics. Land managers would balance recreation demands with other key values such as maintenance of ecosystem and scenic integrity, clean water, wildlife viability, biodiversity, landscape character, research opportunities, traditional cultural properties, and sacred sites.

Developed and Road-based Recreation Activities

Affected Environment

Even though about 44% of NFS lands are available for developed and road-based recreation, demand for new opportunities is increasing (Cordell and others 1999b). Camping and picnicking at developed sites, driving for pleasure, visiting interpretive sites and visitor centers, riding personal watercraft, and participating in road dependent dispersed recreation are examples of activities associated with the developed end of the ROS. This involves greater social interaction with other people, higher levels of managerial control, and more evidence of human activity, which are summarized in Tables 3-46, 3-47, and 3-48. The experiences described in Table 3-46 are highly probable outcomes of participating in recreation activities in specific recreation settings. Traditionally, expansion of these opportunities would occur in unroaded areas, ultimately shifting the ROS classes from P, SPNM, and SPM to Roaded Natural or Rural.

Table 3-46. Recreation opportunity spectrum social setting criteria.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
Usually less than 6 parties per day encountered on trails and less than 3 parties visible at campsite.	Usually 6-15 parties per day encountered on trails and 6 or less visible at campsites.	Low to moderate contact frequency. ^a	Frequency of contact is Moderate to High on roads: Low to Moderate on trails and away from roads. ^a	Frequency of contact is Moderate to High in developed sites, on roads and trails, and water surfaces; Moderate away from developed sites. ^a	Large numbers of users onsite and in nearby areas.

^a Specific numbers must be developed to meet regional or local conditions. (USDA Forest Service 1982)

Roads associated with recreation sites and activities, although low in number of miles, would continue to be constructed or reconstructed in inventoried roadless areas. National prohibitions would have an immediate effect on road construction.

About 33 miles of roads are planned for construction or reconstruction in the next 5 years to support or access dispersed or developed recreation opportunities. They all occur within portions of inventoried roadless areas that have become developed with classified

Table 3-47. Recreation opportunity spectrum managerial setting criteria.

Primitive	Semi-primitive non-motorized	Semi-primitive Motorized	Roaded natural	Rural	Urban
On-site regimentation low with controls ^a primarily off-site.	On-site regimentation and controls ^a present but subtle.	On-site regimentation and controls ^a present but subtle.	On-site regimentation and controls ^a are noticeable, but harmonize with the natural environment.	Regimentation and controls ^a obvious and numerous, largely in harmony with the man-made environment.	Regimentation and controls ^a obvious and numerous.

^a Controls can be physical (such as barriers) or regulatory (such as permits). (USDA Forest Service 1982)

^b Sensitivity level 1 and 2 travel routes from Visual Management System USDA Handbook 461. (USDA Forest Service 1982)

roads, recreation sites, and other constructed features. These developed portions of inventoried roadless areas have lost their roadless character, and may have shifted the ROS setting to Roaded Natural. National prohibitions would apply to these areas, and planned road construction or reconstruction would not occur in the action alternatives.

The alternatives are compared by their relative supply of inventoried roadless areas available for expansion of developed recreation, roads, and road-based recreation. Alternatives are rated low that maintain a higher supply of unroaded areas because they would result in a lower supply of settings for more development based recreation activities. Future expansion of more urban oriented recreation would then occur in areas already developed, increasing the density of use. Alternatives are rated high that would allow for future expansion into inventoried roadless areas.

Alternative 1 – No Action

Developed and road-based recreation would continue to expand into inventoried roadless areas primarily for two reasons. First, recreation use follows roads constructed for another purpose, such as timber or fire prevention; and second, popular dispersed recreation sites are developed to manage use and to eliminate resource damage.

This alternative would provide the most opportunity for developed and road-based recreation to occur. There would be no national prohibitions in place to restrict continued development of inventoried roadless areas. Opportunities to shift from Primitive and Semi-primitive settings to road-based and developed classes of recreation would be maximized. As a result, Alternative 1 receives a relative rating of high.

Alternatives 2 through 4

Because the national prohibitions are applied to all the inventoried roadless areas, these alternatives would maintain the lowest supply of lands with developed recreation potential. Access for forest visitors seeking road based or developed recreation

Table 3-48. Recreation opportunity spectrum evidence of human criteria.

Primitive	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural	Urban
<p>Setting is essentially an unmodified natural environment. Evidence of humans would be unnoticed by an observer wandering through the area. Evidence of trails is acceptable, but should not exceed standard to carry expected use. Structures are extremely rare.</p>	<p>Natural ^a setting may have subtle modifications that would be noticed but not draw the attention of an observer wandering through the area. Little or no evidence of primitive roads and the motorized use of trails and primitive roads. Structures are rare and isolated.</p>	<p>Natural ^a setting may have moderately dominant alternations but would not draw the attention of motorized observers on trails and primitive roads within the area. Strong evidence of primitive roads and the motorized use of trails and primitive roads. Structures are rare and isolated.</p>	<p>Natural ^a setting may have modifications which range from being easily noticed to strongly dominant to observers within the area. However from sensitive ^b travel routes and use areas these alternations would remain unnoticed or visually subordinate. There is strong evidence of designed roads and or highways. Structures are generally scattered, remaining visually subordinate or unnoticed to the sensitive ^b travel route observer. Structures may include power lines, micro-wave installations, etc.</p>	<p>Natural ^a setting is culturally modified to the point that it is dominant to the sensitive^b travel route observer. May include pastoral, agricultural, intensively managed wildland resource landscapes, or utility corridors. Pedestrian or other slow moving observers are constantly within view of culturally changed landscape. There is strong evidence of designed roads and or highways. Structures are readily apparent and may range from scattered to small dominant clusters including power lines, microwave installations, local ski areas, minor resorts and recreation sites.</p>	<p>Setting is strongly structure dominated. Natural or natural-appearing elements may play an important role but be visually subordinate. Pedestrian and other slow moving observers are constantly within view of artificial enclosure of spaces. There is strong evidence of designed roads and or highways and streets. Structures and structure complexes are dominant, and may include major resorts and marinas, national and regional ski areas, towns, industrial sites, condominiums or second home developments.</p>

^a In many Southern and Eastern forests what appears to be natural landscapes may in actually have been strongly influenced by humans. The term natural appearing may be more appropriate in these cases.

opportunities would also be low. The road prohibition is consistent throughout; therefore, these alternatives are indistinguishable regarding their ability to expand development in inventoried roadless areas. As a group, they are rated low because they would immediately prohibit road construction and reconstruction and reduce the possibility of shifts from primitive and semi-primitive ROS settings to Roded Natural or Rural experiences.

Most recreation use on NFS lands depends on roads for access to developed sites. Increased recreation use of all types will increase demand for more roads and more developed sites. For example, a popular dispersed recreation area near a road may become a developed site to minimize environmental damage and manage the number of people; popular backcountry destination areas may require new trailheads; or, as the NFS road system stabilizes, increased use may require reconstruction to a higher level of design. Since expansion into inventoried roadless areas would not be likely, increased demand for opportunities at the more developed end of ROS would occur in existing areas available for development or road based recreation opportunities.

Historically, dispersed recreation followed roads built for timber, fire, or other resource management activity. As use became heavy and demand for amenities increased, some areas became suitable for developed sites. This resulted in wide dispersion of small to medium sized developed sites. This option would no longer be available in inventoried roadless areas under Alternatives 2 through 4. All future increased developed recreation demand would be met and concentrated in areas already available for development.

Under Alternatives 2 through 4, many existing developed sites would require expansion, and their design levels would be raised. Concentrations or clusters of developed sites would become more common. Road-design standards would be raised to handle increased volumes of traffic. Higher concentrations of people would require more infrastructure, high intensity management, and law enforcement. Whereas, campgrounds and other developed sites have been traditionally designed for Semi-Primitive Motorized to Roded Natural ROS classes, design standards would shift to Roded Natural and Rural. This condition would be especially apparent in areas where demand for developed and road-based recreation is highest; usually this occurs closest to large population centers and areas with attractions that draw large numbers of people.

Effects of Social and Economic Mitigation on Recreation

Some road construction and reconstruction associated with mineral development would be allowed, which may cause shifts in the type of recreation opportunities available. Local areas would experience the effects of individual developments; however, from a national perspective the effects on dispersed recreation in inventoried roadless areas would be minimal.

Other Indirect and Cumulative Effects on Recreation

Demand for developed and dispersed recreation will continue to grow (Cordell and others 1999b). Growing recreation demand on NFS lands is and will be driven by population increases, population migration to areas close to NFS lands, the travel and tourism industry, expanded information services, new and shifting recreation activities and technology, influence of special interest groups, and actions of other land management agencies. However, specific projections regarding developed and dispersed recreation growth would be speculative, and would not add substantially to our understanding of the incremental contributions from the alternatives considered in this FEIS. Although the Forest Service has very little, if any, control over this growing demand, it does have control over how it manages the effects.

In the next 40 years, as demand increases, there would likely be more competition for recreation uses and conflicts between recreation users. Carrying capacity for developed and dispersed recreation will exceed supply in various locations throughout the country. In particular, the Eastern United States, areas close to urban population centers, and popular attractions will experience stress due to increased competition. Carrying capacity would usually be exceeded if heavy resource damage occurs, management standards cannot be met, or user satisfaction can no longer be provided. This situation is often related to developed and road based recreation opportunities. However, in dispersed areas close to high population centers and attractions, these management challenges would also become prevalent. In situations where carrying capacity is exceeded, aggressive administrative controls, such as entry stations, closures, increased compliance and law enforcement, increased use of reservation, fee, and permit systems, rest and rotation of recreation areas and facilities, and more dependency on the private sector, would be implemented to manage use. A road system with fewer miles would tend to exacerbate the situation.

Supply of inventoried roadless areas is the basis for comparing alternatives. If an action alternative (Alternatives 2 through 4) were selected, the supply of inventoried roadless areas would be stabilized at close to 58.5 million acres. Coupling acres of inventoried roadless area with the 34.7 million acres of designated Wilderness provides a more complete picture of NFS lands available for Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized dispersed recreation opportunities. The total area available for dispersed recreation opportunities would then approach 93.2 million acres, or 48% of NFS lands.

Data are unavailable to identify the number of available NFS acres outside of Wilderness and inventoried roadless areas with road construction and reconstruction restrictions. However, a conservative estimate would place the amount at approximately 15 million additional acres. Although this is a rough estimate, the total acreage of inventoried roadless areas, designated Wilderness, and other NFS lands with road construction restrictions can serve as a baseline for discussion of cumulative effects. Areas without road construction restrictions are generally available for developed and road based recreation activities and are estimated at 84.1 million acres.

Within the context of NFS lands, analysis identified factors that might have major, minor, or no effect on the baseline of recreation supply. The proposed Roads Policy could cause a major shift in the national baseline of recreation supply. The most common scenario associated with road decommissioning is to reduce road density, not to create unroaded areas. However, the possibility exists that there could be an increase of 10%, or 8.4 million acres, of unroaded areas created over the next 40 years due to road decommissioning. This would decrease the supply available for developed and road based recreation opportunities.

Factors that might have minor effects on the baseline of recreation supply include lands acquired through purchase, exchange, or legislation; reduced access because of private property closures; temporary use restrictions; or fish and wildlife protection closures. These factors may cause recreation use shifts in localized areas or cause small incremental shifts over long periods. However, they typically would not cause major shifts in the national baseline of recreation supply.

Another factor that would not change the baseline recreation supply but would reduce the supply of inventoried roadless areas acres is future Wilderness designations. It is estimated that 10%, or 5.8 million acres, of inventoried roadless areas could be designated as Wilderness in the next 40 years. This amount includes the 7.2% (4.2 million acres) of inventoried roadless acres already recommended for Wilderness designation in land management plans. It also assumes that an additional 2.8 % (1.6 million acres) of inventoried roadless areas could be added to the National Wilderness Preservation System. This would maintain the baseline but could potentially displace some motorized, mechanized, and other forms of dispersed recreation use.

Actions by other land management agencies can be important factors in increasing demand for recreation opportunities on NFS lands. Public lands managed by some local, County, and State agencies, the National Park Service, and the U.S. Fish and Wildlife Service will most likely reach carrying capacity sooner than lands managed by the Forest Service. Access to private lands for outdoor recreation, particularly for Semi-Primitive and Primitive settings, will become increasingly constrained. Actions such as placing limitations on visitation or closing areas to the public (Betz and others 1999), would displace recreation use and shift more demand to available recreation opportunities on NFS lands. For example, the National Park Service is currently promulgating regulations that would reduce or eliminate certain motorized recreation equipment (snowmobiles and personal watercraft) in areas under its jurisdiction. This reduction in supply of public lands for motorized recreation use may put additional pressure on the Forest Service to allow or continue to allow the uses on NFS lands. This action may also increase the use of motorized recreation where allowed. Snowmobiling, which is a recreation activity suited for unroaded areas, is expected to be one of the fastest growing outdoor recreation activities over the next 40 years (Bowker and others 1999). As the demand increases and supply of land diminishes, the future issue for the Forest Service is likely to be striking the appropriate balance between motorized (for example, snowmobiling) and non-motorized (for example, cross-country skiing, snow shoeing) uses in unroaded areas; these are uses generally thought to be incompatible.

Use of personal watercraft (jet skis), on the other hand, is usually associated with developed recreation because roaded access and boat ramps are needed. If any of the action alternatives are implemented, no new roads could be constructed to lakes or rivers in inventoried roadless areas, which would result in limited access to new venues for personal watercraft. In this case, effects of the National Park Service action and the Roadless Rule would be additive in reducing areas (present and future) for use of personal watercraft.

Another current example is the Bureau of Land Management action to develop a national strategy regarding OHV use. The Bureau of Land Management manages the largest supply of Federal lands where opportunities for motorized recreation are abundant. Although the outcome of this action is uncertain at this time, there is a trend for land management agencies to more closely monitor and manage OHV use. Any limitations on OHV use resulting from this action on Bureau of Land Management lands would likely increase demand for OHV use on NFS lands.

Recreation Special Uses

Frequently, visitors to national forests turn to others to facilitate their recreation experience. This may come in the form of lodging, rental equipment, or guiding services. Recreation special use authorizations are employed by Forest Service managers to allow others to provide these desired services. They form a legally binding relationship between the Forest Service and other entities, primarily from the private sector. However, some recreation special use permit holders are nonprofit organizations and other government agencies.

Dispersed Recreation Activities

Affected Environment

Outfitters and guides for activities such as sightseeing, hunting, fishing, and rafting provide most recreation opportunities authorized by special use permits in unroaded areas. Some dispersed recreation opportunities are offered by special use permit holders in association with their management of ski areas, resorts, marinas, and organization camps. Outfitters and guides help visitors enjoy high quality experiences as an extension of the Agency's mission. Even though they provide a small fraction of the total recreation visitor days that occur on national forests, they benefit the visitor, resources, and economy of communities where outfitters and guides are based (USDA Forest Service 1997b).

Visitor demand for a diversity of experiences, settings, and opportunities on national forests continues to increase (Cordell and others 1999b). Many are capable of total self-sufficiency in conducting their activity, but many people want assistance to experience the outdoors. For instance, people with disabilities and first time visitors often choose outfitters and guides to gain access to opportunities, experiences, and settings that would otherwise be unavailable to them.

Outfitting and guiding activities in inventoried roadless areas usually provide recreation opportunities for an unconfined type of outdoor recreation, free of the urban influence. These activities are matched with the appropriate ROS setting (Table 3-43) identified in the land management plan. In areas managed as P and SPNM, opportunities such as hiking, boating, caving, mountaineering, hunting, horseback riding, fishing, cross-country skiing, mountain biking, dog sledding are offered. Areas managed as SPM offer additional opportunities, such as motorized rafting and boating, snowmobiling, OHV driving (motorcycle, ATV, or 4x4), and aircraft transport to remote areas (Table 3-41).

The need for a particular type of special use authorization is determined in the land management plan or by user demand. Increased marketing is one of the key forces driving greater demand for outdoor recreation opportunities on NFS lands. For many communities adjacent to public lands, recreation opportunities provide the potential to diversify their economies. Chambers of commerce, visitor bureaus, and businesses providing a wide range of services for America's travelers use many forms of communication, including the Internet, to offer information about recreation opportunities on Federal lands near their area. These gateway communities are extremely attractive to visitors because of their quality of life and sense of place, factors that are interdependent with the public lands in the vicinity (Abbott and Sheridan 1997).

Focusing the increasing demand for outdoor recreation opportunities through effective marketing has created a growing demand for outfitting, guiding, and ecotourism services in inventoried roadless areas. Therefore, demand for special use permits to provide these services is also on the rise. Through the NEPA process, the Agency responds to these demands within a framework of creating balance between competing resource needs and of the land's capacity to accommodate increased recreation use. Supply of unroaded areas is decreasing.¹³ Alternatives in this rulemaking that maintain the highest supply of total acres have the highest relative ability to accommodate increased demand for outfitting and guiding services. Alternatives with low supply accommodate fewer opportunities for commercial outfitting and guiding experiences for forest visitors and fewer special use permits issued to local businesses.

Comparison of the alternatives shows that effects on demand for outfitting and guiding services and special use permits are similar to those for recreation opportunities in general. Visitors to the nation's national forests are looking for the same settings, activities, and experiences whether assisted by outfitters and guides or discovering them on their own. Demand for P, SPNM, and SPM classes of dispersed recreation is increasing (Cordell and others 1999b) in an environment of decreasing supply. The alternatives fall into different levels based on their relative ability to maintain a supply of outfitting and guiding dispersed recreation opportunities. An alternative that maintains the most NFS lands in an unroaded condition and provides the most protection for roadless characteristics when compared to the other alternatives would result in a high level of supply. Conversely, a low level of supply would result from alternatives that

¹³ See discussion in Recreation, Dispersed Activities, and Affected Environment. Supply of unroaded areas is decreasing because most land allocations allowing development or creating special designations are carved out of inventoried roadless areas.

maintain the fewest acres in an unroaded condition, and offer minimal or no protection for roadless characteristics.

Alternative 1 – No Action

An underlying assumption in Alternative 1 is that inventoried roadless areas, outside of Wilderness and other designated areas, are available for resource management activities that may degrade their unroaded characteristics. Road construction, timber harvesting, and other resource management activities in inventoried roadless areas (where land management plan prescriptions allow it) would reduce the supply of unroaded areas available for outfitter and guide assisted dispersed recreation opportunities in the SPM, SPNM, and P classes. Supply of inventoried roadless areas maintained in an undeveloped condition would decline over time. Since national prohibitions do not apply to this alternative, it has a low ranking for its ability to maintain a supply of unroaded areas.

Of the 58.5 million acres of inventoried roadless areas, 41% are covered by land management-plan prescriptions that restrict road construction and reconstruction. The other 59% are not. Those inventoried roadless areas open to road construction could be affected in the short term, and even those currently protected could be affected over the long term as local conditions and situations change.

Alternatives 2 through 4

Because the national prohibitions are applied to the highest number of areas and total acres, these alternatives would maintain the highest level of supply of lands with potential for outfitter and guide assisted dispersed recreation. Minor shifts in assisted recreation use may occur because of timber harvesting allowed in Alternatives 2 and 3. For instance, most outfitters and guides prefer natural appearing landscapes, so cutover areas could be avoided until they grow back; or, on the other hand, timber harvested areas may attract use because of increased hunting, wildlife viewing, or berry picking opportunities.

In the final analysis, these shifts would have little or no effect on the overall supply or availability of inventoried roadless areas maintained for P, SPNM, and SPM recreation opportunities; therefore, Alternatives 2, 3, and 4 are barely distinguishable. These alternatives are rated high because they would provide considerable and immediate stability to the level of supply, maintain the most access for forest visitors, and allow for the highest opportunity for services authorized by special use permits.

When inventoried roadless areas are managed for their unroaded characteristics, the associated uses are complementary. Outfitting- and guiding-assisted dispersed recreation opportunities would be balanced to complement the other key values such as, maintenance of high ecosystem and scenic integrity, clean water, wildlife viability and biodiversity, landscape character, research opportunities, traditional cultural properties, and sacred sites. Focusing management activities on these few multiple-use activities would enable managers to determine appropriate capacity for outfitting and guiding operations. In the short term, some operations might need to be shifted. Over the long term, the national prohibitions would begin to create a level of certainty regarding

dispersed recreation opportunities. This would enhance Forest Service managers' ability to make sound decisions regarding overall management of unroaded areas and special use permit holders' ability to make long-term business decisions.

Stable land uses on Federal lands would allow communities in and around national forest to make sound economic, social, and land use planning decisions. Outfitting and guiding on NFS lands is an important aspect of recreation and tourism, and can be a key component of local economies. In the past, availability of unroaded areas was unpredictable. Continued availability of unroaded areas for P, SPNM, and SPM dispersed recreation opportunities would assist communities and small businesses in setting their priorities.

Developed and Road-based Recreation Activities

Affected Environment

While outfitter and guide activities are the primary uses requiring a permit in inventoried roadless areas, there are potential effects associated with campgrounds, resorts, ski areas, and other developments that are located nearby. In several cases land management plans have identified inventoried roadless areas for future expansions of existing special uses, or special use have been issued with expansion into inventoried roadless areas as part of the approved activities. In these cases, the holder has made business decisions based on the possibility of future expansion.

Holders of special use permits providing developed recreation opportunities are in various stages of master plan development, revision, or implementation. Many proposed projects are planned for construction in inventoried roadless areas, some within their authorized permit boundary and some outside their authorized permit boundary. Included in the mix of projects proposed in inventoried roadless areas are three new ski areas. All of these projects go through many levels of scrutiny before they are approved, including feasibility study, land management planning, master development planning, and NEPA review.

Comparison of the alternatives is based on the relative ability of the special use permit holders to proceed with the process of planning and implementing their projects; or, in the case of new recreation developments, their ability to proceed with the process to acquire a special use permit. Those alternatives that allow the projects to proceed under existing policy and safeguards would be rated high. Those that preempt existing procedures, creating a situation where the project may be placed in jeopardy because of imposed restrictions would be rated lower.

It should be noted that activities and constructed features of ski area development and management are primarily consistent with Rural and Urban ROS classes. That is, the setting, experience, and activities usually associated with ski areas are more in line with the developed end of the ROS. This is inconsistent with management of inventoried roadless areas for roadless characteristics. Because of the sharp contrast between ski area characteristics and those of inventoried roadless areas, controversy has been high and will

continue. It may become increasingly more difficult for ski area expansion or new construction because of increased regulatory jurisdictions, complex procedures, and heightened public scrutiny.

Alternative 1 – No Action

Under this alternative, projects associated with campgrounds, resorts, ski areas, or other entities that hold special use authorizations would proceed with planning. The largest category of projects proposed is ski area expansion or new ski area development. Determination of actual implementation in inventoried roadless areas would be dependent on existing policy, not on a decision influenced by an overlay of national prohibitions. Because all proposals, no matter what stage of planning or implementation, would be allowed to proceed under existing Forest Service policy, this alternative has a relative rating of high.

Alternatives 2 through 4

Proposed expansion of ski areas, resorts, or other recreation developments into inventoried roadless areas would be allowed to continue under existing Forest Service procedures if special use permits are in existence and proposed activities take place within boundaries established by the special use permit. Proposed expansion or new construction, inside or outside an authorized special use permit boundary, in an inventoried roadless area that has been approved by a signed Record of Decision, Decision Notice, or Decision Memo before implementation of the proposed rule, would also not be subject to the prohibitions.

New construction or projects proposed outside the authorized special use permit boundary in inventoried roadless areas could be subject to the prohibitions; it would depend on the type of project and how it would be constructed. For example, if it were possible to design and build a project without road construction or reconstruction, the project would not be prohibited and could proceed complying with existing processes in Alternative 2. If a proposed project could be designed and built without road construction or reconstruction and timber harvesting (assuming timber harvesting for stewardship purposes is not appropriate for clearings created for developed recreation), it could proceed with normal Forest Service procedures in Alternatives 3 and 4.

It is unlikely that new ski areas would be built under any of these alternatives unless it already had a Record of Decision before implementation of the final rule. Impacts on categories (other than ski areas) of developed recreation special use permit holders would be minimal from a national perspective.

One project proposed in an inventoried roadless area is expected to have a Record of Decision in place before implementation of the final rule; it is an expansion of an existing ski area. It would not be subject to national prohibitions. Six other proposed projects will not have a decision in place before implementation of the final rule, three are new ski areas and three are expansions of existing ski areas. All of these projects would be subject to the national prohibitions. Being subject to national prohibitions probably would affect

their ability to proceed with planning and implementation of the projects if road construction and reconstruction is planned.

Future ski area expansion of any kind outside existing authorized permit boundaries would probably not occur in Alternatives 2, 3, and 4 because roads would not be allowed. Although the alternatives have a different mix of prohibitions, the overall effect on ski areas would be similar. These alternatives are rated low because national prohibitions would affect some existing planned projects and would have a considerable effect on new ski areas or expansion of existing ski areas beyond their authorized permit boundaries.

Effects of Social and Economic Mitigation on Recreation Special Uses

Some road construction and reconstruction associated with mineral development would be allowed, which may cause shifts in the type of recreation opportunities available. Local areas would experience the effects of individual developments; however, from a national perspective the effects on recreation activities associated with outfitters and guides in inventoried roadless areas would be minimal.

Other Indirect and Cumulative Effects on Recreation Special Uses

Increasing demand for dispersed developed, and road-based recreation opportunities (Cordell and others 1999b) could affect private-sector delivery of recreation products and services. Over the next 40 years, budget limitations would most likely cause the Forest Service to turn more often to the private sector to construct and manage developed recreation facilities and to provide more dispersed recreation opportunities through outfitters and guides. As demand continues to increase, the private sector will play a more important role in the delivery of recreation related products and services on NFS lands.

Future expansion of ski areas, resorts, and other developed recreation entities that require a special use permit would only be able to expand into inventoried roadless areas within their existing authorized permit boundary if the preferred alternative is selected. NFS lands would no longer be the reservoir for future ski areas because lands suitable for ski area development are usually associated with high elevation unroaded areas. One major ski area expansion has been approved on NFS lands in the last 20 years. Ski area use, nationwide, is relatively flat. Because of this, it is expected that there would be little impact in the near future. Over time, however, the number of ski areas would become finite in number and size, resulting in increased resource impacts and demand for more support facilities and infrastructure. Future opportunities, although limited by the amount of suitable lands available for ski area development, would occur on private, Tribal, or other government lands, or through legislation.

Scenic Quality

Affected Environment

High quality scenery, especially scenery with natural-appearing landscapes, enhances people's lives and benefits society. It is a primary reason that people choose to recreate on the NFS lands, and contributes directly to real estate values in neighboring communities and residential areas. Scenic quality is based on two definable elements, landscape character, and scenic integrity. Landscape character is the overall visual impression of landscape attributes that provide a landscape with an identity and sense of place. It consists of the combination of physical, biological, and cultural attributes that makes each landscape identifiable and distinct. Scenic integrity is a measure of the wholeness or completeness of the landscape, including the degree of visual deviation from the landscape character valued by constituents. A landscape, which is perceived to have minimal to no deviation from the valued landscape character, is rated as Very High or High scenic integrity. Those landscapes, which appear to be heavily altered, have Low to Very Low scenic integrity (USDA Forest Service 1996a).

The scenic quality of a forest is not static; it changes over time. To varying degrees, roads, timber harvest, insect infestations, and wildland fire events all affect the scenic integrity of a landscape. The Agency has limited control over natural events such as insect infestations and wildland fire. Managers may influence the effects of natural events to some extent by managing vegetation with silvicultural and fuels treatments. In these instances, the positive effects on scenic quality resulting from reducing the effects of these natural events are, to some extent, offset by the negative effects of road construction and vegetative treatments, depending on an individual's perspective.

All resource management activities in inventoried roadless and unroaded areas strive to achieve long-term sustainable Landscape Character Goals¹⁴ within the Scenic Integrity Objectives identified in the land management planning process. The scenic integrity of landscapes in these areas is generally High or Very High, which indicates a low level of landscape modification due to a lack of high intensity management activities in the past; however, altered landscapes do exist in some areas due to activities such as mining, grazing, and special uses. These areas tend to have lower levels of scenic integrity.

Inventoried roadless areas generally have landscapes with High to Very High scenic integrity. Evaluation of the alternatives, therefore, is based on the relative potential for reducing the scenic integrity. Reducing scenic integrity would affect the overall high level of scenic quality. Scenic quality would be higher in those alternatives that prohibit resource management activities that create alterations in the landscape or reduce the amount of acres managed to maintain roadless characteristics. The alternatives fall into distinct groups based on the extent to which they would maintain the high level of scenic quality that exists in unroaded areas.

¹⁴Landscape Character Goals and Scenic Integrity Objectives are terms defined in the Scenery Management System (USDA Forest Service 1996a) used by the Forest Service in planning and implementing activities that affect the visual landscape.

Alternative 1 – No Action

Under Alternative 1, inventoried roadless areas would be available for resource management activities that could affect their unroaded status or roadless character. Impacts on the scenic quality from resource management activities that require roads or other modifications of the landscape would be the most severe in this alternative because there would be no national prohibitions as a screen during planning. Conversely, there might be some positive effects on scenic quality from silvicultural and fuels treatments that reduce the potential magnitude of natural events such as insect infestations and wildland fires. Relative to all other alternatives, however, Alternative 1 would have a low ability to maintain scenic quality.

Alternatives 2 through 4

Alternatives 2 and 3 would allow timber harvesting that would result in short-term disturbances on the scenic integrity. However, the amount and types of timber harvest allowed in inventoried roadless areas would enhance vegetative health and reduce fuel loading, thereby providing protection from pests, diseases, and large fires. Over the long term, scenic integrity could be maintained or improved.

No short-term disturbances or long-term benefits would accrue because of timber harvesting in Alternative 4, but long-term improvement of ecosystems with health problems or other conditions that would benefit from vegetation manipulation would not occur. This alternative has the highest probability of reduced scenic quality resulting from catastrophic natural events. From a national perspective, though, the differences between these alternatives would be minimal, and they would all have the ability to maintain high levels of scenic quality. They have a relative rating of high.

Inventoried roadless areas managed for their unique characteristics and values would have a beneficial effect on scenic quality from a national perspective. These valued characteristic landscapes are visual images of geographic areas that consist of a combination of their unique and identifiable physical, biological, and cultural attributes. Managing for ecological health, viable populations of fish and wildlife, clean water, low impact recreation opportunities, and research are all complementary activities. Each contributes to the overall scenic integrity or wholeness of the landscape character.

From a local perspective, maintenance or enhancement of high scenic quality attributes would contribute to the economic and cultural viability of gateway communities and to the well being of its visitors and residents. Inventoried roadless areas are the backdrop and ‘backyard’ for many gateway communities. Communities in and around NFS lands tend to foster a unique sense of place. Sense of place is the result of the cumulative experiences a person receives by visiting or living in an area; it is the setting within which the community is identified, and it is the area where people work and play. Sense of place produces a mental image and positive feelings. High scenic quality is a key component of sense of place. Scenery, architecture, land-use patterns, wildlife, and available activities all contribute to quality of life.

Effects of Social and Economic Mitigation on Scenic Quality

Some road construction and reconstruction associated with mineral development would be allowed. This could cause considerable deviation from the landscape character in a few areas throughout the nation; however, from a national perspective the effects on scenic quality would be minimal.

Other Indirect and Cumulative Effects on Scenic Quality

Inventoried roadless areas generally have landscapes with High to Very High scenic integrity. Evaluation of the alternatives is based on the relative potential for reducing, maintaining, or increasing the scenic integrity. If an action alternative were selected, scenic integrity would be maintained or improved on 58.5 million acres of NFS lands. Combining the number of inventoried roadless area acres with 34.7 million acres of designated Wilderness provides a more complete picture of NFS lands with high to very high scenic quality. The total area being managed for high scenic quality would approach 93.2 million acres.

Data are unavailable to identify the number of NFS acres outside of Wilderness and inventoried roadless areas with road construction and reconstruction or other development restrictions in land management plans. However, a conservative estimate would place this figure at approximately 15 million additional acres, or 15 million additional acres that would contribute to maintenance of High to Very High scenic integrity. Although this is a rough estimate, the total acreage of inventoried roadless areas, designated Wilderness, and other NFS lands with restrictions on development can serve as a baseline for discussion of cumulative effects. Areas without restrictions, generally those with management prescriptions that allow a wide range of development activities and may have less capability to maintain high scenic quality, total 84.1 million acres.

Within the context of NFS lands, analysis identified factors that may have major, minor, and no effect on the baseline high scenic quality. The only reasonable foreseeable factor that could cause a major shift in the baseline acres managed for High and Very High scenic integrity is the proposed Roads Policy. The most common scenario associated with road decommissioning is to reduce road density, not create unroaded areas. However, the possibility exists that there could be an increase of 10%, or 8.4 million acres, of unroaded areas created over the next 40 years due to road decommissioning. This may increase the number of acres available to be managed for a heightened level of scenic quality.

Factors that might have minor effects include lands acquired through purchase, exchange, or legislation; temporary visual impacts from fire, flood, or other catastrophe; or deviations from the characteristic landscape caused by multiple-use activities. These factors may cause scenic quality shifts in localized areas or cause small incremental shifts over long periods. However, they typically would not cause a major shift in the national baseline for high scenic quality.

Another factor that would not change the baseline for high scenic quality, but would generally raise the scenic integrity levels, is future Wilderness designations. It is estimated that 10%, or 5.8 million acres, of inventoried roadless areas could be designated as Wilderness in the next 40 years. This amount includes the 7.2% (4.2 million acres) of inventoried roadless acres already recommended for Wilderness designation in land management plans. It also assumes that an additional 2.8% (1.6 million acres) of inventoried roadless areas could be added to the National Wilderness Preservation System. This would maintain the baseline, but potentially shift scenic quality to higher levels.

Actions taken by other land management and regulatory agencies are important factors in maintaining high scenic quality from a national perspective. Most land management agencies administer their lands with some form of visual goals integrated into their planning processes. However, the mission of each agency determines that they will manage the natural landscape for high scenic quality. For instance, the National Park Service, U.S. Fish and Wildlife Service, and some parkland managed by local and State agencies manage their lands to maintain the very highest levels of scenic quality. Although a small percentage of these lands are highly modified to handle the large numbers of people drawn to the attraction. Other agencies, such as Bureau of Land Management or State resource development departments, have missions that focus on resource management. The Army Corps of Engineers, Bureau of Reclamation, and local parks, have missions to primarily manage for developed or road-based recreation. Lands managed by these agencies would typically have higher percentages of modified landscapes resulting in lower scenic quality of natural landscapes in some areas.

Certain regulatory agencies have effects on the scenic quality of landscapes at the regional and local scale. For instance, State Coastal Commissions have strong mandates to maintain high scenic quality along their coastlands. Various local commissions throughout the nation use zoning to preserve particular views or valued landscape features. Much of the scenic backdrop and open space around communities is private land. Large ranches, private landholdings, and agricultural lands are being developed at an accelerated pace. As more and more of this land is developed, public awareness of the loss of natural landscapes with high scenic quality has increased and resulted in national efforts focused on maintaining areas of high scenic value. These efforts resulted in the Scenic Highway movement, Wild and Scenic Rivers System Act, American Heritage Rivers program, anti-billboard campaigns, and anti-litter laws.

High scenic quality of natural landscapes is an important component of our national heritage. Over time, the last vast natural landscapes with high scenic quality will be those managed by agencies responsible for the Federal lands. Over the next 40 years, as private lands continue to be developed, and as public lands continue to be altered by management actions, the value of natural landscapes of high scenic quality will continue to increase. Consideration for maintenance of natural landscapes with high scenic quality will play an increasingly larger role in decisions that would cause visual impacts. This may increase the number of acres available to be managed for a heightened level of scenic quality.

Heritage Resources

Affected Environment

Heritage resources include areas, sites, buildings, art, architecture, memorials, and objects that have scientific, historic, or cultural value. They link people to their cultural history, provide insight into how people lived in the past, and reveal past and ongoing relationships between people and the natural world. Many of the nation's heritage resources are located on Federal lands, with NFS lands containing a substantial share.

Under Executive Order 11593, "Protection and Enhancement of the Cultural Environment," Federal agencies are charged with the task of inventorying the historic and prehistoric sites located on the lands they manage. More than 270,000 heritage sites have been inventoried on NFS lands to date (USDA Forest Service 1999f). Approximately 25% of all NFS lands have been inventoried for heritage sites. It is estimated that NFS lands may contain up to 1 million heritage sites (Kaczor personal communication).

The National Historic Preservation Act of 1966, as amended through 1992, and the NEPA (1970) both require Federal agencies to take into account the effects of any development or management actions on historic and cultural properties, which are protected under these laws. Agencies must identify any historic or cultural properties that will potentially be affected by the preferred alternative, assess the effects of that action on those properties, and seek ways to avoid, minimize, and mitigate any adverse effects.

To comply with these laws, agencies inventory areas where projects are proposed, and they identify potential heritage sites. If a site is identified, it is evaluated to determine whether it is significant and eligible for listing in the National Register of Historic Places. If a site is significant, the preferred alternative may not proceed until steps to minimize impacts and mitigate effects are taken. Mitigation measures may also be taken if proposed projects or development activities are undertaken in areas having cultural sites that are considered significant to local American Indian Tribes and other ethnic groups.

The Archaeological Resources Protection Act of 1979 protects archaeological resources and sites on public and American Indian lands to prevent their loss and destruction. The Act provides for criminal prosecution for the unauthorized disturbance of archaeological resources, including any culturally related items of Tribal affiliation. It also establishes a permit process for the management of cultural sites on Federal lands, which provides for consultation with affected Tribal governments. The Native American Graves Protection and Repatriation Act of 1990 requires timely consultation with culturally affiliated Tribes when human remains are inadvertently discovered in the course of implementing projects on Federal lands. Executive Order 13007 states that agencies must consider sacred sites on Federal lands in determining how areas that contain them should be used and managed. The Forest Service consults with more than 400 American Indian Tribes in managing the heritage sites on NFS lands (USDA Forest Service 1999f).

Of the estimated 270,000 heritage sites that have been inventoried on NFS lands, 109,000 of these are considered significant, and most of the remainder have not yet been assessed for significance (Kaczor Personal communication). Of the heritage sites that have been recorded on NFS lands, less than 1% have been stabilized or restored, most have not been studied or evaluated, and 3,000 have been listed on the National Register of Historic Places (USDA Forest Service 1999f). Approximately 2,000 heritage sites on NFS lands are interpreted in some way for the public (USDA Forest Service 1999f).

Most inventories for heritage sites have been conducted on lands where development or management projects have been proposed because of legal requirements to disclose the impacts of such projects on heritage resources. Many heritage sites that have not been inventoried probably exist in inventoried roadless areas, where development has been relatively minimal.

Heritage tourism is one of the fastest growing sectors of the tourism industry, and it is ranked among the top two or three reasons that people take vacations (USDA Forest Service 1999f). In 1994 and 1995, an estimated 123.3 million people visited an historic or prehistoric site in the United States (Cordell and others 1999b). Unfortunately, it is estimated that up to 90% of the nation's prehistoric sites were destroyed by development by the 1960s (USDA Forest Service 1999f). NFS lands contain many of the best-preserved heritage sites that remain in the United States, in some of the least disturbed natural settings. These sites provide opportunities for Americans to learn about their cultural heritage (USDA Forest Service 1999f).

Members of the public who commented on the DEIS largely supported maintaining roadless areas in a roadless state, believing this would protect heritage sites. There was some concern, however, that a prohibition on road construction could make it difficult for the Forest Service to protect historic structures and archaeological sites located in roadless areas. There was also some concern that the proposed rule would make it harder for the Forest Service to inventory heritage resources in roadless areas.

Alternative 1 – No Action

Additional road construction, road reconstruction, and timber harvest would take place in inventoried roadless areas under Alternative 1, as estimated in the National Forest System Roads and Timber Harvest sections of this chapter. The Federal laws described under Affected Environment will help to protect heritage resources under Alternative 1. Nevertheless, building roads and implementing management actions such as timber harvest can affect heritage resources. In the past, roads were often built in locations that have the highest likelihood of containing historic or prehistoric sites, such as along rivers and creeks, or through open areas. Although best management practices now discourage road development in riparian areas and floodplains, some buried or surface remains of archaeological sites may inadvertently be damaged by the earth-moving equipment used in the road construction process, or by logging equipment (USDA Forest Service 2000h). Roads may also cause increased erosion of historic or cultural sites.

However, road construction and reconstruction and timber harvest could lead to the inventorying of as yet unrecorded heritage resources that are located in areas where projects or development are planned. As a result, additional information regarding heritage resources in inventoried roadless areas would be obtained. This might eventually lead to the protection, restoration, and potential development of some of these sites for interpretive and educational purposes. However, given that fewer than 1% of known sites on NFS lands have been stabilized or restored to date, it is likely that only a small number of sites would potentially benefit.

Roads provide access to heritage sites for purposes of research, restoration, visitation, teaching, and interpretation to the public. By making these sites accessible, it is possible to raise public awareness, which helps serve to protect them. However, because they make sites known and accessible to the public, roads provide increased opportunities for vandalism and looting. Furthermore, publicizing heritage resources and increasing visitation to them can increase conflict between people who assign different values and meanings to them, and want to see them managed differently (Lee and Tainter 1999). Roads and timber harvest can also alter the character of heritage sites.

Construction or reconstruction of two heritage-related roads is planned in inventoried roadless areas within the next 5 years to provide public access to historic sites. Each of these planned roads would be 1 mile long, would provide access to a Lewis and Clark historic site, and would be located on the Beaverhead-Deerlodge National Forest in Region 1. One of the planned roads is new construction, which would take place during the year 2000. The other road is a planned reconstruction of a classified road to take place in the year 2001. Under Alternative 1, both of these roads could be built as planned.

The short-term effects of Alternative 1 on heritage resources would likely be small because of the relatively small percentage of inventoried roadless areas to be roaded and logged over the next 5 years, the legal protections already in place, and the low percentage of sites that get restored and developed for interpretive and tourism purposes. However, the long-term effects of no action could be substantial. Road construction and timber harvest would require heritage inventory work in areas targeted for development, which would enhance knowledge and documentation of the heritage resources roadless areas contain over time. A small percentage of these sites might be restored or developed for education and tourism in the future. No action could also lead to accelerated degradation of some heritage resources located in inventoried roadless areas over time.

Alternatives 2 through 4

Potential positive effects common to all of the action alternatives include:

- No new roaded access to heritage sites, meaning less potential for future disturbance, vandalism, and looting;
- Better maintenance of the current character of heritage resources and sites;
- Less conflict between interest groups over the use and management of heritage resources such as sacred sites; and

- Less risk of destruction of heritage resources through development and project-related activities.

Potential negative effects common to all of the action alternatives include:

- Less future opportunity to discover and document the heritage resources that exist in inventoried roadless areas;
- Less opportunity to protect and restore any of the sites that occur in roadless areas; and
- Less opportunity to provide tourism, educational, and interpretive opportunities to the public regarding heritage.

Timber harvest activity can alter the character of heritage resources and sites, and inadvertently damage them. Therefore, Alternative 4, which prohibits all timber harvest in inventoried roadless areas, would provide the most protection from accidental damage to heritage resources. Alternative 2, which does not prohibit any timber harvest activity in inventoried roadless areas, would provide the least amount of protection. However, Alternative 4 would provide less opportunity than Alternative 2 to discover and document heritage resources in inventoried roadless areas. The effects of Alternative 3, which allows timber harvest for stewardship purposes only, would be intermediate between Alternatives 2 and 4.

Fires can also have an impact on heritage resources. They can damage artwork, artifacts, cave shelters, pueblos, historic buildings, and other surface and near surface remains. They alter the character of historic and cultural landscapes, at least temporarily. They also remove vegetation, exposing sites and objects, and making them more vulnerable to vandalism and the elements. The Fire Suppression section of this report concludes that, nationally, the same number of inventoried roadless acres is predicted to burn from wildland fires with or without a prohibition on road construction.

However, Alternative 3, which allows timber harvest for stewardship purposes, including fuels management, could be more beneficial to heritage resources than Alternative 4. Wildland fires that burn out of control in areas where there is a buildup of fuels tend to burn intensively, and induce more damage to sites than fires that burn less intensively. Stewardship timber harvest would make it possible to use thinning as a fuels management technique. This would help to reduce the incidence of intense fires in inventoried roadless areas. Thus, Alternative 3 would be more beneficial to heritage resources than Alternative 4, from the perspective of fire damage. Under Alternative 4, fuels management methods that could take place in roadless areas would be prescribed fire, wildland fire for resource benefit, and some mechanical treatments that do not include cutting of trees.

There is not likely to be a substantial difference between the effects of Alternatives 2 and 3 with regard to fire impacts on heritage resources. Under Alternative 2, thinning for stewardship purposes would be allowed, as would **commercial timber harvest**, which is assumed to reduce the likelihood of intense, uncontrolled fires. However, because the amount of timber harvested for commercial purposes is likely to be small in inventoried roadless areas in the absence of roads, Alternatives 2 and 3 would have similar effects. None of the fire-related effects of the different alternatives discussed above, with regard to timber harvest, would start to be significantly different until at least 2020. Between

2000 and 2020, the effects of the action alternatives are likely to be the same, because under the Forest Service Cohesive Strategy, inventoried roadless areas would not begin to be treated for fuels management until 2020.

A prohibition on road construction and reconstruction would mean that no new roads would be built or reconstructed for the specific purpose of providing access to heritage sites located in inventoried roadless areas. As described under Alternative 1, during the next 5 years, a 1-mile length of new road is planned for the specific purpose of providing access to a heritage site on the Beaverhead-Deerlodge National Forest. One road is also planned for reconstruction in an inventoried roadless area over the next 5 years to provide access to a heritage site on this forest. If the proposed rule is finalized before the final decision to build or reconstruct these roads is signed, it will not be permissible to build or reconstruct them.

Overall, the action alternatives would not have a significant long-term national effect on road construction to provide access to heritage sites located in inventoried roadless areas, because the amount of road construction that takes place for this purpose is so small. There may be small, localized impacts on individual forests that would be prevented from constructing roads for this purpose in the future. Existing means of gaining access to inventoried roadless areas to visit heritage sites would be maintained under Alternatives 2 through 4. These alternatives would not preclude building new trails to provide access to heritage sites. The short-term effects of the action alternatives would likely be insignificant due to the relatively small percentage of inventoried roadless areas to be roaded and logged over the next 5 years and the legal protections already in place. The exception would be if a major site were discovered in the development or management process. The long-term effects of the action alternatives could be significant, however. The most significant long-term effects of the action alternatives would likely be conservation of heritage resources located in inventoried roadless areas over time due to a reduction of disturbance and vandalism, and a persistent lack of knowledge and documentation of the heritage resources these areas contain.

Effects of Social and Economic Mitigation on Heritage Resources

If mitigation measures are implemented for mineral leasing, an estimated 59 miles of roads could be built in inventoried roadless areas over the next 5 years, with additional road miles added over the medium and long term. These roads would be single-use roads that could not be used to provide public access to heritage sites. Road construction would take place in compliance with Federal laws designed to protect heritage resources from ground disturbing activities. However, additional road construction could cause unintended damage and character alteration to historic and prehistoric sites located near it, as described under Alternative 1. It could also lead to the inventorying of unrecorded heritage resources in the areas where roads would be constructed. It is unlikely that any sites discovered in this process would be restored or developed for education and tourism, since the mining roads constructed would not generally be open for public access.

Other Indirect and Cumulative Effects on Heritage Resources

NFS lands contain a substantial share of the nation's heritage resources, and roadless areas contain a large proportion of the heritage resources that occur on NFS lands. Given the widespread destruction of heritage resources located on private lands to date, and the rapidly growing interest in heritage tourism nationwide, heritage sites on NFS lands can be expected to become increasingly unique and valuable resources that more people wish to visit in the future. These trends will pose a dilemma for their management with regard to providing a balance of protection and visitation opportunities. The cumulative effects of these trends and of the action alternatives would be an emphasis on heritage resource and site conservation in inventoried roadless areas due to reduced disturbance and visitation, and a focus on inventory, restoration, interpretation, and tourism opportunities on NFS lands that are developed and that would allow future road construction.

A number of laws were passed during the 1960s and 1970s to protect heritage resources on public lands, as described under Affected Environment. The laws mandate procedures designed to protect heritage resources when ground-disturbing projects such as road construction and timber harvest are implemented on NFS lands. Under Alternative 1, these laws would provide protection to heritage resources and sites if development and management activity occurred in inventoried roadless areas. The action alternatives would provide an additional increment of protection to the foundation provided by these laws by prohibiting road construction, road reconstruction, and possibly some timber harvest in inventoried roadless areas, thereby preventing accidental damage to sites and reducing visitation and disturbance to them.

Wilderness

Affected Environment

The National Wilderness Preservation System (NWPS) includes almost 105 million acres; of these, approximately 34.7 million acres are NFS lands. Designated Wilderness is managed to preserve its primeval character and maintain a condition affected primarily by the forces of nature. Wilderness is a cornerstone for protecting biodiversity (especially in the West and Alaska), is valuable for scientific and educational uses, serves as a benchmark for ecological studies, and preserves historical and natural features (for a more detailed discussion refer to the Biodiversity section). Wilderness is a special place that provides vast areas for solitude, primitive and unconfined recreation, sacred sites, and opportunities to experience adventure, challenge, and self-reliance. Congress has the sole authority for designating additions to the NWPS (Hendee and others 1990).

Potential Wilderness areas are identified in land management plans and have prescriptions to preserve their Wilderness attributes. Lands are identified as potential Wilderness through the land management planning process and by congressional designation. Congress uses recommendations in land management plans as a basis for additions to the NWPS; however, the Congress could designate fewer or more acres as Wilderness depending on its own analysis.

Inventoried roadless areas are distinguished in land management plans by their prescription. Approximately 4.2 million acres are managed to maintain Wilderness attributes, 20 million acres restrict road construction and reconstruction, and 34.3 million acres are available for road construction, reconstruction, timber harvest, and other resource management developments. A substantial number of inventoried roadless areas are near or in close proximity to designated Wilderness areas. Of the 58.5 million acres of inventoried roadless area, 20 million acres (Table 3-29) are adjacent to designated Wilderness areas.

These areas serve as a natural transition between lands with road-based resource management activities and lands affected substantially by natural processes.¹⁵ Maintaining the roadless character of these transition areas would sustain existing levels of Wilderness value protection. This would occur in two ways. First, inventoried roadless areas adjacent to or near Wilderness areas are usually more accessible than Wilderness areas and are an alternative for recreation uses. Second, the additional distance from intense management activities would provide more opportunities for natural processes (for example allowing fire to play its natural role or maintaining the integrity of wildlife habitat) to occur uninterrupted.

Some of the key characteristics of inventoried roadless areas lie in their unique Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized recreation opportunities (refer to the Recreation section for a discussion of the ROS). Activities that are prohibited in designated Wilderness areas and that are not readily available in areas with classified roads can occur in inventoried roadless areas. These areas provide popular, appropriate alternatives to Wilderness areas because, although they contain many Wilderness attributes, a wider range of recreation opportunities with fewer restrictions is available.

Threat to Wilderness character and values by activities or other sources is the measure for evaluating the alternatives. Both potential (identified in a land management plan) and existing designated Wilderness could be threatened when resource management activities change human patterns or ecological values in a manner that diminishes Wilderness character or values. In general, maximizing national prohibitions would result in a low level of threat; those that have fewer prohibitions would result in a higher level of threat. Therefore, relative level of threat between the alternatives will be used to describe effects on potential additions to the NWPS and existing Wilderness areas

Another form of impact comes from the potential threat to inventoried roadless areas not covered by a management prescription that maintains Wilderness attributes. Although inventoried roadless areas may be managed to sustain their roadless characteristics, they are still the reservoir for future designated Wilderness areas. Those alternatives that

¹⁵ The Forest Service is mindful that Congress did not intend Wilderness designations to compel the creation of protective perimeters or buffer zones around Wilderness Areas. Congress has made clear that the fact that non-Wilderness activities or uses can be seen or heard from within any Wilderness Area shall not, of itself, preclude such activities or uses up to the boundary of Wilderness Areas. The Forest Service may consider the effects on a Wilderness Area in determining the uses of adjoining lands, however, as long as the Agency considers other factors as well in its decisions concerning the adjoining lands. The purpose of this portion of the FEIS is to disclose potential consequences of the proposed action and alternatives to Wilderness resources to fulfill the Agency's responsibilities under NEPA. The Forest Service estimates that 34% of the inventoried roadless areas are adjacent to designated Wilderness Areas.

provide the highest level of protection would result in the least amount of threat to the reservoir for future Wilderness areas; conversely, those that provide the least protection would result in more threats, thereby reducing the size of the reservoir.

Of the 58.5 million acres of inventoried roadless areas, 41% are covered by land management-plan prescriptions that restrict road construction and reconstruction. The other 59% are not. Those inventoried roadless areas open to road construction could be affected in the short term, and even those currently protected could be affected over the long term as local conditions and situations change.

Alternative 1 – No Action

Alternative 1 would provide the least protection because no national prohibitions would be applied to inventoried roadless areas. Over time, the supply of inventoried roadless areas available would decrease resulting in more developed recreation use, fewer opportunities for Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized recreation, increased resource management activity, and reductions in the size of lands available for uninterrupted natural processes. This trend of shifting human patterns, increased resource management activity, and reduced ecological integrity in and around potential and designated Wilderness might increase the threat to their Wilderness character. In addition, this alternative would provide the least protection for inventoried roadless areas in general, causing the greatest reduction of the reservoir for future Wilderness areas. For these reasons, Alternative 1 receives a relative rating of high (highest threat to designated and potential Wilderness in relation to Alternatives 2, 3, and 4).

Alternatives 2 through 4

Alternatives 2 and 3 would allow timber harvesting that could result in short term disturbances, such as impacts on the visual resource, displacement of wildlife, or shifts in recreation use. However, the amount and types of timber harvest allowed in inventoried roadless areas would enhance vegetative health and reduce fuel loading, thereby providing protection from pests, diseases, and large wildland fires spreading into designated Wilderness. No short-term disturbances from commercial timber harvesting or long-term benefits from timber harvesting for stewardship purposes would accrue under Alternative 4.

Overall, inventoried roadless areas would remain intact in and around potential and designated Wilderness. Human use would increase in inventoried roadless areas, but at a much slower pace than Alternative 1. Patterns of recreation and other uses would be managed to maintain or enhance roadless characteristics. Large tracts of land where natural processes occur uninterrupted would be maintained. Effects on the reservoir for future Wilderness would be minimized. All action alternatives would provide substantial protection from threats and, from a national perspective, are barely distinguishable from each other. Thus, threats to Wilderness character in potential and existing Wilderness is rated low in these alternatives.

Effects of Social and Economic Mitigation on Wilderness

Some road construction and reconstruction associated with mineral development would be allowed in inventoried roadless areas. The amount of activity associated with mineral exploration and development would create very little threat to designated Wilderness. However, those areas that are developed would reduce the reservoir of roadless area available for future designation of Wilderness. Even so, the effects from a national perspective would be minimal.

Other Indirect and Cumulative Effects on Wilderness

Inventoried roadless areas are managed under a variety of forest prescriptions. Implementation of Alternatives 2 through 4 would help to establish a uniform approach to managing all unroaded areas. Because many inventoried roadless areas are adjacent to designated Wilderness areas, large tracts of land would remain unroaded and essentially undeveloped.¹⁶ Managing these large tracts of land for undeveloped characteristics would be unique in a country as highly industrialized as the United States. A wide range of human uses and activities would be allowed, yet, large areas would be affected solely by the forces of nature or managed to enhance the health of ecosystems. Large tracts of undisturbed lands would provide reference landscapes, biological strongholds and refuges, and intact plant and animal communities at an unparalleled scale.

In the past, inventoried roadless areas were managed as a bank for future resource development or special designation. If these areas were managed for their own inherent values, there could be less pressure to designate these lands as Wilderness or other special designation to shield the land from development. This action may reduce controversy and result in more stability. Threats to Wilderness character and values by activities or other sources were the measure used to evaluate alternatives. If an action alternative were selected, the supply of inventoried roadless areas would be stabilized at close to 58.5 million acres.

Data are unavailable to identify the number of available NFS acres outside designated Wilderness and inventoried roadless areas that are restricted from road construction and reconstruction or other types of development. However, a conservative estimate would place this figure at approximately 15 million additional acres that have land management plans with some form of road construction or development restrictions in land management plans. Although this is a rough estimate, the total acreage of inventoried roadless areas and other NFS lands with restrictions on road construction can serve as a baseline for discussion of cumulative effects. Areas without restriction total 84.1 million acres. These lands are more of a threat to existing and potential Wilderness areas because

¹⁶ For example, six existing Forest Service Wilderness Areas encompass over 1 million acres each. There are 10 Wilderness plus adjacent inventoried roadless areas over 1 million acres. Twenty-two existing Wilderness Areas encompass 250,000 to 1,000,000 acres in size. There are 33 Wilderness plus adjacent inventoried roadless areas 250,000 to 1,000,000 acres in size. (Figure 3-27).

they generally have management prescriptions that allow a wide range of resource management and development activities.

Within the context of NFS lands, analysis identified factors that may have major, minor, or no effect on the baseline. The reasonable foreseeable factors that could cause a major shift in the baseline supply of Wilderness acres are the proposed Roads Policy and new Wilderness designation. The most common scenario associated with road decommissioning under the proposed Roads Policy would be to reduce road density, not create unroaded areas. However, if a conservative estimate were realized, there would be an increase of 10%, or 8.4 million acres, of unroaded areas created over the next 40 years due to road decommissioning. This would increase the number of acres providing an elevated level of protection and a reduced level of threat from resource management activities. This action could change human patterns or environmental conditions in a manner that enhances the character or values of designated or potential Wilderness.

The other factor that would influence a major shift in the baseline is Wilderness designation. It is estimated that 10%, or 5.8 million acres, of inventoried roadless areas could be designated as Wilderness in the next 40 years. This amount includes the 7.2% (4.2 million acres) of inventoried roadless acres already recommended for Wilderness designation in land management plans. It also assumes that an additional 2.8% (1.6 million acres) of inventoried roadless areas could be added to the National Wilderness Preservation System. This would maintain the baseline but increase protection from threats to Wilderness character. This would decrease the number of inventoried roadless areas or other NFS lands with development restrictions. However, the net benefit of increased protection provided by Wilderness designation would increase.

Factors that might have minor effects include lands acquired through purchase, exchange, or legislation and reduced access because of private property, fish and wildlife protection, or other types of closures. These factors may cause the level of threat to designated or potential wilderness to shift in localized areas or cause small incremental shifts over long periods. However, they typically would not cause a major shift in the national baseline of protection.

Actions by other land managing agencies can be important factors in providing additional protection from threats to existing and potential Wilderness. For example, designated Wilderness and other special areas managed by the National Park Service and Bureau of Land Management are often adjacent to NFS lands or near enough to complement each Agency's effort to minimize threats to potential and designated Wilderness. In many cases, special management areas function as transition areas between lands managed to allow for natural ecological processes and lands managed more intensely for human uses. These situations add additional protection from threats to potential and designated Wilderness.

There is considerable controversy over expansion of the National Wilderness Preservation System. However, potential for additions from lands managed by the Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, and, to a lesser extent, other Federal agencies remains fairly high. There continues to be high public and political interest in creating a wide range of special

designations throughout the Federal lands that would manage for particular amenity or ecological resources. Additional designations of lands for special purposes would provide additional protection from threats to potential and designated Wilderness areas. Because of increased development of private lands and growing public interest in maintaining open space, the trend to create special areas on Federal lands would most likely continue for the first decade unless there was a national or global crisis such as a recession or war. But, because Federal lands are a finite resource and there is continued interest in maintaining and creating open space, protecting the environment, and providing for a wide range of recreation opportunities and amenity values, the emphasis would most likely shift from Federal lands to private, State, and locally managed lands in the second decade.

Other Special Designated Areas

Affected Environment

Certain specific areas of NFS lands not designated as Wilderness and containing outstanding examples of plant and animal communities, geological features, scenic grandeur, or other special attributes merit special management. These areas are designated by law, or may be designated administratively by executive order or through Agency planning efforts, as special areas. Areas so designated are managed to emphasize specific values identified in their enabling legislation or order, such as, recreation, geology, or history. Other uses are permitted in the areas to the extent that these uses are in harmony with the purpose for which the area was designated.

Inventoried roadless areas in the following NFS special areas were considered in this rulemaking:

- National Primitive Areas,
- National Scenic Research Areas,
- National Scenic Areas,
- National Wild and Scenic Rivers,
- National Recreation Areas,
- National Game Refuges and Wildlife Preserves,
- National Monuments,
- National Volcanic Monuments,
- National Historic Areas,
- Wilderness Study Areas,
- Research Natural Areas, and
- Other Congressionally designated areas.

The law or executive or administrative order designating each area provides specific objectives and guidelines for management of the area. Some are quite prescriptive with management details written right into the law (for example, the designation of eight management areas depicted on a map in the Smith River National Recreation Area Act). Others are more descriptive, providing the Forest Service with more management discretion (for example, the provisions for general purpose, prohibitions, and exceptions

identified in the Presidential proclamation creating the Sheep Mountain National Game Refuge and Wildlife Preserve in Wyoming). Despite these differences, the Agency's policies, which guide the management of most special areas, have some similarities. The Forest Service manages each special area as an integral part of NFS lands with an emphasis on the primary values and resources as directed by the law or order that established the area. Secondly, the Forest Service manages values or resources not emphasized or prohibited by law in a manner that complement or enhance the primary values of the area and are compatible with overall national forest management objectives. Lastly, special areas are managed as showcases to demonstrate national forest management standards for programs, service, and facilities.

With the exception of National Game refuges, Wildlife Preserves, and Research Natural Areas, one of the objectives for management of special areas involves providing for public enjoyment of the area for outdoor recreation. However, the special values (that is, scenic, cultural, historic, wildlife, geologic, or other values) and attributes that contribute to public enjoyment are to be protected. Other resource values that are present in the area are to be managed in a manner that does not impair the public recreation values or the special attributes of the area.

As indicated in Table 3-49, there are approximately 6 million inventoried roadless area acres in special designated categories. Of this, about 1.2 million acres (20%) are identified in land management plans or other completed assessments as allocated to a prescription that allows road construction or reconstruction. There are approximately 4.8 million acres (80%) allocated to a prescription that does not allow road construction or reconstruction. Of this, 2.1 million acres (35%) are further recommended, in land management plans or other completed assessments adopted by the Agency, for addition to the National Wilderness Preservation System. Table 3-49 displays the inventoried roadless area acreage by type of special designated area and management prescription.

The demand for motorized and non-motorized dispersed recreation opportunities is increasing (Cordell and others 1999b). Demand for special use permits to provide outfitting and guiding services is also on the rise (see Recreation Special Uses, Dispersed Activities section in this chapter). As previously discussed, a key characteristic of inventoried roadless areas is their ability to supply P (Primitive), SPNM (Semi-Primitive, Non-Motorized), and SPM (Semi-Primitive Motorized) settings for a wide range of dispersed recreation activities (see Recreation, Dispersed Activities section in this chapter). Applying this concept to special designated areas, it is generally more applicable in the categories of areas which feature dispersed recreation (or don't emphasize recreation at all) in their management plans. Examples of these areas are National Primitive Areas, National Scenic Research Areas, National Wild and Scenic Rivers, National Game Refuges and Wildlife Preserves, Wilderness Study Areas, and Research Natural Areas.

At the same time, the demand for new developed and road based recreation is also increasing (Cordell and others 1999b; see Recreation, Developed Sites, and Road Dependent Activities sections in this chapter). This demand affects developments managed by both the public and private sectors. New developed recreation would likely

Table 3-49. Special designated areas, in thousand acres, on National Forest System lands.

		Inventoried roadless areas allocated to a prescription . . .			
		...that do not allow road construction and reconstruction	...that allow road construction and reconstruction, and the land management plan recommends as Wilderness	...that allow road construction and reconstruction	Total
National summary ^a					
Areas with single designations	NGRWP	0	0	56	56
	NM	79	0	0	79
	NRA	214	212	749	1,175
	NSA	51	0	0	51
	NVM	25	0	2	27
	NWSR	81	0	81	162
	NSRA	1	0	2	3
	OCD	1,266	16	50	1,332
	RNA	166	28	55	249
	WSA	782	1,820	194	2,796
Areas with multiple designations	NM NWSR	4	0	0	4
	NM OCD	23	0	0	23
	NM OCD NWSR	2	0	0	2
	NRA NWSR	11	0	11	22
	NRA RNA	4	0	0	4
	NWSR OCD	1	0	0	1
	NWSR RNA	0	0	1	1
	OCD NRA	1	0	0	1
	OCD RNA	12	0	0	12
	WSA NSA	0	7	0	7
	WSA RNA	5	0	3	8
	Total	2,728	2,083	1,205	6,015

^a NPA - National Primitive Area RNA - Research Natural Area NHA - National Historic Area
 NVM - National Volcanic Monument NRA - National Recreation Area NSA - National Scenic Area
 NWA - National Wilderness Area NM - National Monument WSA - Wilderness Study Area
 NSRA - National Scenic Research Area NWSR - National Wild & Scenic Rivers
 OCD - Other Congressionally Designated Areas NGRWP - National Game Refuge/Wildlife Preserve
 (Roadless Database 2000)

expand into or occur in unroaded areas. This situation is generally most acute in National Scenic Areas, National Recreation Areas, National Monuments, and National Volcanic Monuments because these areas are more likely than other categories of special designated areas to feature developed recreation.

The alternatives, then, exist in an environment that is characterized by increasing demands for incompatible recreation activities and opportunities competing for a finite resource (roadless areas). What sets special designated areas apart from general forest areas is the special values, attributes, or unique features for which they were established. The effects of the rulemaking will vary depending upon the management emphasis for each area.

The alternatives are compared by the degree to which they maintain the existing supply of inventoried roadless areas coupled with the appropriateness of that supply for both dispersed and developed recreation opportunities. The special designated areas in which management emphasizes dispersed recreation would benefit more from alternatives that create safeguards to maintain the most NFS lands in an unroaded condition. The special designated areas in which management emphasizes greater visitor access and developed recreation would benefit more from alternatives which place the fewest restrictions on access and other management.

Alternative 1 – No Action

This alternative would provide the most flexibility to local land managers of special designated areas to determine the long-term disposition of unroaded lands to meet developed and dispersed recreation needs within the context of the law or order that established the area.

In special designated areas, about 1.2 million acres (20%) are in areas with management prescriptions that permit road construction (Table 3-49). These areas would be available for resource management activities that could degrade their unroaded characteristics. If road construction, timber harvesting, and other resource management activities occur in inventoried roadless areas (where land management plan prescriptions allow it), then the supply of acres available for dispersed recreation opportunities in SPM, SPNM, and P classes (including outfitter and guide assisted dispersed recreation opportunities) probably would diminish. This effect would also mean a decline in the land base on which to resolve conflicts between motorized and non-motorized dispersed recreation activities.

On the other hand, opportunities to shift from Primitive and Semi-Primitive settings to road based and developed classes of recreation would be offered in this alternative.

In general, Alternative 1 would have the least direct effect on the management of National Game Refuges/Wildlife Preserves, National Scenic Research Areas, and National Volcanic Monuments categories of special designated areas. Nationally, these categories have the fewest acres of inventoried roadless area and relatively more roadless areas with management prescriptions that permit road construction (Table 3-49). This alternative would not change the plans for areas where management prescriptions prohibit road construction. However, over the long term, there would be no safeguards preventing management prescriptions from being changed when land management plans are revised to permit road construction.

In this alternative, projects associated with private entities that hold special use authorizations (such as resorts and marinas) would proceed with planning even if those plans could affect inventoried roadless areas. Implementation of those plans would be dependent on existing local policy and direction rather than an overlay of the prohibition alternatives.

Alternatives 2 through 4

In Alternatives 2 through 4, a national prohibition on road construction in inventoried roadless areas in special designated areas would apply. These alternatives would provide less flexibility than Alternative 1 to local land managers of special designated areas to determine the long-term disposition of unroaded lands to meet developed and dispersed recreation needs within the context of the law or order that established the area.

Over the long term, these alternatives would maintain the highest relative supply of lands with dispersed recreation potential. Availability of roadless areas for forest visitors seeking Primitive and Semi-Primitive recreation opportunities (including outfitter and guide assisted dispersed recreation) would be highest in Wilderness Study Areas, National Recreation Areas, and National Wild and Scenic River categories of special designated areas because they have the greatest number of inventoried roadless acres. A stable supply of roadless acres would result from implementing any of these alternatives. This would provide more opportunities than in Alternative 1 for resolving the issues between motorized and non-motorized dispersed recreation activities.

Minor shifts in recreation use might occur because of timber harvesting allowed in Alternatives 2 and 3. For instance, most outfitters and guides prefer natural appearing landscapes, so cutover areas probably would be avoided until they grow back. On the other hand, timber harvested areas might attract use because of increased hunting, wildlife viewing, or berry picking opportunities. These shifts, however, would have little or no effect on the overall supply or availability of inventoried roadless areas maintained for P, SPNM, and SPM recreation opportunities. Therefore, Alternatives 2, 3, and 4 would have roughly equivalent effects on dispersed recreation.

Conversely, these alternatives would result in a lower supply of lands than in Alternative 1 with developed recreation potential or with access for forest visitors seeking road based or developed recreation experiences. The road prohibition would be the same in each of these alternatives, therefore the effect of reducing the possibility of shifts from primitive and semi-primitive ROS setting to Roaded Natural or Rural experiences would be the same.

Proposed expansion of ski areas, resorts, or other recreation developments into inventoried roadless areas would be allowed to continue under existing Forest Service procedures if special use permits are in existence and proposed activities take place within boundaries established by the special use permit. Proposed expansion or new construction, inside or outside of a special use permit boundary, in an inventoried roadless area that has been approved by a signed Record of Decision, Decision Notice, or Decision Memo before implementation of the final rule, would also not be subject to the prohibitions.

New construction or projects proposed outside the authorized special use permit boundary in inventoried roadless areas could be subject to the prohibitions depending upon the type of project. For example, if a proposed project could be designed and implemented without road construction or reconstruction, it could proceed under normal

Forest Service procedures in Alternative 2. If a proposed project could be designed and implemented without road construction or reconstruction and timber harvesting, it could proceed under normal Forest Service procedures in Alternatives 3 and 4.

Effects of Social and Economic Mitigation on Other Special Designated Areas

Special Designated Areas are managed to emphasize specific values identified in their enabling legislation, order, or land management plan. Other uses are allowed in the areas to the extent that these uses are in harmony with the purpose for which the areas were designated. Road construction and reconstruction would be allowed unless these lands were withdrawn from mineral exploration and development by statute or other action. However, if it were allowed, there could be minor shifts in recreation uses and substantial deviation of the characteristics landscape in localized areas. These occurrences would be rare and would have minimal effects from a national perspective.

Other Indirect and Cumulative Effects on Other Special Designated Areas

Inventoried roadless areas in special designated areas are a subset of all inventoried roadless areas included in this rulemaking. Each special designated area also has an overlaying level of protection based on what type of designation was bestowed on it by Congress or by proclamation. Refer to the other FEIS sections for discussions on cumulative effects. These references would apply when there is no conflict with the enabling legislation or order.

Real Estate Management

The fundamental purpose of the real estate management program is to conserve and manage the public's real property of NFS lands. This purpose is complicated because landownership within NFS boundaries includes parcels of lands owned by States, private individuals, and other Federal and non-Federal entities. Issues connected with real property may be resolved through boundary management, landownership adjustments (land exchanges and direct purchase acquisitions), and properly authorized and administered special uses on NFS lands.

Boundary Management and Landownership Adjustments

Affected Environment

Within the exterior boundaries of NFS lands are lands that are under private, State, and other Federal and non-Federal ownerships. Private, State, and other Federal and non-Federal ownership lands constitute approximately 17% of the acreage within NFS land boundaries. The Forest Service engages in land exchanges and direct land purchases to consolidate the national forest ownership pattern to facilitate efficient real estate and resource management. The Agency has conveyed an average annual 70,755 acres in the last 12 years and has acquired an average of 124,470 acres over the same period through

the Land Exchange Program. These land transactions resulted in a fractional increase in total NFS lands over the last decade.

Inventoried roadless areas generally have fewer roads, improvements, and development and therefore, real property issues are not usually a major consideration. However, issues do arise around access to non-Federal inholdings that are in inventoried roadless areas. Less than 1% of inventoried roadless areas are estimated to be blocks of non-Federal land.

Alternative 1 – No Action and Alternatives 2 through 4

All alternatives would have only minor effects on NFS boundary management and land adjustments. In some isolated instances, recognized roadless characteristics of inholdings in inventoried roadless areas may enhance mutual interest in land adjustments to consolidate NFS lands as part of the overall management of roadless areas. However, in other isolated instances, maintaining roadless characteristics surrounding inholdings may be a desirable feature, which reduces the likelihood that landowners would be interested in land adjustments. Regardless, none of the alternatives will directly change the ownership status of non-Federal lands. For lands acquired through exchange, Forest Service regulation states that those lands within areas having an administrative designation set through the land management planning process, shall automatically become part of the area within which they are located, and shall be managed in accordance with the laws, regulations, and land management plans applicable to the area (36 CFR 254.3(f)). For lands acquired through purchase or other means, Forest Service policy provides similar direction.

Access to Non-Federal Ownership within the National Forest System

Affected Environment

Non-Federal ownership of lands or interests in lands may include rights granted pursuant to a reserved or outstanding right or as provided in statute or treaty¹⁷. These rights include, but are not limited to, rights of access provided in the Alaska National Interest Lands Conservation Act (ANILCA) (Public Law 96-487) and recognized highway rights-of-way granted over NFS lands under Revised Statute 2477(R.S. 2477) (Public Law 94-579). The most common type of access pursued in conjunction with these two prominent statutes is roaded access.

ANILCA (Public Law 96-487) ensures access to non-Federal land in-holdings. The authorized officer shall authorize such access deemed adequate to secure the landowner the reasonable use and enjoyment of their land (36 CFR 251, Subpart D). Landowner access need not be the most direct, economical, or convenient route for the landowner. Adequate access may not be road access in all cases. Alternative routes and modes of

¹⁷Rights of access provided in ANILCA and highway rights-of-ways granted under R.S. 2477 are two examples of these types of rights. Rights provided under the 1872 Mining Act (17 Stat. 91) are discussed in the Mineral and Geology section of the FEIS.

access may be considered. If a landowner has an adequate alternative route or mode of access, including access across other land ownerships, the Forest Service is not obligated to authorize roaded access. Reasonable access is currently determined on a case-by-case basis. The Forest Service recognizes valid ANILCA (Public Law 96-487) access as a statutory right.

R.S. 2477 (Public Law 94-579) provides a means by which rights-of-way were granted for public highways constructed across public domain lands in the late 1800s to early 1900s. A R.S. 2477 (Public Law 94-579) highway must have been constructed across public domain lands before the date of the national forest reservation. R.S. 2477 (Public Law 94-579) did not require the issuance of any formal authorization to exercise and perfect rights-of-way. The Federal Lands Policy Management Act repealed R.S. 2477 (Public Law 94-579) in 1976. However, rights-of-way that predate the establishment of the national forest are still in effect, unless they have been subsequently relinquished. The Forest Service recognizes valid R.S. 2477 (Public Law 94-579) rights-of-way as outstanding rights.

Alternative 1 – No Action and Alternatives 2 through 4

Requests for access to non-Federal ownership of lands or interests in lands pursuant to a reserved or outstanding right, or as provided by statute or treaty, including valid ANILCA (Public Law 96-487) or R.S. 2477 (Public Law 94-579) assertions, would continue to be recognized on a case-by-case basis. Under Alternative 1, an estimated 50 projects involving an estimated 130 miles of road would be undertaken to provide access for reserved or outstanding rights, or as provided by statute or treaty. It is assumed that the level of road construction and reconstruction in the future would remain at levels comparable to what is being projected for the next 5 years.

Although, Alternatives 2 through 4 include prohibitions on road construction and reconstruction, all action alternatives provide an exception for roads needed pursuant to reserved or outstanding rights or as provided for by statute or treaty. Under all action alternatives, the Forest Service would continue to recognize and honor requests for access to non-Federal ownership of lands or interests in lands, pursuant to a reserved or outstanding right, or as provided for by statute or treaty, including valid ANILCA (Public Law 96-487) and R.S. 2477 (Public Law 94-579) assertions. All alternatives provide access for reserved and outstanding rights, or as provided for by statute or treaty.

Non-recreation Special Uses

Affected Environment

Commercial and non-commercial interests, not associated with a right granted pursuant to a reserved or outstanding right, or as provided by statute or treaty, often use and occupy NFS lands for a variety of purposes. The Agency administers more than 46,000 non-recreation authorizations to use and occupy NFS lands (USDA Forest Service 2000b). More than 80 different types of non-recreation special uses are authorized most often by issuing special use authorizations. The more common of these non-recreation special uses include communication sites, utility corridors (oil/gas pipelines, fiber optic, telephone

lines, and power lines), linear irrigation facilities (pipelines, ditches, canals), and public and private roads.

These more common types of non-recreation uses generally, but not always, rely on road access to accommodate construction, operation, and maintenance. As such, the majority of existing and proposed uses are either located or proposed to be located where roads currently exist. However, a small percentage of these types of uses can exist without road access and do occur within inventoried roadless and unroaded areas.

Alternative 1 – No Action

Authorized use and occupancy of NFS lands including roads associated with these uses would be continued (as provided within the authorization) in all inventoried roadless areas throughout the term of existing authorization. Upon expiration, re-authorization and proposals for new roads or uses would be evaluated and authorized in compliance with existing rules, regulations, and agency policies.

Alternatives 2 through 4

No action alternative would suspend or modify any existing permit, contract, or other legal instrument authorizing the occupancy and use of NFS lands. Existing roads included as a part of an authorized use and occupancy of NFS lands would be continued as provided in the authorization in all inventoried roadless areas through the term of existing authorization.

The alternatives would not affect the re-authorization of an existing use or occupancy unless such re-authorization involved road construction or reconstruction, however road maintenance is not precluded under these alternatives. Upon expiration, re-authorization would be evaluated and authorized in compliance with existing rules, regulations and Agency policies. Effects related to the management of existing roads, including classified, unclassified and temporary roads that may be associated with a non-recreation special use is discussed in the Access and National Forest Roads sections in this chapter.

Under all action alternatives, potential effects on non-recreation special uses in inventoried roadless areas would be limited. Non-recreation special uses may be authorized in inventoried roadless areas if the use could be accommodated without road access. Under these alternatives, all or part of the more common types of uses could occur without road construction, but most likely, at a higher cost than if road construction was allowed to occur. In some circumstances, the cost to construct, operate, and maintain a facility without a road would make the use and occupancy economically or technically infeasible.

Special use authorization data is very limited regarding road construction beyond the next 5 years, but it is estimated that within the next 5 years, fewer than 20 non-recreation special use projects, with an estimated 35 miles of associated road construction or reconstruction may be affected by Alternatives 2 through 4. These estimated 35 miles are

distributed throughout the nation, and as such, there is not a good means of differentiating the impacts specific to each region or national forest.

Designation of major utility corridors is generally incorporated into land management plans. A review of the Western Regional Corridor Study (Clayton and others 1992) conducted in 1993, is as a valuable resource by the Forest Service and BLM for making reasonably foreseeable estimates of utility corridor needs. Because of this study, many of the existing and proposed utility corridors are identified throughout the Western United States. The study indicates that only a couple of proposed corridors in the Western States may be affected by the prohibitions in Alternatives 2 through 4. However, at this time, it is unknown if these proposals would be precluded from consideration for authorization in an inventoried roadless area under these alternatives, since all or part of the corridor, if proposed, could still be considered depending on the design, location, and implementation of the project.

Current uses and occupancies authorized in inventoried roadless areas would not be affected by any of the action alternatives. Since fewer than 20 proposed uses over the next 5 years, most involving small development and uses, would be affected by the action alternatives, it is reasonable to conclude that the effects on businesses, individuals, or communities would be minimal.

Effects of Social and Economic Mitigation on Non-recreation Special Uses

A potential mitigation is identified in Chapter 2 for Federally assisted State highways. The Federal Highway Administration and State Department of Transportation work cooperatively in planning for new State and interstate highways. Regulations and a Memorandum of Understanding (Title 23 Section 317, and CFR 23, 712.03, August 28, 1998) between the Forest Service and FHWA describe the process used for land transfers between the Forest Service and States in support of approved highway projects.

Numerous State and interstate highways run adjacent to inventoried roadless areas. One project currently proposed, but not yet approved, would cross through an inventoried roadless area on the Chugatch National Forest. If mitigation was adopted, existing State highways included, as a part of an authorized use and occupancy of NFS lands, would be allowed in inventoried roadless if authorized by the Secretary of Agriculture. All alternatives would have minimal effects on federally assisted State highway planning over time. Such mitigation would pose no known conflict with other special use authorizations that might be reasonably foreseeable nor would this mitigation affect other aspects of real estate management.

Other Indirect and Cumulative Effects on Non-recreation Special Uses

Boundary Management and Landownership Adjustments – Alternatives 2 through 4 would have minimal effects on boundary management and land adjustments over time. In some isolated instances, recognizing roadless characteristics may actually enhance

interest in land adjustments, while in other isolated instances roadless characteristics may deter interest in land adjustments.

Access to Non-Federal Ownership within the National Forest System – Alternatives 2 through 4 would have minimal effect on access to non-Federal ownership within NFS lands over time. The Forest Service would continue to recognize and honor requests for access to non-Federal ownership or lands or interests in lands pursuant to a reserved or outstanding right, or as provided by statute or treaty, including ANILCA (Public Law 96-487) and R.S. 2477 (Public Law 94-579) assertions.

Nonrecreation Special Uses – As discussed, the majority of these types of uses are located where roads already exist because they are generally dependent on road access for construction, operation, and maintenance. Therefore, the current and expected future demand to locate these types of uses in inventoried roadless areas is minimal. The effect of the action alternatives is further minimized by the fact that all or part of many types of the more common non-recreation special uses could be constructed, operated, and maintained without road access but likely at a higher cost. Non-recreation special uses may be authorized in inventoried roadless areas when the use and occupancy is consistent with the management objectives of an area's roadless values.

With all action alternatives, approximately 50% of all NFS lands would be available for road based non-recreation special uses. Since so few non-recreation special use proposals would be affected, NFS land outside the inventoried roadless areas, should be adequate to accommodate the majority of non-recreation uses that may be displaced as a result of the action alternatives.

Demand for special uses authorizations in roadless areas that would involve road construction and reconstruction may increase in the future as the population grows and use of national forests increase. However, it is uncertain what future levels of demand will be, and if these demands can be met by lands outside inventoried roadless areas. It is not anticipated that these increased demands will be substantially different from the types of uses currently being requested. Therefore, the economic, social, and biological impacts are not believed to be significant given the limited number and small scope of these requests.

Minerals and Geology

On NFS lands, minerals are classified according to the law under which they are managed. Minerals are classified as locatable, leasable, and salable (most common). This distinction is important because each classification is subject to different requirements for exploration and development, and in some cases, the Forest Service cannot prohibit exploration and development. Other related topics discussed in this section are abandoned and inactive mines and geological and paleontological resources.

Locatable Minerals

Affected Environment

Most valuable mineral deposits on lands open to mineral entry are considered locatable unless otherwise determined to be leasable or salable. Locatable minerals include commodities such as gold, silver, copper, lead, zinc, barite, gypsum, and certain varieties of limestone, which are subject to appropriation under the General Mining Law of 1872 (17 Stat. 91, as amended). This law provides United States citizens with the right to prospect, explore, and develop these minerals on public domain lands, applies to NFS lands by virtue of the Organic Administration Act (16 U.S.C. §§ 482), and provides for reasonable access to conduct these activities. Depending on the stage of exploration or development, reasonable access can range from unimproved temporary roads for prospecting or drilling to more permanent improved roads for full mine development and ore transportation.

Valuable deposits of locatable mineral resources do occur in inventoried roadless areas, principally west of the 100th meridian (Figure 1-1). Therefore, over the long term, it is reasonable to assume that future exploration, mining, and mineral processing activities will continue to occur in inventoried roadless areas where valuable deposits exist.

Exploration and development of locatable mineral resources are non-discretionary activities. This means that the Forest Service cannot prohibit reasonably necessary activities associated with the exploration, prospecting, or development of valuable mineral deposits. However, the Forest Service has authority to regulate locatable mineral operations to prevent or minimize damage to NFS surface resources.

Currently, there is a trend of decreasing exploration and development of domestic locatable mineral resources. This may be a function of fluctuating commodity prices, higher environmental and permitting costs associated with resource development in the United States, declining accessibility to mineral resources, and apparent lack of public support for mineral resource development on Federal lands.

Alternative 1 – No Action

All proposals for locatable mineral exploration or development would be subject to the planning and design requirements governing locatable minerals in 36 CFR 228, Subpart A. If proposed activities cause significant disturbance to NFS surface resources, a plan of operation would be required of the mining operator, and an analysis of environmental effects would be conducted under NEPA. This plan of operation would be binding on the operator. An estimated 61 miles of road construction or reconstruction for locatable minerals would occur in inventoried roadless areas under this alternative during the next 5 years. This same rate of mineral exploration and development was assumed for future decades since we have little information that would lead to higher or lower expectations of development.

Alternatives 2 through 4

Road construction and reconstruction for locatable mineral exploration and development would be considered a right of access as provided by the General Mining Law. Therefore, locatable mineral exploration and development would be excepted from the prohibition on road construction or reconstruction, and it would not be affected under these alternatives. Under these alternatives, the effects on locatable mineral exploration and development are the same as those under Alternative 1.

Several public comments indicated that some people thought the proposed Roadless Rule included mineral withdrawal. Mineral withdrawal would involve further public notice and analysis that is more specific. Mineral withdrawal is not proposed in any of the alternatives

Leasable Minerals

Affected Environment

Leasable minerals are those that can be explored for and developed under one of the several mineral-leasing acts. They include energy mineral resources such as oil, gas, oil shale, coal, gilsonite, and geothermal. They also include non-energy minerals, such as phosphate, and minerals important for their sodium, potassium, or sulfur content. Moreover, for lands acquired or administered under the Weeks Act (Public Law 61-435) (mostly in the Eastern United States) and the Bankhead-Jones Act (Public Law 75-210), they include deposits of otherwise locatable minerals like gold, copper, lead, barite, and gypsum.

Exploration and development of leasable mineral resources are discretionary activities. This means that leasing may or may not be allowed by the Bureau of Land Management, the agency that has the authority to dispose of leasable mineral resources on NFS lands. Most leasable mineral resources, however, may only be leased subject to Forest Service concurrence. Exceptions are gilsonite, sodium, potassium, sulfur, and phosphate, which may be leased without Forest Service concurrence. The holder of a lease or permit has a contractual agreement with the government that allows reasonable access for exploration and development of the leased commodity.

After a lease is issued, it can be modified and adjusted for economic or technical reasons. Often, during mine development small areas of mineral will be identified that are not included in the original lease. To promote recovery or prevent environmental damage, these small areas may be added to the existing leases. As an example, it may be more environmentally sound to locate ancillary facilities, such as topsoil and overburden stockpiles, in areas outside the boundaries of the issued lease. This would require a modification of the lease and possibly expanding the lease boundary.

Environmental impact statements are generally prepared before the issuance of mineral leases in inventoried roadless areas. The effects of any future lease exploration or development are also addressed in subsequent environmental analysis, which may be

another site-specific environmental impact statement. Presently, coal, oil and gas, and phosphate mineral exploration and development would be most affected by the action alternatives.

Oil and Gas - Area-wide environmental impact statements are generally prepared before accepting lease nominations for oil and gas. Leases are generally issued for 10 years. The effects of oil and gas exploration and development activities on the surface resources of NFS lands are controlled by the Forest Service and require surface use plans of operations, monitoring of surface disturbing activities, and enforcement of surface-use requirements and reclamation standards.

With the exception of the Los Padres National Forest in California, discussed below, inventoried roadless areas, with oil and gas potential, are located in the Rocky Mountain Area (Gautier and others 1998). Table 3-50 shows, by Forest Service region, the number of acres of inventoried roadless areas with the potential to produce oil and gas in the Rocky Mountain Area; however, the location and extent of the possible reserves are unknown. A recent natural gas study indicates that as much as 137 trillion cubic feet of gas may be contained within Federal lands in the Rocky Mountain Area, but the study did not determine what proportion of this estimate may be found on NFS lands (National Petroleum Council 1999).

Since the RARE II environmental impact statement, the USGS completed a petroleum resource estimate for the entire United States. Because inventoried roadless areas are not delineated subsets of the geologic areas, the amount of petroleum resource contained within inventoried roadless areas cannot be extrapolated from the analysis (Gautier and others 1998).

Table 3-50. Potential oil and gas resource acreage in inventoried roadless areas by Forest Service regions in the Rocky Mountain area.

Region	Inventoried roadless area acres of oil and gas potential (thousands)
Region 1	2,029
Region 2	2,484
Region 3	83
Region 4	3,045

(Roadless Database 2000)

Because of the downturn in the domestic oil and gas industry, the amount of NFS lands under oil and gas lease dropped from about 35 million acres in the mid-1980s to about 5 million acres today. However, United States consumption of natural gas has increased 14% between 1992 and 1998 and is projected to increase an additional 32% by 2010 (National Petroleum Council 1999). This increased consumption and recent technological advances have caused a significant increase of interest in development of coal-bed methane. Current interest is focused on the Powder River Basin of Wyoming and Montana. Other areas, including the Dakota Prairie Grasslands, may have coal-bed methane resources. Their acreages are included in Table 3-50.

Oil and gas lease sales are scheduled on a regular basis for lands where there is interest in leasing and where environmental analyses have been completed. Since 1992, more than 30 environmental impact statements have been completed for NFS lands where there is current industry interest. Remaining to be completed are the Los Padres National Forest, parts of the Custer National Forest, and several areas on the Bridger-Teton National Forest. The Records of Decision for the 30 environmental impact statements did concur with some leasing in inventoried roadless areas. For example, the Grand Mesa, Uncompahgre, and Gunnison National Forest issued a Record of Decision that concurred to lease approximately 171,500 acres of inventoried roadless areas under standard lease terms (USDA Forest Service 1993). Field information gathered during the analysis for the Interim Roads Policy indicated that 334,000 acres in inventoried roadless areas were scheduled for lease auction on the Beaverhead-Deerlodge, Custer, San Juan-Rio Grande, White River, Bridger-Teton, Manti-La-Sal, and Monongahela National Forests (USDA Forest Service 1999r).

In August 2000, the Targhee National Forest released its decision for oil and gas leasing on the forest. Some large blocks of land with a high-development potential are located in inventoried roadless areas and were made available for leasing with a no-surface occupancy stipulation (Robison 2000a).

The Los Padres National Forest will soon release a draft environmental impact statement for oil and gas leasing on the forest. Its Reasonable Foreseeable Development scenario identified five areas on the forest as having high potential for oil and gas development. These areas comprise 222,000 acres (12.5% of the forest), some of which are in Wilderness or otherwise withdrawn from mineral leasing. A total of 21.4 million barrels of oil are estimated to exist in these high-potential areas and, consequently, they are the most likely to have industry interest for leasing. The Cuyama High-Potential Area is the largest-high potential area. This area is comprised of about 85,000 acres, and it estimated to contain 18 million barrels (84% of the total estimated reserves in high-potential areas). Nearly all of the Cuyama High-Potential Area is in inventoried roadless areas (Riddle 2000).

Coal – Federally owned coal plays a major role in the energy supply of the United States. Large reserves of low-sulfur coal are located in Wyoming, Utah, Montana, Colorado, and New Mexico, where the Federal government owns the rights to the majority of coal reserves (USDI Geological Survey 1998). USGS estimates that approximately 60% of the area underlain by coal-bearing rocks in the contiguous United States is under Federal surface. Approximately 30 billion tons of minable coal is located on NFS lands (USDI Geological Survey 1995). Coal produced from Federal leases has tripled from about 12% of the total United States production in 1976 to almost 34% in 1995. This increase is because of the demand for low-sulfur coal for use in power plants, and the existence of large reserves of low-sulfur coal in the Western Interior United States where the Federal government owns the rights to most of the coal reserves (USDI Geological Survey 1997a). Currently, 57.3% of United States electric power is generated from coal (National Mining Association 1999). Domestic demand and consumption of coal will continue to increase. Because of its low-sulfur and high air quality-compliance status,

Western Interior United States coal will be increasingly relied upon to meet future demand.

There are approximately 2,539,000 acres of coal-bearing rocks (geologic formations of known coal-bearing potential) within inventoried roadless areas (Roadless Database 2000). Of this, it is important to note that approximately 308,000 acres (12%) are in Region 1, approximately 886,000 acres (35%) are in Region 2, and approximately 1,171,000 acres (46%) are in Region 4. Together, these three regions contain approximately 93% of the total acres of coal-bearing rocks in inventoried roadless areas. Each of the remaining regions contain one-sixth or less of the 308,000 acres of coal-bearing rocks in inventoried roadless areas in Region 1. There are no known significant occurrences of coal within the national forests of Alaska (Region 10) (USDI Geological Survey 1995).

Table 3-51 shows acres not currently leased in inventoried roadless areas containing known coal reserves or resources near or adjacent to active mines. Some of these reserves or resources would likely be developed within the next 5 years if offered for lease. Other inventoried roadless areas contain coal resources; however, they are not listed because the extent of the resource is unknown and there is no demonstrated industry interest in these areas (or in some cases, their development is precluded by the Surface Mining Control and Reclamation Act of 1977 [Public Law 95-87, as amended]).

Table 3-51. Known coal resources or reserves in inventoried roadless areas by forest.

National forest	Mining method	Inventoried roadless area acres not leased	Estimated resources/recoverable reserves (million tons)
Grand Mesa, Uncompahgre, and Gunnison	Underground	47,400	237 - 1,300
Manti La-Sal	Underground	13,800	71

(USDA Forest Service 1999r)

The coal mining from the national forest inventoried roadless areas is not extensive, but there are two national forests with active coal mining. In March 2000, the Grand Mesa, Uncompahgre, and Gunnison National Forest consented to lease approximately 500 acres in an inventoried roadless area for development of coal resources by underground methods (USDA Forest Service 2000f). In addition, the forest received an application for coal lease modification encompassing approximately 300 acres in inventoried roadless areas, also to be mined using underground methods. Access for this new mining would be from existing underground mines, not from surface roads on NFS lands (Mattson 2000). On the Manti-La Sal National Forest, three potential coal tracts remain on the Wasatch Plateau that total 36,200 acres and contain recoverable reserves of 185 million tons of high-BTU bituminous coal; however, none of these tracts have been leased. Approximately 40% of these reserves are in inventoried roadless areas (Table 3-51). One tract would require full development of an underground mine (e.g., transportation and portal facilities) in an inventoried roadless area; surface development of another could be

done outside any inventoried roadless area. The third tract could be developed from an adjacent underground mine. However, development of the three tracts would depend on the ability to conduct both pre-lease exploration drilling and post-lease development drilling. Included in the above figures are approximately 22 million tons of recoverable coal reserves in inventoried roadless areas that were transferred to the State of Utah School and Institutional Trust Lands Administration under the Utah Schools and Lands Exchange Act of 1998 (Public Law 105-335) (Reed 2000). These reserves would be considered outstanding rights. Additional discussion of the coal situation on the Manti-La Sal and Grand Mesa, Uncompahgre, and Gunnison National Forests is included in the Energy and Non-energy Minerals section.

Phosphate – Table 3-52 shows known phosphate resources on the Caribou-Targhee National Forest in inventoried roadless areas adjacent to active mines. Some of these resources would likely be developed within the next 5 years, if offered for lease. There are other inventoried roadless areas containing phosphate resources; however, they are not listed because the extent of the resources is unknown and there is no demonstrated industry interest in those areas.

Table 3-52. Known phosphate resources in inventoried roadless areas by forest.

National Forest	Mining method	Inventoried roadless areas acres not leased	Estimated resource (million tons)
Caribou	Surface	7,939	873.3

(USDA Forest Service 2000g)

Currently, the Caribou-Targhee National Forest has 46 phosphate leases affecting 23,843 acres of NFS lands. Of these, approximately 6,282 acres are in inventoried roadless areas. In addition, 7,939 acres of inventoried roadless areas have been identified as Known Phosphate Lease Areas, a U.S. Geological Survey designation to identify lands known to contain phosphate deposits and, thus, subject to competitive leasing. More than 1,000 acres in inventoried roadless areas are included in pending lease modifications (to be mined by surface methods), exploration licenses, and prospecting permits that could result in additional lease acreage (Robison 2000b).

Alternative 1 – No Action

Under this alternative, management of leasable mineral resources in inventoried roadless areas would not change from the way they are currently managed. Environmental impact statements are expected to be prepared for leasing decisions in these areas. Areas with management prescriptions that prohibit construction or reconstruction of roads either may not be leased or may be leased with a no-surface occupancy stipulation. Areas with management prescriptions that allow road construction or reconstruction may be leased subject to standard lease terms, and any other supplemental stipulations deemed appropriate and necessary by the Forest Service.

Overall, an estimated 103 miles of road construction or reconstruction in inventoried roadless areas over the next 5 years would occur for exploration or development within

existing leases. An additional 59 miles of road construction or reconstruction would occur outside of existing leases in inventoried roadless areas over the next 5 years.

Alternatives 2 through 4

The prohibition alternatives would not directly prohibit mineral leasing in inventoried roadless areas. Instead, they would prohibit construction or reconstruction of roads associated with future leasing. Proposals for exploration or development of leasable minerals using existing roads or not requiring use of roads may be allowed in inventoried roadless areas. Construction or reconstruction of roads that are reasonable and necessary for development of existing energy or mineral leases, for access to existing energy or mineral leases, and for access to associated product conveyance lines would be allowed as necessary to fulfill the terms of the lease. When existing leases expire, any renewals would have to be considered in light of the prohibition directed by these alternatives. In addition, this would apply to any modifications of existing leases. Prohibition of road construction or reconstruction in inventoried roadless areas may influence reanalysis of lands available for lease when land management plans are revised or amended.

The prohibition on road construction or reconstruction would restrict or preclude the opportunity for exploration or development of presently undiscovered leasable mineral resources in inventoried roadless areas.

Oil and Gas – Alternatives 2 through 4 could affect exploration and possible development of five high-potential oil and gas areas on the Los Padres National Forest. The prohibitions could preclude possible future development of up to an estimated 21.4 million barrels of oil on this forest. In the Rocky Mountain Area, up to an estimated 7,641,000 acres of inventoried roadless areas with varying levels of potential to contain oil and gas would be affected by Alternatives 2 through 4. Consequently, any exploration for or development of these resources would likely be restricted and possibly precluded in some areas. The Grand Mesa, Uncompahgre, and Gunnison National Forest would be required to review, for conformance to the prohibition alternatives, its 1993 decision to allow leasing of oil and gas on approximately 171,500 acres of inventoried roadless areas. Plans to auction for lease 334,000 acres in inventoried roadless areas on the Beaverhead-Deerlodge, Custer, San Juan-Rio Grande, White River, Bridger-Teton, Manti-La Sal, and Monongahela National Forests would require review for conformance with the prohibition alternatives. The outcome of these reviews would likely include a recommendation of no-surface occupancy stipulations in inventoried roadless areas without present access, yet still feasible to develop, and no Forest Service consent to lease in areas without present access and not feasible to develop without road construction or reconstruction.

In cases where oil or natural gas resources in inventoried roadless areas cannot be developed because of the prohibition alternatives and are likely to be drained by wells on adjacent non-Federal lands, the recourse is to lease them with no-surface occupancy stipulations and recover them by off-site directional drilling methods. When this is not technically and economically feasible and minimum drill-spacing requirements are being

observed in resource recovery, the Federal government cannot recover the value of the resources being drained.

Coal – Throughout the National Forest System, Alternatives 2 through 4 would affect up to an estimated 2,539,000 acres of inventoried roadless areas with various levels of potential to contain coal resources. Consequently, exploration for or possible development of this resource would likely be restricted to some degree and possibly precluded in some areas. The Grand Mesa, Uncompahgre, and Gunnison National Forest's recent consent to lease 500 acres for underground coal development in inventoried roadless areas was conditioned on the outcome of the proposed Roadless Rule. If road construction or reconstruction are necessary for coal mining (e.g., construction of required ventilation shafts), development would likely be restricted or possibly precluded. This is also the case concerning a proposed 300-acre coal-lease modification on this forest. Recovery of coal reserves within the three tracts identified on the Manti-La Sal National Forest would be affected under Alternatives 2 through 4. On one tract, the prohibition alternatives could preclude construction of the portal and transportation facilities; thus, they could preclude development of 135 million tons of recoverable coal reserves within the entire tract. However, these facilities would be necessary for the State of Utah School and Institutional Trust Land Administration to develop its 22 million tons of recoverable coal reserves within the tract, and thus, as an outstanding right, they would be excepted from the prohibition alternatives. On all three tracts, the prohibition alternatives could affect pre-lease exploration drilling, post-lease development drilling, and construction of ventilation shafts; thus, increasing costs and likely lowering the bonus bids for the three parcels if they are leased.

Phosphate – On the Caribou-Targhee National Forest, there are 7,939 acres that are not leased that are designated as Known Phosphate Lease Areas in inventoried roadless areas that would probably be affected by Alternatives 2 through 4 (Table 3-52). Because development of new phosphate surface mines or expansion of existing phosphate surface mines would require road construction or reconstruction in inventoried roadless areas, leasing would probably be denied, thus precluding development of an estimated 873.3 million tons of phosphate resource (see Energy and Non-energy Minerals section).

Some areas will not be affected by the prohibitions. These include forests and grasslands within the Powder River Basin area of coal-bed methane potential area and any reasonably foreseeable future leases areas for lead mining on the Mark Twain National Forest because there are no inventoried roadless areas in those existing or potential lease areas.

Salable Minerals

Affected Environment

Salable minerals are common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. Generally, they are widespread and of low value; they are primarily used for construction or landscaping materials. Their value is dependent upon market factors, quality of the material, and availability of transportation.

The Forest Service is the principal user of material from borrow pits on NFS lands. The Agency develops borrow pits to obtain surfacing material for construction and maintenance of forest roads. Other Federal agencies, State and local governments, and non-profit organizations may obtain free use permits for these materials for public projects. The public may purchase these materials from the Forest Service. Disposal of these resources is at the sole discretion of the Forest Service.

Alternative 1 – No Action

The Forest Service would have no need to develop future sites in inventoried roadless areas except as incidental to new road construction or reconstruction. This alternative would not depend on nor require the Forest Service to use salable minerals from inventoried roadless areas. There would not likely be an interest in development of material sites in inventoried roadless areas by others because inventoried roadless areas are generally remote and thus, would not be cost-effective to develop. Generally, other sources of similar material are available outside inventoried roadless areas.

Alternatives 2 through 4

For the same reasons discussed under the No Action Alternative, there would not likely be an interest in development of material sites in inventoried roadless areas by others. The effects under Alternatives 2 through 4 are the same as those under Alternative 1; consequently, there are no anticipated effects to salable minerals because of the prohibition alternatives.

Abandoned and Inactive Mines

Affected Environment

Abandoned mines, oil and gas wells, quarries, and other mineral sites may pose human health or environmental or safety risks that require some type of reclamation or mitigation. According to the USDA Office of the Inspector General (Office of Inspector General 1996), there are an estimated 38,500 abandoned and inactive hard rock mines located on or affecting NFS lands. An estimated 2,000 of these sites are releasing, or have the potential to release, a hazardous substance that would require some type of response action under CERCLA (USDA Office of Inspector General 1996). This act addresses emergency response, site remediation, and spill prevention. The Forest Service has authority for CERCLA enforcement on NFS lands under Executive Order 12580, Section 2(j).

Another 4,000 sites are estimated to require some type of reclamation to resolve violations of the Clean Water Act (USDA Office of Inspector General 1996). Inventoried roadless areas may contain sites that require some type of reclamation.

Alternative 1 – No Action

Management of abandoned and inactive mines would not change from what is described above under the affected environment. Various national forests have identified 42 abandoned mine-land projects in inventoried roadless areas that would require approximately 21 miles of road construction or reconstruction to meet reclamation objectives.

Alternatives 2 through 4

An exception under these alternatives provides for road construction or reconstruction needed to conduct a response action under CERCLA or to conduct a natural resource restoration action under CERCLA, Oil and Hazardous Substance Liability, Section 311 of the Clean Water Act, or under the Oil Pollution Act.

These alternatives would not change the Agency's response to CERCLA violations at abandoned mines, oil and gas wells, quarries, and other mineral sites. Construction or reconstruction of any necessary temporary roads for this activity would be excepted from the prohibition alternatives.

Geological and Paleontological Resources

Affected Environment

Paleontological resources are recognized as important for their scientific and natural resource values and for the active protection required in their management. Identification of fossil resource probability in an area and the appropriate management prescriptions is accomplished in the land management planning process. The Forest Service only recently began to inventory paleontological resources on NFS lands for purposes of land management planning (Kuizon 2000).

Karst and cave resources can be expected to occur on NFS lands underlain by limestone or marble or areas having exposed basaltic flows. Some of the values associated with karst and cave resources are their ability to store and transmit groundwater, their importance as subterranean wildlife habitats, their importance as cultural resource or paleontological sites, and their ability to provide interpretive sites or recreational opportunities for spelunkers or cavers. They can also present hazards, such as sinkholes, to resource use and development.

Road construction or reconstruction activities and other developments are sources of sediment, debris, and other pollutants that, when entering karst or cave systems, can damage them and their associated resources.

Alternative 1 – No Action

Management of geological and paleontological resources would not change from what is described above under the affected environment. Access would depend on whether land

management prescriptions prohibit road construction or reconstruction. Access may be affected in those areas with management prescriptions that currently do not allow road construction or reconstruction.

Alternatives 2 through 4

Roads provide access to paleontological sites for purposes of research, restoration, teaching, and interpretation. By making these sites accessible, it is possible to raise public awareness and help protect resource values. Alternatively, by making sites accessible to the public, roads can provide increased opportunities for vandalism or unauthorized removal of paleontological resources, especially now when some specimens are commanding record high prices by collectors (Flynn 2000). The discovery of significant vertebrate fossil sites and collecting sites for rocks, minerals, and invertebrate and plant fossils usually occurs in areas having roaded access. Although other forms of access may be used (e.g., off-road vehicles, helicopters, etc), Alternatives 2 through 4 could reduce the possibility for discovery of new sites and subsequent efforts to locate, interpret, remove, and preserve vertebrate fossils from erosion or corrosion by natural elements. Alternatively, prohibiting road access to undiscovered vertebrate fossil sites could lessen the possibility of vandalism or unauthorized removal of fossils. Overall, these alternatives are not likely to adversely, or favorably, affect paleontological resources and activities associated with management of these resources.

Alternatives 2 through 4 could reduce potential damage to karst and cave systems in roadless areas from sedimentation, debris, and other pollutants associated with roads, as well as vandalism or unauthorized removal of speleothems or other valuable cave features. Consequently, the functions of karst systems and the protection of cave resources would be maintained.

Effects of Social and Economic Mitigation Measures on Minerals and Geology

The social and economic mitigation measures would permit road construction or reconstruction associated with future leasable mineral exploration and development activities in inventoried roadless areas; the effects of the action alternatives on leasable minerals described above would not apply. Any mineral lease decision would be made on a case-by-case basis after completion of environmental analysis. Construction or reconstruction of roads, where no other feasible alternatives exists, would be allowed as necessary to fulfill the conditions of the lease. The effects of this mitigation on mineral development are discussed in the section on Energy and Non-energy Minerals. Additional discussion of these effects is in the National Forest System Roads section in this chapter.

Other Indirect and Cumulative Effects on Minerals and Geology

Under Alternatives 2 through 4, leasable and salable mineral exploration and development opportunities in inventoried roadless areas would be limited, and their costs would increase. This could contribute to a greater reliance on some mineral resources

from abroad where foreign political and economic influences would factor into their price and availability. A reduction in the potential for leasable and salable mineral development may reduce revenues to Federal, State, and local governments (see Energy and Non-energy Minerals section).

Social and Economic Factors

NFS lands are used, enjoyed, and valued by people everywhere, including those who live in nearby communities, those who visit them from cities, States, and countries farther away, and those who never visit, but benefit from the ecosystem services and passive use values they provide. Because of this, policy decisions that influence the management of NFS lands have the potential to affect almost anyone.

Some people, however, are more directly affected than others because of the interest that they have in forest management. Those who have the strongest interests in NFS lands, and those whose livelihood or recreational pursuits are most closely tied to the national forests, are most directly affected by Forest Service policy. It is these forest stakeholders who are the focus of the socioeconomic effects analysis.

This analysis centers on eight broad categories of forest stakeholder interest: 1) non-commodity values, 2) recreation, 3) hunting and fishing, 4) livestock grazing, 5) non-timber forest products, 6) timber harvest, 7) energy and non-energy minerals, and 8) road construction. Forest-dependent communities and local involvement are also addressed because they were identified as key issues during the scoping and public comment periods. American Indian and Alaska Native issues, civil rights and environmental justice concerns, and the effects of the alternatives on them are also discussed. In addition, Agency costs associated with the proposed rule are analyzed. Additional detail is provided in the Socioeconomic Specialist Report (Langner and Charnley 2000). The section concludes with a discussion of cumulative social and economic effects.

An extensive Civil Rights Impact Assessment and analysis of Environmental Justice issues was prepared in conjunction with this rulemaking to provide a better understanding of how populations protected by civil rights and environmental justice legislation and policies might be affected by the proposed rule, as required by the U.S. Department of Agriculture. This document is available upon request.¹⁸

Three measures are assessed in the socioeconomic effects analysis. These are: 1) the ability of people to continue to engage in their preferred uses of NFS lands, and the quality of their experience; 2) economic impact on individuals, communities, and revenues to State and local governments; and 3) peoples' abilities to maintain their social and cultural integrity and forest-related values.

The socioeconomic effects analysis does not detail the ecological impacts of the human activities and interests discussed here on inventoried roadless areas. During the public comment period on the DEIS, many people commented that specific human activities

¹⁸To request this document, refer to the contact information at the front of this FEIS.

should be prohibited in roadless areas due to their ecological impacts. After careful review of public responses to the Notice of Intent, the Forest Service determined it would consider prohibiting only those activities that are likely to significantly alter and fragment landscapes at the national scale. Therefore, the Agency decided to analyze alternatives that would limit road construction, reconstruction, and timber harvest only. These activities are most likely to result in immediate, irretrievable, and long-term loss of roadless characteristics. The reason for the focus on roads and timber harvest is described in the Purpose and Need section of Chapter 1. The ecological impacts of some human activities are discussed in the Ecological Factors section of this chapter.

Several assumptions underlie this analysis:

- Any individual may hold one or more of the interests in NFS lands described in this section. Consequently, the impacts of the alternatives on specific individuals may be a cumulative one, and mixed, depending on how many of these interests he or she holds. For purposes of this analysis, it is only possible to outline the effects of the different alternatives on each individual interest category.
- Maintenance of social and cultural integrity among forest stakeholders depends in part on peoples' abilities to maintain their current and historic uses of NFS lands.
- The ability of forest stakeholders to continue to engage in their current uses of NFS lands, and to maintain the quality of their experience, is tied to the ecological health of the natural resources found there.
- Management actions that are inconsistent with peoples' forest-related values are perceived by them as threatening and undermining those values.
- Resource use is highest close to roads and decreases as the distance from roads increases.

Non-commodity Values

The Human Uses and Social and Economic Factors sections of this chapter address specific commodity uses and values of NFS lands, and the effects of the alternatives on these activities and their participants. This section discusses the non-commodity values and benefits associated with NFS lands. NFS lands provide a host of non-commodity values and benefits that can be grouped into three general categories: 1) recreation values, 2) ecological values, and 3) passive use/spiritual/aesthetic values (Bengston and others 1999). Recreation values are discussed in the Human Uses and the Social and Economic Factors sections of this chapter, and are not treated here.

Ecological values and benefits associated with NFS lands include:

- Maintenance of ecosystem health,
- Conservation of plant and animal species,
- Conservation of air and water quality, and
- Provision of undeveloped natural areas for research and teaching.

Passive use/spiritual/aesthetic values include:

- Valuing scenic quality (discussed in the Scenic Quality section under Human Uses in this chapter),
- The desire to experience solitude and personal renewal in wild areas,

- Feeling a sense-of-place attachment to a specific area,
- Wanting to know that natural areas exist for their own sake, and
- The desire to leave a legacy of natural areas for future generations to experience and benefit from.

A central purpose of the proposed Roadless Rule is to protect the characteristics of inventoried roadless areas, many of which are associated with these non-commodity values.

Natural Resource Protection Values – For some people, natural resource protection values are passive use values. In other words, they believe in protecting forests because they feel it is important, independent of any utilitarian motive. Other people believe that it is important to protect forests because they provide a number of benefits (Content Analysis Enterprise Team 2000a,b). These include:

- Watershed protection, clean drinking water, flood protection, and water for irrigation;
- Clean air quality;
- Maintenance of soil productivity;
- Stabilization of hillsides to prevent sedimentation of watercourses;
- Protection of fisheries;
- Protection of wildlife for viewing and hunting opportunities;
- Provision of recreation opportunities associated with primitive and semi-primitive classifications;
- Regulating climate and counter-acting the effects of global warming;
- Enhancing social and ecological sustainability;
- Preventing the spread of nonnative invasive species that degrade ecosystems;
- Cost savings from environmental protection versus future environmental restoration;
- Providing current and future supplies of medicinally valuable plants;
- Well-functioning ecosystems and biodiversity;
- Honoring treaty rights, and
- Enhanced quality of life.

The Ecological Factors section of this chapter discusses many of these characteristics in detail, and the effects of the alternatives on them.

Water and Air Quality – People have many reasons for believing it is important to maintain and enhance air and water quality. Water flowing from NFS lands is important to downstream users, such as municipalities, irrigators, and industrial users. In-stream uses for hydroelectric generation and recreation are also highly valued uses of NFS water. The EPA estimated in 1999 that 3,400 public drinking water systems are located in watersheds containing NFS lands. About 60 million people live in those 3,400 communities (Sedell and others 2000).

The most recent EPA water quality inventory found that **nonpoint source pollution** still accounts for the majority of water-quality impaired stream miles and lake acres (U.S. Environmental Protection Agency 1998a). Although agriculture is still, by far, the largest nonpoint source of water pollution, forestry and related activities are important

contributors in some areas of the United States. However, the proper implementation of best management practices and contract requirements has significantly controlled pollutants from forestry operations on NFS lands. The costs of water quality control in the United States are substantial and rising. A recent EPA survey indicates that community water systems in the United States will need to invest \$138 billion over the next 20 years (Hertzler and Davies 1997). Water pollutants, such as sediment, increase treatment costs downstream.

Water quality also affects the value of water-based recreation activities. The impact of sedimentation and other water quality impairments has a negative effect on recreation user benefits. For example, a national study (Russell and Vaughan 1982) estimated that the total benefits to anglers of improving the water quality of lakes and streams ranged from \$300 to \$966 million (in 1982 dollars). Another national study estimated that the total damages to all recreational water uses from all types of pollution ranged from \$1.8 to \$8.7 billion (in 1978 dollars per year) (Freeman 1982).

Air quality can directly affect human health and indirectly affect visibility that can reduce scenic quality and the ability to enjoy outdoor recreation in natural areas. Several studies have documented peoples' willingness to pay to enhance air quality and corresponding visibility. A study of the benefits of conserving visibility in National Parks of the Southwestern United States determined that the benefits outweighed the treatment and regulatory costs (Schulze and others 1983). A study conducted in Utah County, Utah estimated that respondents were willing to pay an average of \$37 per household per month to improve air quality to a level found in nearby areas in Utah and Idaho (Pope and Miner 1988).

Solitude and Personal Renewal – Many people visit inventoried roadless areas to interact with the natural world and experience solitude, and spiritual and psychological renewal. This includes visiting American Indian and Alaska Native sacred sites. Some would argue that interaction with the natural world is crucial for the human spirit and for emotional and psychological well being (Roberts 1999; Schroeder 1999; Wilson 1984; Kellert and Wilson 1993). Undeveloped natural areas can be viewed as a spiritual and psychological resource in this regard (Rolston 1999). One public commentator noted that protecting inventoried roadless areas on NFS lands is necessary for the soul of the nation (Content Analysis Enterprise Team 2000b). As more and more Americans spend most of their lives in urban and suburban environments, public lands increase in importance as places people can go to experience nature, solitude, and personal renewal. There is substantial evidence that doing so has a positive effect on the quality of life (Driver and others 1999).

Sense of Place – Sense of place is the physical locations that people have invested with meaning, value, and feelings because of their experiences there (Brandenburg and Carroll 1995). Some place values are use-oriented (Mitchell and others 1993). People value these places because they support a particular use that they like to engage in, such as a mushroom picking spot or a favorite fishing hole. Once the place no longer supports that use, it may lose its value to the individual and cause him or her not to return there. Other place values are attachment-oriented. People have emotional bonds to places, which are important to them for providing certain kinds of experiences they value. Even if

conditions change in these places, people may continue to revisit them. Sense of place can play an important role in fostering individual identity, influencing quality of life, reinforcing cultural traditions (e.g., subsistence), and shaping attitudes towards the land and how it should be managed (Roberts 1999).

Research and Teaching – Many people recognize the value of inventoried roadless areas as relatively undisturbed ecosystems that provide opportunities for research and teaching. They provide a setting for undertaking basic biological and ecological research on individual species. As reasonably intact ecosystems, they can provide a baseline for understanding the ecological impacts of development elsewhere. Inventoried roadless areas are also invaluable as reference landscapes for undertaking long-term research on large-scale ecological patterns, processes, and management activities. This landscape-level research is critical for understanding how to manage NFS land sustainably.¹⁹ Because they are typically large ecosystems, inventoried roadless areas also serve as important training grounds for scientists, ecologists, wildlife biologists, foresters, and natural resource managers.

Passive Use Values – Passive use values are independent of any active or consumptive use of a natural area. Passive use values include existence and bequest values. Existence values are things, places, or conditions that people value simply because they exist, without any intent or expectation of using them (Peterson and Sorg 1987; Randall 1992). Bequest value is the desire to allow others, such as future generations, to benefit from a resource. Some natural resource protection values can also be considered passive use values. For example, many people believe that forests and wildlife have inherent worth in and of themselves, independent of their usefulness to humans, and should therefore be protected (Steel and others 1994).

Passive use values are often associated with T&E species, unique ecosystems, and biodiversity. Passive use values differ among individuals, groups, and landscape conditions. Under special conditions, the passive use value of an area can exceed the active use value served (or potentially served) by road access to that area (Walsh and others 1984; Driver and others 1987; Walsh and others 1990; Payne and others 1991; Brown 1993; Driver and others 1999; Bengston and Fan 1997). Walsh and others (1984) found that passive use values accounted for 38% to 54% of the value of protecting areas as Wilderness. Walsh and others (1996) focused on what proportion of natural areas should be protected and the willingness of residents to pay for protection. Residents of all regions preferred protection for most natural areas in the eastern United States, while the proportion preferred in the West ranged from 83% to 92%. Willingness to pay for protection of natural areas averaged \$263 per person for all natural areas in the United States (including both use and passive use value). Most residents were willing to pay more for protection of areas within their own region than for protection in other regions. However, most residents were willing to pay more for protecting natural areas in Alaska than for any other region, indicating a significant passive use value for protection of areas in Alaska. Loomis and Richardson (2000) applied passive use values estimated in the literature to acreages of inventoried roadless areas, and estimated the total annual value of

¹⁹Refer to discussion of Reference Landscapes in Ecological Factors section.

protecting roadless areas to be \$274 million in the Western United States and \$6.2 million in the Eastern United States.

A review of studies on the economic benefits of endangered species indicated that peoples' willingness to pay for the protection of individual species ranged from a low of \$6 per household for the striped shiner (a fish) to a high of \$95 per household for the northern spotted owl and its old-growth habitat (Loomis and White 1996). Vincent and others (1995) reviewed studies of passive use values related to forestland. The value of protecting the northern spotted owl was estimated to range from \$48 to \$144 per United States household. A more focused study examined the value of preserving the northern spotted owl to residents of the State of Washington. The average value was \$35 per household. A study of the willingness of residents of the Pacific Northwest to pay to double the size of Columbia River Basin salmon and steelhead runs by 2000 estimated that the value to nonusers was \$27 per household. It was not possible to determine the passive use component of total value for users of the resource. However, in reviewing the literature, the authors concluded that it is clear that passive use values are an important component of total use values for natural resources.

Alternative 1

Alternative 1 would result in continued road construction and timber harvest in inventoried roadless areas. An estimated 1,160 miles of classified and temporary roads are planned to be constructed or reconstructed in inventoried roadless areas between 2000 and 2004. In addition, an estimated 1.1 BBF of timber could be offered for sale in inventoried roadless areas during this 5-year period. More people would gain access to these areas. Management of inventoried roadless areas would continue as prescribed in local land management plans. People, who believe that non-commodity values are compatible with multiple uses, including resource extraction and road development, may perceive no impact from Alternative 1. However, the Ecological Factors section of this FEIS indicates that Alternative 1 could have detrimental effects on ecosystem health including watershed health, forest health, and biodiversity. The Recreation section of this FEIS finds that Alternative 1 could reduce scenic quality and Primitive and Semi-Primitive recreation opportunities, which often make it possible to experience solitude and personal renewal, and opportunities to engage in long-term scientific study in natural settings using reference landscapes (see those sections for a detailed account). The long-term associated impacts on people who value the non-commodity benefits of inventoried roadless areas could include:

- Diminished air and water quality within the airsheds or watersheds of affected inventoried roadless areas they visit or live in;
- A degradation of scenic quality in affected inventoried roadless areas;
- Reduced opportunities to experience solitude and personal renewal;
- Alteration of special places within inventoried roadless areas that individuals or groups have a place attachment to, including sacred sites;
- A diminished legacy of undisturbed natural lands for future generations;
- A threat to existence values;

- A reduced supply of undisturbed natural areas where research and teaching can take place; and
- Threats to the conservation of some plant and animal species people care about.

Alternatives 2 through 4

Prohibiting road construction and reconstruction in inventoried roadless areas would shelter them from some forms of development and disturbance, including some planned timber harvest activity, depending on the alternative chosen. In contrast to Alternative 1, the action alternatives would maintain and conserve the current roadless characteristics of inventoried roadless areas. For example, the Ecological Factors section of this chapter concludes that, in general, the action alternatives would conserve ecosystem health on NFS lands to a greater degree than Alternative 1. Specifically, they would maintain water, soil, and air quality; maintain intact aquatic ecosystems; enhance land-based ecosystems; prevent habitat degradation, loss, and fragmentation; conserve species viability and biodiversity; and minimize human disturbance.

These findings indicate a positive effect on people who value ecosystem health and want to protect plant and animal species, and air and water resources. The action alternatives would also have a positive effect on people having passive use values including existence and bequest values. People who value inventoried roadless areas as places for research and teaching would also benefit from the action alternatives because these alternatives would help maintain the undisturbed character of natural areas and reference landscapes.

The Recreation Sections of this chapter find that the action alternatives would maintain high levels of scenic quality on NFS lands relative to Alternative 1. They also find that these alternatives maximize opportunities for dispersed recreation in primitive and semi-primitive settings. Hence, the action alternatives would have a positive effect on people who value scenic quality, and people who wish to experience solitude and personal renewal in undisturbed natural settings. People with a sense-of-place attachment to inventoried roadless areas would also benefit from the action alternatives, because these alternatives – and especially those that prohibit timber harvest – minimize the likelihood that the current character of special places, including American Indian and Alaska Native sacred sites, would be altered by disturbance.

Because the action alternatives conserve the roadless characteristics of inventoried roadless areas, they also conserve the non-commodity values associated with those characteristics. The alternatives that prohibit timber harvest, in general, would go further in protecting non-commodity values than the alternative that prohibits road construction and reconstruction alone.

Recreation, Scenic Quality, Wilderness, and Recreation Special Uses

Affected Environment

Nationally, the demand for most recreation activities continues to grow (Cordell and others 1999b). The 1994-95 National Survey on Recreation and the Environment found that 95% of the American population 16 years of age and older participated at least once in outdoor recreation during the year. This survey included recreation participation across the entire range of recreation settings on all ownerships, from urban parks and playgrounds to the most remote Wilderness. NFS lands provide recreation opportunities across a narrower range of settings, as described by the ROS (see Recreation section under Human Uses in this chapter).

Recreation activities associated with more developed portions of the ROS (e.g., developed camping, driving for pleasure, and visiting nature centers) tend to be more popular in terms of total participants and days of participation (Cordell and others 1999b). A smaller percent of the population engages in activities that are associated with more remote landscapes, such as backpacking, primitive camping, and semi-primitive motorized uses such as off-highway driving and snowmobiling. However, varieties of recreation activities occur in all of the ROS settings, including picnicking, hiking, wildlife viewing, off-highway driving, fishing, and hunting.

Table 3-53 shows changes in the national participation levels for outdoor recreation activities that are also available on NFS lands between 1982 and 1983, and between 1994 and 1995. Participation has increased in all activities but horseback riding.

Table 3-53. Number of Americans (16 years and older) participating in outdoor recreation activities available on National Forest System lands, 1982-1983 and 1994-1995.

Activity	1982-1983 (millions)	1994-1995 (millions)
Visiting an historic or pre-historic site	No data available	123.3
Picnicking	84.8	98.3
Biking	56.5	57.4
Bird watching	21.2	54.1
Hiking	24.7	47.8
Motor boating	33.6	47.0
Developed camping	30.0	41.5
Primitive camping	17.7	28.0
Off-Road driving	19.4	27.0
Skiing (downhill and cross-country)	15.9	23.3
Backpacking	8.8	15.2
Horseback riding	15.9	14.3
Snowmobiling	5.3	7.1

There are several reasons for the upward trend in outdoor recreation participation. Because 80% of the American population is now urban, recreation has become one of the few avenues people have for experiencing the outdoors. Moreover, people have become increasingly aware that outdoor recreation contributes to the quality of their lives (Driver and others 1999). One survey (The Recreation Roundtable 1997) found that participation in outdoor recreation, especially as a child, leads to a more satisfying and fulfilling life. People are also more aware of the numerous benefits that result from engaging in outdoor recreation (Driver and others 1999). These include:

- Spiritual and Psychological Benefits – better mental health, personal development and growth, personal appreciation and satisfaction, spiritual renewal, stress release, experiencing the natural world;
- Physical Health Benefits – exercise, spending time in relatively unpolluted environments;
- Social and Cultural Benefits – spending quality time with family and friends, learning about cultural and historical heritage resources, reinforcing cultural identity (including the practice of culturally important activities), improving environmental awareness, conflict resolution; and
- Economic Benefits – reduced health care costs, better job performance.

Participation in outdoor recreation is influenced by demographic variables such as gender, age, ethnicity, education, and income level. For example:

- During 1994 and 1995, 94.5% of the visitors to federally designated Wilderness areas were White (Cordell and Teasley 1998).
- Communities having a higher proportion of African American and low-income residents participate less in dispersed and winter recreation (Tarrant and others 1999).
- White Americans engage in recreational fishing more than African Americans and other racial and ethnic groups (Johnson 1999).
- People who have completed college participate more in hiking and backpacking than those with high school educations (Johnson 1999).
- People over 60 participate less in camping than do younger age groups (Johnson 1999).
- Men and middle-income groups are more likely than women or other income groups to camp (Johnson 1999).
- Hispanic populations prefer using developed recreational sites, and tend to regularly visit specific sites for day trips in large extended family groups (Magill and others 1993).

The Forest Service is the single biggest provider of outdoor recreation opportunities in the United States (Cordell and others 1999b). As the demographic characteristics of the American population change over time, there may be corresponding changes in demands for different types of recreational opportunities on NFS lands.

Future growth in recreation demand is projected to be greater for activities that require roaded access than for activities in more remote settings (Bowker and others 1999). As reported in the National Forest System Roads section of this chapter, recreation use accounts for 90% of daily traffic on system roads. However, most recreation traffic occurs on the 20% of NFS roads that are designed and maintained for passenger cars. In addition to those roads, recreationists also use the 54,600 miles of public roads maintained by States and Counties within NFS lands.

Federal lands are often the only source of remote recreation opportunities, such as those found in inventoried roadless areas. For example, in the Southern Appalachian region, Federal lands provide two-thirds of remote settings. Attributes that are highly demanded include scenic landscapes, wild rivers, high quality trout habitat, and historic sites (Southern Appalachian Man and the Biosphere 1996b). The scarcity of Federal lands in the East implies more limited opportunities for large, undeveloped recreation relative to the population base. The concentration of Federal lands in the West provides residents with much greater access to remote recreation experiences than in the Eastern United States.

Access to private land for public recreation is expected to decrease in the future; so public lands are likely to be the destination of choice for increasing numbers of people looking for high-quality recreation experiences in natural settings (Cordell and others 1999b). Increasing demand is likely to lead to more congestion and user conflicts and less user satisfaction across all ROS settings. Urban residents have fewer outdoor recreation opportunities than rural dwellers, leading to increased pressures on, and demand for, recreation opportunities closer to metropolitan areas (Tarrant and others 1999). Recreation use patterns show a trend for more trips closer to home (Cordell and others 1999b), which is most likely to impact public lands in close proximity to urban populations.

Data are not available on the amount of recreation use in roaded versus inventoried roadless areas. While many types of recreation activities can occur in the undeveloped settings of inventoried roadless areas, some activities are more strongly associated with these areas than others. These include backpacking, hiking, orienteering, horseback riding, off-road driving, primitive camping, mountain climbing, caving, and rock climbing, a group of activities described by Cordell and others (1999b) as “Outdoor Adventure.” Hiking is the only activity in this group that is among the 10 most popular in the United States. Mountain biking and wildlife viewing are among the 10 most popular activities not classified as Outdoor Adventure that do take place in inventoried roadless areas.

While Outdoor Adventure participants engage in recreation activities on other lands, and other recreation activities occur in inventoried roadless areas, the Outdoor Adventure category offers a reasonable indicator of recreation demand for the setting offered in inventoried roadless areas. Depending on the region of the country, from a third to a half of the United States population participates in Outdoor Adventure activities (Winter and Chavez 1999). Although the percentage of the population that participates in these activities is higher in the Western United States, the total number of participants is greater in the Eastern United States (Table 3-54). Outdoor Adventure activities are projected to grow between 10% and 49% by 2040. The lower growth rates are projected for off-road driving, while hiking and horseback riding are projected to each grow about 45%. Generally, Outdoor Adventure activities will be among the slowest to grow over the next 40 years (Bowker and others 1999).

Although demand for other recreation activities will increase more rapidly in the future, the availability of opportunities for remote recreation activities may be a limiting factor

in meeting future demand. Inventoried roadless areas provide an important setting for these types of recreation activities. Some of these activities can also take place in Wilderness, with the main exception of off-road driving. One indicator of the availability of recreation opportunities to meet future demand is to examine the acres of land available per participant. Table 3-54 displays the number of acres of Wilderness on all Federal ownerships, and inventoried roadless area acres on NFS lands by Resources Planning Act Assessment region. The Eastern United States (North and South regions) has the least amount of Wilderness and inventoried roadless acres per recreation participant. For activities that cannot take place in Wilderness (primarily off-road driving), the limited opportunities are even more pronounced. The Pacific Region has more land per capita than the Eastern United States, while participants in the Rocky Mountain Region have the greatest abundance of land suitable for Outdoor Adventure Activities in the lower 48 States. In Alaska, there are about 120 acres of Wilderness and inventoried roadless area per capita. Additional inventoried roadless areas may exist on other Federal ownerships, but only data on Wilderness were available for other Federal agencies.

Table 3-54. Acres of Wilderness and inventoried roadless areas available for Outdoor Adventure Activities in the lower 48 States, by Resources Planning Act assessment region.

Region	Outdoor adventure participants ^{a,c}			Designated Wilderness ^{b, c}		Inventoried roadless areas	
	Number (millions)	Percent of population	Distribution by region (%)	Distribution by region (%)	Acres per participant	Distribution by region (%)	Acres per regional participant
North	32.0	34.8	43.4	3.3	0.05	1.5	0.02
South	20.5	32.9	27.8	4.9	0.10	2.2	0.05
Rocky Mtn.	7.1	47.5	9.6	45.9	2.86	77.6	4.78
Pacific	14.1	45.1	19.1	46.0	1.44	18.7	0.58
Total	73.7	36.8	100.0	100.0	0.60	100.0	0.79

^a Number of participants includes individuals 16 years or older.

^b Wilderness includes acres administered by Forest Service, National Park Service, and Bureau of Land Management in the lower 48 States.

^c Alaska acres are not included in Wilderness or inventoried roadless acres.

The availability of remote activities can be compared to total recreation opportunities per capita (Table 3-55). In addition to Federal lands, State parks and forests provide recreation opportunities that are similar to some types of NFS opportunities. The total acres in State forests, State parks, and all Federal land management agencies were summed by Resources Planning Act assessment region. It was not possible to calculate the number of acres available per participant in recreation, since no estimate of overall recreation participation was available for the regions. Total acres were compared to the total population 16 years of age and older, which underestimates acres available per recreation participant. Acres in the National Wilderness Preservation System were not included in Table 3-55. Acres available per person are shown both with and without acres in NFS inventoried roadless areas.

Table 3-55. Acres available for recreation on State and Federal lands, by Resources Planning Act assessment region.

Region	Population 16 and older (millions)	Acres of land per person ^a	Acres of land per person ^b
North	92.0	0.4	0.4
South	62.3	0.5	0.5
Rocky Mtn.	14.9	17.0	14.8
Pacific	31.0	3.2	1.8
Alaska	0.5	308.0	283.7
Total	200.7	3.0	2.6

^a Including inventoried roadless areas.

^b Not including inventoried roadless areas.

The per capita availability of recreation opportunities by region is similar to the availability of Wilderness and inventoried roadless areas shown in Table 3-54. The North and South regions have the least acres per person, while the Rocky Mountain Region has much more abundant resources.

Recreation is an important component of the travel and tourism industry. Travel and tourism is America's largest retail export industry, and is the third largest domestic retail sales industry, with sales in excess of \$500 billion and direct employment of 7.6 million people. Approximately one out of every 17 United States residents was employed because of direct travel spending in the United States during 1999 (Travel Industry Association of America 2000). Tourism has been one of the three most important generators of outside income in Idaho, Oregon, and Washington, while Montana's economy has been driven largely by the tourism sector and an influx of new residents (Quigley and Arbelbide 1997b).

In the Columbia River Basin, recreation supported nearly 78,000 direct jobs (Crone and Haynes 1999). A study by English and Marcoullier (1999) estimated that 767,000 jobs and \$11.8 billion of labor income are associated with expenditures by non-resident recreation visitors in all non-metropolitan Counties in the United States. In the Southern Appalachian region, outdoor recreation tourism was estimated to contribute almost \$6 billion in business sales, and create employment for more than 100,000 workers in the region (Southern Appalachian Man and the Biosphere 1996b). In southeast Alaska, recreation and tourism levels more than doubled between the mid-1980s and the mid-1990s, accounting for an estimated 2,941 direct jobs in the region in 1995 (representing 7% of total employment in Southeast Alaska) (USDA Forest Service 1997d). Because of the high level of outdoor recreation use on NFS lands, the Forest Service has been shifting the focus of multiple-use land management away from commodity production and toward recreation and related amenity uses (Driver and others 1999).

Recreation use on NFS lands generates considerable economic benefits for businesses in local communities. Use by non-residents is particularly important, since non-residents bring "outside" dollars into communities. Based on recreation expenditure profiles

developed for Forest Service impact analysis, developed uses (such as winter sports) generate more jobs per recreation visit than dispersed activities, such as camping, picnicking, and hiking. For example, winter sports are estimated to generate 1,322 direct jobs per million visits, while wildlife viewing generates about 645 direct jobs. Hunting and fishing visits tend to generate smaller numbers of jobs per million visits (281 direct jobs for fishing and 480 direct jobs for hunting). However, more developed activities also impose higher infrastructure costs on communities, such as law enforcement, road maintenance, and sanitation facilities.

Landowners with property adjacent to public lands benefit from enhanced property values, and adjacent communities benefit because the amenity values of national forests attract businesses and residents. High population growth is occurring in areas with high recreation use (Johnson and Beale 1994). Counties with a high level of recreation use tend to be diversifying more rapidly than other Counties, which is at least partly attributable to the presence of public lands that attract both tourists and permanent residents (Ashton and Pickens 1995).

Recreation special uses on the NFS are important to many local businesses and generate economic activities in many adjacent communities. Recreation special uses include ski resorts, lodges, outfitter and guide services, marinas, and other resorts. Receipts from recreation special uses on NFS lands were almost \$38 million in 1998.

Currently, the Forest Service has more than 26,000 recreation special use permits. The largest number of permits is for recreation residences (14,504), followed by outfitter and guide permits (5,777). Winter resorts accounted for 148 special use permits on NFS lands. Demand for recreation special use permits is expected to continue increasing in the future.

Outfitters and guides provide services to a wide variety of recreation participants. Hunting, fishing, hiking, horseback riding, rafting, and OHV tours are examples of the types of activities. Demand for most of these activities is expected to increase in the future, as described earlier. Although hunting participation is expected to decline overall, big game hunting is expected to increase. The availability of undeveloped lands is essential for many outfitter and guide businesses (Adams 2000).

The winter resort special use permits on NFS lands include most of the downhill skiing capacity in the Western United States. The number of ski areas has decreased since 1985, primarily through the closure of small ski areas. Most downhill skiing capacity has increased through expansion of existing resorts. New ski developments are unlikely. Development requires a high capital investment, and a lengthy approval process. For example, in the last 10 years every large ski area in the Rocky Mountain Region has expanded. No new developments have been proposed (Ryberg personal communication).

According to ski industry reports, the number of ski resorts went from 700 in 1986 to 519 in 1996. Resort consolidation is expected to continue, with ownership of resorts concentrated in fewer companies. Downhill skiing participation has been relatively flat in the last few years. Annual variations are often related to weather conditions. Future

demand for downhill skiing depends largely on whether the participant base is expanded. White males have historically made up the majority of customers, and they are decreasing as a proportion of the total population (Gardner 1999).

Recreation was an important topic for people commenting on the Notice of Intent and the DEIS. The majority of public comment related to recreation focused on the issue of whether or not motorized vehicles should be allowed in inventoried roadless areas (Content Analysis Enterprise Team 2000a, b). Many of the people commenting believed existing roads and OHV trails would be closed by the alternatives.

Public sentiment regarding motorized recreation in roadless areas is polarized. At one end of the spectrum are people who believe that motorized recreation in roadless areas should be restricted or eliminated. This group values these areas as places to go to escape noise, development, and pollution. They believe that such areas are increasingly hard to find. Many believe that existing NFS roads are sufficient. Others oppose the use of OHVs in roadless areas because they believe they are ecologically destructive, and that these areas deserve environmental protection.

At the other end of the spectrum are those who believe that roadless areas should be open to motorized recreation. These people believe in their right to use public lands, and assert that many people would be denied this right if motorized access were prohibited in the future. Many believe that limiting motorized recreation discriminates against the physically disabled, elderly people who cannot hike long distances, and people who do not otherwise have the time, money, or inclination to visit roadless areas.

Comments were also received about the growing demand for recreation. Some believe that increasing demand for developed uses would degrade the experience and environment in roaded areas if no future development is allowed in inventoried roadless areas. These people generally believe that certain places in inventoried roadless areas should be roaded to accommodate this demand. Others were concerned about maintaining existing inventoried roadless areas to meet demands for recreationists seeking solitude.

The potential effect on local economies was also a concern to many respondents. Some believe the prohibitions could have negative impacts on local communities, while others believe inventoried roadless areas are essential to maintaining the resource base for recreation-related economic activities.

Alternative 1 – No Action

Recreation use on NFS lands is expected to continue increasing across a wide spectrum of activities. Road construction and reconstruction in inventoried roadless areas would occur to varying degrees by location, increasing access for motor vehicles and decreasing inventoried roadless area acreage. New roads in entry into inventoried roadless areas would occur primarily for access to timber harvest, mineral development, and other special uses. A high percentage of those roads would likely be closed when no longer needed for the development activity, except in Region 10, where the majority of roads

would be maintained for future use. Therefore, planned road development would not provide many miles of additional access for recreationists in the short term.

Alternative 1 would increase the opportunities for recreation activities in more developed ROS classes at the expense of opportunities in the undeveloped ROS classes (Table 3-55). This would benefit people who prefer more developed outdoor recreational experiences but would be detrimental to those who value dispersed primitive and semi-primitive recreational opportunities. Declines in these opportunities would affect recreationists in the Eastern United States and urban areas of the Western United States, where the land base is already very limited relative to the land base available for more developed types of recreation activities. Given the abundance of the land base in most parts of the Interior West and Alaska, such declines would have relatively little effect on recreationists, at least in the short term. Increased access may affect the ability of Tribes to practice treaty-protected rights.

Additional roaded access into inventoried roadless areas would provide new opportunities to view scenic vistas, and develop new recreation sites, which would respond to increasing demands for road-based recreation. Increased access can also provide people with the opportunity to enjoy unique and sensitive areas, but it can make protection of these areas difficult.

There would be a decline in the land base available for recreation opportunities in relatively undisturbed landscapes outside of Wilderness. Development, such as road construction, would be likely to negatively affect scenic quality on affected areas. Since inventoried roadless areas tend to have high scenic integrity, management actions would likely reduce scenic integrity, which could negatively affect recreation values and adjacent property values.

Within the inventoried roadless areas, there would likely be increasing congestion, which negatively affects the quality of the recreation experience. Increased access and use in areas adjacent to Wilderness would increase the potential for illegal uses and degradation of Wilderness attributes. In addition, some users may transfer use to Wilderness areas as a substitute for the loss of acres of inventoried roadless areas, increasing congestion in Wilderness areas.

A decline in the acres of inventoried roadless area is likely to affect the Agency's ability to accommodate increasing demands for recreation special use permits that are based on remote recreation experiences, such as outfitter and guide permits. This could have a negative economic impact on outfitters and guides. Alternative 1 would allow new recreation developments in inventoried roadless areas, such as campgrounds, resorts, and ski area expansions. Such new development would expand developed recreation opportunities.

The net effect of the changes in opportunities would vary by national forest and grassland, depending on existing use patterns, density of use, and preferences of users. Overall, increases in use are mostly likely to occur on NFS lands in the Eastern United

States where opportunities are already scarce, and areas in close proximity to urban populations throughout the United States.

Thirty-three miles of roads were planned for construction or reconstruction in the next 5 years for recreation projects. However, recreationists usually use roads built for other purposes to gain access. If all of the proposed projects that required roads were implemented, about 258 miles (that would not be closed) of timber roads would be available for recreational use over the next 5 years. Almost 48% of those timber roads would be in Region 10. Of the 528 non-temporary miles of roads associated with other projects, data are not available on what proportion would remain open for other use over the long term.

Alternatives 2 through 4

Similar effects on recreation resources would occur under these three action alternatives. It is important to note that the action alternatives do not directly address the balance between motorized and nonmotorized recreation in roadless areas. This issue is outside the scope of the national prohibitions. Furthermore, no existing roads would be closed under the national prohibitions. Thus, the prohibitions should have no negative effects in the short term on people who engage in motorized recreation activities in inventoried roadless areas. To the extent that new roads would have been built for activities such as timber harvest, those roads would not be available for motorized recreation activities.

Opportunities for remote recreation would be maintained under the prohibition alternatives, compared to Alternative 1. In areas where remote opportunities are scarce, particularly in the Eastern United States, maintaining these opportunities would be particularly valuable. Although recreation use is likely to increase in these areas, maintaining the existing land base would result in smaller increases in density than under Alternative 1. The effects of the prohibitions would be positive for people who engage in activities such as backpacking, mountaineering, cross-country skiing, off-highway driving, horseback riding, hiking, mountain biking, wildlife viewing, hunting, and fishing.

Maintaining inventoried roadless areas in their current state would reduce the need for recreationists in search of remote experiences to move to Wilderness areas to enjoy a comparable experience. This would lessen the visitation pressure on Wilderness areas and help maintain the quality of Wilderness experiences.

Lack of roading would maintain scenic quality in inventoried roadless areas, although timber harvest may reduce scenic quality where it occurs. Therefore, Alternative 4 may maintain scenic quality to a greater degree than Alternative 2. Alternative 3 could offer the most opportunity to maintain or enhance scenic quality, since stewardship harvest to address forest health and fire risk problems would be allowed.

The road prohibition would limit roaded recreation access to inventoried roadless areas, which may cause increased congestion in existing roaded areas of NFS lands. This could have negative effects for people who prefer roaded recreation activities, such as pleasure

driving, visiting heritage sites or interpretive nature centers, and camping or picnicking in developed areas. The prohibition on road construction and reconstruction would affect a maximum of 258 road miles associated with timber harvest in the next 5 years. These road miles would have remained open, and they might have been used for recreation access in the next 5 years. However, almost 48% of those miles would be in Region 10, and therefore there would be little effect on recreation access in other regions. Another 244 road miles would be prohibited for other planned projects in the next 5 years. These impacts would be greatest in those forests with current high densities of roaded recreation use. In parts of the NFS, recreation use density is far below capacity across all settings in the ROS, while other areas are congested. Therefore, the net effect would vary widely by location.

As with recreation use, there are likely to be tradeoffs between businesses that benefit and those that are constrained by reduced development opportunities. Maintenance of inventoried roadless acreage could be beneficial to meeting increasing demand for outfitter/guide permits. Non-resident recreationists may be more likely to use these services, so increases in use could generate additional external revenue for local communities. Special uses that require roading would not occur in inventoried roadless areas. However, developments such as campgrounds are likely to have substitute sites available.

The special use most likely to be impacted is future ski-area development in inventoried roadless areas. If historic trends continue, future increases in ski area capacity are most likely to occur through expansion of existing areas. Such expansion is not prohibited within existing permit boundaries. However, expansion beyond existing permit boundaries, and new ski developments that require road construction, would not be allowed under the prohibitions unless a decision to approve them is made prior to rule implementation. The likelihood of such proposals being approved under current policy is difficult to predict, given the complex procedures and increased public interest in these projects. The potential economic effect of national prohibitions on the ski industry is difficult to assess. Some increase in capacity would be possible in the future even with prohibitions implemented. If demand remains flat, then any new development would be competing for market share. Many ski areas have developed into 4-season resorts, reducing their dependence on downhill skiing as the sole source of revenue, and providing year-round economic activity in local communities.

Hunting and Fishing

Affected Environment

Recreational, subsistence, Tribal treaty rights, and commercial hunting and fishing occur on and around NFS lands. Hunting and fishing on NFS lands is regulated by individual States, although the Forest Service can close areas for public health and safety purposes or to protect certain species. As human populations increase and land conversion from rural to urban uses continues on private lands surrounding NFS lands, public and private lands that contain open space will become increasingly important as places that provide quality hunting and fishing opportunities. In addition, fishing and hunting activities on

NFS lands provide national, State, and household economies with important sources of jobs, income, food, and other benefits. Inventoried roadless areas provide important habitat for fish and game species, and management of these areas has direct consequences for hunting and fishing.

Recreational hunting and fishing takes place on NFS lands throughout the United States. Approximately 9% (47 million) of the total United States freshwater fishing participation days in 1996 occurred on NFS lands mostly on inland waters (Loftus and Flather 2000; Maharaj and Carpenter 1999; USDI Fish and Wildlife Service and USDC Bureau of the Census 1997). Of the total national expenditures on recreational fishing, about 12% (\$2.9 billion) were associated with activities on NFS lands. The number of people participating in cold-water recreational fishing increased consistently throughout the 1970s and 1980s (Flather and Hoekstra 1989). Recent projections indicate that this trend will continue, with the number of fishing participants increasing 36% and participation days of fishing increasing 27% by 2050. The largest increases are expected to occur in the Rocky Mountains (Bowker and others 1999). This growth in participation will result from population growth. The percentage of the total United States population that is participating in recreational fishing is actually declining (Loftus and Flather 2000).

Although demand for freshwater fishing is predicted to increase in the future, the supply of desirable native and nonnative fish will be affected by human-induced aquatic habitat degradation and competition with undesirable nonnative species (Flather and Hoekstra 1989). Adequate data do not exist for most fish species for assessing population trends. Insufficient aquatic resource information for NFS lands makes it difficult to determine whether the supply of angling opportunities is meeting demand (Loftus and Flather 2000). It is expected that a gap between the supply of and demand for fishing opportunities will develop, increase over time, and be particularly large for coldwater fishing (Flather and Hoekstra 1989). This implies an increased density of use and decreasing catch rates, which may degrade the quality of the recreational fishing experience for some participants and put further pressure on fish populations. However, research indicates that time, interest level, and family and work obligations are the most common limiting factors on fishing participation (Loftus and Flather 2000). While crowding and competing uses of water resources are also factors, the condition of aquatic resources does not currently appear to be limiting fishing participation (Loftus and Flather 2000).

Recreational hunting is another socially valued and economically important activity in the United States, though not as many people participate compared with fishing. Recreational hunting participation days on NFS lands represented 11% (28 million) of the national total in 1996 (Maharaj and Carpenter 1999; USDI Fish & Wildlife Service and USDC Bureau of the Census 1997). Expenditures on recreational hunting on NFS lands represented 10% (\$2.1 billion) of the national total in 1996.

Hunting trends appear to be mixed. Recent trends reflect an overall increase in hunting participation days (Maharaj and Carpenter 1999). Big game hunting has been increasing since the 1960s, and it is predicted to continue to increase on NFS lands through 2040 (Flather and Hoekstra 1989). NFS lands provide much of the big game habitat in the West. Migratory bird hunting had been declining, but increased slightly between 1991

and 1996 (USDI Fish and Wildlife Service and USDC Bureau of the Census 1993, 1997). Most migratory bird hunting occurs near wetland habitats, where waterfowl occur. In general, big game populations have increased substantially nationwide since 1975 (Flather and others 1999). Duck, geese, and swan populations are also on the rise (Flather and others 1999).

In contrast, small game hunting has been declining, and it is predicted to continue to decline through 2040 (Flather and Hoekstra 1989). The decrease is due in part to declining populations of some small game species, reduced access to hunting areas on private lands, and declining numbers of rural residents (Flather and others 1999). Small game populations associated with rangeland and agricultural habitats have been declining, while those associated with forest habitats have shown mixed trends throughout the country (USDA Forest Service 2000e). The overall number of hunters is projected to decline about 11% by 2050, although the number of days should remain stable (Bowker and others 1999).

Game species that adapt well to human activity or that are highly valued and therefore carefully managed are expected to continue to do well in the future (USDA Forest Service 2000e). Game species that require large, undeveloped landscapes or special habitats that are vulnerable to development pressure may not do as well (USDA Forest Service 2000e). Although hunting activity is expected to increase on NFS lands in the future, the greatest amount of hunting participation takes place in the Eastern United States and occurs on private land (Maharaj and Carpenter 1999).

Subsistence Hunting and Fishing – The majority of subsistence hunting and fishing on NFS lands occurs in Alaska. Localized activity occurs in the contiguous United States where American Indian populations are concentrated, such as the Pacific Northwest, California, the Southwest, and the Rocky Mountains. In the lower 48 States, treaties between the Federal government and federally recognized American Indian Tribes guarantee subsistence rights that allow Tribes to harvest fish and game on Federal lands. In Alaska, rural Alaskan residents have subsistence rights on Federal lands by Federal law (Alaska National Interest Lands Conservation Act; Public Law 96-487) and by Alaska State law (AS16.05.258).

Subsistence hunting and fishing can be important to the economy, culture, and health of rural families and communities. In Alaska, for example, the annual subsistence harvest of wild foods is estimated at 43.7 million lbs. of usable weight annually (Alaska Department of Fish and Game 1998). This total represents 375 lbs. per person per year for rural residents and 22 lbs. per person per year for urban residents. Sixty-two percent of this total is comprised of fish, 36% is comprised of game, and the remaining 2% comes from plant material.

These harvests represent a substantial portion of the caloric and protein requirements of rural Alaskans. They also have substantial economic importance, with a **replacement value** of \$131.1 to \$218.6 million annually. In addition, subsistence hunting and fishing play a central role in the culture, traditions, and social fabric of many cultural groups in Alaska. The Alaska case illustrates the importance of subsistence hunting and fishing to

those who participate in it. Inventoried roadless areas may support limited and localized subsistence hunting and fishing activity, especially in Alaska.

Treaty Hunting and Fishing – Off-reservation hunting and fishing rights vary depending on treaty language, subsequent legislation, and court decisions. Some Tribes believe that the Federal government is obligated to manage wildlife and fish habitats to protect the Tribes' treaty rights. In some treaties in the Pacific Northwest, the Federal government is obligated to protect the Tribes' rights to access "usual and accustomed grounds and stations" (where those grounds and stations are on Federal lands).

Commercial Fishing – Demand for edible fish has been on the rise since the 1960s, resulting in an upward trend in commercial fishing activity. The number of commercial fishing vessels in the United States has remained stable over the last decade (Loftus and Flather 2000). Commercial fishing in the United States supports more than 30,000 full time jobs (Loftus and Flather 2000). NFS lands support commercial anadromous fisheries based on fish species that spawn in rivers and streams. The most important commercial fish species supported by NFS lands are salmon and steelhead trout, which occur primarily in Alaska and the Pacific Northwest (including northern California). Federal lands in these three States support 259 of the 314 anadromous fish stocks at risk (USDA and others 1993). In 1998, almost 19 million lbs. of salmon were landed offshore of the Pacific Coast States (Washington, Oregon, and California), having a value of \$15.3 million dollars (USDC National Marine Fisheries 2000). In 1994, 284 million lbs. of salmon were harvested in Alaska, for an estimated value of \$121 million. Approximately 80% of the salmon harvested in Southeast Alaska originate on the Tongass National Forest (USDA Forest Service 1997d). However, reduced Pacific salmon stocks have caused a substantial reduction in commercial fishing opportunities in the Pacific Northwest (Loftus and Flather 2000).

Many members of the public who commented on hunting and fishing during the scoping period for the Notice of Intent and on the DEIS supported a prohibition on road construction and reconstruction in inventoried roadless areas (Content Analysis Enterprise Team 2000a,b). Some people perceive that hunting success always decreases because of additional roads. Others feel that the quality of the hunting experience is greater in roadless areas than in roaded areas. Still others enjoy the outdoor experience they have when hunting or fishing in an undisturbed natural setting. One person noted that roads increase hunting pressure on wildlife species and are therefore undesirable. Some respondents believe that logging destroys wildlife habitat and leads to reduced hunting success. Some people believe that game species leave roaded areas due to increased traffic.

Some respondents commented that although inventoried roadless areas are generally positive for wildlife, there are certain species that depend on the edge effect of roads. Some stated that certain timber harvesting practices are essential, as they create forage for some game species. Additional comments were received that expressed concern over the fact that clearings, which had been created by fires or timber harvesting, were disappearing and that multiple levels of forests or a mosaic were needed to provide habitat for all wildlife species, including game species. There was also concern that a decline in revenue and wildlife conservation dollars would occur if hunting becomes

more difficult because of poor access, and forests become too dense to support deer and other wildlife.

Other commentators believe that hunting and fishing should be prohibited in inventoried roadless areas to protect fish and game species. These respondents believe roadless areas provide habitat with a high level of ecological integrity and should be protected to conserve and enhance species populations. Many other commentators noted the importance of maintaining healthy ecosystems to support the commercial fishing industry and tourism, which is based on recreational hunting and fishing.

Tribes expressed different viewpoints about whether road construction in inventoried roadless areas would be desirable with regard to subsistence hunting and fishing. In some locations, they do not support a prohibition on road construction and reconstruction. They desire improved access to existing hunting and fishing locations. In other locations, Tribal members expressed the view that road construction was a major cause of ecological degradation. These respondents support a prohibition on road construction, believing it would protect subsistence and treaty rights resources.

In December 1999, the Theodore Roosevelt Conservation Alliance surveyed 600 hunters and anglers to solicit their opinions regarding road management in existing inventoried roadless areas of NFS lands (Theodore Roosevelt Conservation Alliance 1999). Eighty-six percent of the anglers and 83% of the hunters surveyed supported a policy to prevent future road construction in inventoried roadless areas. These hunters and anglers highly value many attributes of NFS lands, including the habitat they provide for endangered species, the protection of water quality, the opportunity to experience solitude and nature, and the hunting and fishing opportunities in remote places having few roads and people.

Alternative 1 – No Action

In the next 5 years, an estimated 1,160 miles of permanent and temporary road construction and reconstruction are planned in inventoried roadless areas. Based on historic levels of road construction, it is anticipated that 5% to 10% of inventoried roadless areas are likely to have roads constructed in them over the next 20 years. By 2040, between 18% and 28% of inventoried roadless acres would be roaded, with an estimated 16,000 miles of new and existing roads. However, a portion of these roads would be single-purpose roads closed to other uses. Some roads would be decommissioned after use. The remaining roads would provide hunters and anglers with increased roaded access to hunting and fishing sites in inventoried roadless areas. In light of projected increases in hunting and fishing activity on NFS lands, this could redistribute use from more crowded sites near currently roaded areas to less crowded sites in inventoried roadless areas, decreasing overall user density in the short-term. However, this redistribution would depend on a number of factors including access management strategies, State fish and game regulations and strategies, and whether the new roads lead to areas with high fish and game population densities that would draw hunters and anglers to them.

To the extent that new roads increase access to hunting and fishing sites, they could also introduce more hunters and anglers to both roaded and roadless areas, causing increased

crowding. This could increase the potential for conflict within and between user groups. Alternative 1 would reduce the area available for primitive, dispersed hunting and fishing opportunities.

Additional roaded access to inventoried roadless areas would make it easier to conduct some fish and wildlife management activities. Roads also provide easier access for habitat restoration and enhancement projects. In some instances, where access is provided to fishing and hunting areas, associated law enforcement activities would also be facilitated, helping to manage species populations.

The Aquatic Animal Habitat and Species section of this chapter indicates that road construction, maintenance, use, and the presence of roads can adversely affect aquatic systems and the species supported. Timber harvest can also adversely affect aquatic habitat, although stewardship timber harvest may potentially provide some beneficial effects to some species. Some of the resultant effects to fish species include loss of spawning and rearing habitat, increased mortality of eggs, increased mortality and reproductive failure, barriers to fish passage, higher vulnerability to disease and predation, greater likelihood of nonnative species introductions, and increased susceptibility to over harvest.

Under this alternative, there is the greatest potential for adverse effects to fish species relative to the action alternatives. This alternative also has the greatest potential for adverse effects to recreational, commercial, treaty rights, and subsistence fishing because it could cause declines in the populations of desirable fish species. For example, roads have been linked to the decline of salmonid populations in the Pacific Northwest, which are important to all fisheries in this region. If fishing success rates decline, the quality of the recreational fishing experience could also decline. However, this would likely be a long-term rather than short-term effect to recreational fishing because the condition of the fishery is not currently a limiting factor on fishing participation for most recreational anglers (Loftus and Flather 2000). Reduced catches could have important short- and long-term effects on subsistence and treaty rights fishing. A reduction in per capita harvests and consumption could negatively affect the health, economy, and culture of American Indians and Alaska Natives, in particular. Declines in anadromous fish populations dependent on NFS lands could also reduce the allowable catch by commercial anglers, having negative economic consequences, and potentially threatening livelihoods. By providing additional access for hunters, roads facilitate the illegal poaching of many big game species such as caribou, pronghorn, mountain goat, bighorn sheep, deer, and elk. In addition, roads increase the incidence of species mortality from road kills.

The Terrestrial Animal Habitat and Species section of this chapter indicates that road construction and timber harvest can have mixed habitat-related effects on game species populations. Game populations are significantly influenced by changes in their habitat. For example, elk and bighorn sheep can exhibit strong road avoidance in some areas. Inventoried roadless areas provide the large, high quality core habitat required by game species such as elk and black bear. Road construction and timber harvest cause habitat fragmentation and disturbance that can be detrimental to these species. When timber harvest activities and road densities are poorly planned and managed, habitat quality or

habitat loss can be negatively affected. However, timber harvest activity that results in the creation of a mix of habitats and a variety of age classes is generally beneficial to most game species. Deer and elk populations, for example, can benefit from improved forage conditions created by some timber harvest activities.

The impacts of road construction and timber harvest on habitat change, and consequently on the game species associated with those habitats, will depend on species needs, and the extent, duration, timing, and intensity of timber harvest and road construction activity. It is difficult to generalize about the effects of Alternative 1 on species population trends, and their impact on hunting success rates. For game species that benefit from the habitat pattern changes associated with timber harvest and associated roads, encounter rates and hunting success rates could potentially increase, heightening the quality of the recreational hunting experience. For species that are disturbed or displaced by these ground-disturbing activities, encounter rates could decline, potentially reducing hunting success rates and the quality of the recreational hunting experience. Increases in hunting success would be beneficial for subsistence and treaty rights hunters. Declines in hunting success would decrease per capita game harvests by subsistence and treaty rights hunters, with negative consequences for the health, economy, and culture of American Indians and Alaska Natives in particular.

Road construction has been found to have some negative impacts on subsistence hunting and fishing in Alaska. One study on the relationship between roads and subsistence in Alaska found a significant association between the presence of roads and reduced subsistence productivity (Wolfe and Walker 1987). This study found that subsistence harvests in rural communities located along road networks or marine highways were 69% lower than those of communities located off the road network. Reduced harvests are associated with new settlement that takes place along roads. New residents engage in hunting and fishing locally, increasing competition for fish and game resources, and reducing the catch available to traditional subsistence users. Roads built in rural areas also draw urban residents who use them to gain access to new areas for recreational hunting and fishing. For example, residents of Ketchikan in southeast Alaska use timber roads built on Prince of Wales Island on the Tongass National Forest for deer hunting. This increases competition between recreational and subsistence users, reducing subsistence harvests (Ellanna and Sherrod 1987; Turek and others 1998).

Alternatives 2 through 4

National prohibitions on road construction and reconstruction in inventoried roadless areas would not alter existing access for hunting and fishing on NFS lands. Existing access for hunting and fishing opportunities in inventoried roadless areas would be maintained. Roaded access to inventoried roadless areas for hunting and fishing would not increase in the future. As the number of people participating in hunting and fishing on NFS lands increases, a prohibition on road construction in inventoried roadless areas could contribute to crowding (depending on State hunting regulations and strategies) at hunting and fishing locations that are easily accessible by roads.

Both the Terrestrial and Aquatic Animal Habitat and Species sections of this chapter find that a prohibition on road construction and reconstruction would reduce the potential for increased levels of human-caused disturbance, and degradation of terrestrial and aquatic habitat quality, quantity, and distribution relative to Alternative 1. Therefore, this prohibition would also reduce the potential for road-related adverse effects on fish and game species populations.

The amount of timber harvest that would occur in inventoried roadless areas under Alternatives 2 through 4 would be reduced relative to Alternative 1 and would vary depending on the specific alternative chosen. Alternative 3, which would allow stewardship timber harvest as a management tool but would prohibit commercial timber harvest, would likely be more beneficial to fish and game species than Alternative 2, which would allow commercial timber harvest. Alternative 4, which would prohibit all timber harvest in inventoried roadless areas (except to meet T&E species objectives), is not expected to have an adverse impact on fish or game species. Alternative 4 could benefit some game species, such as black bears in the Eastern United States. However, Alternative 3 could potentially be more beneficial to game species than Alternative 4 by maintaining the capability of the Agency to manage for diverse habitat structures using timber harvest. In contrast, Alternative 4 would likely be more beneficial to fish species than Alternative 3 because it would minimize the likelihood of adverse effects to aquatic ecosystems caused by timber harvest activity. The beneficial effects of Alternatives 2 through 4 on fish and game populations would translate into corresponding beneficial effects for fishing and hunting.

Many complex variables influence fish and game species populations. However, Alternatives 2 through 4 have more potential than Alternative 1 for conserving commercial fisheries, maintaining recreational hunting and fishing resources (thereby contributing to the quality of the experience), and supporting subsistence and treaty rights hunting and fishing. They would therefore help to maintain the economy and culture of participants.

Livestock Grazing

Affected Environment

Forest and rangelands in the United States provide forage and browse for more than 100 million cattle and 8 million sheep (USDA Forest Service 2000e; Joyce 1989). About 20% of all beef cattle and 50% of all sheep in the United States are located in 11 Western States (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) (Council for Agricultural Science and Technology 1996; Field 1990). About half of these beef cattle and sheep rely on land managed by the Forest Service and the Bureau of Land Management for grazing (Harris and others 1996). Some 80% to 85% of all Federal lands in the West are grazed by livestock (Harris and others 1996, Council for Agricultural Science and Technology 1996). Although only a small percentage of the national forage supply for livestock is produced on public lands, some Western livestock operations are highly dependent on Federal-land grazing because a high percentage of rural land in the West is publicly owned.

In 1998, about 92 million acres of NFS lands were in grazing allotments, 84 million of which were actively in use. Some 2,114,000 cattle and sheep grazed on NFS grazing allotments in 1998 (Herman, personal communication). On NFS lands, all areas that are suitable for grazing have already been placed in allotments and the opportunity to expand is negligible.

In 1998, there were 8,395 permittees using NFS lands, as compared with 9,126 in 1990. Approximately 81% of Forest Service permittees run small- to medium- sized family ranch operations specializing in beef cattle production (Council for Agricultural Science and Technology 1996). Cow-calf and cow-calf-yearling operations are the most common of these. Although the number of permittees has decreased over the last decade, this trend is affected more by the consolidation of permits than by declining use.

Although the per capita consumption of beef and veal has been and should continue declining, total demand for beef is expected to increase due to population growth. The annual increase in demand through the year 2020 is expected to be less than 0.5% (USDA Forest Service 2000e). Livestock grazing on public and private forest and rangelands is expected to decline, especially in the West (Van Tassell and others 1999). The Forest Service projected a decline in grazing on NFS lands in the West by 2030 (Council for Agricultural Science and Technology 1996). This decline is expected to result from changing land management policies that respond to public demands for other uses such as recreation and the protection of wildlife and habitat. The supply of private grazing land will also decline due to the conversion of rural land to urban uses, and the sub-division and development of private ranches. Nevertheless, forage production on private lands is expected to compensate for the loss of public land grazing through increased production made possible by range improvement.

Ranching is a way of life that is deeply rooted in the West. One survey of Western ranchers found that individual ranchers had spent an average of 31 years on the same ranch, and had come from families that had ranched for an average of 78 years (Fowler and others 1994). Despite the fact that ranch families generally depend on a combination of farm and non-farm employment to remain economically viable, preserving the ranching lifestyle is important to many. Ranchers often value the rural way of life, having an agricultural occupation, feeling close to the natural world, their independence, and other associated social and psychological benefits of their occupation (Ruyle and others 2000). American Indians in the Southwest depend on livestock for their subsistence and market values, ceremonial and ritual purposes, crafts, gifts and exchanges, and for raising and educating children (Brugge and Gerow 2000). Ranching also plays an important role in the social and cultural systems of Hispanic communities in the Southwest (Raish 1996; Raish in press). Because of the dependency of some Western ranchers on Federal grazing allotments, Forest Service lands can play an important part in maintaining the society and culture of ranchers in the West.

Western American Indian Tribes have treaties that provide for pasturing animals on off-reservation land. The allocation of grazing permits on NFS lands depends on the treaty language. The Regional Forester may authorize treaty-based grazing under a Memorandum of Understanding. Tribal governments are exempt from the Forest Service

policy against issuing term grazing permits to governments. Treaty grazing permits are free of charge.

Roads provide ranchers with motorized access to their allotments, which is important for transporting livestock and for maintaining fences and water developments. Allotments located in roadless areas are usually reached on horseback or by OHV. The roads used by ranchers are usually constructed for other purposes; seldom are roads built on NFS lands for the primary purpose of providing access to grazing allotments.

NFS roads have both positive and negative effects on range forage quality. Because roads have largely replaced stock driveways as the means of getting livestock to grazing allotments, driveways that were historically used for moving livestock have dramatically improved in health (USDA Forest Service 2000h). However, roads also introduce unpalatable, nonnative, invasive plant species that reduce overall forage quality.

Timber harvest activities, like fires, often increase the forage supply for livestock by opening the forest canopy and increasing the production of understory vegetation. These increases are temporary, lasting up to 10 to 20 years (Council for Agricultural Science and Technology 1996). This effect is particularly evident in habitats dominated by ponderosa pine, which are widespread on NFS lands (Daryl Herman, personal communication).

Public comments received in response to the Notice of Intent and the review of the Draft Environmental Impact Statement expressed a variety of viewpoints regarding grazing in and near inventoried roadless areas (Content Analysis Enterprise Team 2000a,b). Some individuals stated that grazing is one of the multiple uses that is appropriate on NFS lands, and should be continued. Several people wanted current roaded access to allotments protected so that permittees could engage in range management activities and infrastructure maintenance. Others pointed out that permittees who have successful livestock businesses are able to retain rather than sell their ranches, thereby preventing the sub-division and development of private ranchlands, and keeping these areas in open space. Comments also reflected a belief that grazing can reduce fire risk on NFS lands.

In contrast, other people believe that grazing is environmentally destructive, and that it undermines the ecological integrity of inventoried roadless areas. They believe, therefore, that it should be eliminated, restricted, or monitored and evaluated, with permits cancelled if it is found to cause environmental damage. At a minimum, they believe that no new grazing allotments should be opened up in inventoried roadless areas. Some people believe that no new roads should be built to accommodate grazing on NFS lands in the future. Several sets of comments underscored the point that livestock are grazed on Federal lands for lower than market value, and want to see this issue addressed.

Alternative 1

Under this alternative, 260 miles of road construction and reconstruction are planned in inventoried roadless areas in the 11 Western States to provide access to 503 MMBF of planned timber offer. If these roads were built, 71 miles would remain open following

timber harvest, and be available for use by ranchers to improve their access to current allotments. They could also be used by American Indians to access their grazing treaty rights in inventoried roadless areas. An additional 422 miles of roads may be built in the next 5 years in the Western States for non-timber project purposes. Use of those roads might reduce the operating costs of ranchers where they occur in close proximity to access points for grazing allotments. However, new road construction could have the effect of introducing undesirable plant species, offsetting some of the economic gains from improved access. Timber harvest would open up the forest to understory growth in many areas, temporarily increasing forage for livestock. These short-term effects would be amplified over the medium- and long-term.

Alternatives 2 through 4

Prohibiting road construction in inventoried roadless areas would not affect existing routes of access to grazing allotments. Nor would it affect the future supply of grazing allotments. Data collected from NFS lands indicate that there is currently no planned road construction relating directly to range activities. The 260 miles of roads planned to facilitate timber harvest over the next 5 years would not be built under the action alternatives. About 201 miles of roads associated with other projects may also be prohibited by these alternatives.

Prohibiting road construction is estimated to reduce total timber harvest in inventoried roadless areas by 73% over the next 5 years. This could limit the growth of understory vegetation and reduce the amount of livestock forage that would otherwise be available in some areas. The action alternatives would have a positive effect on range condition by reducing the potential for introducing nonnative invasive species.

Non-timber Forest Products

Affected Environment

There are five broad categories of non-timber forest products: wild food plants, such as mushrooms, fruits, nuts, and berries; medicinal plants and fungi; floral greenery and horticultural stocks; plants, lichens, and fungi used for fiber and dyes; and other chemical plant extracts such as oils and resins (Weigand and others 1999). Woody materials, such as firewood, poles, and boughs, are included in this discussion because they, too, are commonly used non-timber forest products. Data on the distribution and abundance of non-timber forest products, and on their biology, ecology, and productivity are inadequate (Molina and others 1997; von Hagen and Fight 1999). They are gathered on both private and public lands. Public lands in the Pacific Northwest are believed to be the most heavily used public lands in the country for the harvest of floral greens and botanicals (Molina and others 1997). The role of NFS lands as a source for non-timber forest products varies regionally, but is particularly important in the Pacific Northwest and in the northern Rocky Mountains (Weigand Personal communication).

Non-timber forest products have three main kinds of social value: 1) livelihood (both market and non-market), 2) cultural, and 3) recreational (Emery 1999). For example, in

parts of California and in the Southwest, many rural Hispanic communities depend on gathering firewood from NFS lands for both cooking and heating (Raish in press). In Southern California, Asian Americans gather bracken ferns on NFS lands for food, basket-making, dyes, astringents, soaps, medicine, and other uses that are important to their cultural traditions (Chavez and Gill 1999). Many recreational users, such as amateur mushroom collectors, also gather non-timber forest products (Fine 1998). The size, structure, and dynamics of the non-timber forest products sector remain poorly understood (Jones and others 2000; von Hagen and Fight 1999).

The traditional way of life of many American Indian and Alaska Native Tribes involves gathering and using products from their natural surroundings. In some treaties, these rights were included under the term “gathering rights.” In negotiating treaty terms, many Tribal governments reserved off-reservation rights to gather miscellaneous forest products such as berries, roots, bark from trees, mushrooms, basket making materials, tepee poles, cedar for totem poles, and medicinal plants. The availability of these materials, and discretion about how they are grown (such as without pesticides) or raised, and the conditions under which they are gathered are important to American Indians.

In addition to their treaty, subsistence, and recreational values, non-timber forest products have gained increasing commercial importance since the mid-1980s. The number of requests to harvest non-timber forest products on public and private lands for commercial use has risen exponentially in the last two decades (Jones and others 2000). The non-timber forest products industry provides economic opportunities for producers, buyers, dealers, and for those who add value to them by manufacturing them into products, such as medicinals. Roughly 1,400 plant species found in the United States are traded for commercial purposes (USDA Forest Service 2000h). Knowledge of the commercial role of non-timber forest products in the United States is sketchy, though the following statistics allude to their importance.

The market for herbal products in the U. S. was about \$2.5 billion in 1996, and it has been growing at a rate of 13% to 15% annually (von Hagen and Fight 1999). More than 50% of the 25 top selling botanicals in the United States come from native plant species. American ginseng (*Panax quinquefolius*), goldenseal (*Hydrastis canadensis*), Echinacea species, and common St. Johns Wort (*Hypericum perforatum*), all found on NFS lands, are major contributors to this herbal and botanical industry (USDA Forest Service 2000h).

Mosses and lichens, which are harvested extensively from public forestlands and are exported to worldwide markets, were valued at more than \$14 million in 1995. In 1992, the wild edible mushroom industry contributed more than \$41 million to the regional economy of the Pacific Northwest, employing more than 11,000 people full or part time (von Hagen and Fight 1999). By 1995, harvests of Christmas boughs in the Pacific Northwest had reached nearly 20 million lbs. annually. The sale of permits and leases to collect non-timber forest products on NFS lands in fiscal year 1998 generated \$2,977,626 (USDA Forest Service 1999o). Growing markets for non-timber forest products make it safe to assume that demand for these products will continue to rise in the coming years, increasing harvest pressure on NFS lands.

The harvest of non-timber forest products for both personal use and commercial sale is a traditional activity that has taken place for generations by American Indians and rural people living in locations throughout the United States, such as in the Appalachians, the Ozarks, Michigan's upper peninsula, and the Pacific Northwest. Participants in the timber industry have also long-gathered non-timber forest products to supplement their incomes (Freed and Davis 1997). Non-timber forest products provide opportunities for some people who live in rural communities characterized by instability to diversify their household livelihood strategies by serving as subsistence resources, as well as a source of cash income (Emery 1999). They provide insurance against economic hard times, and help to supplement household incomes as necessary. Edible, ceremonial, and medicinal products are especially valuable as subsistence goods, while products used for crafts and decoration are important for their market value (Emery 1999).

Beginning 10 or 20 years ago, people from a wide variety of ethnic backgrounds (many of them recent immigrants) started harvesting non-timber forest products, and relying on them as their sole source of income. For example, Hispanics and Southeast Asians are active producers in the Pacific Northwest (Love and Jones 1997). Evidence suggests that a disproportionate number of harvesters and processors are members of the rural and urban poor, and that a large percentage of participants in the industry are women, children, and elderly people (von Hagen and others 1996).

In 1999, Congress passed legislation requiring the Secretary to establish a 5-year pilot program to monitor and assess fees for the harvest of forest botanical products on NFS lands (Section 339 of the Department of the Interior and Related Agencies Appropriations Act 2000, Public Law 106-113 – Appendix C, 113 Stat. 1501A-199). The legislation also requires the Secretary to manage non-timber forest-product species on a sustainable basis. Under the pilot program, the Secretary must collect fair market value for forest botanical products and must recover all costs to the Department associated with granting, modifying, or monitoring the authorization for harvest of forest botanical products, including the costs of any environmental or other analysis (the Secretary may waive these charges). The Forest Service is currently assessing how-to implement the law. This legislation will lead to increase future management of non-timber forest-product species on NFS lands.

Because non-timber forest products are economically valuable, and can generally be extracted from forests while leaving the forests structurally and functionally intact, these types of products have the potential to provide opportunities for the sustainable economic use of forests. Such opportunities may be particularly important for residents of forest-dependent communities who have suffered lost jobs and revenues due to declining timber sales on public forest lands. However, because non-timber forest-product industries are seasonal, cyclical, and competitive, with generally low rates of return to producers, few individuals previously employed in the timber industry have diversified into the non-timber forest-product sector to date (von Hagen and Fight 1999). Non-timber forest products are better viewed as a supplementary source of income, than as a substitute for employment in the timber industry (von Hagen and others 1996).

Members of the public commenting on the Notice of Intent and the Draft Environmental Impact Statement expressed the importance of harvesting non-timber forest-product species to their way of life (Content Analysis Enterprise Team 2000a,b). They believe they should be allowed to continue to gather non-timber forest products in inventoried roadless areas, including those products gathered for commercial purposes. Some believe that without roads they would no longer be able to gather non-timber forest products because they would not be able to access certain areas. The majority of the uses mentioned were for subsistence, such as edible plants and fuel wood. Some commentators asserted that the production of non-timber forest products from NFS lands was of much greater economic value than the production of timber. Other people feared that the negative ecological impacts of road construction could threaten some species. Several people felt that inventoried roadless areas should be protected because they may contain species that could prove valuable for medicinal or other purposes in the future.

Alternative 1 – No Action

Under Alternative 1, some road construction and timber harvest would take place in inventoried roadless areas in the future. Roads and timber harvest create openings and disturbance that benefit some populations of non-timber forest products, and harm others. For example, one assessment found that 30% of non-timber forest products in Oregon occur in openings and along roadsides (USDA Forest Service 2000h). In contrast, road construction and timber cutting harms some species, such as wild gingers (*Asarum* spp.), pitcher plants (*Sarracenia* spp.), and shade-loving mosses that require undisturbed forest. Some non-timber forest products species that are highly sensitive to harvest pressure are threatened in areas close to roads where they are easily accessible.

Timber harvest and road construction alter the opportunities available to harvest different species. Depending upon the species of interest to a particular person, roads and timber harvest may be viewed as either ecologically (and economically) beneficial, or detrimental. Biological evidence suggests that managing forests for joint production of timber and non-timber forest products is economically and ecologically viable for North American forests, though more research is needed (Von Hagen and others 1996).

Roads may degrade those populations of non-timber forest products growing along them, because of pollution or herbicide and pesticide spraying (though this is rarely done along roads on NFS lands). Of more concern, roads can promote the spread of invasive weeds, which are often more competitive and drastically reduce native species valued as non-timber forest products. Nevertheless, some invasive species are also valuable non-timber forest products.

People who harvest non-timber forest products use roads built for other purposes, mainly timber harvest, to access non-timber forest-product species (USDA Forest Service 2000h). Some products, such as firewood, are not usually harvested far from roads because of their weight. Other products can be gathered away from roads, but the time and labor investment increases. Some people use OHVs to harvest these products, which offsets this increase. People who depend on roaded access to forests for gathering non-timber forest products would benefit from any additional roaded access to inventoried roaded areas that would occur under Alternative 1.

Harvest pressure on non-timber forest products is likely to be greatest in the areas that are closest to roads, and to decrease in areas that are more remote. Therefore, harvest areas away from roads may be worth using if product quality and net returns are better. Using areas distant from roads is not feasible for all products or all individuals. For example, American Indian elders who are traditional healers may not be able to collect traditional cultural non-timber forest products away from roads because of difficulty walking long distances. While roads facilitate the illegal taking of non-timber forest products, they also facilitate the monitoring and enforcement of harvest activities by Forest officials.

New roads would have the short-term effect of enabling harvesters to disperse along more roads, better distributing harvest pressure on non-timber forest products located close to roads. It would also provide new opportunities to those people whose harvest activities are generally restricted to roadsides, such as the elderly or firewood gatherers. By increasing access to currently roadless areas, individuals who now use those areas in their roadless condition would experience greater competition with other harvesters.

Alternatives 2 through 4

A prohibition on road construction and reconstruction in inventoried roadless areas would not alter current access conditions for the harvest of non-timber forest products, and would therefore have no impact on existing physical access to harvest opportunities. A prohibition on road construction and reconstruction could limit future opportunities to harvest non-timber forest products in roadless areas for those people who lack OHVs and can only engage in non-timber forest products harvest along existing roads, for example elderly people or people gathering firewood. New trails could be built in inventoried roadless areas under Alternatives 2 through 4, which would help provide access.

Assuming that harvest pressure on non-timber forest products is greatest along roads, and decreases with increasing distance from roads, maintaining current access conditions could have the long-term effect of heavily impacting those species populations that are located close to roads by failing to provide new opportunities to harvest products in areas that are currently less accessible. This impact could be important in the context of rising demand for non-timber forest products, accompanied by a proliferation of harvesters. However, species populations located in roadless areas, especially those that are remote from existing roads, would be protected from heavy harvest pressure by preventing roaded access to them. People who harvest non-timber forest products close to roads could see dwindling economic returns over time, while those who harvest non-timber forest products away from roads would be less likely to do so. This effect could be offset however if more people used OHVs to gain access to harvest opportunities in roadless areas.

To the extent that prohibiting road construction and reconstruction protects biodiversity and limits the spread of invasive weeds, the action alternatives would have a positive impact on non-timber forest-product species populations. They would also shield species from road-related pollution and from pesticides and herbicides. A prohibition on road construction and reconstruction would especially favor those species that are adverse to disturbance, not only because it would prevent road construction, but also because it

would limit timber harvest in inventoried roadless areas. Individuals who gather non-timber forest products that do not tolerate disturbance would benefit economically from the prohibitions. Those who depend on non-timber forest products that grow in disturbed areas would not see those species populations increase through road-building and associated timber harvesting (though they could do so as a result of other types of disturbance), and would not have this added economic benefit.

The effect of additional prohibitions on timber harvest under Alternatives 3 and 4 would be to further reduce or eliminate timber harvest activities from inventoried roadless areas. Species populations that need or prosper from ground disturbance and higher levels of light, and people who harvest them, would be at a disadvantage. Plant species that do not tolerate disturbance and individuals who harvest them would benefit.

Timber Harvest

Affected Environment

Substantial changes have occurred in the timber industry in the last two decades because of fluctuations in wood product prices, international markets, technology, industry restructuring, and declines in Federal timber harvest. Gains in timber-related employment have occurred primarily in the Eastern United States, which accounts for more than 75% of total forestry services and wood products manufacturing jobs. Employment associated with NFS harvest declined 50% between 1992 and 1996. In 1996, NFS related jobs accounted for 3% of total timber-related employment.

Although its share of the market has declined markedly, the harvest of timber from NFS lands continues to generate jobs and income for both the local and national economy. The distributional effects on jobs, income, and Payments to States are estimated for all alternatives. In addition, data on net revenues are used to predict whether sales in inventoried roadless areas are likely to be below cost. A section on the effects on other ownerships and global resources completes the economic analysis, and it is followed by a discussion of related social effects.

For several years, the Administration has been working with Congress to stabilize payments to States and Counties for schools and roads. Historically, 25% of all receipts generated from national forests were returned to States and Counties to spend on schools and road maintenance. The decline of timber harvests from national forests over the past decade has resulted in decreasing payments to States and Counties.

As of the printing of this FEIS, both the Senate and the House of Representatives have passed legislation that allows States to choose between 25% payments or a new payment formula based on historic payment levels. This legislation, if signed by the President, will diminish the economic impact of each of the action alternatives considered in this FEIS.

The quantified effects look forward through the next 5 years of planned offer. The effects of the associated harvest are assumed to occur in the same period but may occur beyond those 5 years, since harvest may take place up to 4 years after sales are made. The longer-

term effect on timber availability is also important to consider. Some national forests that did not plan to enter inventoried roadless areas in the next 5 years may plan to enter those areas in the longer term.

Over the long term, the effects of prohibitions may be greater than estimated for those forests that intended to rely on inventoried roadless areas for a considerable portion of their harvest volume. In addition, reductions in inventoried roadless areas may affect scheduling harvest on remaining areas of NFS land. Given the controversial nature of entries into those areas, it is difficult to predict whether those plans would ever be implemented.

Many members of the public commented that NFS lands should provide an economic base for rural communities. They believe that the proposed Roadless Rule would cost jobs in the timber industry, hit small timber producers especially hard, and have negative consequences for loggers and forest-dependent communities, particularly in the West. Forest product jobs are often well paid relative to others, and cannot adequately be replaced by jobs in other sectors, such as recreation and tourism. Concern was also raised that prohibiting road construction and limiting logging in inventoried roadless areas would concentrate harvest on other private and public lands, and increase environmental impacts in these areas. Reduced NFS harvest was also seen as leading to increased prices for wood products, and increasing imports from countries that may have few environmental safeguards for harvesting.

Some believed that timber-related job losses would exacerbate unemployment problems in some communities, amplify social problems, and undermine community integrity. The loss in Payments to States would also place financial stress on communities. People also believed that cumulatively, these effects could degrade the social fabric of communities.

Other respondents believed that timber-dependent communities would be caught in a continuous boom-bust economy if they remain tied to NFS harvest. The importance of diversifying economies was mentioned, with frequent mention of the importance of tourism and other sectors that benefit from maintaining inventoried roadless areas.

Some individuals believe that timber harvest on NFS lands is not an economically sound practice, and does not produce enough revenue to cover costs. Some suggested that the Forest Service should re-direct money towards forest and watershed restoration projects, which could provide jobs for environmentally beneficial purposes. Others believe no logging should occur in inventoried roadless areas, including helicopter logging, because of the negative environmental consequences.

Alternative 1 – No Action

Harvest volume in fiscal years 1996 to 1999 was used in developing the baseline for Alternative 1. These years most accurately reflect current condition and likely harvest volume in the near future. Volume harvested, rather than volume offered or sold, creates economic effects. Average annual harvest volume for the baseline is approximately 3,300

MMBF (Table 3-56). It is assumed that the timber program on NFS lands will continue to range from 3,000 to 4,000 MMBF.

The estimate of jobs and income associated with NFS harvest is based on response coefficients from the **IMPLAN** model. Employment and total income effects can include direct, indirect, and induced effects. Direct employment and income effects include jobs and income associated with the harvest of timber and primary wood and paper products processing. Indirect effects include jobs and income associated with industries that supply inputs to the harvesting and processing sector. Induced effects include jobs and income associated with spending in the economy from the salaries created by the direct and indirect effects.

Regional direct and total (the sum of direct, indirect and induced effects) job and income effects were estimated using regional job and income response coefficients calculated from regional data reported in TSPIRS. Regional data on jobs and income for fiscal years 1996 through 1998 were used to create response coefficients for average total jobs per MMBF and average income per MMBF that were applied to the baseline harvest levels. Estimates of these measures are in Table 3-56.

Table 3-56. Total average annual jobs, income, receipts, and Payments to States associated with timber harvest from National Forest System lands under Alternative 1 (1997 dollars).

Region	Total harvest (MMBF ^a)	No. direct jobs	No. total jobs	Direct income ^b	Total income ^b	Timber receipts ^b	Payments to States ^b
Northern (1)	320	3,196	8,950	\$99,493	\$276,369	\$61,369	\$15,342
Rocky Mtn. (2)	143	861	2,008	22,730	53,037	23,524	5,881
South-western (3)	77	690	1,380	18,059	36,117	4,982	1,245
Inter-mountain (4)	199	1,794	2,990	104,038	173,397	29,105	7,276
Pacific SW (5)	492	3,442	5,409	165,306	259,767	107,678	26,919
Pacific NW (6)	694	5,551	9,714	159,627	279,347	140,847	35,212
Southern (8)	663	6,627	12,591	208,853	398,821	100,727	25,182
Eastern (9)	596	4,172	6,556	246,453	387,284	60,795	15,199
Alaska (10)	125	625	1,000	28,645	45,832	10,995	2,749
Total	3,308	26,957	50,596	\$1,053,204	\$1,907,970	\$540,022	\$135,006

^a Million board feet

^b In thousands

Some of the receipts generated from the sales of timber are returned to the United States Treasury. States also receive a portion of timber sale receipts based on congressionally determined formulas, generally referred to as Payments to States. Receipts from timber sales historically have been the largest source of Forest Service Payments to States. The

baseline receipts are a 3-year average of National Forest Fund receipts from 1996 to 1998. Payments to States are estimated to be 25% of total receipts. Actual Payments to States in those years averaged about \$100 million higher because of guarantee payments to Regions 5 and 6, put in place to mitigate the effects of protecting the northern spotted owl.

To offer timber sales, the Forest Service spends money on preparing sales, doing environmental analyses, and other administrative and associated planning activities. Timber sales are offered for sale competitively, so stumpage prices received for NFS timber reflect market prices. However, the Forest Service does not necessarily recover its cost from timber sale revenues. Below-cost sales have long been a controversial issue for the Forest Service. As a result, TSPIRS was developed and put into place to create a consistent accounting framework for comparing revenues and costs associated with the Agency timber sales program.

The TSPIRS data from 1996 to 1998 were used to estimate the average revenues and costs associated with the timber sales program in each region. In the timber sales program, stewardship sales are undertaken to accomplish ecosystem management objectives. Although revenues do exceed costs for some stewardship sales, it is more appropriate to evaluate those sales based on whether they are the least-cost method for achieving the management objective. Commodity sales are undertaken to deliver fiber to the market, and therefore it is appropriate to assess the “profitability” of the program. On average, revenues exceeded costs in the commodity component for most regional timber sales programs (Table 3-57). Three regions had average costs in excess of average revenues between 1996 and 1998.

Table 3-57. Average volume harvested for commodity purposes and average net revenue per thousand board feet harvested.

Region	Average volume commodity harvest (MMBF ^a)	Average net revenue (\$/MBF ^b)
Northern (1)	248	-8
Rocky Mountain (2)	85	44
Southwestern (3)	12	-179
Intermountain (4)	126	7
Pacific Southwest (5)	130	21
Pacific Northwest (6)	320	77
Southern (8)	366	67
Eastern (9)	439	49
Alaska (10)	115	-178
Total	1,841	29

^a Million board feet

^b Thousand board feet

Under Alternative 1, the volume planned for offer in inventoried roadless areas would be part of the total land management planned program offer. The data on planned offer for inventoried roadless areas looks out into the next 5 years. The planned volume is likely to

be reduced because of further analysis of the planned sales location. Changes in planned offer can occur for various reasons, such change in land condition or as a need to mitigate for T&E species. Once the final volume to be offered is determined, bids are taken on the offered volume. Not all volume for sale is purchased. Therefore, the likely harvest volume from inventoried roadless areas would be less than the planned offer volume. The process for adjusting the planned offer volume is described in the following section.

Alternatives 2 through 4

Alternatives 2 through 4 limit the amount of timber volume that can be harvested from inventoried roadless areas. Forest-level data on planned offer from inventoried roadless areas for the next 5 years were the starting point for economic effects. Total planned offer for the 5-year period was converted to average annual offer volume, since actual timing of harvest can occur within the contract period, often 3 to 4 years.

As mentioned above, planned offer was adjusted to estimate a likely harvest from inventoried roadless areas. A 2-step process was used to adjust average annual planned offer volumes. First, an adjustment was made to account for differences between planned offer and actual offer. No data are available that directly address this difference. A comparison of offer targets to offer accomplishments by national forest was examined. One drawback of these data is that salvage volumes are included that inflate accomplishments, since salvage is not included in offer targets. Data comparing volume sold in inventoried roadless areas from 1993 to 1999 were also compared to future planned offer in inventoried roadless areas. The differences in volume ranged from 15% to 50%. Neither of these sources provided a clear basis for an adjustment. The planned offer was reduced by 30% to account for volume reductions between planned offer and volume offered for sale on all forests in the lower 48 States. On the Tongass National Forest, planned offer was reduced by 10%.

The second step addressed the difference between volume offered and volume sold. This adjustment was straightforward, based on the TSPIRS data for offer and sold volume between 1996 and 1999. The average percent difference between volume offered and volume sold was applied by national forest. The estimates of average annual harvest volumes based on the 2-step adjustment are in Table 3-58.

Nationally, average annual planned offer in inventoried roadless areas was 220 MMBF. The estimated average annual harvest volume after the adjustment is 147 MMBF. Under Alternative 2, only volume that requires road construction and reconstruction would be foregone. The estimated average annual harvest volume foregone under Alternative 2 is 108 MMBF per year. Alternative 3 results in a further reduction since only stewardship harvest that does not require roads could take place. An estimate of the percent of volume that would be offered for stewardship purposes was provided by the national forests. This percentage was applied to estimate an average annual harvest foregone of 126 MMBF under Alternative 3. Under Alternative 4, the entire 147 MMBF would be foregone.

The effects of the prohibitions are not evenly distributed across forests within Forest Service regions. Therefore, rather than apply the regional job and income coefficients

Table 3-58. Average annual harvest volume reductions, in million board feet, in inventoried roadless areas associated with national prohibitions.

Region	Road prohibition	Road prohibition and commodity harvest prohibition	Road prohibition and all timber harvest prohibition
Northern (1)	3.7	4.4	11.0
Rocky Mountain (2)	4.0	5.3	5.7
Southwestern (3)	0.2	0.3	0.4
Intermountain (4)	15.6	17.1	23.8
Pacific Southwest (5)	0.9	3.1	4.2
Pacific Northwest (6)	3.6	8.0	10.9
Southern (8)	2.2	3.3	3.8
Eastern (9)	5.2	8.3	10.3
Alaska (10)	72.8	76.6	76.6
Total ^a	108.2	126.4	146.7

^a Totals may not be exact due to rounding.

used in calculating the baseline, a weighted average was estimated using forest-level impact coefficients from those forests planning to offer volume in inventoried roadless areas. Effects on regional jobs, income, and Payments to States under Alternatives 2 to 4 were estimated for each year using a volume-weighted average of forest-level coefficients. As of the printing of this FEIS, both the Senate and the House of Representatives have passed legislation that allows States to choose between 25% payments or a new payment formula based on historic payment levels. This legislation, if signed by the President, will diminish the economic impact of each of the action alternatives considered in this FEIS.

A national prohibition on road construction in inventoried roadless areas (Alternative 2) would affect about 607 direct jobs associated with timber harvest nationwide; about 1,054 total jobs would be affected nationwide (Table 3-59). Compared to Alternative 1, jobs and Payments to States would be about 2% less. The largest share of the impacts would occur in Region 10, while Region 4 would have the largest impacts in the lower 48 States.

Since 73% of the annual average harvest in inventoried roadless areas would be reduced by Alternative 2, the additional impacts associated with Alternatives 3 and 4 are relatively small. Compared to the baseline, job, income, and Payments to States decline by about 3%, as shown in Table 3-60 and Table 3-61. The impacts of the prohibitions are not evenly distributed across national forests within the regions. More detailed information about those forests most affected by prohibitions is provided in the Forest-dependent Communities section of this chapter.

For some Counties, decreases in Payments to States may be partially offset by an increase in payments in lieu of tax (PILT) payments. Other offsets are currently being made in

Table 3-59. Estimated average annual economic impacts from a national prohibition on road construction in inventoried roadless areas (1997 dollars), Alternative 2.

Region	Affected volume (MMBF ^a)	No. direct jobs	No. total jobs	Direct income ^b	Total income ^b	Payments to States ^b
Northern (1)	3.7	35	100	\$1,064	\$2,991	\$179
Rocky Mountain (2)	4.0	23	52	498	1,172	164
Southwestern (3)	.2	2	4	54	108	4
Intermountain (4)	15.6	96	162	5,497	9,235	570
Pacific Southwest (5)	0.9	6	10	321	505	49
Pacific Northwest (6)	3.6	32	51	957	1,513	185
Southern (8)	2.2	17	41	848	1,724	82
Eastern (9)	5.2	32	51	1,880	3,008	131
Alaska (10)	72.8	364	582	16,730	26,769	1,602
Total ^c	108.2	607	1,054	\$27,850	\$47,025	\$2,966

^a Million board feet^b In thousands^c Totals may not be exact due to rounding.**Table 3-60. Estimated average annual economic impacts from national prohibitions on road construction and commodity-purpose timber sales in inventoried roadless areas (1997 dollars), Alternative 3.**

Region	Affected volume (MMBF ^a)	No. direct jobs	No. total jobs	Direct income ^b	Total income ^b	Payments to States ^b
Northern (1)	4.4	41	117	\$1,252	\$3,520	\$211
Rocky Mountain (2)	5.3	31	69	660	1,553	217
Southwestern (3)	.3	3	5	68	137	5
Intermountain (4)	17.1	105	178	6,029	10,128	625
Pacific Southwest (5)	3.1	22	34	1,107	1,739	170
Pacific Northwest (6)	8.0	70	112	2,095	3,312	405
Southern (8)	3.3	25	62	1,268	2,578	124
Eastern (9)	8.3	52	83	3,030	4,849	212
Alaska (10)	76.6	383	613	17,604	28,166	1,685
Total ^c	126.3	730	1,273	\$33,112	\$55,982	\$3,652

^a Million board feet^b In thousands^c Totals may not be exact due to rounding.

Regions 5 and 6 because of owl guarantee payments, although this supplement is scheduled to end after 2003.

Substitution Effects – The estimated economic impacts do not account for any potential substitute harvest from other ownerships or substitute job opportunities. The potential for substitute harvest can be estimated using United States harvest trends by region and

Table 3-61. Estimated average annual economic impacts from national prohibitions on road construction and all timber harvest in inventoried roadless areas (1997 dollars), Alternative 4.

Region	Affected volume (MMBF ^a)	No. direct jobs	No. total jobs	Direct income ^b	Total income ^b	Payments to States ^b
Northern (1)	11.0	103	293	\$3,131	\$8,805	\$527
Rocky Mountain (2)	5.7	33	74	707	1,664	233
Southwestern (3)	.4	3	6	82	165	6
Intermountain (4)	24.0	146	247	8,374	14,068	868
Pacific Southwest (5)	4.2	30	46	1,507	2,367	231
Pacific Northwest (6)	10.9	96	153	2,876	4,547	555
Southern (8)	3.8	29	72	1,474	2,997	144
Eastern (9)	10.3	64	103	3,768	6,029	263
Alaska (10)	76.6	383	613	17,604	28,166	1,685
Total^c	146.7	886	1,608	\$39,523	\$68,808	\$4,512

^a Million board feet^b In thousands^c Totals may not be exact due to rounding.

ownership (Haynes and others 1995). The percent change in regional harvest by ownership between 1990 and 1995 is shown in Table 3-62. During this period, NFS harvest levels declined 41% nationally, while total United States harvest increased 1%. Increased harvest on other ownerships, particularly from non-industrial private lands, more than offset declines on NFS lands. The contribution of NFS harvest is extremely small in the Eastern United States, where private lands have always been the dominant source of wood fiber. In the Western United States, increased harvest on non-industrial private ownerships provided some substitute harvest to offset declines on all other ownerships. These data indicate there is some potential for substitution in those regions, although these opportunities probably occur primarily in Regions 1, 4, 5, and 6. Little substitute volume is likely to exist in Regions 2, 3, and 10.

To the extent that harvest substitution occurs, the jobs and income effects from reduced NFS harvest would be offset. In the absence of substitute harvest, it is difficult to provide substitute opportunities for direct and some types of indirect effects (particularly effects associated with purchases of supplies unique to wood product manufacturing). However, in a growing economy, there are opportunities for substituting induced job and income effects. Employment increased in all major sectors of the economy except mineral industries between 1992 and 1997 (USDC Bureau of the Census 2000).

The effects of the alternatives on net revenues of the timber sales program cannot be estimated with any certainty, since costs and revenues vary greatly between sales. However, the average historic net revenue of the commodity portion of the timber sales program should be indicative of whether future sales are likely to be below cost. The average net revenue for commodity-purpose timber sales was calculated for each of the national forests planning to offer volume from inventoried roadless areas. Applying the

Table 3-62. Percent change in timber harvest levels between 1990 and 1995 on all ownerships.

Region	Forest industry	Farmers and other private	National Forest	Other government	Total
Pacific Northwest (Regions 6 and 10)	-8	22	-67	-45	-25
Pacific Southwest (Region 5)	-29	61	-62	-3	-30
Rocky Mountain (Regions 1-4)	-10	41	-46	-20	-15
Northern (Region 9)	26	-7	15	45	7
Southern (Region 8)	17	13	13	-15	13

(Haynes and others 1995)

average net revenue to the estimated commodity harvest volumes provides a rough estimate of the change in net revenues from the alternatives.

Using data from the affected forests, rather than regional averages, the net revenue associated with commodity harvest was estimated and summed by region. Negative figures shown in Table 3-63 identify regions where more timber sales are likely to be below cost in inventoried roadless areas. Commodity harvest in inventoried roadless areas in Regions 1, 4, 5, 8, and 9 under Alternative 2 (no commodity harvest that requires roads) are likely to be above cost and result in positive net revenues. These revenues would be foregone under Alternative 2. Implementation of Alternative 2 should reduce losses identified in the remaining regions. Under Alternatives 3 and 4 (no commodity harvest), positive net revenues would also be foregone in Region 6. The effects within an individual region vary widely by forest. In Region 6, the most “profitable” forests do not require roads for harvest. Therefore, prohibiting roads could eliminate some below-cost sales, while allowing some above-cost sales.

The negative net revenue in Region 10 partly reflects the large share of harvest volume in Region 10, but also reflects the high costs of preparing and administering sales and road construction in Alaska. Regions 2 and 3 had negative average net revenues between 1996 and 1998, and the portion of commodity harvest from inventoried roadless areas is likely to also have negative net revenues (Table 3-63). Since it is likely that preparing sales in inventoried roadless areas may have higher average costs than other sales, the actual net revenue may be even less than using historic averages.

The reductions in NFS harvest resulting from the prohibitions are not likely to affect timber prices. Therefore, none of the alternatives should affect consumers. Total United States wood consumption would likely be unaffected by the reduction in NFS volume. The total affected volume is less than 0.5% of total United States production. There would be opportunity to substitute timber from other ownerships to replace reduced volume in the Eastern United States. In the West, some substitution is also possible. Increased imports from Canada are also a likely result of reduced harvest on NFS lands.

Table 3-63. Estimated net revenue associated with reduced commodity harvest in inventoried roadless areas (1997 dollars).

Region	Reduction in commodity harvest volume from Alternative 2 (MMBF ^a)	Net revenue associated with commodity harvest volume (dollars)	Reduction in commodity harvest volume from Alternatives 3 and 4 (MMBF ^a)	Net revenue associated with commodity harvest volume (dollars)
Northern (1)	0.1	211	0.5	-14,995
Rocky Mountain (2)	3.4	-122,177	4.7	-82,741
Southwestern (3)	0.1	-39,802	0.2	-68,613
Intermountain (4)	4.0	24,092	5.7	70,519
Pacific Southwest (5)	0.5	36,842	2.7	116,898
Pacific Northwest (6)	1.3	-157,928	4.3	388,057
Southern (8)	1.6	113,911	2.6	179,017
Eastern (9)	3.0	32,402	6.5	237,903
Alaska (10)	72.8	-12,958,400	76.6	-13,634,800
Total	86.7	-12,808,755	103.9	-13,067,851

^a Million board feet

Long-term Effects – The effects described for the alternatives are based on planned volume for the next 5 years. Long-run effects are projected in the Timber Harvest section under Human Uses of this chapter. The potential range of impacts on harvest volume, jobs, income, and Payments to States at the national level are shown in Table 3-64. The range of effects estimated for the long run encompasses the 5-year effects described for the alternatives.

Table 3-64. Estimated annual effects of harvest reductions in inventoried roadless areas on jobs, income, and Payments to States over the long-term.

	Road prohibition, Alternative 2	Road and commodity harvest prohibition, Alternative 3	Road and timber harvest prohibition, Alternative 4
Reduction in harvest volume (MMBF ^a)	95 -118	118 -147	130 -162
Number of direct jobs	570 -708	708 -882	780 - 972
Number of total jobs	950 -1,180	1,180 -1,470	1,430 -1,782
Direct income (millions)	\$24.5 - \$30.4	\$31.0 - \$38.7	\$35.1 - \$43.7
Total income (millions)	\$41.4 - \$51.4	\$52.5 - \$65.4	\$61.2 - \$76.3
Payments to States (millions)	\$2.7 - \$3.4	\$3.7 - \$4.6	\$3.8 - \$5.2

^a Million board feet

The projected effects are based on current technology and economic conditions. As the last 2 decades have shown, the timber industry will continue to change. Timber prices, technology, trade policy, and other economic factors are likely to change in the future. However, these changes will not change the relative differences between alternatives.

Effects on Other Ownerships and International Effects – A number of comments raised a concern about the economic and environmental effects of the roadless proposal on other ownerships in the United States. Some respondents believe that increased harvest on State and private lands will have negative environmental effects because Federal lands have stricter environmental standards. Two main concerns were raised relative to global economic and environmental effects. One was the potential to increase U. S. dependence on foreign wood products, with a resulting increase in trade deficits and loss of domestic jobs. The second concern addressed the environmental consequences of increasing timber harvest in other countries that may have less stringent environmental regulations.

The reduction in timber harvest on NFS lands in the past decade resulted in increased harvest on other ownerships in the United States and increased imports, primarily from Canada. Most of the NFS harvest reductions occurred in the Pacific Northwest. The market responses to the reduced supply of timber were an increase in regional prices, a high degree of competition that eliminated a number of marginally profitable facilities, reduced regional production of lumber and pulp, and reduction in logs exported. While production in the Pacific Northwest declined, tighter supplies and higher prices provided incentives to other suppliers to increase harvests. Substitute harvest came from private timberlands in the South (primarily non-industrial private forest land), and increased imports from Canada (Sedjo and others 1999).

Harvest from NFS lands is substantially reduced from the late 1980s and early 1990s and now plays a much smaller role in timber markets. The alternatives examined in this section would affect from 3% to 4% of total NFS harvest and less than 0.5% of national timber supply. The reductions in roadless area harvest would transfer some harvest effects to other ownerships, but these effects will be small and difficult to isolate from the expected trends in the supplies from other ownerships contributing to total United States production. For example, much of the future United States production of softwood sawtimber is expected to come from plantations in the South.

The environmental effects of timber harvest on private and other public lands in the United States will vary depending on State forest practice acts and implementation of requirements established by laws such as the Clean Water and Endangered Species Acts. These controls along with market incentives such as certification for sustainable forestry management have done much to improve forest and range management practices to minimize negative ecological effects.

The United States is the largest producer and consumer of sawnwood, wood-based panels, and wood pulp for paper and paperboard. The United States is a major importer of softwood lumber, but also is a significant exporter of logs, sawnwood, and woodpulp for paper. Except for hardwood plywood from Southeast Asia, much of the import volume over the years has come from Canada. Although imports from other countries have

increased, Canada remains the dominant supplier to the United States and supplies more than 95% of the softwood sawtimber (Martin and Darr 1997).

Softwood sawtimber imports from Canada increased through the early 1990s, but have stabilized between 35 and 36% of the total United States softwood lumber market since 1996. Most of these imports are from British Columbia, although an increasing share is coming from Quebec.

The harvest effects of the alternatives would have little effect on total imports. The largest total harvest effect (147 MMBF annually) is less than 1% of average softwood lumber imports in the last 4 years. Therefore, the economic impacts of the roadless proposal on global forest production are negligible.

Other countries are willing to supply wood products to the United States and other nations. The environmental oversight on harvest in other countries varies dramatically. British Columbia and Quebec, the main suppliers of United States imports, have environmental regulations governing harvest. It is possible that increasing concerns over old-growth harvest in Canada will change production and imports from this country in the future. Other suppliers, such as New Zealand and Chile, provide supplies from intensively managed plantations.

Social Effects of the Alternatives – The social effects that may result from any reduced employment opportunities for timber workers associated with the action alternatives are expected to be variable. These effects would be experienced differently by individuals and communities, depending upon their circumstances. For example, a person's ability to adapt to job loss is profoundly influenced by such things as family and community (Carroll and others 2000a). This section provides a range of potential social effects that could be felt by timber-related workers. Actual effects will vary across the country, depending upon the differential localized impacts of the rule, and the people affected.

The majority of research that is available regarding the effects of job loss on timber industry workers comes from the Northwestern United States. According to this research, job loss in the timber and other natural resource-based industries is not just an economic issue; it also raises issues relating to professional and social identity, place attachment, and the rural way of life (Carroll and others 2000a; Kusel 1996). These variables affect the decisions of displaced workers regarding whether they will choose to stay in the same place following job loss and look for another job, or whether they will move elsewhere in search of a similar job (Carroll and others 2000a).

Forest products-related workers, and particularly loggers, have been found to maintain a strong sense of professional and social identity that revolves around being a logger, working hard and being productive, and living and working in their preferred rural setting (Carroll 1995; Carroll and Lee 1990). Their social networks are based in the logging community, and they participate in a common logging culture. For some, logging is a way of life that has been passed down from generation to generation (Carroll 1995; Carroll and Lee 1990; USDA Forest Service and others 1993). Though individuals may

commonly change jobs, they remain in the same occupation over the long-term (Carroll 1995; Carroll and Lee 1990).

For timber workers, the loss of timber jobs might not only mean the loss of a good source of income; it could also mean the loss of a way of life and a sense of individual and cultural identity. Similar people in other occupations whose identities are strongly tied to their jobs, many timber workers also identify with their jobs, enjoy their work, regard its product as useful to society, and appreciate the associated lifestyle. Therefore, taking on other work and adapting to other occupations may not be a simple substitution. It may be resisted, because it disrupts not only their work life, but also their lifestyle, culture, and social interactions. Job loss in any profession can often lead to reduced economic opportunities, psychological stress, domestic strain, and changed quality of life. These problems can be compounded if workers have to move away from the rural communities that are home to them, in search of new job opportunities.

The effects of job loss on people whose sense of identity is not strongly tied to their jobs may not be as extreme. For example, research from the Pacific Northwest indicates that in general, mill workers identify as much with organized labor as with sawmill work (Carroll 1995; USDA Forest Service and others 1993). They do not wish to lose their jobs any more than loggers do; however, they expressed a greater willingness to accept equivalent employment in another sector, if available. Mill workers were found to be more concerned about having to relocate, particularly to urban areas, than about switching occupations (Carroll 1995; USDA Forest Service and others 1993).

Two studies, one from northeastern California, and one from northern Idaho, examine the effects of job loss on logging-related employees that occurred as a result of industrial restructuring and consequent layoffs of timber company employees (Kusel and others 2000; Carroll and others 2000b). Most displaced workers found new logging-related jobs in the same communities, often working for independent contractors, within a few months. Some workers found new jobs locally that were unrelated to logging, but that utilized their existing skills. Retraining for a new job requiring new skills was chosen by only a small number of displaced workers. A small number of older workers chose or were forced to retire. Few, if any, displaced workers moved out of the study areas. They wanted to maintain a rural way of life, and they were attached to their local communities and social networks (Kusel and others 2000; Carroll and others 2000b).

However, most workers experienced reduced income levels, which increased the financial burden on other family members. They also experienced reduced benefits and job security. Some had to work longer hours. Many were dissatisfied with their new jobs. Negative emotional and psychological impacts were noted. No positive effects of adaptation to job loss were reported by these authors (Kusel and others 2000; Carroll and others 2000b).

While job loss in the two cases cited above was caused by company restructuring to remain economically competitive, and not by reductions in timber harvest levels from public lands, it is reasonable to expect some of these same social effects from the latter. Most of the timber workers in these studies were able to find new jobs in the same occupation relatively quickly by working for independent contractors. The effects could

be more severe where job loss is related to reductions in timber harvest from public lands, without increasing the harvest from nearby private lands to maintain local timber-related employment. In the case of harvest reductions from public lands, the impacts of job loss can be expected to be greater on people who work for small timber companies that do not own land, than on people who work for large companies that own their own land and can more easily compensate (Carroll 1995).

In some places, opportunities to find work in the woods are disappearing (Carroll and Lee 1990). Oregon is a State that is undergoing a structural shift in its economy, with permanent reductions in timber employment (Daniels and others 2000). Research on reemployment programs for dislocated timber workers in Oregon found that some displaced timber workers undergoing retraining were experiencing difficulty adjusting to the dislocation, while others had made successful job transitions and were prospering (Daniels and others 2000).

For many people, as described above, timber-related work represents a long-term occupation. However, this is not the situation for all people who work in the woods. One study found that in 1991, the **median** tenure of employment in the wood products industry was 5.3 years (Power 1996). According to this author, the greatest hardship of job loss for these shorter-term workers is the challenge of finding equivalent paying jobs without obtaining additional education or training, which is not always feasible.

Several studies cite the instability of timber communities, due to the migratory nature of the industry (Carroll 1995; Kaufman and Kaufman 1990; Drielsma and others 1990; Krannich and Luloff 1991). Because timber jobs migrate in response to the expansion and contraction of the industry in local areas, so do some of the workers. Significant effects of job loss on these workers may include the stress of migration and relocation, disruption of social networks and sense of community, and the stress of reintegration into new communities.

Regardless of the level of personal investment in the timber industry individuals employed there may have, all can be expected to experience the negative psychological effects of uncertainty regarding forest management on NFS lands, and how it will affect their lives and livelihoods (USDA Forest Service and others 1993).

Energy and Non-energy Minerals

Affected Environment

Many different mineral commodities are produced from NFS lands. Production levels for some of those commodities are shown in Table 3-65. Other mineral outputs from NFS lands include crushed stone, sand and gravel, dimension stone, perlite, pumice, quartz crystals, molybdenum, helium, sulfur, carbon dioxide, and geothermal energy.

Output from NFS lands accounts for a large share of total United States mine production for some commodities. For example, the Stillwater Mine on the Custer National Forest is the only United States mine producing platinum and palladium as primary products. In

Table 3-65. Production of selected minerals from National Forest System lands in 1999.

Precious metals (troy ounces)	
Gold	558,238
Silver	9,787,684
Platinum	95,000
Palladium	315,000
Base metals (short tons)	
Copper	105,935
Lead	319,869
Zinc	147,713
Energy minerals	
Oil (million barrels)	8.5
Natural Gas (billion cubic feet)	76.4
Coal (million short tons)	69.4
Industrial minerals (short tons)	
Limestone	1,388,962
Mica	135,585
Phosphate	4,852,617

(USDA Forest Service 1999t; U.S. Securities and Exchange Commission 2000)

addition, the Riley Ridge area on the Bridger-Teton National Forest provides a significant portion of the country’s helium. (The helium is extracted from helium-rich natural gas.) Even where the NFS’ share of total United States supplies is small, NFS production can be very important to local markets. In some areas, the only sources of sand and gravel or crushed stone within a reasonable shipping distance may be on NFS lands. Figure 3-32 shows the percentage of United States mine production coming from NFS lands for selected commodities.

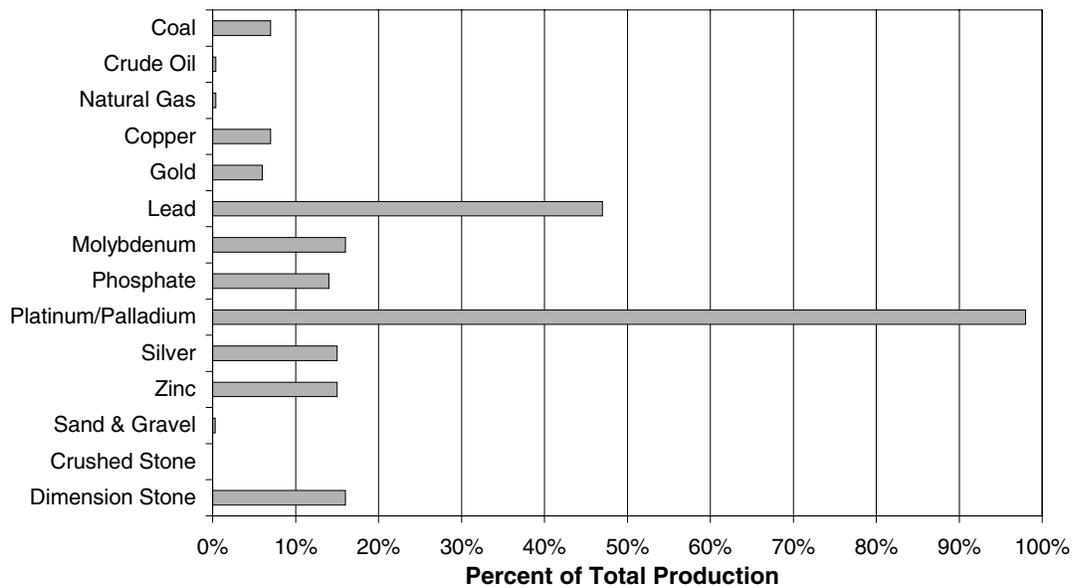


Figure 3-32. Forest Service mineral production as a percentage of total United States production, 1998.

(USDI Geological Survey 2000; USDA Forest Service 1999w; USDA Forest Service 1998d; U.S. Department of Energy 1999; U.S. Securities and Exchange Commission 2000)

An input-output model called IMPLAN was used to estimate the number of jobs and the amount of income attributable to mineral production on NFS lands in fiscal year 1999 (Table 3-66). Total economic impacts generated from the IMPLAN analysis are the aggregation of three types of effects. The direct impacts are the effects on the initial sector (e.g., mining) experiencing a change in output. Indirect effects are the impacts on those industries that provide goods and services to the initial sector, and induced impacts are the effects associated with the expenditure of new household income generated by the direct and indirect effects of the output changes.

Mineral activities on NFS lands generated about \$104 million in receipts to the United States Treasury in 1999 (Table 3-67), most of which is attributable to royalty payments on leasable mineral production. A portion of the United States Treasury receipts is returned to States and Counties to be used for schools and roads. States receive 50% of leasable receipts on public domain lands, except in Alaska, where the State receives 90%. This same 50% share applies when the surface is managed as national grassland, but the mineral estate is determined to be public domain. On acquired lands of the national forests, States receive 25% of receipts with the requirement that the funds be used for the benefit of the Counties where the national forest is located. Where the mineral estate underlying national grassland is acquired, 25% of leasable receipts are returned to the Counties in which the grassland is located. States also receive 25% of receipts from salable minerals, and those funds are passed down to the Counties in which NFS lands are located.

Despite higher interest in some commodities (e.g., coal bed methane), the total number of energy and non-energy operations processed by the Forest Service declined about 24% from 1997 to 1999.

The Energy Information Administration (EIA) forecasts that coal and natural gas production in the United States will rise steadily through 2020, while the downward trend in domestic crude oil output is not expected to be reversed until 2010 (United States Department of Energy 1999). Activity levels on NFS lands should correlate fairly well with EIA's forecasts. As mentioned previously, coal bed methane is currently attracting a lot of exploration attention. NFS lands where coal and natural gas production are the dominant energy activities are likely to fare better from an economic standpoint (i.e., jobs, income, Payments to States and Counties) than those where the emphasis is on crude oil. Industry interest in phosphate also remains high.

Demand for phosphate in the United States has steadily increased since the early 1960s, primarily because of demand for phosphate fertilizer. World demand is expected to continue to grow in the future, although at a slightly slower rate since environmental concerns are reducing fertilizer application rates. The majority of phosphate production occurs in the eastern United States, but production in the Western United States has increased, and it is expected to make up an increasing share of total production in the future (Jasinski 1999).

In 1999, a decline in fertilizer demand in the East and Midwest resulted in a reduction of phosphate rock production in the eastern United States. Several mines and fertilizer

Table 3-66. Employment and labor income attributable to mineral production from National Forest System lands in fiscal year 1999.

Sector	Number direct jobs	Number total jobs	Labor income	
			Direct (millions)	Total (millions)
Agriculture	0	681	\$0.0	\$12.3
Mining	5,902	9,139	374.5	594.4
Construction	0	1,126	0.0	39.5
Manufacturing	2,619	5,999	241.9	411.9
Transportation, communications, public utilities	0	1,904	0.0	96.3
Trade	0	7,574	0.0	185.2
Finance, insurance, real estate	0	2,590	0.0	93.6
Services	0	10,980	0.0	337.1
Government	0	434	0.0	23.9
Total	8,521	40,427	\$616.4	\$1,794.2

(IMPLAN 2000)

Table 3-67. Fiscal year 1999 United States Treasury receipts and Payments to States/Counties from mineral activities on National Forest System lands.

Region	Total receipts (millions)	Payments to States/Counties (millions)
Northern (1)	\$8.8	\$2.7
Rocky Mountain (2)	34.2	16.1
Southwestern (3)	6.0	2.6
Intermountain (4)	40.0	20.0
Pacific Southwest (5)	2.4	1.1
Pacific Northwest (6)	0.1	0.0
Southern (8)	6.4	1.7
Eastern (9)	6.4	1.8
Alaska (10)	0.1	0.0
Total	\$104.4	\$45.9

(USDA Forest Service 1999q; USDA Forest Service 1999k)

production plants closed as a result. Western producers were largely unaffected, because their products are sold regionally. The short-term outlook for the domestic phosphate industry is for a lower than average production of phosphate rock in the East, although eastern production will continue to account for more than 80% of total production (Jasinski 1999).

The majority of Western phosphate production occurs on the Caribou National Forest, accounting for about 12% of national production. Southeastern Idaho has extensive

phosphate reserves. In 1999, about \$2.2 million was paid to the State of Idaho as their share of royalty payments on NFS phosphate leases.

United States coal production steadily increased from the early 1960s through most of the 1990s. While production has increased, increases in worker productivity reduced direct employment by nearly half between 1986 and 1997. The number of operating mines has also decreased, but average production per mine has increased. Coal prices have declined through the 1990s, and they are expected to continue to decline in the near future, which will continue to limit investment in exploration and new development. Although the United States has extensive coal reserves, lack of investment in development of new reserves could result in a shortage of coal in the next 20 to 30 years, as existing reserves are depleted (Bonskwoski 1999).

In the short-term, there will be continued interest in coal development. Production is expected to increase in the Western United States, especially in the Powder River Basin where low-sulfur coal can be surface mined at relatively low cost (Bonskowski 1999). Western coal reserves are primarily found in Federal ownership. Federal coal production is concentrated in Colorado, Montana, Utah, and Wyoming, with smaller amounts of production in Alabama, Kentucky, New Mexico, North Dakota, Oklahoma, and Washington.

The United States has considerable reserves of oil and gas. Despite recent price increases for crude oil, total United States production of crude oil is expected to continue to decline through 2010. Increased prices for natural gas are expected to lead to increases in production of natural gas (U.S. Department of Energy 1999). Federal leases are an important source of oil and gas, but most of the production is from offshore leases. Production from NFS lands accounts for 0.4% of total United States oil and gas production.

Prices for some metals (copper, gold) have declined in the past few years, providing less of a financial incentive for firms to explore for and develop those commodities. The continuing low prices have resulted in the shutdown of a number of mines or a reduction in production levels. In addition, lengthy processing times, increasing environmental mitigation and permitting costs, less public acceptance of resource extraction activities, and delays caused by appeals and lawsuits are often seen as a disincentive to explore and develop on Federal lands.

Public comments on mining were diverse (Content Analysis Enterprise Team 2000b). Some people believe that mining should be prohibited in inventoried roadless areas because they think it has a negative impact on human health and the environment. Some noted that the Federal government should be promoting alternative sources of energy.

Other people believe roadless areas contain valuable mineral resources that should continue to be available for development. Concern was raised about the potential economic impact to mining-dependent communities, and increasing dependency on foreign sources of supply. Others expressed concern that the proposed rule would not

protect access to existing claims. Some believe that banning mining in roadless areas would be contrary to existing laws.

Alternative 1 – No Action

Under the No Action Alternative, land management plans, and other lease, license, permit, or sales decisions would be implemented and mineral operations would be approved under existing authorities. Mineral activity on NFS lands will continue to depend upon such factors as market conditions, environmental regulations, tax policies, technological advances, and mineral potential.

Within the next 5 years, several new metal mines on NFS lands should begin producing, and some existing metal mines will expand their output. Thus, the amount of copper, gold, silver, platinum, and palladium produced from NFS lands should increase over current levels. Over the long term, however, the overall interest in exploring for and developing metal deposits domestically is likely to continue to decline unless prices for certain commodities increase substantially and mining companies perceive a significant improvement in the regulatory and policy framework. Eventually, the lack of exploration activity will result in a drop in metals production and associated decreases in jobs and income.

Phosphate mining is expected to continue to expand on NFS lands in southeastern Idaho. Operators of current mines all have plans to expand existing operations. These operators also own processing facilities for production of either phosphate fertilizer products or elemental phosphorus production. Current production levels should be maintained or possibly increase in the near future.

In 1998, coal production from Federal leases on NFS land accounted for almost 7% of total national production, and about 22% of production from Federal leases (USDA Forest Service 1999o and USDI 1998). Based on planned projects in the next 5 years, there is industry interest in expanding current operations in Colorado and Utah to replace reserves as they become depleted. With continuing declines in coal prices, the long-term outlook is more difficult to predict. Although production is expected to increase, productivity increases are still expected to result in further reductions in direct jobs associated with coal mining (United States Department of Energy 1999).

Interest in natural gas development may increase on NFS lands in response to increasing prices and increasing demands. Although much of the increased development is expected to be offshore, a number of national forests and grasslands either have current leases, or have applications for permits to explore for natural gas. Therefore, increased activity in this area is likely. Increased activity for crude oil is not expected, given the outlook for crude oil.

Alternatives 2 through 4

The economic effects focus on how the alternatives affect future exploration and development of energy and non-energy minerals. The effects would be similar under

Alternatives 2 through 4. The Minerals and Geology section of this chapter provides an analysis of the general effects of the alternatives on locatable, leasable, and salable minerals. For locatable minerals, the construction and reconstruction of roads reasonable and necessary for exploration and development would be allowed under the General Mining Law of 1872.

The alternatives would not affect road construction and reconstruction providing access to and development within existing lease boundaries, but the prohibitions would likely prevent expansion of existing lease areas into adjacent inventoried roadless areas except in situations where development can be done without road construction. In many cases, such expansion is more economically advantageous to the operator than developing new deposits. In addition, expansion could result in less environmental damage than beginning new development outside of inventoried roadless areas, if leasable deposits are available.

Where reserves of leasables are known to occur in inventoried roadless areas, the alternatives are likely to preclude future development. In some situations, mineral deposits can be developed under a lease with no surface occupancy stipulations. The economic effects of precluding development depend on the availability of alternate resources in areas that may be available for leasing (either on NFS lands or on other ownerships). Since mineral deposits tend to be concentrated in some geographic areas, it is likely that impacts would also be concentrated in a few areas. The immediate economic effects of the prohibitions are associated with current proposals to expand existing leases into adjacent inventoried roadless areas for phosphate and coal mining.

Phosphate mining on the NFS currently occurs only on the Caribou National Forest in southeastern Idaho. There are eight Known Phosphate Lease Areas²⁰ in southeastern Idaho, totaling more than 81,000 acres. About 48% of those acres are on NFS lands administered by the Caribou National Forest Land and Resource Management Plan. Almost 60% of the Known Phosphate Lease Areas lands on the Caribou National Forest are currently leased, with 26% of the leased acres within inventoried roadless areas. However, these areas include leases on areas that have already been developed and that contain no more minable phosphate rock.

Three mines are currently operating on the Caribou National Forest, with a fourth operation scheduled to begin soon. One of the mines is currently operating partially within an inventoried roadless area, and accounts for about half of the phosphate rock production in Idaho. Future production at this site depends on Interior Board of Land Appeals decision on a lease that was issued within an inventoried roadless area, and on approval of an expansion into a contiguous area that is not within an inventoried roadless area. The lease appeal is not related to the lease being within an inventoried roadless area. If production is allowed to go forward at either or both sites, then no short-term effects are expected related to phosphate mining on the Caribou.

²⁰A Known Phosphate Lease Area is land known to contain phosphate deposits and is classified by the USGS as subject to competitive leasing.

If production is not allowed to go forward at either site, then production will be interrupted. The operator would not have sufficient time to do the required permitting and construction necessary to develop substitute reserves before reserves at the existing operation are depleted. Other mine operators in southeast Idaho are not likely to have sufficient excess capacity to provide substitute production in the short-term. The potential interruption in supply is not related to the possible imposition of a road prohibition, but a road prohibition could constrain future options for developing substitute reserves. Therefore, the economic impacts of interrupting the production of 3 millions tons of phosphate rock per year (estimated current production level) were estimated to illustrate the level of impacts that could occur if the road prohibition precludes development of reserves within inventoried roadless areas (Table 3-68). An interruption in supply would also affect jobs at the production facility that is owned by the mine operator, but those impacts are not included in the table.

Over the long term, phosphate leasing potential on NFS and non-NFS lands outside of inventoried roadless areas is generally limited to small areas that are contiguous to existing leases or deposits with a low development potential. More than 1,000 acres in the Caribou have been formally applied for through Lease Modifications, Exploration Licenses, and Prospecting Permits. Most of the applications would be significantly affected by road prohibitions.

The short-term effects for coal mining are linked to expanding existing mines into inventoried roadless areas. On the Grand Mesa, Uncompahgre, and Gunnison National Forest, one coal-mine operator is interested in expansion into surrounding inventoried roadless areas. Although the mine is an underground operation, expansion may require road access for exploration and development drilling, and construction of ventilation shafts. The mine currently produces about 7 million tons per year (not entirely from NFS leases). The operator will need access to new reserves to maintain production levels in 4 to 5 years. If production cannot be expanded into inventoried roadless areas, the mine could close when current reserves are exhausted. The potential effects on jobs and labor income of reducing production by 7 million tons per year are shown in Table 3-68. The impacts of a closure would be concentrated in the local communities where the workers reside (see Forest-dependent Communities section of this chapter). If substitute coal development occurs within the same geographic area, then these effects could be offset.

The Manti-LaSal National Forest has identified three potential coal tracts with proven reserves that are partially within inventoried roadless areas. Even though these tracts would be mined underground, road access is often needed for pre-lease exploration drilling in order for interested bidders to gather sufficient information for bidding. Bonus bids are likely to be reduced if the tracts are offered for lease, since bidders will not have complete information about the deposits, and will be uncertain about access to portions of the reserves. Recent bonus bids for two major leases on the forest were \$16.9 and \$25.2 million, for lease tracts with estimated recoverable reserves of between 60 and 63 million tons of coal. A reduction in bonus bids reduces returns to the United States Treasury, and the share of receipts to the States. Two of the potential tracts on the Manti-LaSal have relatively small recoverable reserves, but the third tract has an estimated 135 million tons of recoverable reserves, of which 50 million tons are within inventoried roadless areas.

None of the tracts have been offered for lease to date. It is difficult to predict possible bonus bids, and likely future production levels.

There is interest in new natural gas development on several forests, and continuation of oil and gas leasing in other areas. Although oil and gas production on NFS lands is a minor portion of national production, it is an important source of economic activity in some communities. For example, the Little Missouri National Grasslands in North Dakota accounted for about half of total NFS production in 1999. The prohibition on road construction and reconstruction will have no effects on current leases, and therefore no short-term economic impacts are expected. If road prohibitions are implemented when leases expire, there is little likelihood that future exploration and development could occur. However, oil and gas can sometimes be produced under a lease with a no surface occupancy stipulation using technologies such as directional drilling. A number of other forests have identified areas of high oil and gas potential within inventoried roadless areas (see the Minerals and Geology section of this chapter).

Table 3-68. Annual economic impacts of prohibitions on road construction and reconstruction in inventoried roadless areas for selected mineral commodities and national forests.

Commodity	National Forest	Labor income (millions) ^b		Employment (number of jobs)		Payments to States ^a (millions) ^b
		Direct	Total	Direct	Total	
Coal	Grand Mesa, Uncompahgre, and Gunnison	\$25.8	\$89.3	361	2119	\$2.1
Phosphate	Caribou	10.4	38.5	185	976	1.3
Total		\$35.8	\$127.8	546	3095	\$3.4

^a Payments to States estimates are based on 1999 prices for coal and phosphate.

^b 1999 dollars.

For salable minerals, the prohibition on road construction and reconstruction would reduce the demand for mineral materials (e.g., crushed stone) used in building roads on NFS lands. The most likely reason for developing salable deposits in inventoried roadless areas for NFS administrative use is in support of road construction in nearby areas and road maintenance in those areas. In the absence of road construction activities, development of these areas is unlikely for Agency use. However, there could be impacts on State and local governments and on commercial businesses that would propose development of such sites, even though transportation costs could be substantial. These effects should be highly localized, primarily in areas where substitute deposits are scarce on NFS lands outside of inventoried roadless areas or non-NFS lands.

For both locatable and leasable minerals, there may also be impacts associated with potential increases in the costs of permitting and environmental mitigation of activities within inventoried roadless areas. This could affect future exploration and development for leasable and locatable minerals. Most proposed activities, particularly if they are proposed within an inventoried roadless area, are already subject to intense scrutiny through preparation of environmental impact statements. However, it is possible that in

some cases, the requirements for environmental analysis may increase, mitigation requirements may increase, and the processing time may increase.

Over the long term, higher costs and longer processing times might cause some portion of the mineral resources in inventoried roadless areas to become uneconomic. If that occurred, the level of development would be reduced, resulting in fewer mining-related jobs, less income, and a reduction in United States Treasury receipts and Payments to States and Counties. There is not enough information available, however, to quantitatively estimate the degree to which jobs, income, and revenue would be reduced by increased costs.

USGS has conducted assessments of undiscovered deposits of numerous mineral resources. Based on knowledge of the geologic environment and a comparison with known deposits having similar geologic attributes, the USGS has estimated the amount of undiscovered mineral resources for areas that seem conducive to the existence of such deposit types. These areas are referred to as permissive tracts for metallic minerals and as provinces for oil and gas resources. The estimates were provided in the form of probability distributions, which describe the likelihood of existence of varying amounts of mineral resources in the tract or province.

The USGS maps of undiscovered resources were overlaid with the location of inventoried roadless areas. Permissive tracts and provinces that did not contain inventoried roadless areas were eliminated. Table 3-69 to Table 3-71 contain the results of the comparisons for gold, silver, copper, lead, zinc, oil, and natural gas. In Table 3-69 and Table 3-70 the quantity and value of undiscovered resources are shown at the 50th percentile, which means there is an equal chance that the actual quantity is higher or lower. The mean (or average) estimate of the quantity and value of oil and gas that could be extracted with current technology is shown in Table 3-71.

The data in Table 3-70 and Table 3-71 indicate that there are potentially valuable mineral deposits within these permissive tracts and provinces. The probability of these deposits occurring within inventoried roadless area is unknown. In most cases, inventoried roadless areas account for a small portion of the area within the permissive tract or province. This is particularly true in the East, where NFS lands account for a small portion of total land area, and inventoried roadless areas are a small percentage of total NFS lands. In addition, oil and gas resources in the Gulf Coast include offshore resources. The likelihood of deposits occurring within inventoried roadless areas is higher in the Intermountain West, where many areas of inventoried roadless areas are located, and where most of existing mining activity occurs on NFS lands.

Market conditions play an important role in determining the level of exploration and development interest for a particular mineral commodity, and prices for some commodities would have to increase significantly over current levels to generate much interest in exploration and development. If operators face higher costs in inventoried roadless areas, Alternatives 2 through 4 would reduce the investment attractiveness of conducting activities in inventoried roadless areas and cause some portion of the mineral resources to go undeveloped. The amount of the resources that would be affected and the

Table 3-69. Estimates at the 50th percentile of undiscovered resources of gold, silver, copper, lead, and zinc for permissive tracts containing inventoried roadless areas (metric tons).^a

Region	States	Gold	Silver	Copper	Lead	Zinc
Colorado Plateau	AZ, CO, NM, UT	0	0	0	0	0
Central/Southern Rocky Mountains	CO, NM, TX, WY	619	4,853	4,468,980	832,000	919,000
East-Central U.S.	AL, GA, IL, IN, KY, MD, MI, MS, NC, NJ, NY, OH, PA, TN, VA, WV	0	910	0	4,450,000	36,200,000
Great Basin	AZ, CA, ID, NV, OR, UT	1,891	52,991	16,937,217	4,800,500	6,700,900
Great Plains	AR, IA, IL, IN, KS, KY, MI, MO, NE, NM, OH, OK, TN, TX, WI	0	440	9,400,000	1,900,000	10,000,000
Lake Superior	IA, KS, MI, MN, MO, ND, NE, SD, WI	488	13,003	25,600,000	570,000	10,000,000
Northern Appalachian Mountains	CT, MA, ME, NH NY, VT	20	1,636	840,000	383,000	2,946,000
Northern Rocky Mountains	ID, MT, SD, WA WY	550	34,968	13,490,800	2,170,100	3,865,000
Pacific Coast	CA, ID, NV, OR, WA	389	5,612	6,855,030	67,100	516,900
Southern Appalachian Mountains	GA, NC, TN, VA	12	430	910,000	0	250,000
Southern Basin and Range	AZ, CA, NM	715	27,193	63,664,000	3,228,000	3,703,000
Total		4,684	142,036	142,166,027	18,400,700	74,570,800

^aThe above numbers refer to overall resources in permissive tracts that contain roadless areas, not in the roadless areas themselves. As explained in the text, resources actually located inside roadless areas are likely to be an insignificant portion of total resources.

(USDI Geological Survey 1996b)

Table 3-70. Estimates at the 50th percentile of the number of undiscovered deposits and the value of gold, silver, copper, lead, and zinc for permissive tracts containing inventoried roadless areas. ^a

Region	Number of deposits	1998 Gross value of contained metal (billion dollars)				
		Gold	Silver	Copper	Lead	Zinc
Colorado Plateau	0	\$0	\$0	\$0	\$0	\$0
Central/Southern Rocky Mountains	27	5.9	0.9	7.4	0.8	0.9
East-Central United States	9	0	0.2	0	4.4	35.9
Great Basin	120	17.9	9.4	28.0	4.8	6.1
Great Plains	6	0	0.1	15.5	1.9	9.9
Lake Superior	100	4.6	2.3	42.3	0.6	9.9
Northern Appalachian Mountains	1	0.2	0.3	1.4	0.4	2.9
Northern Rocky Mountains	51	5.2	6.2	22.3	2.2	3.8
Pacific Coast	52	3.7	1.0	11.3	0.1	0.5
Southern Appalachian Mountains	6	0.1	0.1	1.5	0	0.2
Southern Basin and Range	85	6.8	4.8	105.3	3.2	3.7
Total	467	\$44.5	\$25.3	\$235.1	\$18.3	\$74.0

^a The probability of these deposits occurring in inventoried roadless areas is unknown. In most cases, inventoried roadless areas account for a small portion of the area within the permissive tract. (USDI Geological Survey 1996b)

magnitude of the related economic impacts would depend, in part, upon the availability of alternative investment opportunities.

Table 3-71 indicates that there may be as much as 20.80 billion barrels of technically recoverable oil resources in provinces containing some national forest inventoried roadless areas. However, while the amount of such deposits actually beneath inventoried roadless areas has not been estimated, the Agency believes it is unlikely to be more than an insignificant percentage of this amount for the following reasons. First, the table refers to technically recoverable – not economically recoverable – oil and gas deposits. Second, about one third of the 20.80 billion barrels is located in the Gulf Coast, Mid-continent, and Eastern regions where there are only a few widely scattered inventoried roadless areas. Third, the vast majority of inventoried roadless areas have been open to leasing for decades; thus, areas with economically recoverable deposits are likely to have already been leased, and existing leases are not subject to the prohibition alternatives. Moreover, total oil and gas production from the all NFS lands is currently about 0.4% of the current national production.

Table 3-71. Mean estimates of undiscovered technically recoverable conventional resources of crude oil and natural gas for provinces containing inventoried roadless areas.^a

Region	Crude oil		Natural gas	
	Billion barrels	1998 gross value (billion dollars)	Trillion cubic feet	1998 gross value (billion dollars)
Alaska	0.96	10.4	2.16	4.2
Pacific Coast	4.01	43.6	12.00	23.2
Colorado Plateau/Basin and Range	1.31	14.2	8.56	16.6
Rocky Mountains/Northern Great Plains	4.51	49.0	21.98	41.6
West Texas/ Eastern New Mexico	2.88	31.3	18.71	31.8
Gulf Coast	5.40	58.7	98.02	190.2
Mid-continent	0.26	2.8	19.58	6.5
Eastern	1.47	16.0	11.54	18.4
Total	20.80	226.1	171.34	332.4

^a As explained in the text, the amounts referred to above are estimates for all provinces that contain roadless areas, not in the roadless areas themselves. For reasons explained in the text, the amount of economically recoverable oil and gas beneath inventoried roadless areas is not accurately known but is unlikely to be more than an insignificant percentage of the above amounts.
(USDI Geological Survey 1996a)

The USGS has also conducted coal resource assessments for several regions in the United States. Estimates from the Northern Rocky Mountains and Great Plains assessment are shown in Table 3-72. The figures represent coal that should be used over the next 20 to 30 years. Coal resources in several other Tertiary basins in the Northern Rocky Mountains and Great Plains were not assessed, because they were less likely to be used during that time. The estimates do not include resources within mine or lease areas, or resources in coal beds less than 2.5 feet thick.

Table 3-72. Estimates of coal resources, in million short tons, in the northern Rocky Mountains and Great Plains regions in Counties containing inventoried roadless areas.^a

Basin	States	Measured (<1/4 mile)	Indicated (1/4-3/4 mile)	Total	1998 gross value (billion dollars)
Powder River	MT, WY	77,870	295,180	373,050	6,532
Williston	ND	622	4,038	4,660	82
Greater Green River	WY		no roadless areas		
Hanna-Carbon	WY		no roadless areas		
Total		78,492	299,218	377,710	6,614

^a The above numbers refer to overall resources in regions that contain roadless areas, not in the roadless areas themselves. As explained in the text, resources actually located inside roadless areas are likely to be an insignificant portion of total resources.
(USDI Geological Survey 1999)

The estimates are presented at two levels of geologic assurance, which relate to the distance from drill holes. Measured coal resources are those within a 0.25-mile radius from a drill hole, while indicated resources are within 0.75 mile. The USGS reported resources for two other categories (inferred and hypothetical), but these are not presented in Table 3-72 as they represent lower levels of geologic assurance. Similar to the oil, gas, and metal resources discussed above, the USGS coal estimates have been adjusted where coalfields within a basin clearly contain no inventoried roadless areas. Even so, for the reasons mentioned previously for undiscovered oil and gas and metal deposits, the percentage of resource estimates in Table 3-72 within inventoried roadless areas is unknown. For example, in the Powder River Basin, 87% of the coalfield containing inventoried roadless areas is federally owned coal, while in the Williston Basin, 37% of the coal is federally owned. As with undiscovered oil and gas and metal deposits, however, over the long term some coal resources would likely not be developed under Alternatives 2 through 4, which will reduce the number of jobs, the amount of income, and the level of payments to the Federal treasury, States and Counties.

Social Effects of the Alternatives – Alternatives 2 through 4 would prohibit road construction and reconstruction in inventoried roadless areas for the exploration and development of salable minerals and leasable minerals that are not currently within existing lease boundaries. Exploration and development of locatable minerals could be affected if costs are increased because of additional environmental mitigation and/or delays. The social impacts of Alternatives 2 through 4 on communities located near inventoried roadless areas having **mineral reserves** would be variable. These impacts would in large part depend on whether the communities affected are already impacted by ongoing mining activity, or have not previously been impacted by mining. The assumption in this discussion is that a prohibition on road construction and reconstruction would preclude development of new salable deposits and new leasable deposits in inventoried roadless areas, but would not affect existing operations that are operating within the scope of their current approvals.

If mineral development activity is underway near an affected community, and Alternatives 2 through 4 preclude expansion or new development under new leases in nearby inventoried roadless areas, then these communities are likely to experience negative social and economic impacts over the medium to long-term. Some of the communities expected to fall into this category are listed in the Forest-dependent Communities section of this chapter. If Alternatives 2 through 4 preclude new leasable or salable mineral development in inventoried roadless areas where none currently exists, then local communities not already impacted by mining will forego opportunities for future economic development based on mining. Mineral development could still occur elsewhere on NFS lands, however, partially offsetting these effects.

The social and economic effects of mineral development vary by the type of activity being undertaken. Exploration activities generally have a minimal social and economic impact on surrounding communities because they involve little ground disturbance and a small work force (Wenner 1992).

Site development, which is often the most labor-intensive phase of new mining operations, is likely to have the greatest impacts, especially if it occurs within a short

time (Wenner 1992). Site development, which can entail extensive construction work, can create numerous relatively high paying jobs in local communities that often pay better than other local employment opportunities. Depending on the mining company and the supply of locally available skilled labor, local residents may be employed. However, a substantial number of non-local people generally migrate into these communities to take advantage of the employment opportunities as well. Typically, these people have a history of mineral sector employment, and related skills. The workforce of most mining operations includes an average of 30% to 60% local workers (Wenner 1992). The jobs associated with the construction phase are relatively temporary, lasting from a few months to a few years (Power 1996).

If a large number of migrants move into the local community within a short time frame, there will be a strain on existing infrastructures, housing shortages, and local price inflation, especially if the company does not provide housing and other facilities for its workers (Wenner 1992). However, local businesses tend to benefit, and property values increase. Local governments also gain tax revenues. Often a disproportionate number of newcomers are single males, which brings a new set of social dynamics to the community, as does an influx of new families. Existing residents will need to try to adapt to these social changes. Residents who favor the amenity values of their communities, who are adverse to development and its environmental impacts, who prefer the small community feeling, or who are engaged in the recreation and tourism business may feel adverse impacts from these changes. While many local residents may be economically better off, they do not necessarily experience an improved quality of life due to the social problems that can arise because of these community impacts (Corkran 1996; Wenner 1992).

The construction phase of mineral development has greater social and economic impacts on local communities than the production phase does (Wenner 1992). The production phase requires fewer workers, and is the most stable and long lasting phase of mineral development. Although it offers fewer jobs, the jobs provide more stable employment. The length of the production period will depend on the size of the mineral deposit, and on market conditions. Production may last 10 to 50 years or longer, providing medium to long-term economic stability to communities. Some of the new residents who came for construction jobs will remain, and some local workers will obtain stable employment. However, when the mining operation eventually shuts down, it can be a great shock to the local community. People who were employed lose high paying jobs, some residents move away, local businesses decline, local governments lose revenue, and property values decline. The success of a community in adapting to this phase-down will depend in part on how economically diverse it is, and what kinds of other employment opportunities are available. Communities that are also timber dependent and experiencing simultaneous declines in timber-related employment, and communities that are not recreation and tourism destinations, could be especially affected. The cycles of expansion and decline that characterize many mining dependent communities, and their associated adverse social and economic impacts, have been well documented (Freudenburg and Frickel 1994; Krannich and Luloff 1991; Power 1996). It is important to note that the impacts of mining development and dependence on community well-being will vary, and

depend to some degree on the type of mineral involved, the technology used to extract it, and the resulting industrial organization (Nord and Luloff 1993).

Alternatives 2 through 4 could have negative economic and social impacts on communities with a history of mining dependency if future production requires access to minerals in inventoried roadless areas. If road prohibitions prevent the future expansion of development opportunities in these areas, the downturn phase of minerals activity could occur sooner than under the No Action Alternative. Communities that do not have a history of involvement in the mining sector, and are located near inventoried roadless areas that contain leasable and salable mineral reserves, are unlikely to experience either the positive or the negative social and economic effects of mineral development if one of the action alternatives is implemented. They could experience these effects however if mineral development takes place elsewhere on NFS lands located near them.

Effects on Other Ownerships and International Effects – The United States is a net importer of phosphate rock. Despite having large reserves, projected growth for phosphate rock for production facilities in the East will be met by increased imports, primarily from Morocco. High transportation costs currently prohibit Western phosphate rock from being economically competitive with imports in supplying eastern production facilities. Phosphate rock imports to eastern facilities are used primarily in producing value-added products, primarily fertilizers. The United States is a net exporter of numerous phosphate fertilizer products and elemental phosphorous (Jasinski 1999).

Western phosphate production is used to provide raw materials to Western processing plants. The only two elemental phosphorous plants in the United States are in southeast Idaho. Phosphate reserves in the West are sufficient to provide raw materials to Western processing facilities for the foreseeable future. Restrictions on development in inventoried roadless areas may cause some temporary disruptions as production moves to other areas. Over the long term, lack of development of reserves within inventoried roadless areas would result in reserves being depleted at an earlier date.

The United States is a net exporter of coal, although exports have declined in recent years because of increasing competition from other countries, declining coal consumption in Europe, and a strong United States dollar. International competition has had minor impacts on national production and prices, with the exception of certain premium coal and steam coal producers (mostly mines in northern Appalachians, Colorado, and Utah) (Fremer and Hong 1999).

The potential reductions in coal production associated with road prohibitions in inventoried roadless areas are unlikely to have any effect on national production or prices. The majority of Federal production in the near future is expected to continue to come from surface-mining operations in the Powder River Basin. Current production in that area is primarily from other Federal lands, and there is little inventoried roadless area within the basin area. If reserves within inventoried roadless areas are unavailable for future development, reserves on other Federal land and other ownerships are likely to be developed.

United States imports of crude oil are expected to continue to increase. The share of petroleum consumption met by net imports is projected to increase from 52% in 1998 to 64% in 2020. The United States was essentially self-sufficient in natural gas until the late 1980s. Net imports as a share of consumption more than tripled from 1986 to 1999. Production has declined, and most imports are from Canada. Despite increases in domestic production, net imports are expected to increase through 2020, from 14.6% to 16.3% of total gas consumption (United States Department of Energy 1999). Production from NFS lands is a small part of total United States production of oil and natural gas and is unlikely to have any appreciable effects on import dependence.

Road Construction

Affected Environment

Users of the National Forest System depend on road access for both commercial and amenity uses of NFS lands. The economic effects of those uses are captured in previous sections. However, road construction, reconstruction, maintenance, and decommissioning activities also generate jobs that are not captured in the resource-specific analyses.

Road construction and reconstruction activities generate about 20 jobs per million dollars expended on roads. About 10 million of those jobs are direct jobs, while the remaining are indirect and induced jobs. The cost of road construction varies widely, depending on the type of road, intended use, environmental conditions, and other factors. Roads to access timber sales are most likely to be **local roads**. In the lower 48 States, average cost to construct a local road ranges from \$50,000 to \$60,000 per mile, while average reconstruction cost varies from \$8,000 to \$16,000 per mile. Temporary road construction cost was estimated to range from \$5,000 to \$10,000 per mile. In Alaska, road construction is more expensive. The cost of constructing permanent roads was estimated to be \$140,000 per mile, and the cost of constructing temporary roads was estimated to be \$120,000 per mile.

Alternative 1 - No Action

Under Alternative 1, road construction and reconstruction needed to implement planned projects is assumed to go forward. A total of 537 miles of roads were projected in association with non-timber projects over the next 5 years. Of that total, 448 miles would be new construction, 80 miles would be reconstruction, and 9 miles would be temporary. It is unlikely that all planned projects would go forward, so that the total number of miles would be less than 537. Since most of the planned projects are associated with mineral development and special uses, most are likely to be single use local roads.

A total of 623 miles were projected in association with planned timber offer over the next 5 years. Of the total, 346 miles are new construction, 99 miles are reconstruction, and 178 miles are temporary construction. Although there is not a direct correlation between harvest volume and road miles, the same process used to adjust planned offer volumes for harvest was also applied to road miles to get an estimate of miles likely to be constructed and reconstructed for estimated timber harvest. Using this process, total timber roads

were estimated to be 404 miles over the next 5 years. Of that total, 226 would be new construction, 62 would be reconstruction, and 116 miles would be temporary roads.

To estimate effects on jobs, the total miles of roads were converted to average annual figures (Table 3-73). The total annual cost of constructing, reconstructing, and building temporary roads was estimated using the costs per mile described above. If all of the road development activity were implemented, annual costs would range from \$12.2 to 13.4 million. Using this range of costs, direct jobs associated with road activities would range from 122 to 134, while total jobs would range from 244 to 268, as shown in Table 3-73.

Alternatives 2 through 4

The economic effects of the national prohibitions are the same for Alternatives 2 through 4, since road construction and reconstruction are prohibited under all three alternatives. Of the 537 miles of roads planned for non-timber projects, up to 244 miles may be prohibited by the alternatives. The remaining 293 miles would not be prohibited. If all of the prohibited projects were assumed to proceed in the absence of the proposed rule, then jobs associated with the 244 miles would be affected. The road miles planned for timber harvest would also be affected by the prohibitions.

Table 3-73. Total jobs associated with average annual road construction and reconstruction for estimated timber harvest and planned activities in inventoried roadless areas.

Region	Average annual miles for non-timber projects	Average annual miles for timber harvest	Range of direct jobs affected	Range of total jobs affected
Northern (1)	17	7	9-11	18-22
Rocky Mountain (2)	14	7	8-10	16-20
Southwestern (3)	4	0	2	4-5
Intermountain (4)	31	14	14-18	28-36
Pacific Southwest (5)	12	1	6-7	12-15
Pacific Northwest (6)	7	2	4-5	9-11
Southern (8)	6	3	3-4	6-8
Eastern (9)	3	6	2-3	4-5
Alaska (10)	14	40	73	147
Total ^a	107	81	122-134	244-268

^aTotals may not be exact due to rounding.

The range of affected direct and total jobs is shown in Table 3-74. All of the jobs associated with timber harvest are affected. Since only 45% of non-timber project road miles are affected by the road prohibitions, the impacts on road jobs associated with those activities are less. As discussed in the Timber section of this chapter, there may be substitution opportunities for jobs related to road construction and reconstruction. Between 1992 and 1997, total employment in the construction industries increased by 20% (USDC Bureau of the Census 1999). Although substitution may be possible, whether those opportunities would exist in the affected communities cannot be predicted.

Table 3-74. Jobs affected by prohibitions on road construction and reconstruction in inventoried roadless areas.

Region	Average annual miles prohibited for non-timber projects	Average annual miles prohibited for timber harvest	Range of direct jobs affected	Range of total jobs affected
Northern (1)	3	7	2-3	5-7
Rocky Mountain (2)	9	7	5-7	11-14
Southwestern (3)	1	0	1	1-2
Intermountain (4)	19	14	10-12	19-25
Pacific Southwest (5)	6	1	3-4	7-8
Pacific Northwest (6)	2	2	2	4-5
Southern (8)	2	3	1-2	3-4
Eastern (9)	2	6	2-3	4-5
Alaska (10)	4	40	59	118
Total ^a	49	81	86-93	171-186

^a Totals may not be exact due to rounding.

Forest-dependent Communities

Affected Environment

The well being of rural communities connected to Forest Service administered lands has been an important factor in forming many social and economic policies enacted by the Forest Service and Congress. The concept of stability, in reference to economy, community, and industry, has been a dominant theme of management especially in relation to timber. In examining community economic stability, the distinction between industry business needs and community economic needs is often overlooked (Society of American Foresters 1989). While employing local residents, industry interests, such as mining, tourism, and timber, inevitably differ from the communities in which they are located.

Forces beyond their control substantially affect both communities and industry. The community has little influence on the business decisions made by firms operating in their area, while the firms have little influence on macroeconomic forces that influence their operations. As such, rural communities often find themselves vulnerable to boom and bust cycles, commodity price fluctuations, and national and regional recessions (DeVilbiss 1992). Among the economic factors that affect the relationship between a community and local firms are alternative sources of supply, geographic isolation (proximity to larger labor markets), inter-community competition for jobs, international markets, and changing technology.

Timber Dependency – The concept of community stability has been closely tied to timber dependency. Timber dependency has been extensively studied, particularly concerning the relationship between NFS lands and rural communities in the Western United States.

Historically, the remedy favored by the Forest Service for the boom and bust cycles has been to maintain a relatively even flow of timber offerings, transferring a large share of cyclic economic adjustment costs from the community to the Federal Treasury (Boyd and Hyde 1989). The intent was to maintain a constant supply of timber so that mills and jobs in rural Western communities were protected from external market changes.

The literature is ambiguous about whether sustained yield policies resulted in more stable employment in the timber industry (Force and others 1993). Macroeconomic forces and associated changes in the timber industry probably influenced rural communities more than the Forest Service could with even flow policies. Today, with NFS harvest levels are at a fraction of earlier levels, the ability of Federal land managers to offset economic cycles with even flows of timber volume has been greatly reduced.

Even if land managers could provide an even flow of timber offerings, the industry has changed to such an extent that it can no longer be assumed that local mills will be the successful bidder for Agency timber sales, nor that local communities will receive logging and processing jobs as a result of those sales. In today's market, the destination of Federal timber is generally unpredictable as processors reach far to supply their mills. Log sorting yards and high efficiency mills disperse logs differently, directing logs to their most profitable use. These conditions undermine confidence that the Federal timber-supply policy is capable of supporting jobs in specific communities.

From Community Stability to Community Resiliency – Many social scientists are investigating new concepts to replace traditional notions of community stability. The common theme through most of these concepts is an ability to adapt to change. Beckley (1994) suggested that community adaptability might be a more useful concept than community stability in assessing those communities that will thrive in our rapidly changing world. Levels of human capital, the imagination of community leaders, the ability to access information, and the availability of a flexible, diverse resource base are variables that will likely affect community adaptability.

Community resiliency is a concept developed as an indicator of a community's health and vitality. Resiliency is a measure of the ability to successfully deal with the inevitable multiple social and economic changes that are evident in our society. Harris (1996) described community resiliency in the Interior Columbia River Basin as consisting of population size, economic diversity, attractiveness and surrounding amenities, strong leadership, and other factors such as community residents' ability to work together and be proactive toward change.

This definition of resiliency is similar to the concept of community capacity (USDA Forest Service and others 1993). Harris (1996) noted the most resilient communities tended to be larger in population, have an economy based on a mix of industries, view themselves as autonomous, and work as a community to develop strategies for the future. Horne and Haynes (1999) developed measures of socioeconomic resiliency based on a composite of economic resiliency, population density, and lifestyle diversity.

A study by Ashton and Pickens (1995) found that it was not the presence of resource-use employment in a County that caused communities to be vulnerable to change, but the

absence of other jobs that would contribute to a more diverse economy. Areas with proportionately high resource-use employment and Forest Service involvement tended to be less diverse. More favorably, these less diverse Counties tended to be diversifying more rapidly than others.

Because tourism and recreation, retirement settlement, and other uses of NFS lands can provide considerable sources of jobs, income, and personal enjoyment, communities value national forests and grasslands and other public lands for these uses (Society of American Foresters 1989). The presence of desirable environmental amenities, and especially the types supplied by public lands, can contribute to an area's population and economic growth. Scientists differ in their interpretation of the value of this benefit, which can vary depending on the scale at which it is measured. Some evidence to support this relationship is the high population growth occurring in areas with high recreation use (Johnson and Beale 1994).

Ashton and Pickens (1995) found that recreation Counties tend to be diversifying more rapidly than non-recreation Counties, attributing this to Forest Service multiple-use policy that provides an environment that attracts both tourists and permanent residents to the area. Rasker (1994) and Power (1994) have emphasized the role of a high quality natural environment, scenic beauty, and recreation opportunities in influencing population growth and shaping local economies.

Population and Community Resiliency – The population of a community and the rate of change the population experiences are often used as indicators of economic diversity, economic resiliency, and community vitality. Communities with larger populations have more businesses. Economic diversity provides a cushion to job losses in declining industries because the economy does not depend heavily on any single industry or firm. A larger economy also means that less money leaves the local economy to pay for goods purchased from the outside. The result is a more economically resilient community. It is unlikely that Forest Service land use decisions would substantially affect communities with larger populations and diverse economies. This is confirmed by the findings in the Assessment of Ecosystem Components of the Interior Columbia Basin (Quigley and Arbelbide 1997b).

The opposite is generally true for communities with small populations, having fewer industries and fewer firms per industry. Even where many industries are represented, each may include a few firms. A decline in one industry or loss of a firm, especially a major employer, can mean high job loss in the community until adjustments are made. This can be especially disruptive if the community is geographically isolated with few alternative employment opportunities. This situation describes many rural communities with a high proportion of employment in agriculture and natural resource commodity industries. It is reasonable to expect that Forest Service land use decisions can affect industries that are important to smaller communities near lands administered by these agencies, especially where the communities are geographically isolated.

Population growth is usually associated with economic growth and vice versa, but not always. A community can experience rapid growth followed by rapid decline, a boom

and bust situation. Finally, it must be determined whether economic growth is driving population growth or the other way around.

Economic Diversity – Economic diversity is considered an important component of economic resiliency, whether measured at community, County, or regional levels. Economic diversity is considered vital to quality of life attributes provided by economic opportunity and services, including infrastructure, medical care, education, commercial services, and the critical presence of job opportunities (Rojek and others 1975).

The Shannon-Weaver Diversity Index (Inventory and Monitoring Institute 2000) provides a measure of economic diversity for each County. It is based on the number and variety of industry sectors and associated employment using data from the IMPLAN input/output model. A greater number of industry sectors provide a greater diversity of employment opportunities. Therefore, the higher the diversity index, the more likely that a County's economy can absorb and rebound from changing conditions.

A study conducted in support of ICBEMP to calculate the economic diversity at the community level assessed the type and amount of employment in nearly 400 communities in the project area (USDA Forest Service and USDI Bureau of Land Management 1998). However, there is no consistent measure for community diversity nation-wide. The size of area over which economic diversity is measured is critical. The larger the area considered the greater the economic diversity and expected economic resiliency, especially if it includes a large metropolitan area (trade center). This explains why a multi-County region can be highly resilient, while individual Counties or communities in the region are not.

Public comments indicated that people are concerned about the potential effects of the Roadless Rule on local economies close to NFS lands. Some respondents believe that road prohibitions and limitations on timber harvest and mineral exploration and development will be economically devastating to nearby communities. Reductions in Payments to States related to declines in timber harvest and mineral development were a major concern, often raised in conjunction with concerns about maintaining funding for roads and schools. Lost revenue, decreased employment, and loss of community integrity were cited as negative impacts of the proposal. The importance of recreation to local communities was also raised, although comments varied as to whether protecting inventoried roadless areas would have a negative or positive community effects.

Alternative 1 – No Action

Under this alternative, management of NFS lands would continue according to current policies and land management plan direction. Flows of goods and services were described by resource area in the previous sections. Road construction and reconstruction in inventoried roadless areas would proceed, based on local decisions, and economic activity associated with that development would continue.

Alternatives 2 through 4

The alternatives would reduce future timber harvest and mineral exploration and development in inventoried roadless areas. Communities with significant economic activities in these sectors could be adversely impacted.

Potentially Affected Timber-dependent Communities – The effects of the alternatives on national, and to large extent regional, social and economic systems with the possible exception of timber harvest on the Tongass are minor. None of the alternatives are likely to have measurable impacts against the broader social and economic conditions and trends observable at these scales. However, the effects of the alternatives are not distributed evenly across the United States.

A subset of national forests has been identified that is likely to experience the greatest timber-related impacts on local communities in the next 5 years, based on planned offer volumes described previously. Sixty-one administrative units planned to offer timber from inventoried roadless areas during the next 5 years. Of those 61 administrative units, the effects of timber reductions on 34 units were considered most likely to affect local communities.

The selected units either were planning to offer 5 MMBF or more in the next 5 years (32 units) or the average annual planned offer was greater than 10% of the historic offer between 1996 and 1999 (an additional two units). The effects of the prohibitions on the 34 units are considered in detail in this section.

Table 3-75 contains a list of the 34 administrative units, the average annual planned offer from inventoried roadless areas over the next 5 years, the planned offer as a percent of the average total between 1996 and 1999, and communities potentially affected by the prohibitions. The list of communities is based on several sources described below, and may not reflect the most current circumstances. Some communities that could be affected may not be represented on this list, and this list may include communities that will not be affected.

The starting point for the list of communities was a list of timber dependent communities compiled by the Forest Service in 1987. The criteria for being on that list was that forest products employment in a community was at least 10% of total employment and that local wood processing firms used at least 50% NFS timber. This list is dated, given the major declines in the timber program since that time. A second source was an analysis of communities in the Interior Columbia River Basin (USDA Forest Service and USDI Bureau of Land Management 1998) that estimated employment specialization ratios for 423 communities. Communities from the 1987 list that were rated as having no or low wood product specialization were removed from the initial list. Communities from the Interior Columbia River Basin with high to very high timber specialization and with ties to the 34 forests (part of the forest is in the County) were added to the list.

This combined community list was then refined. If the community's County was classified, based on Economic Research Service (ERS) County Typology (USDA

Table 3-75. National Forest System administrative units and communities potentially affected by prohibitions on road construction and reconstruction and timber harvest during the next 5 years.

Region	National Forest administrative unit	Average annual planned offer from inventoried roadless areas (MMBF ^a)	Percent of average volume offered, 1996-1998	Potentially affected communities
Northern (1)	Clearwater	2.9	8	Kamiah, ID ^b Kooskia, ID ^b Orofino, ID ^b Pierce, ID Weippe, ID ^b
	Helena	1.6	20	Townsend, MT
	Idaho Panhandle	8.6	12	Bonner's Ferry, ID ^b Clark Fork, ID Hope, ID, Moyie Springs, ID ^b Oldtown, ID Pinehurst, ID, Plummer, ID ^b Princeton, ID ^b Priest River, ID ^b Sandpoint, ID St Maries, ID ^b Thompson Falls, MT
	Nez Perce	2.0	10	Elk City, ID Grangeville, ID ^b White Bird, ID
Rocky Mtn. (2)	Bighorn	0.6	12	Sheridan, WY ^b
	Medicine Bow/ Routt	2.4	11	Saratoga, WY ^b Olathe, CO ^b
	Shoshone	2.0	42	Cody, WY ^b
	White River	2.0	14	Saratoga, WY ^b Olathe, CO ^b
Southwestern (3)	Lincoln	.3	15	None identified
Intermountain (4)	Ashley	1.0	10	LaPoint, UT Vernal, UT
	Boise	4.1	9	Cascade, ID ^b Council, ID Emmett, ID Horseshoe Bend, ID ^b Montour, ID Sweet, ID
	Caribou	2.1	23	Ovid, ID ^b

Region	National Forest administrative unit	Average annual planned offer from inventoried roadless areas (MMBF ^a)	Percent of average volume offered, 1996-1998	Potentially affected communities
	Dixie	8.3	44	Escalante, UT ^b Panguitch, UT
	Fishlake	4.1	45	Beaver, UT ^b Bicknell, UT ^b Lyman, UT ^b Sigurd, UT ^b
	Manti-Lasal	6.6	80	Gunnison, UT ^b Old La Sal, UT ^b Wellington, UT ^b
	Payette	10.9	21	Cambridge, ID Casade, ID ^b Council, ID Emmett, ID New Meadows, ID ^b
	Targhee	1.0	17	Ashton, ID Driggs, ID Salmon, ID St. Anthony, ID Tetonia, ID Victor, ID
	Uinta	1.0	31	Fairview, UT ^b Heber, City, UT ^b
Pacific Southwest (5)	Klamath	1.5	4	Happy Camp, CA Yreka, CA
	Shasta-Trinity	3.7	6	Burney, CA ^b Hayfork, CA Weed-Mt. Shasta- McCloud, CA ^b Weaverville-Douglas City, CA ^b
	Six Rivers	1.1	6	Burnt Ranch-Willow Creek, CA
Pacific Northwest (6)	Okanogan	2.6	14	Omak, WA ^b Oroville, WA ^b Pateros, WA Twisp, WA Winthrop, WA
	Rogue River	3.3	15	None identified
	Siskiyou	1.0	4	Brookings, OR ^b Glendale, OR ^b Gold Beach, OR Powers, OR

Region	National Forest administrative unit	Average annual planned offer from inventoried roadless areas (MMBF ^a)	Percent of average volume offered, 1996-1998	Potentially affected communities
	Umatilla	1.7	3	Elgin, OR Clarkston WA
	Wenatchee	1.7	3	CleElum, WA
	Willamette	5.3	7	None identified
Southern (8)	George Washington/ Jefferson	1.0	4	None identified
	Ozark/St. Francis	3.6	7	None identified
Eastern (9)	Chequamegon/ Nicolet	4.8	4	None identified
	Monongahela	3.6	30	Marlinton, WV ^b Richwood, WV ^b Webster Springs, WV ^b
	Superior	5.2	8	Grand Marais, MN ^b Two Harbors, MN ^b Isabella, MN Tofte, MN
	White Mountain	1.6	9	None Identified
Alaska (10)	Tongass	103.0	56	Coffman Cove, AK Craig, AK Hoonah, AK ^b Ketchikan, AK ^b Klawock, AK ^b Metlakatla, AK ^b Petersburg, AK ^b Thorne Bay, AK Wrangell, AK ^b

^a Million board feet

^b Community has an operating sawmill.

Economic Research Service 1995), as metropolitan, urban, or next to a metropolitan area, the community was removed because it is likely to be resilient. This result was then combined with the list of communities potentially affected by the Interim Roads Rule. This information added communities, particularly in the Eastern United States where a limited number of communities were identified in 1987. Communities that currently have softwood sawmills based on a recent report (Spelter and McKeever 1999) or other primary wood products manufacturing facilities identified by regional data requests are noted. No communities were identified for six units: Lincoln, Rogue River, Willamette, George Washington/Jefferson, Ozark/St. Francis, and White Mountain.

The planned timber volume offer data are not specific to any particular inventoried roadless area, so it is not possible to link the planned offer to production sites in local communities. In fact, even with that information, it is not certain that local mills or communities would gain the jobs from volume sold. With increased haul distances, the effects of reduced volume may occur in communities at considerable distance from the forest. In some States there are a limited number of sawmills. These mills likely draw volume from a wide radius around the State.

Economic Effects – The analysis of community effects is based on County resilience to external shocks. It is founded on the premise that large populations and diverse economies can more readily adapt to changing social and economic conditions. The Shannon-Weaver Diversity Index (Inventory and Monitoring Institute 2000) is used to identify diverse economies, and population density is the indicator of large populations. Additional information from the ERS County Typology (USDA Economic Research Service 1995) is used to assess County urbanization, the importance of several economic components of Counties (farming, mining, manufacturing, government and services), and a sixth non-specialized type. The ERS classification scheme also identifies five overlapping rural policy-relevant types: 1) retirement-destination, 2) Federal lands, 3) persistent poverty, 4) commuting, and 5) transfers-dependent.

The County resilience measure needs to be placed in perspective. This process compares one County to other Counties in the Bureau of Economic Analysis (BEA) region (USDC Bureau of Economic Analysis 1999) in which it occurs. Comparison within a BEA region provides a local analysis that is more locally relevant than comparing Counties nationwide. The BEA regions selected are those containing components of the 34 national forests.

The communities that are located in Counties with diversity indices less than the average of all Counties in the BEA region, and with population densities less than the average, are designated as low in resiliency. Counties that have higher than average population densities and diversity indices are designated as high in resiliency. Where the population and diversity indices split, a medium designation is assigned. Finally, if a community is in a County with a population of less than five people per square mile, it is specified as low in resiliency. A low, medium, or high resiliency has no positive or negative connotation. It means that communities that are less resilient would have more difficulty adapting to policy shifts such as decreases in timber harvest levels.

The ERS typology is then used to provide an indication of additional considerations that may lessen or contribute to County resiliency. It should be remembered that those communities classified as metropolitan or urban next to metropolitan areas are not included on the list of potentially affected communities. This is not to say that individuals or businesses in these communities would not be affected, but the inherent diversity of larger economies and populations would allow these communities to more readily adapt to the effects of the alternatives.

Table 3-76 displays results of the resilience determination and the direct timber jobs affected by the range of alternatives. The alternatives would not generally alter overall

population trends so that the component of resiliency is not affected. The alternatives would affect timber harvest and associated employment. Change in employment is another important factor affecting socioeconomic resiliency. Although a change in jobs within one industry or one firm within an industry may have minimal impact on overall employment diversity, it is assumed that decreases in employment would have negative effects on employment diversity, and that increases in jobs would have a positive effect.

The direct jobs associated with timber harvest were based on the estimated change in timber harvest for each of the 34 administrative units. The range of jobs displayed in Table 3-76 is based on the range of effects that would occur from prohibiting road construction and reconstruction (Alternative 2), to those that would occur from prohibiting all timber harvest (Alternative 4) in inventoried roadless areas. These job effects would be spread over a number of communities, depending on the location of the sales and the type of product harvested.

Although it is not possible to identify the communities that would be affected, it is reasonable to discuss the types of effects given general community ties to national forest resources and resilience to social and economic change. A note of caution is advisable for interpreting Table 3-76. The current resiliency rate of a County does not suggest that timber jobs or the lack of timber jobs is the basis for a County's resiliency rating. The interpretation is that the Counties identified in Table 3-76, with existing ties to national forest timber, would adapt more easily to timber supply changes if their resilience were higher.

Region 1 – Changes in timber harvest under Alternative 2 would have the largest effects on communities with timber resource ties to the Idaho Panhandle National Forest and, to a lesser extent, to the Helena and Clearwater National Forest. Ten of the communities have existing softwood manufacturing facilities and six of these communities are located in Counties ranked low in resilience. Implementation of Alternative 4 would result in further reductions in timber harvest, with more pronounced and widespread employment effects. Communities with ties to the Clearwater and Helena are located in Counties with low resilience rankings. All of the communities are in Counties that share in receipts from timber sales under Payments to States.

A predominant feature from the ERS typology for most of the Counties where the affected communities are located is that Federal land comprises 30% or more of each County's land area. In addition, the majority of the Counties are nonspecialized. Only five Counties showed specialization based on employment statistics from 1987 to 1989.

They are Shoshone County, Idaho (mining), Clearwater, Bonner, and Benewah County, Idaho (manufacturing), and Latah County, Idaho (government).

Region 2 – Changes in timber harvest under Alternatives 2 and 4 would be approximately the same. The largest decreases, nine, seven, and six jobs, respectively, would occur in timber-related direct employment opportunities for communities with timber resource ties to the Shoshone, Medicine Bow-Routt, and White River National Forests. The four communities identified for the four national forests in Region 2 all have existing

Table 3-76. Resilience of Counties containing communities potentially affected by prohibitions on road construction and reconstruction and timber harvest during the next 5 years.

Region	National Forest administrative unit	Direct jobs	Potentially affected communities	County/State	County resilience
Rocky Mtn. (2)	Clearwater	5-19	Kamiah, ID ^a	Idaho, ID	Low
			Kooskia, ID ^a	Idaho, ID	Low
			Orofino, ID ^a	Clearwater, ID	Low
			Pierce, ID	Clearwater, ID	Low
			Weippe, ID ^a	Clearwater, ID	Low
	Helena	12-13	Townsend, MT	Broadwater, MT	Low
	Idaho Panhandle	23-46	Bonner's Ferry, ID ^a	Boundary, ID	Medium
			Clark Fork, ID	Bonner, ID	Medium
			Hope, ID	Bonner, ID	Medium
			Moyie Springs, ID ^a	Boundary, ID	Medium
			Oldtown, ID	Bonner, ID	Medium
			Pinehurst, ID	Shoshone, ID	Low
			Plummer, ID ^a	Benewah, ID	Low
			Princeton, ID ^a	Latah, ID	Medium
			Priest River, ID ^a	Bonner, ID	Medium
			Sandpoint, ID	Bonner, ID	Medium
	St Maries, ID ^a	Benewah, ID	Low		
	Thompson Falls, MT	Sanders, MT	Low		
	Nez Perce	0-13	Elk City, ID	Idaho, ID	Low
			Grangeville, ID ^a	Idaho, ID	Low
			White Bird, ID	Idaho, ID	Low
Bighorn		Sheridan, WY ^a	Sheridan, WY	High	
Medicine Bow/ Routt	4-7	Saratoga, WY ^a	Carbon, WY	Low	
		Olathe, CO ^a	Montrose, CO	Medium	
Shoshone	8-9	Cody, WY ^a	Park, WY	Low	
White River	6	Saratoga, WY ^a	Carbon, WY	Low	
		Olathe, CO ^a	Montrose, CO	Medium	
Southwestern (3)	Lincoln	1-2	None identified		
Intermountain (4)	Ashley	0-4	LaPoint, UT	Uintah, UT	Medium
			Vernal, UT	Uintah, UT	Medium
	Boise	2-16	Cascade, ID ^a	Valley, ID	Low
			Council, ID	Adams, ID	Low
			Emmett, ID	Gem, ID	Medium
			Horseshoe Bend, ID	Boise, ID	Low
			Montour, ID	Gem, ID	Medium
	Sweet, ID	Gem, ID	Medium		
	Caribou	3-7	Ovid, ID ^a	Bear Lake, ID	High
	Dixie	19-20	Escalante, UT ^a	Garfield, UT	Low
Panguitch, UT			Garfield, UT	Low	

Region	National Forest administrative unit	Direct jobs	Potentially affected communities	County/State	County resilience
	Fishlake	15	Beaver, UT ^a Bicknell, UT ^a Lyman, UT ^a Sigurd, UT ^a	Beaver, UT Wayne, UT Wayne, UT Sevier, UT	Low Low Low Medium
	Manti-Lasal	17-28	Gunnison, UT ^a Old La Sal, UT ^a Wellington, UT ^a	Sanpete, UT San Juan, UT Carbon, UT	Low Low Low
	Payette	32-45	Cambridge, ID Casade, ID ^a Council, ID Emmett, ID New Meadows, ID ^a	Washington, ID Adams, ID Adams, ID Gem, ID Adams, ID	Medium Low Low Medium Low
	Targhee	0-4	Ashton, ID Driggs, ID Salmon, ID St. Anthony, ID Tetonia, ID Victor, ID	Fremont, ID Teton, ID Lemhi, ID Fremont, ID Teton, ID Teton, ID	Medium Medium Low Medium Medium Medium
	Uinta	4	Fairview, UT ^a Heber City, UT ^a	Sanpete, UT Wasatch, UT	Low Medium
Pacific Southwest (5)	Klamath	0-7	Happy Camp, CA Yreka, CA	Siskiyou, CA Siskiyou, CA	Low Low
	Shasta-Trinity	5-18	Burney, CA ^a Hayfork, CA Weed-Mt. Shasta-McCloud, CA ^a Weaverville-Douglas City, CA ^a	Siskiyou, CA Siskiyou, CA Siskiyou, CA Trinity, CA	Low Low Low Low
	Six Rivers	0-4	Burnt Ranch-Willow Creek, CA	Humboldt, CA	Low
Pacific Northwest (6)	Okanogan	13-14	Omak, WA ^a Oroville, WA ^a Pateros, WA Twisp, WA Winthrop, WA	Okanogan, WA Okanogan, WA Okanogan, WA Okanogan, WA Okanogan, WA	Low Low Low Low Low
	Rogue River	14-18	None identified		
	Siskiyou	0-7	Brookings, OR ^a Glendale, OR ^a Gold Beach, OR Powers, OR	Curry, OR Douglas, OR Curry, OR Coos, OR	Low Medium Low High
	Umatilla	0-6	Elgin, OR Clarkston WA	Union, OR Asotin, WA	High High
	Wenatchee	0-7	CleElum, WA	Chelan, WA	Medium
	Willamette	0-36	None identified		

Region	National Forest administrative unit	Direct jobs	Potentially affected communities	County/State	County resilience
Southern (8)	George Washington/ Jefferson	3-6	None identified		
	Ozark/St. Francis	10-17	None identified		
Eastern (9)	Chequamegon/ Nicolet	11-26	None identified		
	Monongahela	1-9	Marlinton, WV ^a Richwood, WV ^a Webster Springs, WV ^a	Pocahontas, WV Nicholas, WV Webster, WV	Low Medium Low
	Superior	19	Grand Marais, MN ^a Isabella, MN Two Harbors, MN ^a Tofte, MN	Cook, MN Lake, MN Lake, MN Cook, MN	Low Low Low Low
	White Mountain	2-10	None Identified		
Alaska (10)	Tongass	364-383	Coffman Cove, AK	Unorganized, AK	Low
			Craig, AK	Unorganized, AK	Low
			Hoonah, AK ^a	Unorganized, AK	Low
			Ketchikan, AK ^a	Ketchikan-Gateway, AK	Low
			Klawock, AK ^a	Unorganized, AK	Low
			Metlakatla, AK ^a	Unorganized, AK	Low
			Petersburg, AK ^a	Sitka, AK	Low
			Thorne Bay, AK	Unorganized, AK	Low
			Wrangell, AK ^a		

^a Community has an operating sawmill.

softwood manufacturing facilities. The locations of these communities in relation to the national forests reveal the long distances many wood processing facilities now haul sawlogs and pulpwood. Two of these communities are in Counties that rank low in resilience. In Region 2, a predominant feature from the ERS Typology is that Federal land comprises 30% or more of each County's land area for most of the Counties. Sheridan and Park Counties, WY, are government specialized, and Carbon County, WY, is nonspecialized. Montrose County, CO, ranks high in services, which is consistent with it being a retirement destination.

Region 3 – Changes in timber-related direct employment under Alternative 2 and 4 would be small and about the same, ranging from one to two job opportunities annually. No communities were identified as potentially affected communities.

Region 4 – This region would experience the second largest reductions in timber-related direct jobs under Alternatives 2 through 4. The largest impacts would occur on three forests. Alternative 2 would result in 83 fewer jobs associated with the Dixie, Fishlake, Manti-Lasal, and Payette National Forests. Among the 18 communities associated with these forests, 11 are located in Counties rated low in resilience. The Ashley and Targhee would have no jobs affected under Alternative 2. The Boise and Caribou National Forests combined would have five jobs potentially affected, which are spread across seven communities, three of which have softwood sawmills. These communities are located in Counties generally split between low and medium resiliency rankings. Ovid, ID, is the only community located in a County ranking high in resilience. The Uinta National Forest with a reduction of four direct jobs under both Alternatives 2 and 3 has two communities identified as potentially affected.

The Dixie, Fishlake, Manti-Lasal and Payette National Forests would have a combined effect of 108 direct timber jobs under Alternative 4. These decreases potentially affect nine communities, three of which contain softwood sawmills. Three of these communities, Escalante, UT, and Casade and New Meadows, ID, are in Counties ranked low in resilience. Under Alternative 4, the Ashley and Targhee National Forests would each show about four direct timber job decreases. Reductions on the Boise National Forest could affect about 16 jobs.

Every County identified in Region 4 has 30% or more of the land area in Federal land based on the ERS Typology. One County ranks as nonspecialized; six Counties show farming specialization and nine Counties rank high in government employment. Horseshoe Bend and New Meadows, ID, both rank high in manufacturing and have sawtimber facilities. None of the Counties are highly specialized in services, and Boise County, ID, and Wasatch County, UT, are commuter Counties.

Region 5 – The changes in timber harvest under Alternative 2 would affect five direct timber job opportunities associated with the Shasta-Trinity National Forest. These reductions are spread across four communities, of which three have softwood sawmills. Alternative 4 would result in larger direct timber job decreases. The Klamath National Forest shows reductions of seven jobs, the Shasta-Trinity National Forest job decreases would approach 18, and jobs associated with the Six Rivers would decrease by four. All of the communities identified in Region 5 are located in Counties that have low resilience rankings.

In Region 5, two out of the three Counties have Federal land comprising 30% or more of each County's land area. Siskiyou County, CA, is nonspecialized and a retirement destination. Trinity County is government specialized and Humboldt County ranks high in services.

Region 6 – Changes in timber harvest under Alternative 2 would have minimal effects on all communities except those associated with the Okanogan and Rogue River National Forests where 13 and 14 jobs, respectively, would be affected during the next 5 years. A mill in Omak, WA, has recently closed. Communities with resource ties to the Okanogan also are in a County with low resilience and with a high proportion of Federal land. With implementation of Alternative 4, the effects on employment are more pronounced and

widespread. Reductions on the Willamette National Forest would incur approximately 36 fewer job opportunities, and on the Rogue River there would be potentially 18 fewer jobs. No communities are identified with Rogue River or Willamette since they are located in Counties that are classified as metropolitan or urban next to metropolitan.

A predominant feature from the ERS typology in Region 6 for most of the Counties where the communities are located is that Federal land comprises 30% or more of each County's land area. Half of the Counties are nonspecialized. Based on employment statistics, four Counties showed farming specialization and the rest are distributed between manufacturing, government, and services. Curry, OR, is a retirement destination County.

Region 8 – The George Washington/Jefferson and the Ozark/St. Francis National Forests in Region 8 have no identified communities. The direct timber job losses for these forests would be 13 jobs under Alternative 2 and 23 jobs under Alternative 4.

Region 9 – Changes in timber harvest under Alternative 2 would result in the largest decreases in timber-related direct employment for communities with timber resource ties to the Chequamegon-Nicolet and Superior National Forests totaling 30 potential jobs. To a lesser extent, the Monongahela and White Mountain National Forests affect a combined total of three jobs. Two of the communities associated with the Superior National Forest have existing softwood manufacturing facilities, and both of these communities rank low in resilience. No communities were identified as tied to the Chequamegon-Nicolet. Implementation of Alternative 4 would result in further reductions in timber harvest. Reductions in employment would increase to 9 direct timber jobs on the Monongahela, and 10 jobs on the White Mountain. The Superior National Forest would remain at 19 jobs affected, and the Chequamegon-Nicolet would increase to 26 potentially affected direct jobs. For the Monongahela National Forest, the ERS Typology identifies Pocahontas County, WV as nonspecialized with 30% or more Federal land. Lake and Cook County, MN associated with the Superior National Forest have a large component of Federal land and both are government specialized.

Region 10 – The effects of reduced timber harvest are greatest on the Tongass because of the relatively high harvest likely to occur in inventoried roadless areas. Because of the isolated nature of most Alaskan communities, all communities were rated low in resilience. Mill closures, and reduced logging activity can be expected to trigger direct job losses of 350-369 employees in the private sector. These job losses will occur in communities where mills and logging companies are located, including Ketchikan, Coffman Cove, Craig, Thorne Bay, Klawock, Metlakatla, Wrangell, Petersburg, and Hoonah. The distribution of effects by community depends on the location of harvest.

Effects on National Forest System Employment – Forest Service headquarters and ranger stations are often located in small communities in or near National Forest System lands. Historically, these offices have provided relatively secure permanent and many seasonal jobs. Federal employees generally have stable wages and are often among the better-paid residents in a community. The Agency has already downsized in response to significant

declines in NFS harvest and offices have been combined or eliminated, leaving many small communities with fewer or no Forest Service employees.

Additional changes in the timber harvest program could affect Forest Service employment. Jobs may be fewer under the alternatives since reductions in harvest volume directly affect funds in support of timber management. Between two and three jobs per million board feet of timber harvest – nationally 2.6 jobs in 1999 – are associated with all aspects of the timber program and include planning, preparation, and administration of timber sales.

The small harvest declines associated with the alternatives are not likely to affect employment on most forests, especially during the next 5 years. However, there are some exceptions. Because of the large volume being offered from inventoried roadless areas on the Tongass National Forest, the alternatives could have a significant impact on Forest Service employees on that forest. About 30% of the Tongass workforce could be affected by harvest reductions associated with Alternative 4, or about 141 direct Forest Service jobs. These effects are described in more detail in the Tongass section of this chapter.

Effects in the lower 48 states are most likely to occur on those forests with larger timber sale programs in the inventoried roadless areas previously identified in Table 3-76. These same forests are displayed in Table 3-77 along with the range of Forest Service jobs potentially affected by Alternatives 2 through 4. Table 3-76 also identifies the communities with Forest Service offices that are in Counties that are not classified as metropolitan or urban and next to a metropolitan area (USDA Economic Research Service 1995). It is difficult to link employment changes to a particular community. District offices and Forest headquarters are sharing employee services on a wider basis. It is also difficult to assume the potential job losses identified will occur. The current shifts in program emphasis to forest health, road decommissioning, fuels management, and other ecosystem restoration activities are changing the foundation for employment.

Table 3-77. Forest Service jobs potentially affected by prohibitions on road construction and reconstruction and timber harvest during the next 5 years.

Region	National Forest administrative unit	Forest Service direct jobs	Potentially affected communities	County/State
Northern (1)	Clearwater	1-5	Kamiah, ID ^a Kooskia, ID ^a Orofino, ID ^a Lolo, MT Potlach, ID	Idaho, ID Idaho, ID Clearwater, ID Missoula, MT Latah, ID
	Helena	1-3	Townsend, MT ^a Helena, MT Lincoln, MT	Broadwater, MT Lewis&Clark, MT Lewis&Clark, MT
	Idaho Panhandle	7-13	Bonner’s Ferry, ID ^a Priest River, ID ^a Sandpoint, ID ^a St Maries, ID ^a Silverton, ID Avery, ID	Boundary, ID Bonner, ID Bonner, ID Benewah, ID Shoshone, ID Shoshone, ID
	Nez Perce	0-4	Elk City, ID ^a Grangeville, ID ^a White Bird, ID ^a Kooskia, ID	Idaho, ID Idaho, ID Idaho, ID Idaho, ID
Rocky Mountain (2)	Bighorn	1	Sheridan, WY ^a Lovel, WY Buffalo, WY Greybull, WY Worland, WY	Sheridan, WY Big Horn, WY Johnson, WY Big Horn, WY Washakie, WY
	Medicine Bow/ Routt	2-3	Saratoga, WY ^a Laramie, WY Encampment, WY Douglas, WY Steamboat Springs, CO Yampa, CO Walden, CO Kremmling, CO	Carbon, WY Albany, WY Carbon, WY Convers, WY Routt, CO Routt, CO Jackson, CO Grand, CO
	Shoshone	4	Cody, WY ^a Lander, WY Dubois, WY	Park, WY Fremont, WY Fremont, WY
	White River	3	Glenwood Springs, CO Aspen, CO Meeker, CO Silverthorne, CO Eagle, CO Minturn, CO Carbondale, CO	Garfield, CO Pitkin, CO Rio Blanco, CO Summit, CO Eagle, CO Eagle, CO Garfield, CO
Southwestern (3)	Lincoln	0-1	Carlsbad, NM Ruidoso, NM	Eddy, NM Lincoln, NM

Region	National Forest administrative unit	Forest Service direct jobs	Potentially affected communities	County/State
Intermountain (4)	Ashley	0-2	Vernal, UT ^a Duchesne, UT Roosevelt, UT	Uintah, UT Duchesne, UT Duchesne, UT
	Boise	1-6	Cascade, ID ^a Emmett, ID ^a Idaho City, ID Lowman, ID Mountain Home, ID	Valley, ID Gem, ID Boise, ID Boise, ID Elmore, ID
	Caribou-Targhee	1-5	Ashton, ID ^a Driggs, ID ^a St. Anthony, ID ^a Pocatello, ID Dubois, ID Island Park, ID Montpelier, ID Idaho Falls, ID Soda Springs, ID Malad, ID	Fremont, ID Teton, ID Fremont, ID Bannock, ID Clark, ID Fremont, ID Bear Lake, ID Bonneville, ID Caribou, ID Oneida, ID
	Dixie	10-11	Escalante, UT ^a Panguitch, UT ^a Cedar City, UT Teasdale, UT	Garfield, UT Garfield, UT Iron, UT Wayne, UT
	Fishlake	6	Richfield, UT Beaver, UT ^a Fillmore, UT Loa, UT	Sevier, UT Beaver, UT Millard, UT Wayne, UT
	Manti-Lasal	7-12	Price, UT Ferron, UT Moab, UT Monticello, UT Ephraim, UT	Carbon, UT Emery, UT Grand, UT San Juan, UT Sanpete, UT
	Payette	12-17	Council, ID ^a New Meadows, ID ^a McCall, ID Weiser, ID	Adams, ID Adams, ID Valley, ID Washington, ID
	Uinta	2	Heber, UT ^a	Wasatch, UT
Pacific Southwest (5)	Klamath	0-3	Happy Camp, CA ^a Yreka, CA ^a Mt. Hebron, CA Orleans, CA Fort Jones, CA	Siskiyou, CA Siskiyou, CA Siskiyou, CA Humboldt, CA Siskiyou, CA
	Shasta-Trinity	2-6	Hayfork, CA ^a Mt. Shasta, CA ^a Weaverville, CA ^a	Siskiyou, CA Siskiyou, CA Trinity, CA
	Six Rivers	0-1	Willow Creek, CA ^a Eureka, CA	Humboldt, CA Humboldt, CA Del Norte, CA

Region	National Forest administrative unit	Forest Service direct jobs	Potentially affected communities	County/State
			Gasquet, CA Orleans, CA Bridgeville, CA	Humboldt, CA Humboldt, CA
Pacific Northwest (6)	Okanogan	4	Twisp, WA ^a Winthrop, WA ^a Okanogan, WA Tonasket, WA	Okanogan, WA Okanogan, WA Okanogan, WA Okanogan, WA
	Rogue River	4-5	None Identified	
	Siskiyou	0-2	Brookings, OR ^a Gold Beach, OR ^a Powers, OR ^a	Curry, OR Curry, OR Coos, OR
	Umatilla	0-3	Hepner, OR ^a Pomeroy, WA	Wheeler, OR Garfield, WA
	Wenatchee	0-2	Wenatchee, WA Chelan, WA Cle Elum Entiat, WA Leavenworth, WA	Chelan, WA Chelan, WA Kittitas, WA Chelan, WA Chelan, WA
	Willamette	0-9	None Identified	
Southern (8)	George Washington/ Jefferson	1-2	Wise, VA Bridgewater, VA Natural Bridge Station, VA Covington, VA Marion, VA Edinburg, VA Newcastle, VA Hot Springs, VA	Wise, VA Rockingham, VA Rockbridge, VA Allegheny, VA Smyth, VA Shenandoah, VA Craig, VA Bath, VA
	Ozark/St. Francis	4-6	Russellville, AR Hector, AR Ozark, AR Jasper, AR Paris, AR Clarksville, AR Mountain View, AR Marianna, AR	Pope, AR Pope, AR Franklin, AR Newton, AR Logan, AR Johnson, AR Stone, AR Lee, AR
Eastern (9)	Chequamegon/ Nicolet	3-9	Glidden, WI ^a Park Falls, WI ^a Washburn, WI ^a Laona, WI ^a Eagle River, WI Florence, WI Lakewood, WI	Ashland, WI Price, WI Washburn, WI Forest, WI Vilas, WI Florence, WI Oconto, WI
	Monongahela	1-6	Marlinton, WV ^a Richwood, WV ^a Elkins, WV Parsons, WV Petersburg, WV	Pocahontas, WV Nicholas, WV Randolf, WV Tucker, WV Grant, WV

Region	National Forest administrative unit	Forest Service direct jobs	Potentially affected communities	County/State
	Superior	9	Bartow, WV White Sulphur Springs, WV Grand Marais, MN ^a Tofte, MN ^a	Pocahontas, WV Greenbrier, WV Cook, MN Cook, MN
	White Mountain	1-3	Laconia, NH Bethlehem, NH Gorham, NH Bethel, ME Plymouth, NH Conway, NH	Belknap, NH Crafton, NH Coos, NH Oxford, ME Crafton, NH Carrol, NH
Alaska (10)	Tongass	134-141	Craig, AK ^a Hoonah, AK ^a Ketchikan, AK ^a Petersburg, AK ^a Thorne Bay, AK ^a Wrangell, AK ^a Sitka, AK Yakutat, AK	Unorganized, AK Unorganized, AK Ketchikan-Gateway, AK Unorganized, AK Unorganized, AK Unorganized, AK Sitka, AK Unorganized, AK

^a Community is also identified as potentially affected timber-dependent.

Region 1 – About 7 out of 9 timber related Forest Service jobs in Region 1 potentially affected under Alternative 2 would be associated with the reduced timber program on the Idaho Panhandle National Forest. Alternative 4 increases these potential reductions to 25 jobs, with half of those jobs related to the Idaho Panhandle timber program. Eleven out of the 18 communities with Forest Service offices included in this analysis are also timber-dependent (Table 3-76).

Region 2 – Alternatives 2 and 4 potentially affect the national forests in Region 2 for a maximum of 11 Forest Service jobs. Those effects are distributed evenly across the affected national forests. Saratoga, Sheridan, and Cody, WY are the communities with Forest Service offices that are also identified as timber-dependent.

Region 3 – In Region 3, the small reduction in timber harvest potentially affects 1 job on the Lincoln National Forest.

Region 4 – Region 4 has the second greatest potential impact on Forest Service employment. The potential impacts on the Ashley and Uinta are small, ranging from 0 to 2 jobs per forest. Effects on the Boise, Caribou-Targhee, and Fishlake range from 1 to 6 jobs per forest. The largest effects occur on the Dixie, Manti-LaSal, and Payette because of the level of planned offer on those forests. Under Alternative 4, about 61 Forest Service jobs related to the timber program could be affected across the region. Thirty-six communities with Forest Service offices are identified, ten of which are timber-dependent.

Region 5 – In Region 5, the largest decreases in timber program related employment could occur on the Shasta-Trinity National Forest where decreased timber harvest

projections are greatest. The result would be a potential decrease in Forest Service employment ranging from 2 to 6 jobs. The Klamath and Six Rivers would not be affected under Alternative 2 and the Six Rivers would have potential reductions of 3 jobs under Alternative 4. About half of the communities with Forest Service offices are timber-dependent.

Region 6 – Under Alternative 2, no Forest Service jobs would be affected on the Siskiyou, Umatilla, Wenatchee and Willamette National Forests. Four jobs could be affected on the Okanogan and Rogue River. About 25 Forest Service jobs could potentially be impacted across all these forests under Alternative 4. Nine of these jobs would be the result of a reduced timber program on the Willamette. All of the Siskiyou National Forest associated communities included in this analysis were also identified as timber-dependent.

Region 8 – In Region 8, the effects of the alternatives on the George Washington/ Jefferson National Forest would be about 1 to 2 Forest Service jobs. Impacts on the Ozark/St. Francis employment would be from 4 to 6 jobs. None of the communities identified with Forest Service offices were previously identified as timber-dependent.

Region 9 – Alternative 2 would primarily affect Forest Service employment on the Superior National Forest, potentially affecting 9 jobs. The remaining forests would see potential declines of 1 to 3 jobs under this alternative. About 27 jobs associated with Forest Service employment could be reduced under Alternative 4 across all of these forests. One half of the identified communities with Forest Service offices are also identified as timber-dependent.

Region 10 – Alternatives 2 through 4 would have a direct effect on Forest Service operations in Alaska. Unless budget allocations reflect a significant change in programs and priorities, Alternatives 2 through 4 are likely to reduce Forest Service employment in the region. The potential job effects range from 131 to 141 jobs. The number of Forest Service jobs lost will be greatest in those communities with both a Supervisor's Office and a District Office presence. These include Sitka, Petersburg, and Ketchikan. (see Tongass section in this chapter)

Effects on Mining Communities – Of the more than 3,000 Counties in the lower 48 states, mining earnings exceed 15% of total earnings in 109 Counties. A disproportionate number of the mining-dependent Counties are within or close to national forests. Of the 796 United States Counties containing NFS lands, 67 have mining earnings greater than 15% of total earnings. These 67 Counties are geographically dispersed throughout the lower 48 states (Table 3-78).

Table 3-78. National Forest Counties that are also mining-dependent Counties.

Region	National Forest administrative unit	County/State	Percent of total earnings from mining
Northern (1)	Clearwater, Idaho Panhandle	Shoshone, ID	18.3
	Custer	Big Horn, MT	23.5
		Rosebud, MT	21.9
		Stillwater, MT	35.7
	Beaverhead-Deerlodge, Helena	Jefferson, MT	34.1
Rocky Mountain (2)	Arapaho-Roosevelt, Pike/San Isabel	Clear Creek, CO	25.6
	Black Hills	Lawrence, SD	22.1
	Black Hills, Thunder Basin	Crook, WY	15.3
		Weston, WY	22.7
	Grand Mesa, Uncompahgre, and Gunnison White River	Gunnison, CO	19.2
	Medicine Bow-Routt, White River	Moffat, CO	25.0
Rio Blanco, CO		27.4	
	Pike/San Isabel	Costilla, CO	25.2
Southwestern (3)	Apache-Sitgreaves	Greenlee, AZ	64.6
	Coronado, Tonto	Pinal, AZ	24.7
	Gila	Grant, NM	25.5
	Lincoln	Culberson, TX	47.5
Eddy, NM		24.1	
Intermountain (4)	Ashley	Sweetwater, WY	26.9
	Caribou	Caribou, ID	20.8
	Bridger-Teton, Shoshone (Region 2)	Sublette, WY	18.8
	Humboldt-Toiyabe	Eureka, NV	86.9
		Humboldt, NV	38.2
		Lander, NV	55.6
		Nye, NV	18.8
		White Pine, NV	30.3
Humboldt-Toiyabe, Inyo (Region 5)	Mineral, NV	31.5	
Manti-La Sal	Carbon, UT	25.4	

Region	National Forest administrative unit	County/State	Percent of total earnings from mining
		Emery, UT	36.6
	Salmon-Challis, Sawtooth	Custer, ID	18.3
	Wasatch-Cache	Uinta, WY	19.9
Pacific Southwest (5)	Inyo	Esmeralda, NV	53.7
Southern (8)	Chattahoochee-Oconee	Twiggs, GA	60.7
	Daniel Boone	Bell, KY	18.6
		Breathitt, KY	15.5
		Harlan, KY	32.5
		Knott, KY	53.3
		Leslie, KY	47.9
		Perry, KY	16.1
	George Washington and Jefferson	Buchanan, VA	40.5
		Letcher, KY	30.5
		McDowell, WV	28.2
		Pike, KY	34.5
		Wyoming, WV	38.4
	National forests in Alabama	Walker, AL	18.7
	National forests/grasslands in Texas	Hemphill, TX	17.2
		Jack, TX	17.1
		Leon, TX	26.0
Eastern (9)	Hoosier	Greene, IN	16.4
		Pike, IN	22.3
	Mark Twain	Iron, MO	22.6
		Reynolds, MO	20.4
	Monongahela	Barbour, WV	18.4
		Clay, WV	34.3
		Grant, WV	18.7
		Webster, WV	42.1
	Shawnee	Gallatin, IL	20.3
		Hardin, IL	20.8
		Livingston, KY	19.5
		Perry, IL	18.7
		Saline, IL	22.6
		Union, KY	40.5
		Webster, KY	42.9
	Superior	Lake, MN	20.1
	Wayne	Marshall, WV	17.3
		Meigs, OH	44.9
		Monroe, OH	22.0

(Vasievich 2000)

Mining earnings in the 67 Counties tend to be concentrated in one segment of the industry. For example, there are 33 Counties where coal mining accounts for more than 15% of total earnings. Another 20 Counties rely on metal mining, six Counties are dependent on oil and gas extraction, three Counties on other nonmetallic mining, and one County is dependent on mineral materials mining for more than 15% of total earnings. Eureka County, Nevada is the most mining-dependent national forest County in Nevada. This County derives 87% of total earnings from metal mining.

The contribution of production from NFS lands to mining earnings in these Counties can vary widely. For example, earnings in Caribou County, Idaho are largely dependent on phosphate mining on the Caribou National Forest. The Counties associated with the Monongahela National Forest depend on coal mining, although no coal mining occurs on the national forest. County-level characterization may miss some communities that have a high level of dependence on mining, even though the County does not. For example, no County in close proximity to the Little Missouri National Grassland has total mining earnings more than 15%. However, a number of communities may be greatly influenced by activity on the grasslands.

Counties with a heavy dependence on processing facilities are not included in this list, because processing is included in the manufacturing sector rather than the mining sector. In some cases, nearby processing facilities could be impacted by changes in levels of production from NFS lands.

The potential effects of Alternatives 2 through 4 would most likely occur in those Counties where the mining dependence is primarily associated with leasable minerals, where NFS production provides a relatively significant contribution to total production, and inventoried roadless areas are likely to provide future production capacity. Existing mining activity is one indicator of likely future activity. Counties in the East are not likely to be affected because the area of inventoried roadless areas on eastern forests is relatively small, and most of the current production occurs outside of NFS lands.

Because of the uncertainty about the effects of the road prohibitions and likelihood of development in inventoried roadless areas, a community list was not developed for each national forest and grassland listed in Table 3-78. A list of potentially affected communities was developed for those national forests where impacts are likely in the near future (Table 3-79). The Dakota Prairie National Grasslands were also considered because of public concerns about the potential effects on future oil and gas production. Several Counties are listed that are not mining dependent but may be potentially impacted. Some communities were added where processing or transportation facilities are located, if those communities were not part of a metropolitan area. Communities in Delta County, CO, were included because the coal transport facilities from mining are located in Delta County, even though mining occurs in Gunnison County. Communities such as Mandan, ND, and Pocatello, ID, were not included because they are within a metropolitan area.

Table 3-79. Resilience of Counties containing a sample of communities potentially affected by prohibitions on road construction and reconstruction on leasable mineral exploration and development in the next 5 years.

Region	National Forest administrative unit	Potentially affected communities	County/State	County resilience
Northern (1)	Dakota Prairie National Grasslands	Bowman, ND	Bowman, ND	Low
		Baker, MT	Fallon, MT	Low
		Watford City, ND	McKenzie, ND	Low
		Sidney, MT	Richland, MT	Medium
		Belfield, ND	Stark, ND	High
		Dickinson, ND	Stark, ND	High
		Williston, ND	Williams, ND	High
Rocky Mountain (2)	Grand Mesa, Uncompahgre, and Gunnison	Paonia, CO	Delta, CO	Medium
		Hotchkiss, CO	Delta, CO	Medium
		Somerset, CO	Gunnison, CO	Low
Intermountain (4)	Caribou	Soda Springs, ID	Caribou, ID	Low
		Afton, WY	Lincoln, WY	Low
	Manti-Lasal	East Carbon, UT	Carbon, UT	Low
		Helper, UT	Carbon, UT	Low
		Price, UT	Carbon, UT	Low
		Scotfield, UT	Carbon, UT	Low
		Wellington, UT	Carbon, UT	Low
		Castle Dale, UT	Emery, UT	Low
		Cleveland, UT	Emery, UT	Low
		Elmo, UT	Emery, UT	Low
		Emery, UT	Emery, UT	Low
		Ferron, UT	Emery, UT	Low
		Huntington, UT	Emery, UT	Low
		Orangeville, UT	Emery, UT	Low
		Ephraim, UT	Sanpete, UT	Low
		Fairview, UT	Sanpete, UT	Low
		Manti, UT	Sanpete, UT	Low
		Mount Pleasant, UT	Sanpete, UT	Low
		Spring City, UT	Sanpete, UT	Low

The resilience of each of the Counties in Table 3-79 was assessed, using the same procedures described previously for Counties associated with potentially affected timber-dependent communities. The current resiliency rating may not be tied to economic activity related to mining. The tie is likely to be strongest for Counties identified in Table 3-78 as mining-dependent (Gunnison, Carbon, and Emery Counties). Most of the Counties listed in Table 3-79 have low resiliency. Except for Sanpete, Stark, and William Counties, these Counties have a population density of five or fewer people per square mile. The potential impacts on these communities depend on the future role of inventoried roadless areas as a source of leasable mineral deposits. The information available indicates there is likely to be new development for coal and phosphate leasing, and possibly for oil and gas development. Lack of access to those areas could have negative social and economic impacts on these communities, including reductions in payments to states if no substitute deposits are available for development within the same Counties.

Local Involvement

Affected Environment

The Forest Service recognizes many levels of public involvement: national, multi-regional, landscape, regional, forest, and project. Generally, local planning focuses on land management plans, area analyses, and site-specific projects. Local-level Agency decisions are usually made at the land management plan- and project-level, and depending on the delegation of authority, by the Forest Supervisor or District Ranger.

Interested members of the public are invited to participate by commenting on or by providing information for NFS land management planning and site-specific project decisions under the Agency's NEPA provide notice and opportunity to comment and allow for administrative appeal of actions implementing land management plans and appeal procedures. Regional Foresters, Forest Supervisors, and District Rangers are encouraged to seek input and participation by State, local, and Tribal officials and other affected interests early in land management planning and project planning processes regarding inventoried roadless areas. The deciding official is required by regulation and policy to comment. This process is detailed at 36 CFR 215, 217, 219, and 251, and in FSH 1909.15. For area analyses like watershed assessments, the public and American Indian and Alaska Native Tribes may be asked to comment or to provide information. However, no Agency decisions are made in these analyses. Rather, they are generally used to establish background information and purpose and need for planning or site-specific projects. Furthermore, States, Tribes, and local governments are encouraged to participate as cooperating agencies under NEPA as per the Council on Environmental Quality's July 28, 1999, memorandum to heads of Federal agencies.

One of the main issues of public concern raised during the scoping period on the Notice of Intent and during the public comment period on the DEIS was local involvement (Chapter 1 of this FEIS and Content Analysis Enterprise Team 2000a, b). Concerns were raised about how the national prohibitions would affect local involvement in decision-making at the land management plan and project levels. Some people believe that by prescribing national prohibitions on activities, the action alternatives would reduce local involvement (Content Analysis Enterprise Team 2000a, b). They fear this would undermine the collaborative land management planning process, and existing trust between agency officials and local citizens. Some believe the time and effort they have already invested in the land management plan-revision process will have been wasted if national prohibitions are applied. This contributes to the feeling that regardless of their input, decisions will ultimately be made by officials in Washington, D.C., further undermining trust. Other people believe that local involvement and decision-making is necessary for developing management approaches that are sensitive to the unique social and ecological conditions of individual forests and grasslands, and that national policies lack this sensitivity. Many believe local managers are in the best position to solve local management problems, with public participation, due to their knowledge of the local situation. Many also believe that local concerns are more important than non-local concerns (Content Analysis Enterprise Team 2000a, b). Some people oppose the national prohibitions not because of the nature of the prohibitions themselves, but because they

prefer all issues relating to project and forest plan decision-making to be addressed and resolved locally. In contrast, many people believe that it is appropriate for the Forest Service to make decisions regarding roadless area protection at the national level because these issues have not been resolved in an expedient fashion at the local level, and because they believe that local officials are subject to the influence of local interest groups.

Alternative 1 – No Action

Under this alternative, there would be no change to the current local involvement process. There would also be no change to the current scope of issues to be decided upon locally regarding the management of inventoried roadless areas.

Alternatives 2 through 4

Under Alternatives 2 through 4, any national prohibitions would apply to inventoried roadless areas. Local involvement at the forest level would not reverse the prohibitions. The prohibitions would eliminate debate on whether road construction or reconstruction would occur within inventoried roadless areas on NFS lands. Depending on the specific alternative, national prohibitions could also eliminate debate on whether certain forms of timber harvest should occur within inventoried roadless areas.

These issues have been discussed locally for several decades, and they have proven highly contentious. Because they have not been effectively resolved at the local level in many places, the national prohibitions, which are based on public input through the NEPA process, are intended to bring these issues to resolution. In reaching its final decision, the Forest Service hopes to reduce the amount of conflict that pervades the local involvement process, and shift the local discussion about inventoried roadless areas to focus on managing them in the manner prescribed by the final decision.

The national prohibitions in Alternatives 2 through 4 would not affect the local involvement process. They would narrow the scope of what is to be decided upon locally with regard to the management of inventoried roadless areas. While the prohibitions may undermine local communities' trust in the public involvement process over the short-term, this trust may be regained over the long-term.

American Indian and Alaska Native Issues

Affected Environment

Presently, there are 558 Federally recognized Tribes located on 315 reservations, and numerous other forms of Tribal lands that are not reservations within the United States. According to the 1990 census, there are approximately 2 million American Indians and Alaska Natives--half living on or adjacent to Indian reservations; half in urban areas.

American Indians and Alaska Natives have land bases totaling about 615,210 square miles. Indian Tribes and individual Tribal members own approximately 56.6 million acres of land in the contiguous 48 States. Alaska Natives own an additional 44 million

acres in Alaska. Together, Tribes own about 4.2% of the land area within the United States.

Many reservations are adjacent to NFS lands. Figure D-1 in Appendix D of this analysis shows the 1990 distribution of the American Indian population in the United States in relation to inventoried roadless areas. The highest concentrations of American Indians near roadless areas occur in the Pacific Northwest, California, the Southwest, and Alaska. These are the geographic locations where one can expect the greatest use of roadless areas by these populations and the greatest potential impacts of the alternatives.

The unique relationship between American Indian Tribes and the Federal government is reflected in the U.S. Constitution, Articles I and VI. Federally recognized American Indian Tribes have a government-to-government or Nation-to-Nation relationship with the Federal government. The fact that Tribes are sovereign nations with their own Tribal governments makes them equal to other sovereigns or other governments and they are not to be considered as simply being part of the public. Tribes have a special recognized status, and interaction with Tribes reflects and respects this special status. Refer to the “Roadless Rulemaking: Consultation re: American Indian and Alaska Native Tribes” document for a description of the consultation process undertaken with Tribes on this proposed rule, which is available upon request.²¹

Treaties between Indian Tribes and the United States were negotiated primarily to extinguish Indian title to the land being described in the treaty that would be ceded to the United States. The goal of treaty making was to transfer the land into the public domain thereby creating new territories and making way for settlement. Other goals were to: make or maintain peace between Tribes, and end wars and create peace between Indian Tribes and the United States military, as well as non-Indian pioneers and settlers. Treaties were also used to create permanent living reserves for Indian people. Not all Tribes have treaties. In Alaska, acts of Congress serve to outline the legal rights and relations of Alaska Natives with the United States and the State of Alaska. Indian Tribes in Alaska exercise subsistence rights with other rural users. Agreements between the United States and Indian Tribes after 1871 were addressed by executive orders, which were later codified into the general statutes. These documents obligate the United States to certain legal and political responsibilities to care for Indian owned assets, and to consult with Indian Tribes as governments for proposed federal actions that have the potential to affect property or resources important to Indian Tribes and their members.

In the treaties, executive orders, and other agreements between the United States and Indian Tribes, Indian Tribes reserved for themselves certain rights and uses originally held exclusively by them. These uses and rights to take natural resources were to be exercised outside the boundaries of their respective Indian reservation. These are known as treaty-reserved off-reservation rights. Today, those treaty rights exist generally in the States of Washington, Oregon, Idaho, Western Montana, and the Great Lakes states. They apply to most public lands except, in some instances, national parks, and most military installations.

²¹To request a copy of this document, refer to the contact information on the title page of the FEIS.

Off-reservation hunting and fishing rights vary depending on treaty language, subsequent legislation, and court decisions. Some Tribes maintain that the United States government is obligated to manage wildlife and fish habitats to protect the Tribes' treaty rights.

Some Western Tribes have treaties that provide for pasturing animals on off-reservation land. These rights, which have been upheld by the courts, have been exercised in various ways. The allocation of grazing permits on NFS lands depends on treaty language. The Regional Forester may authorize treaty-based grazing under a Memorandum of Understanding. Tribal governments are exempt from the Forest Service policy against issuing term grazing permits to governments (FSM 2204.2(13)). Grazing on NFS lands is free of charge to Tribes as part of their treaty rights.

The traditional way of life for many American Indian and Alaska Native Tribes involves gathering and using products from their natural surroundings. In some treaties, these rights were included under the term "gathering rights." In negotiating treaty terms, many Tribal governments reserved off-reservation rights to gather miscellaneous forest products such as berries, roots, bark from trees, mushrooms, basket making materials, tepee poles, cedar for totem poles, and medicinal plants.

Tribes use many existing Forest Service roads to access sacred sites, spiritual grounds, ceremonial sites, gathering areas, and hunting and fishing sites. The rights of Tribes to practice particular activities on NFS lands, as are provided for in treaty language, are greatly dependent on the Tribe's ability to access national forests. The ability of Tribes to access NFS lands for purposes of practicing treaty reserved rights must be upheld. However, treaty rights and cultural interests that Tribes possess do not include the requirement that the Forest Service provide vehicular access to such sites and areas.

President Clinton issued E.O. 13007, which states that in managing Federal lands, each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, to the extent practicable, accommodate access to and ceremonial use of American Indian sacred sites by American Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. The E.O. also called for procedures to ensure reasonable notice is provided of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

American Indians expressed a range of opinion by on the Notice of Intent and the DEIS during scoping and the public comment process (Content Analysis Enterprise Team 2000a,b). Some favored protection of roadless areas because it would provide environmental protection, and conserve resources, such as plants, fish, and wildlife, used by them. Others emphasized the need for road development to increase access to lands needed for economic uses, recreation, subsistence resource harvesting, and treaty-rights activities. Still others wanted to ensure that the policy would not keep the Forest Service from honoring its treaty rights obligations with Tribes. Most respondents favored local decision making regarding roadless area management.

Alternative 1 – No Action

Under Alternative 1, inventoried roadless areas outside Wilderness and other special designated areas are available for resource management activities that may affect their roadless status or character. Impacts on Tribal governments and Tribal practices from resource management activities that require roads or other modifications to the landscape would be minimal because of consultation requirements. However, there are sacred sites where American Indians and Alaska Natives conduct ceremonies that require privacy. If a road were built to or near such a site, the associated increase in visitation could make it impossible to conduct ceremonies there, undermining important cultural practices. Roads and extraction activities may also alter the character of places that have historic or cultural value, thereby diminishing their value. However, historic and prehistoric cultural resources and traditional cultural properties would be protected by law as described in the Heritage Resources section of this chapter. The effects on treaty rights of no action might be adverse depending on the actions taken. Refer to the Hunting and Fishing section of this chapter for a discussion of how Alternative 1 could affect subsistence and treaty rights hunting and fishing. The Livestock Grazing and Non-timber Forest Products sections of this chapter discuss the impact of Alternative 1 on these activities, which American Indians or Alaska Natives may engage in.

Alternatives 2 through 4

These alternatives provide prohibitions for the highest number of total acres. Alternatives 2 and 3 allow timber harvesting that might conflict with Tribal interests or disturb sacred sites. There would be less conflict between interest groups and Tribes over the use and management of areas that may contain sacred sites. If privacy were necessary for sacred sites, a roadless state would increase the privacy. A roadless state might improve the habitat of plants that Tribes use during gathering activities. Without future roaded access to inventoried roadless areas, it would be difficult for some Tribal members (such as elders) to access cultural sites, hunting grounds, fishing grounds, and gathering grounds located there. Refer to the Hunting and Fishing section of this chapter for a discussion of how Alternatives 2 through 4 could affect subsistence and treaty rights hunting and fishing. The Livestock Grazing and Non-timber Forest Products sections of this chapter discuss the impact of Alternative 1 on these activities, which American Indians or Alaska Natives may engage in.

Civil Rights and Environmental Justice

This section evaluates how the alternatives proposed in this FEIS might affect subsets of the general population identified through Civil Rights legislation and policies, and Executive Order 12898 (Environmental Justice). These subsets include ethnic minorities (American Indians, Hispanics, African Americans, and Asian and Pacific Islander Americans), disabled people, and low-income groups. American Indian and Alaska Native Tribal issues are government-to-government issues and are addressed in the American Indian and Alaska Native Issues section of this chapter.

The material presented here summarizes a more extensive Civil Rights Impact Analysis and Environmental Justice issues document associated with the this rulemaking that was prepared for internal U. S. Department of Agriculture review. This document is available upon request.²²

Affected Environment

Maps showing the location of inventoried roadless areas in relation to the distribution of Hispanic, African American, and Asian and Pacific Islander populations, and areas of persistent poverty are located in Appendix D.²³ The maps show that populations of these groups, areas of persistent poverty, and NFS inventoried roadless areas are not uniformly distributed across the country. The region of the U. S. having the greatest amount of inventoried roadless area (the Rocky Mountain States) is also an area that shows low population densities in general; the lowest populations of minorities; and, the lowest areas of persistent poverty. These data provide a basis for the conclusion that many of the effects of the alternatives would be regional or local in nature, rather than national in scope. Some of the assumptions based on the mapped data include:

- Inventoried roadless areas that receive the greatest use by minority/low income groups are likely to be those that are close to population centers or historically occupied lands. These uses would continue to include activities such as recreation in undeveloped areas (e.g., hiking and camping), subsistence hunting, gathering, and fishing, and traditional cultural or spiritual activities.
- Under Alternative 1, populations living closest to inventoried roadless areas would continue to engage in economically oriented forest uses such as employment in timber-related fields, grazing, and harvesting of special forest products.
- Cultural, spiritual, and sense-of-place values pertaining to roadless areas may be considerable among those people who live immediately adjacent to these areas; among people who were historically displaced from these areas; and among people who have moved far away from them.
- The same cultural values regarding NFS lands and communication styles do not occur uniformly across the continental United States, Alaska and Hawaii because ethnic groups and areas of persistent poverty are localized. Some adjustment of outreach strategies on a local basis would be necessary to encourage full participation by traditionally underserved publics in the management of roadless areas.
- Minority populations and persistent poverty are high in the southeastern United States where the fewest acres of roadless area are located. Inventoried roadless areas in the southeast are anticipated to be in high demand in the future by these groups because of their relative scarcity relative to the distribution of these sub-populations.

The following sections discuss minority employment and Hispanic, African American, Asian and Pacific Islander American, and disabled populations in terms of their uses of and interests in NFS lands, and their communication styles. The extent of the discussion for each group is limited by the availability of published information on these topics. The

²²To request the Civil Rights Impact Analysis and Environmental Justice Issues document, refer to the contact information at the front of this FEIS.

²³Demographic information and maps used for this section were prepared by M. Vasievich, USDA Forest Service Natural Resources Information System, Human Dimensions Module, Branch Chief.

section concludes with an analysis of the effects of the alternatives on these sub-populations.

Employment – Data are not readily available regarding the percentage of minorities and people with disabilities employed in the timber, mining, and road construction sectors, which are the most likely sectors to experience localized impacts in the future from this rule. Any impacts to minorities employed in these sectors are not expected to be different than those to other groups employed in these sectors.

The Forest Service does contract with minority businesses for activities such as road construction, road maintenance, and timber harvest. There has been a decline in the total dollar amount of the contracts awarded to minority businesses by the Forest Service since Fiscal Year 1998, reflecting a decline in the total Forest Service budget. The USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration determine the percentage of Forest Service contracts that must be reserved for minority contractors. The action alternatives are expected to have no impact on this process. It would be difficult to distinguish the cause of any potential future declines in dollars allocated to Forest Service contractors following implementation of the alternatives. Such declines could be associated with reduced future demand for the services provided by minority contractors, which the action alternatives could contribute to; with declining Forest Service budgets; with the percentage allocation process undertaken by the Office of Small and Disadvantaged Business Utilization; or, with other social and economic factors.

Hispanics – The two kinds of readily available data regarding use of NFS lands by Hispanics concern urban uses centering on recreation, and rural uses centering on grazing and rural lifestyles. Most of the information on recreational uses of NFS lands by Hispanics comes from the Southwest and southern California. Family values, with the extended family as the predominant social unit, result in recreation opportunities structured for all ages that are designed to incorporate the maximum number of people for social interaction (family togetherness) (Garcia 1999; Gramann and others 1993). These visits are shorter, more intense, and commonly take place on major holidays. Attachment to specific spots with regular visitation patterns may be characteristic (Garcia 1999). Picnicking at developed sites, playing, and relaxing near creeks are common activities. Sites on NFS lands are also used by Hispanic church groups that hold church services there (Carr and Chavez 1993).

Information on rural uses of NFS lands comes primarily from northern New Mexico. Hispanic peoples colonized rural lands that are located in what is now the Southwestern United States after the Spanish conquest in 1519 (Wildeman and Brock 2000). During the 1700s, land use and ownership were confirmed by land grants from the Spanish Crown or Mexican government. These land grants were often community land grants that, following the Mexican War, were not acknowledged by the American government (Eastman and others 2000). The land grant boundaries were uncertain, original titles were lost, and community ownership patterns were inconsistent with the American system. Grants that were never confirmed became part of the public domain and, in Northern New Mexico, later became parts of the Carson and Santa Fe National Forests. Hispanic

communities traditionally used these lands for grazing on cooperatively owned pastures (Eastman and others 2000).

Small Hispanic communities now located near these NFS lands are characterized as suffering from continued land loss, economic decline, and poverty, forcing people to leave villages for migrant labor or urban lifestyles. This situation has resulted in tension between the Forest Service, environmental groups (perceived as threatening traditional uses and favoring preservation), and local Hispanic communities (Garcia 1999.)

Current uses of NFS lands by these rural communities are the logical outcome of what was historically communal use of large tracts of unsettled land for livestock grazing. Because of deep traditional ties to these specific lands, domesticated animals have special importance to their owners in small communities, a significance which may be out of proportion to their strict numbers or economic value (Garcia 1999; Eastman and others 2000).

Historically, subsistence harvest of wild resources was also important, including trees, shrubs, herbs, grasses, roots, tubers, berries, and large and small game. These resources were used for food, fuel, building materials, tools, clothing, and medicine (Garcia 1999). Contemporary communities still attempt to use forest commodities, but the subsistence economy has recently been supplemented by developing tourism, though jobs tend to be low paying and seasonal. In Northern New Mexico, the preservation of the subsistence life style is associated with preserving a working relationship with the land, and a tradition of self-sufficiency and frugality (Raish in press, Raish 2000).

Regarding communication styles, Hispanics often maintain the use of Spanish as a first language, and rely on personal experience as a source of information, especially recreation information (Garcia 1999). Raish (2000) describes the communication style of Hispanic communities in Northern New Mexico as having been muted or silent in previous generations because people lacked the opportunity to express themselves in their own terms and languages. They also suffered from an absence of power, and from isolation. However, educated sons and daughters often return home with a desire to preserve their heritage and ties to the land, thereby changing the silent image of previous generations (Raish 2000). In fact, in Northern New Mexico, the conflict between the Forest Service, environmental groups, and Hispanic communities has become vocal, litigious, and violent, which is a further departure from the more traditional muted communication of previous generations.

African Americans – African Americans use NFS lands for recreation, though little information is available on their recreation preferences. Johnson (1999) and West (1993) note that African Americans are less likely than White Americans to recreate in remote or dispersed settings or to travel to regional recreation areas, preferring instead to recreate in parks and forests close to urban areas. Cordell and others (1999a) note that White Americans and others camp more frequently than African Americans. The National Survey on Recreation and the Environment found that during 1994 to 1995, roughly 19% of African Americans participated in fishing. Some NFS lands in the Eastern United States contain historic sites that are important to African Americans, such as underground

railroad sites. Information is not readily available on other uses of NFS lands by African Americans, or on African American communication styles.

Asian and Pacific Islander Americans – Sense of place or place perception can be influenced by race and ethnicity (Johnson 1999). Like other ethnic groups, Asian and Pacific Islander Americans may identify strongly with sites preserved under the National Historic Preservation Act, such as historic Chinese mining and railroad sites. The success of tourism targeted at later generations of Asian and Pacific Islander Americans wishing to explore their historic roots on NFS lands and surrounding communities suggests a strong sense of place among them (Hom 1996). Families with ties to these places may no longer be local residents in the areas of interest, either due to choice or because of forced relocation. Sense of place can also influence perceptions of appropriate behavior or decorum when visiting these special places (Johnson 1999).

Particularly in the Pacific Northwest, Southeast Asian immigrants, Hispanics, and other ethnic groups use NFS lands for the commercial collection of wild mushrooms, floral greens, and other non-timber forest products (Otani and others 1996). Established Asian and Pacific Islander American groups may regard excursions to NFS lands for the collection of mushrooms for personal use as a fall ritual (Otani and Shon 1994). In southern California, Korean and Japanese Americans harvest bracken ferns on NFS lands (Chavez and Gill 1999).

Information on Asian and Pacific Islander American communication styles is also lacking, but observation would suggest that many diverse Asian and Pacific Islander languages are in use in the United States, and that English is not the first language between all Asian and Pacific Islander Americans. Recently arrived Southeast Asian immigrants with low English language skills may still communicate through a spokesperson, for example when mushroom harvesting on NFS lands. Among established Asian and Pacific Islander American groups, a record of academic achievement suggests that communication in English, oral or written, is not a limiting factor. However, certain styles of communication (e.g., indirect vs. direct) may still be the cultural preference. For example, Hart (1998) reports that for someone of Chinese descent, it would be unusual to seek help from an unknown official, or to expect reliable information from someone to whom he or she has not been properly introduced. At the same time, the Forest Service and other resource agencies have been using the persuasion communication model to “tell” the public what they want them to know and do (Magill and Chavez 1993). The result of these disparate styles illustrates how a lack of meaningful exchange can result.

Persons with Disabilities – Issues surrounding persons with disabilities appear to be primarily concerned with access to NFS lands and recreation. Access for persons with disabilities was a concern raised by members of the public in relation to the action alternatives. Some people believe a prohibition on road construction and reconstruction would discriminate against people having disabilities, or would violate the Americans with Disabilities Act, because they think it would limit access to NFS lands by persons with disabilities.

Recreation use in developed sites is not discussed here because of the presumption that it occurs in currently roaded areas where their status will not change. The National Survey

on Recreation and the Environment (Cordell and others 1999a) found that there is little difference in the percentage of disabled and able-bodied Americans participating in outdoor recreation activities of different types. Persons with disabilities engage in a wide range of activities in roadless areas, including use of COBRAs (motorized wheelchairs), OHV recreation, horseback riding, boating, outfitter guided trips, and roadless area skiing with helicopter drop off. Local Forest Service units work with individuals who have disabilities to assist them in accessing the recreation experiences they are seeking.

Barriers to outdoor recreation for people with disabilities are different from barriers to outdoor recreation for ethnic minorities. Personal health limitations are the greatest constraint, followed by lack of assistance for physical limitations (Johnson 1999).

People with disabilities do not necessarily want to build road in Wilderness Areas but want to experience nature in a way that is just as challenging and pristine as it is for others (McAvoy and Lais 1999). Many value undeveloped areas and do not want to be limited to areas designated for use by people with disabilities. One of the values of outdoor recreation for persons with disabilities is to experience a sense of freedom from socially imposed status hierarchies and limitations. The natural world is a place where they can escape the societal attitudes and stigmas that place limits on them (McAvoy and Lais 1999). Outdoor recreation is also a means of achieving social integration between people with and without disabilities, increasing the tolerance for differences among people.

People with mobility disabilities are presumed to have communication styles that are consistent with those of the public in general, or with members of their same ethnic group. Accommodation for other disabilities (e.g., hearing impaired) must be provided as necessary and appropriate.

Alternative 1 – No Action

Alternative 1 would provide for continuing road construction, reconstruction, and timber harvest in inventoried roadless areas. Impacts to protected classes are speculative because of a lack of readily available data regarding uses of NFS lands by minority groups, people with disabilities, and low-income populations. All current uses of NFS lands would be expected to continue. These uses include recreation, employment in the timber industry, grazing, harvesting of non-timber forest products, subsistence resource uses, and cultural/spiritual uses. The abundance and/or relative availability of some plant and animal species may change because of new timber sales and road construction. However, this effect is not anticipated to be uniform or simultaneous nationwide, nor would it have disparate impact on people with disabilities.

Members of different minority groups could be affected by changes in the availability of resources they use. If resources decline, conflicts with other, competing user groups could arise. Other negative impacts of Alternative 1 could be continuing conflict regarding those cultural/spiritual uses of NFS lands that are incompatible with development and increased human activity.

Developing roads in previously roadless areas would influence recreation opportunities. Hispanic populations appear to prefer to recreate in areas with roaded access, and the continued construction of roads may increase their use of specific local areas and newly developed sites. A full spectrum of opinion exists among disabled people as to whether road construction in previously roadless areas would increase their use and/or enhance their recreational experience.

For a detailed discussion of the impact of Alternative 1 on specific uses of NFS lands that the general public, including protected populations, engage in, see the other sections in this chapter under Social and Economic Factors.

Alternatives 2 through 4

The action alternatives would not change existing access to inventoried roadless areas. No existing roads would be closed by the action alternatives. Minority groups, low-income populations, and persons with disabilities would continue to gain access to inventoried roadless areas in the same ways they do now. Future roaded access to these areas would not occur.

A prohibition on road construction and reconstruction is not anticipated to have any disparate impacts on protected populations at the national level. While there may be adverse impacts to some protected populations at the local level, they are not expected to be greater than those experienced by other groups. Differences in national level effects and regional/local level effects are a result of the uneven geographic distribution of minorities and inventoried roadless areas, and variations in regional, cultural, and traditional land and resource uses. Any potential disparate impacts at the local level would be mitigated under the local planning process to reduce these impacts.

For example, some localized adverse impacts could result from limiting timber sales, which would be greater under Alternatives 3 and 4 than under Alternative 2. In Northern New Mexico, for instance, the commercial timber industry has historically provided a substantial number of logging and wood processing jobs, which employ people from small rural communities (Raish 2000). Reductions in timber volume harvested from NFS lands in northern New Mexico were a partial cause of sawmill closures and job loss in the 1980s and 1990s. In response, there have been local efforts to improve timber supplies in Hispanic communities, but these efforts are already having trouble (Raish 2000). The action alternatives could worsen this situation.

Forage for grazing and the harvest of non-timber forest products could be negatively affected by limiting timber harvests, if future opportunities for increasing availability of these resources in former timber sale areas are limited. Limits to future economic expansion (e.g., native-owned saw mills), and specific activities, such as livestock grazing on former timber sale sites, are not anticipated to be greater than those incurred by comparable non-protected communities.

In some locations, such as in northern New Mexico, Hispanics rely heavily on firewood harvested from NFS lands for fuel. Because firewood is most easily harvested near roads,

a prohibition on road construction in inventoried roadless areas would be likely to foreclose future opportunities for them to harvest firewood there.

Barriers to participation in outdoor recreation that have been identified for different ethnic groups would not be impacted positively or negatively by limits on future road construction or timber harvest. The three greatest barriers to recreation participation for White Americans, African Americans, Hispanics, and Asians and Pacific Islander Americans, are lack of time, lack of money, and personal health (Cordell and others 1999b). Lack of time, the greatest barrier to participation, should not be exacerbated by this alternative because developed recreation sites, generally the closest to national forest boundaries, would not be affected by this proposal. No disparate effect is anticipated on protected populations because all groups (including the general population) have identified the same three barriers in the same order of importance.

The other sections of this chapter under Social and Economic Factors discuss in detail the impacts of Alternatives 2 through 4 on specific uses that the general population, including protected classes, engage in.

Agency Costs

People who commented raised concerns about the effects of the proposal on revenues needed for management of NFS lands. They believed that less money would be available for law enforcement and other management actions. Public concern was raised about lost revenue from reduced timber sales, higher costs for fuels and forest health treatments, fire suppression, monitoring costs, and enforcement costs.

Alternative 1 – No Action

Under Alternative 1, Agency costs would continue in line with current and proposed budget requests. Emphasis would continue to be placed on watershed health and restoration, sustainable forest management, NFS roads, and recreation (Natural Resource Agenda for the 21st Century, March 2, 1998).

Alternatives 2 through 4

These alternatives are not expected to have major impacts on Agency cost. The effects have the potential to reduce some costs, while increasing others. A reduction in timber harvest would reduce sale preparation and other planning costs on sales that would have been offered from inventoried roadless areas. If the number of Forest Service employees were reduced in association with a reduced timber program on some forest, personnel costs would be reduced.

There would be little effect on appropriated funds used for construction or reconstruction, since the benefiting user would build most of the roads prohibited by Alternatives 2 through 4. However, there would be cost savings since Agency employees would not have to engage in planning, design, and oversight of these projects. If the planned roads were built, roads that remain part of the classified road system would be the Agency's

responsibility to maintain. Therefore, the reduction in new road miles would reduce the miles of road added to the system compared to the No Action Alternative. About 146 miles of new roads would be constructed for timber harvest²⁴, and remain open after harvesting was completed. Road miles for other projects are generally maintained by the operator (such as roads for mineral access or private road access), and are not an Agency cost. Maintenance costs are estimated at approximately \$1,500 per mile. The potential savings in maintenance costs from not maintaining 146 miles of new roads would be \$219,000 per year, once all the roads are in place. Since the Agency has a large maintenance backlog, this cost savings would allow limited funds to be allocated to existing maintenance needs.

The costs of fire suppression are not likely to change because of road prohibitions in inventoried roadless areas. Generally, fire suppression in inventoried roadless areas is a lower priority because threats to public safety and private property are less common. Annual pre-suppression and emergency fire suppression costs are expected to continue to fluctuate in the future (see the Fire Suppression section in this chapter).

The costs of fuels management in inventoried roadless areas would be higher because roaded access will not be available. However, priority for fuel management is focused on areas with the greatest threats to human populations, which is primarily in the wildland-urban interface. As described in the Fuel Management section of this chapter, most inventoried roadless areas are not located in close proximity to population centers and therefore, are not likely to be a high priority for fuel treatment. In the near future, fuel management dollars are not likely to be targeted towards inventoried roadless areas.

The national prohibitions are expected to remove some of the controversy over roadless area management from forest and project level planning. All alternatives would remove the controversy over road construction and reconstruction in roadless areas, while Alternative 4 would remove the controversy over timber harvesting in these areas. This may reduce the number of future local appeals and litigation, which would reduce Agency costs. However, there are likely to be litigation costs associated with implementation of the roadless rule, when promulgated.

Effects of Social and Economic Mitigation on Social and Economic Factors

Non-commodity Values – Mitigation measures for minerals leasing could result in an additional 59 miles of new road construction in inventoried roadless areas over the next 5 years. In the longer term, other new roads would likely be built for exploration and development purposes. In those areas where road construction and mining development occur the beneficial effects of the prohibition alternatives on non-commodity values would be lost.

Recreation, Scenic Quality, Wilderness, and Recreation Special Uses – If mitigation is implemented for mineral leasing and State highways, then an additional 65 miles of road

²⁴ A total of 257 miles (346 construction miles, plus 99 reconstruction miles, less 188 estimated closures of classified roads) of timber roads associated with timber offer were projected to remain open (Table 3-6). That total was adjusted downward to be consistent with adjustments between offer and harvest volumes.

may be built under the prohibition alternatives in the next 5 years. Roads for mineral leasing would be single use roads that will not contribute to road access for recreation use. In those areas where road construction and mining development occur, the beneficial effects of the prohibition alternatives for dispersed recreation users will be lost. However, the number of acres affected is expected to be small. Exceptions for State highway construction could have a beneficial effect by providing new access routes, but the overall impact would be expected to be negligible.

Hunting and Fishing – Mitigation measures for mineral leasing and State highways would lead to an estimated 65 miles of new road construction in inventoried roadless areas over the next 5 years, and more over the medium and long term. Roads for mineral leasing would be single-purpose roads that could not be used by hunters or fishermen. Thus, mitigation measures for mineral leasing would have no impact on access to hunting and fishing locations. In those areas where road construction and mining development occur, the beneficial effects of the prohibition alternatives on wildlife and fish habitat would be lost. However, the number of acres affected is expected to be small.

Livestock Grazing – If mitigation measures are implemented for mineral leasing and State highways, an estimated 65 miles of roads could be built in inventoried roadless areas over the next 5 years, with additional road miles added over the medium and long term. These roads would not increase roaded access to grazing allotments by permittees. No effects to livestock grazing are anticipated because of this additional road construction.

Non-Timber Forest Products – Mitigation measures for minerals leasing and State highways could result in an additional 65 miles of roads built in inventoried roadless areas over the next 5 years. Roads for mineral leasing would be single-purpose roads; they would not provide additional roaded access to non-timber forest-product harvesters. Existing access to inventoried roadless areas for gathering non-timber forest products would be maintained. However, this additional road construction could affect non-timber forest-product-species populations, and their distribution, as described under Alternative 1.

Timber Harvest – Mitigation for mineral leasing, reconstruction for public health, and State highways is expected to have no impact on timber harvest.

Energy and Non-energy Minerals – Implementing an exception for mineral leasing would reduce the economic effects to local communities, businesses, and individuals employed by mining where continuation of mineral production requires access to deposits in inventoried roadless areas. The most immediate relief would occur in locations where existing leases would have the option of being expanded into contiguous inventoried roadless areas. The loss of jobs and income associated with reductions in current production levels (Table 3-68) would be avoided. The exception does not guarantee future production; it merely allows the decision to be made at the local level.

The mitigation could lead to future minerals development in some communities where no mineral development currently exists, thereby causing those communities to experience the associated economic and social impacts described previously. The mitigation would

maintain opportunities for communities to expand their involvement in the leasable mining sector in the future. If leasable minerals development did occur in inventoried roadless areas it would provide jobs and income to these communities, at least in the short and medium term, enabling communities to experience the associated economic benefits.

Road Construction – Implementation of mitigation measures would increase the potential number of road miles in the next 5 years. A total of 65 miles of roads are projected to be associated with mineral leasing activities and State highways, which would be approximately 13 miles per year. The number of jobs affected by the prohibition alternatives would be reduced slightly because of job opportunities associated with these additional miles of road. The total average annual miles of roads prohibited would be reduced from 49 miles to 36 miles. Direct job effects would be reduced by about 8 to 9 jobs, and total job effects would be reduced by about 15 to 18 jobs. These effects would occur primarily in Region 2, where about 58% of the miles excepted occur.

Forest-dependent Communities – Implementing an exception for mineral leasing could reduce the economic impacts on mining-dependent communities in locations where continuation of production requires access to deposits in inventoried roadless areas. This could reduce the impacts on mining employment, as well as community revenues derived from Federal leasing royalties. The mitigation could also result in future mineral exploration and development in areas where no current mineral development exists. The exception would not guarantee future mineral development; it merely allows the decision to be made at the local level. Timber-dependent communities would not be affected.

American Indian and Alaska Native Issues – Mitigation measures for mineral leasing and State highways would lead to an estimated 65 miles of new road construction in inventoried roadless areas over the next 5 years, and more over the medium and long term. New roads for mineral leasing would not provide additional roaded access to American Indians or Alaska Natives for conducting subsistence or treaty rights activities, as they would be single-use roads. Mitigation measures for mineral leasing would therefore have no impact on access. However, they could have an impact on the physical, biological, and cultural attributes of inventoried roadless areas that are valued by American Indians and Alaska Natives. For example, sacred sites and traditional cultural properties could be disturbed by road construction. Privacy required for conducting ceremonies in the affected areas would also be disturbed. Negative impacts on plant and fish and game species populations could translate to negative effects for subsistence and treaty rights hunting, fishing, and gathering.

Agency Costs – If an exception is provided for mineral leasing and State highways, an additional 65 miles of roads may be built. Responsibility for construction and maintenance of these roads belongs to the lessee or State, although Agency employees would be involved in planning, design, and oversight. Therefore, cost savings to the Agency would be slightly less than under the prohibition alternatives, but the difference would be negligible.

Other Indirect and Cumulative Effects on Social and Economic Factors

This section traces changing trends in the management of NFS lands over the last century, and discusses the current trajectory in relationship to the Roadless Rule and other recent and ongoing rule-making efforts. Specifically, this section examines the cumulative effects of these policies on access to NFS lands, the balance of commodity and non-commodity uses and values on NFS lands, social controversy over the management of roadless areas, public involvement in forest management decision making, resource supply and demand, and forest dependent communities.

Trends in Management – From the early 1900s up until the mid-1940s and World War II, Forest Service management policy toward lands it was administratively responsible for was largely custodial (Giltmier 1998; MacCleery & Le Master 1999; Nelson 1995). Timber production from NFS lands was minimal because there were large supplies of timber available from private lands (Giltmier 1998; Nelson 1995). Livestock grazing was the predominant commodity use of NFS lands during this period (U.S. General Accounting Office 1999).

Following World War II, there was a dramatic increase in demand for lumber as veterans returned from the war, started families, and wanted homes (MacCleery and Le Master 1999). The timber industry turned to national forest timber to supplement or replace the supply from private forestlands, which had been heavily cut over (Williams 2000). Forest Service management between 1945 and 1960 was dominated by a major expansion of timber production, accompanied by extensive road construction activity to meet the demand for wood (Nelson 1995). By the 1960s, wood extracted from Federal lands supplied nearly 20% of the national demand (MacCleery and Le Master 1999).

At the same time that timber harvest on NFS lands was increasing, the demand for other uses, especially recreation was also on the rise (U.S. General Accounting Office 1999). In 1946, there was an estimated 18 million recreation visitor days on NFS lands (Dombeck 2000). By 1960, this number had risen to 93 million and by 1975, to 233 million recreation visitor days (MacCleery & Le Master 1999). As increasingly more people visited NFS lands, they saw the visual effects of timber harvesting. This sparked debate over the use of NFS lands.

The 1960s and 1970s saw a dramatic rise in the environmental consciousness of the American public (Dunlap 1991). People became concerned more about air and water quality and the environmental and aesthetic impacts of forest management practices (Cortner and others 1999). This growing environmental concern was reflected in a proliferation of environmental legislation that was passed in the 1960s and 1970s (MacCleery and Le Master 1999). In response to these shifting values, the Forest Service initiated RARE I and RARE II to identify and recommend to Congress areas suitable for inclusion as Wilderness Areas.

Public awareness of environmental problems and support for environmental protection increased steadily during the 1980s. By 1990, public concern for environmental quality

had reached unprecedented levels (The Roper Organization, Inc. 1992). Environmentalism among the American public has continued to increase as has public demand for the non-commodity values that NFS lands provide (Kempton and others 1995; Kennedy and Thomas 1995). In addition, the American public has continued to demand a larger role in public land management decision-making since the 1970s.

In response to these changing social values, the Forest Service implemented a major paradigm shift in its management approach to NFS lands in the 1990s. What emerged was ecosystem management. Ecosystem management expanded the objectives of public land management to include a broader spectrum of values, uses, than the multiple use-sustained yield approach that preceded it (MacCleery & Le Master 1999). Whereas multiple-use sustained yield emphasized maximizing the sustained production of resource outputs, ecosystem management emphasizes management to ensure the long-term health and sustainability of the ecosystem, using a collaborative stewardship approach.

Future Social and Economic Effects – It is highly likely that recent trends in social values relating to the management of NFS lands will continue into the future, both in the short- and long-terms. The growing national population, growing urban population, and increased conversion of open-space land to urban uses will cause more people to turn to NFS lands and other public lands as places that provide ecological, recreation, and spiritual and aesthetic values, which are increasingly difficult to find elsewhere. Americans are also likely to be increasingly vocal about how public lands are managed. The Roadless Rule is one of several recent and on-going Federal policies that reflect the desire of the public to see the environmental health of their public lands protected, and that emphasize the non-commodity values of NFS lands (see Cumulative Effects of the Proposed Rule with Other Federal Policies section in this chapter).

Access – People’s ability to use NFS lands depends on their being able to gain access to them. As discussed in Chapter 3, the American public is very concerned about the impact that the Roadless Rule will have on their ability to gain access to NFS lands, and thereby to continue to use and enjoy them in the ways that they have historically. People are particularly confused about what the Roadless Rule implies for access in combination with the Roads Policy.

Although the Roadless Rule would not alter existing access to NFS lands, existing access could be affected by the Roads Policy. The combined and cumulative effects of the Roads Policy on **forest roads** are detailed in the Cumulative Effects of the Proposed Rule with Other Federal Policies and National Forest System Roads sections of this chapter. Generally, the effect of decommissioning would be to reduce road density in some areas; it would not close off roaded access to most areas. However, it is expected that acres of unroaded areas could grow by 5% to 10% because of implementing these policies together.

The cumulative effects of these two rules would be to minimize new roaded access to NFS lands in the future. This would have the greatest impact on people whose preferred uses of NFS lands are road-based, and on people who can only experience NFS lands that they can reach by roads. The Planning Regulations in concert with the Roads Policy and Roadless Rule could result in slower development of unroaded areas in the future.

Commodity and Non-commodity Values – As stated, Forest Service and other Federal proposed or recent policies all emphasize the non-commodity values of Forest Service lands. The Roadless Rule also emphasizes non-commodity values and uses of Forest Service lands on 58.5 million acres (roughly 31% of all NFS lands). This is in addition to the 18% of NFS lands classified as Wilderness, which already prohibit or restrict road construction. The remaining 51% of NFS lands are open to a wide range of uses and activities, both commodity and non-commodity-oriented. By prohibiting road construction in inventoried roadless areas, an estimated 73% reduction in timber harvest will take place there over the next 5 years compared to the No Action Alternative. Timber harvest in inventoried roadless areas could be further reduced if Alternative 3 or 4 is chosen. In addition, salable and leasable mineral extraction in inventoried roadless areas would likely be precluded by a prohibition on road construction and reconstruction unless mitigation measures are applied. Locatable mineral extraction, livestock grazing, and non-timber forest-product harvest in inventoried roadless areas would likely experience minor effects from the prohibitions.

In light of these proposed and recent rules and policies, the contribution of the Roadless Rule to the trend towards managing NFS lands for their non-commodity values is that it emphasizes managing for these values on a significant portion of NFS lands. It would bring to nearly one half the amount of NFS land that could not have roads. While the other policies and rules emphasize watershed protection and ecological sustainability, they do not directly apply to specific NFS land classifications. This shift has economic implications that are discussed further in this chapter.

Social Controversy over Roadless Area Management – Decisions about public land management are often controversial because of the different values that people attach to these lands, and competing interests in their use. As stated in Chapter 1, roadless area management has been a substantial point of conflict in adopting land management plans for NFS lands. It is the intent of the Forest Service that a national rule to guide roadless area conservation will reduce this conflict, which has not been adequately resolved at the local level to date. The Roads Policy also aims to address this debate and, similarly, to reduce conflict over roads management. The cumulative effects of the Roads Policy and the Roadless Rule are expected to be reduced public conflict over the management of roads and roadless areas, one of the four goals of the Natural Resource Agenda.

However, Roadless Rule may heighten social controversy over fire management in roadless areas. Under the Cohesive Fire Strategy, inventoried roadless areas are not likely to be a high priority for fuels reduction in the next 20 years. A prohibition on road construction and reconstruction could hinder fuel reduction treatments when they do occur in some inventoried roadless areas, as could a prohibition on timber harvest. This could increase the likelihood of large fires in some high priority areas, especially over the short- to medium-term. Added to this is a perception on the part of some members of the public that a prohibition on road construction would make it harder to fight wildland fires in inventoried roadless areas, should they occur there. Many people believe that roads are needed for fire suppression and for fuels management. Given the extensive wildland fires that occurred during the 2000 fire season, public sensitivity to this issue is heightened. The result could be increased social controversy over the Roadless Rule, and its

implications for fire management in roadless areas of NFS lands. Whether this social controversy increases or decreases in the future will depend on what happens with fires in inventoried roadless areas in the coming years, which cannot be predicted.

Local Involvement – The NFMA Planning Regulations, the Clean Water Action Plan and its Unified Federal Policy, and the Cohesive Fire Strategy all emphasize a collaborative approach between agencies, partners, and the public in ecosystem management, whether for fire and fuels management, watershed protection, or land use and management planning. Some members of the public perceive that the Roadless Rule contradicts the emphasis placed on collaboration by these other policies and therefore, reduces their cumulative focus on local involvement, because it imposes national level prohibitions that supercede local-level decision-making. The Roadless Rule would not affect the collaborative decision-making process itself. However, it could have the effect of reducing the public confidence that other programs will follow a collaborative planning path.

Resource Supply and Demand – Management choices made by the Forest Service affect the level of goods and services from NFS lands. A number of factors affect future demands for these goods and services including population growth, economic trends, and technology. These factors were described in the previous sections as they related to individual resources. The Forest Service has no control over most of the factors influencing future demand for resources. Because of the uncertainty associated with quantitative estimates of future demand and supply, the cumulative effects analysis relies on expected future trends. These general trends are sufficient for evaluating the differences between alternatives.

The Roads Policy and recent planning activities, such as the Northwest Forest Plan, Sierra Nevada Framework, and Interior Columbia Basin Ecosystem Management Project, have the potential to expand the area managed for roadless characteristics, further increasing the supply of roadless areas. The cumulative effect of increases in the area of roadless areas could increase the beneficial effects of the Roadless Rule on ecosystem services, natural resource protection values, passive use values, and some types of recreation use. Protecting more roadless areas through such efforts will further increase the Agency's ability to meet increasing public demand for goods and services that rely on extensive, undeveloped areas of NFS lands. Federal lands will continue to be the main source of large, undeveloped lands into the future. Other public lands and private lands tend to be smaller on a per unit basis and more developed than most Federal lands.

The cumulative effect of the current and proposed policies listed is likely to further reduce the available supply of resources, such as timber and minerals, from NFS lands as discussed elsewhere in Chapter 3. Reduced production from roadless areas may be partially offset by production from other portions of NFS lands, but such substitution potential is seen as limited. In addition to the policies already mentioned, listing of the lynx and future listings of other T&E species are likely to further restrict extractive activities on Federal lands.

Further reductions in Federal timber harvest will increase pressure for harvest on other public and private lands. If cumulative reductions are significant, prices may increase in

response and bring new sources of domestic supply onto the market. Increased imports are also likely. Price increases may result in a switch to substitute materials (such as steel) that are not derived from renewable resources. Influences that could offset the increased pressure on domestic and international supplies include technology changes that increase our ability to use small diameter wood products in processing, increases in recycling, and productivity increases in timber yields.

The cumulative effects on future mineral development are difficult to predict. Factors such as discovery of new resources, prices, and technology, determine which mineral deposits are economically recoverable. Estimates of likely future development would be highly speculative. The effect of reduced access to deposits that may be economically recoverable depends on the availability of deposits on other ownerships. Increased development could occur on other portions of NFS lands or other public and private ownerships, or imports could increase.

Roaded and developed recreation opportunities on NFS lands may also be affected by the combined policies. Protection of roadless areas will affect the Agency's ability to develop new developed recreation facilities. Since demand for these types of recreation activities is also growing, density of use will increase, and some type of rationing system may be required. Other Federal lands may also be restricted in developing future capacity because of many of the same policies affecting NFS lands. As a result, increased pressure on other public recreation lands is likely.

Forest-dependent Communities – A number of communities have strong economic ties to activities on NFS lands. In the past decade, the decline in timber harvest from NFS lands has created economic hardships in communities that depended on harvest flows from NFS lands to maintain harvesting operations and processing facilities. In addition to losing jobs and businesses, reductions in Payments to States reduced funds available for local schools and roads. Community effects depend on numerous factors including the availability of substitute harvest opportunities on other lands and other economic opportunities within the commuting area.

The reductions in timber supply estimated for the prohibition alternatives, and the associated effects on jobs, income, and Payments to States appear minor for most areas. However, these effects may be significant when added to changes in resource flows over the last decade. For example, a wood products manufacturing plant may have been reduced to marginal operating efficiency from restricted timber supply. Further reductions may result in the closure of a mill, which could result in jobs and income losses greater than previously estimated. These effects cannot be estimated with any degree of certainty since too many factors independent of this rulemaking affect future demand and supply.

Similar cumulative effects are likely for mining-dependent communities. Reduced access to roadless areas will restrict future exploration and development for some types of minerals. Communities that currently depend on mining would be affected if production cannot be maintained in the long-term without development of roadless areas. Such

communities would face declining jobs and reductions in Payments to States. For communities with both mining and timber sectors, the combined effects would be greater.

The protection of roadless areas will benefit communities with a strong economic tie to dispersed recreation uses and where the natural amenities provided by NFS lands attract new businesses and residents. The cumulative effect of proposed policies is likely to increase this benefit. However, it is possible that restrictions on some types of recreation use could have a negative effect on some sectors of the economy.

Effects of the Tongass National Forest Alternatives

Affected Environment

Encompassing approximately 17 million acres, the Tongass National Forest is the largest administrative unit in the National Forest System, in the nation's largest State (Figure 3-33). The Tongass is a naturally fragmented patchwork of temperate rainforest bordered by muskeg, alpine meadow, rock, water, and ice distributed across 22,000 islands and a narrow strip of mainland encompassing nearly all of Southeast Alaska.

Ecological Factors – Unlike many NFS lands in the contiguous 48 States, the Tongass National Forest does not have a long history of intense multiple-use management. Compared to other forests and regions, the Tongass has relatively few TES species. Management activities that have affected overall ecosystem health are tied predominantly to intensive roading and timber harvest that has occurred within the past few decades.

The Tongass National Forest is the majority of the northern Pacific coast ecoregion. This ecoregion occupies a narrow (160 km wide) coastal band extending from the southern portion of the Alexander Archipelago to Prince William Sound and eastern Kodiak Island. Containing more than one fourth of the world's coastal temperate rainforests, this ecoregion is one of the most pristine temperate rainforest and shoreline ecosystems in the world (Ricketts and others 1999).

The forest's high degree of overall ecosystem health is largely due to the quantity and quality of its inventoried roadless areas and other special designated areas. Approximately 84% of the forest is in land-use designations, such as Wilderness Areas and National Monuments, which limit road construction and timber harvest activities. The Tongass National Forest, because it is so large, is comparable to entire Forest Service regions in the contiguous United States. It has more inventoried roadless areas than any other Forest Service region except the Intermountain Region (Region 4). The percentage of total acreage on the Tongass in inventoried roadless areas is greater than that of any other Forest Service region. In addition, the Tongass has a higher percentage of inventoried roadless areas where road construction and reconstruction are prohibited in comparison to any other Forest Service region.

Conserving inventoried roadless areas is central to maintaining a high degree of ecosystem health. In naturally fragmented landscapes, such as the Tongass, there are



Figure 3-33. Comparison of Alaska and Tongass National Forest to continental United States at equal scales.

(Roadless Database 2000)

heightened concerns regarding fragmentation, isolation of populations, and local population extinctions (USDA Forest Service 1997d). Under these conditions, inventoried roadless areas may be critical in maintaining ecosystem health. Inventoried roadless areas help provide adequate quantity and quality of habitat, connectivity between habitats, and greater likelihood that populations would not be further isolated from one another. Because ecosystems in Southeast Alaska are naturally fragmented and may be less resilient to further fragmentation, the loss of inventoried roadless area conditions may pose a high risk to species existence and persistence.

Limestone karst topography characterized by numerous sinkholes, caves, underground streams, and fractured bedrock is prominent in many locations on the Tongass (Ricketts and others 1999). Serving as a major influence on ecological function and productivity, the karst landscape on the Tongass is a three-dimensional system that includes productive forests and peat lands on top of karst, surface and sub-surface interactions, and ground waters originating from these systems. Within the last decade, the karst topography of the Tongass has gained national attention. Exploration of caves and karst terrain during this time has led to unique ecological, hydrological, and archaeological discoveries (Julin and Shaw 1999)

Human Uses – The undeveloped character of the forest and the marine environment is important in attracting recreationists and tourists, and in meeting their expectations (USDA Forest Service 1997d). The main attractions for recreationists and tourists include

scenery, wildlife, feelings of remoteness, and a sense of vastness. The Tongass National Forest Land and Resource Management Plan Revision Final Environmental Impact Statement (TLMP FEIS) indicates that the recent rapid growth in recreation and tourism is likely to continue (USDA Forest Service 1997d).

Currently, on the Tongass, the recreation-opportunity demand is well below supply, and is expected to be met in the near future for all ROS classes (USDA Forest Service 1982) except Semi-Primitive Motorized (SPM). Areas suitable for SPM activities are primarily natural appearing shorelines, lakes, and rivers that provide semi-primitive experiences, but are classified as motorized due to boat and float plane activity in the vicinity (Table 3-44). The 1999 TLMP Record of Decision projected that unmet SPM demand was “expected to occur under any (land management plan) alternative,” not by losing acres to development, but through “increasing resident population and tourism growth” (USDA Forest Service 1999n). The recreating public is drawn to the Tongass National Forest because of its natural appearing landscapes, and as a result, activities in SPM account for 62% of forest recreation use. These areas receive high levels of use because they are accessible by boat and floatplane. Accessing areas that are unroaded and without suitable water access is prohibitive to most users.

Most people visit Southeast Alaska by cruise ship or ferry during the summer season. Outfitters and guides provide services that help visitors and others experience Alaska via airplanes, boat tours, river rafting, and bus tours. Because people expect to experience Alaska wild and unspoiled, outfitters and guides seek natural appearing landscapes. Day use tours are a prominent feature of the 100-day tourist season, although longer duration recreation opportunities, such as big game hunting, skiing ice fields, and extended fishing, rafting, or sea kayaking trips, are also popular.

Hunting and fishing activities are highly valued in Alaska because of the pristine environments and high quality recreational experiences. On the Tongass, hunting and fishing is a large part of the total recreational activity (USDA Forest Service 1997d). Sport fishing user days increased from 60,000 in 1979 to nearly 150,000 in 1994. Recreation visitor days for hunting increased from roughly 75,000 in 1984 to 120,000 by 1995. Because of low population density in Alaska and high travel costs to visit Alaska, current user density is low relative to fishing and hunting opportunities.

Legislation²⁵ acknowledges the importance of subsistence hunting, fishing, and gathering in Alaska. Southeast Alaska is largely unroaded, and rural communities exhibit a high level of reliance on air and water transportation to support a subsistence lifestyle. Within Southeast Alaska, the estimated annual wild food harvest supplies all of the rural population’s protein needs. The total wild food harvest in Southeast Alaska is approximately 5,065,000 lbs. valued at \$15,194,000 (Alaska Department of Fish and Game 1998). Wolfe and Walker (1987) found that the presence of roads is extensively associated with reduced subsistence productivity. On the Tongass, decreased productivity may be associated with settlement of nonnative people along roadways in response to timber-related employment opportunities. This results in competition for subsistence

²⁵ The Alaska National Interest Lands Conservation Act (Public Law 96-487) and by Alaska State law (AS16.05.258).

resources, forcing native and rural people to either use roads for subsistence hunting and fishing or to conduct these activities in non-traditional areas.

The Tongass National Forest is unique because the majority of subsistence and game species, for example Sitka black-tailed deer, marten, wolf, brown bear, salmon, trout, and steelhead, are integrally linked to habitat qualities, including intact old growth and riparian habitats, often found in inventoried roadless areas. The dependence of terrestrial game and subsistence species on roadless conditions or old-growth habitat on the Tongass contrasts sharply with many game species, such as upland game birds, white-tailed deer, in other ecosystems that depend on early and midseral habitats and respond favorably to human-caused disturbances, such as timber harvest.

Currently, the Tongass National Forest has about 3,640 miles of classified roads, or about 90% of the classified roads in the Alaska Region. The majority of these roads were built to support timber harvest. About 20% of the forest roads on the Tongass are maintained for low-clearance passenger cars. Another 45% are designed and maintained for high-clearance vehicles. The remaining 35% are single-use roads that are closed for extended periods between uses. The Tongass has a \$13.5 million backlog in deferred road maintenance. This includes costs for improving fish passage where older roadbeds cut across streams.

Most reconstruction and construction of new roads on the Tongass is accomplished to provide access for timber harvest. Most of the new road construction planned from 2000 through 2004 is within inventoried roadless areas. During that time, the estimated road construction in inventoried roadless areas consists of 214 miles of classified roads and 77 miles of temporary roads, mainly to access timber. Almost all of these roads will be maintained for high-clearance vehicles or closed between timber sales. An additional 13 miles of construction for non-timber sale purposes is planned in inventoried roadless areas from 2000 through 2004. This consists of access for special use permits, recreation, or hydropower projects.

Unlike most of the forests in the contiguous United States, wind, rather than fire is the predominant natural disturbance element in the cool rain forest of Southeast Alaska. Therefore, there is neither need nor ecological basis for constructing or reconstructing roads into inventoried roadless areas to address fire risks.

Similarly, insect and disease infestations on the Tongass National Forest are not likely to require road construction, reconstruction, or vegetative treatments in inventoried roadless areas to maintain or restore ecological condition. Instead, insects and disease predominantly affect loss of timber value. In general, relatively few forest health vegetative treatment opportunities exist on the Tongass in comparison to forests in the lower 48 States.

Timber harvest occurs almost exclusively to promote growth and yield using even-aged (clearcut) harvest methods and extensive road construction. The result has been a decline of old growth in some intensively managed areas (central and northern Prince of Wales Island and northeast Chichagof Island, in particular). Concerns exist over habitat loss or

increased species mortality rates within these intensively managed areas. About two-thirds of the forest's planned timber volume offered in the next 5 years would be from inventoried roadless areas. This volume is approximately half of the total planned volume offered in inventoried roadless areas nationally.

Over the last decade, timber harvest levels on the Tongass National Forest have declined by 69%. In 1990, 471 MMBF of timber were removed from the forest, compared to a 1999 harvest level of 146 MMBF. The harvest reductions have been a consequence of increased competition in global wood products markets coupled with the termination of two 50-year timber harvest contracts. The Southeast Alaska timber industry is undergoing a fundamental transformation, as operators work to regain a competitive niche in the international wood products market and reshape the industry to remain viable in the absence of large-scale pulp mills. One company in Ketchikan, Alaska plans to add a veneer mill to its operations this fall. The new veneer plant will be the only processing facility of its kind in Southeast Alaska. It is intended to process smaller diameter spruce and hemlock logs that are currently an underutilized component of the Tongass timber supply. When the veneer mill is operational, material that is now being stacked in log decks or chipped will instead be processed into thin sheets of veneer. This additional processing facility may increase the overall efficiency and economic viability of the company's operations and improve its competitive position in the Southeast Alaska timber market.

Most timber under private ownership in Southeast Alaska is exported directly without local mill processing. As a result, employment in the region's wood products industry depends on the supply of timber from NFS lands. However, some job losses in logging and road construction in recent years have also occurred because of harvest reductions on private lands. The volume of timber harvested from lands owned by the Alaska Native Corporations fell from an estimated 532 MMBF in 1989 to 239 MMBF in 1999.

Thirteen mineral deposits have been identified on the Tongass National Forest. Active mining is currently underway for gold, silver, zinc, and lead. Future mining developments are likely if prices remain high enough to support Alaska's high exploration, development, and production cost.

An estimated 3,500 people are employed in commercial fishing and seafood processing in Southeast Alaska. In 1994, the most recent year for which data are available, the seafood industry was the region's largest private economic sector. Most of the commercial fishing activity and roughly 60% of the processing activity focuses on the salmon species. As roughly 80% of the salmon stocks in Southeast Alaska originate from within the Forest boundaries, the Tongass plays an important role in sustaining this component of the regional economy.

Protection of stream and lake habitat for fish was identified as a key issue in the TLMP. At the direction of Congress, guidance for making timber harvest more compatible with aquatic habitat management was developed in the Alaska anadromous fisheries habitat assessment (AFHA) (USDA Forest Service 1997m). More than 50 scientists and managers participated in the development of AFHA. Recognizing AFHA as the most comprehensive and credible scientific review of measures needed to protect fish habitat

on the Tongass, the TLMP incorporated all recommendations made in the AFHA report. The 1999 TLMP Record of Decision reduced timber harvest activity levels in various locations on the forest, further reducing risk to fisheries and riparian resources (USDA Forest Service 1999n).

Social and Economic Factors – In 1998, wage and salary employment in the Southeast Alaska region accounted for 34,981 jobs, an increase of 2% relative to 1993. At a sub-regional level, increased employment in the Juneau area masked more troublesome economic conditions in the rural areas. For example, over the same period, total employment in the Ketchikan and Wrangell/Petersburg areas declined by 12% and 13%, respectively. Economic forecasts for the Southeast Alaska region suggest a similar growth pattern over the next 5 years. Region-wide, job growth is expected to continue at a rate of 1%, primarily tied to growth in tourism and health-related service industries, and to construction employment in several public works projects.

Market Demand for Tongass National Forest Timber – The size and reliability of the Tongass timber supply has been the subject of congressional scrutiny for many years. In 1990, Congress passed the Tongass Timber Reform Act “to make management of the Tongass consistent with the management of the other 155 forests in the National Forest System.” In doing so, the unique timber supply provisions and fixed appropriations included in Section 705(a) of the Alaska National Interest Lands Conservation Act (Public Law 96-487) were repealed and replaced with the following more general direction in Section 101:

Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d of this section, the Secretary shall, consistent with providing for the multiple-use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle.

As the TLMP was being revised in 1997, research economists at the Pacific Northwest Research Station were asked to update their earlier projections of Alaska timber products output and timber harvest by ownership (Brooks and Haynes 1997). This work provides a basis for evaluating the extent to which the Tongass alternatives will enable the Forest Service to meet the projected market demand for timber from the forest.

The most recent projections of Tongass timber harvest account for several dramatic changes in Southeast Alaska’s manufacturing capabilities, increased competition from a number of sources, and the steady erosion of North America’s share of Japanese timber markets. The harvest projections are based on the expected outcome of three market scenarios developed by the Pacific Northwest Research Station’s economists to portray alternative futures for Alaska’s forest sector. Several key information sources indicate that the current state of Southeast Alaska timber markets most closely resembles that of the low market scenario. Currently, timber inventory is substantial, industry capacity-use rates are low, and there is no evidence of industry-wide changes in processing efficiency.

Under these conditions, average annual harvest is projected at 124 MMBF for the remainder of the forecast period (2000 to 2010).

In their report, the Pacific Northwest Research Station's economists emphasized the uncertainty inherent in predicting the future demand for national forest timber:

We characterize the future demand for National Forest timber as having a high degree of uncertainty because of the magnitude of recent changes in the Alaska forest sector, and because many of the factors that will determine the size and type of industry in the future cannot be predicted. The level and reliability of timber supplies from Alaska National Forests are only two among a number of sources of uncertainty; rates of economic growth in key markets, changing technology and tastes and preferences of consumers, and the strength of competition are among other sources of uncertainty (Brooks and Haynes 1997).

Significant changes in Alaska's manufacturing capacity, product mix, or competitive position are indicative of change in market demand. Under these circumstances, a revision of the above-referenced harvest projections for the Tongass may be warranted.

Tongass Not Exempt Alternative

Prohibition alternatives selected for the rest of National Forest lands would apply to the Tongass National Forest

Under this alternative, the prohibitions (Alternatives 2 through 4) proposed for NFS lands in the lower 48 States would also apply to the Tongass National Forest. Exceptions under the final rule and decision would similarly apply to all NFS lands including the Tongass. For most resources, the effects of implementing the prohibitions may be more dramatic on the Tongass National Forest than on other NFS lands, since more roading in inventoried roadless areas is projected to occur on the Tongass than elsewhere. However, if issues related to a given resource area are relevant to the Tongass National Forest then the types of resource effects mentioned previously could also occur on the Tongass, and they are not reiterated in this section.

For the Tongass National Forest, no relevant differences have been identified among prohibition Alternatives 2 through 4. Nearly identical outcomes are expected among these prohibition alternatives because:

- Regional data indicate a 95% decrease in timber volume from the inventoried roadless areas under a road construction and reconstruction prohibition. Thus, the effects of a prohibition on road construction are not substantially different from the effects of a combined prohibition on road construction and timber harvest;
- Timber harvest on the forest is designed and implemented primarily to provide timber to meet market demand and maximize growth and yield. Thus, the effects of a prohibition of timber harvest, except where designed for stewardship purposes, is unlikely to be

substantially different from a prohibition of all timber harvest, particularly within the current planning cycle; and

- Initial estimates indicate that approximately 33% of the timber volume is scheduled to come from outside inventoried roadless areas. Under current management standards and guidelines, Agency policy, and applicable law, it is unlikely that the Tongass could substantially increase the amount of timber harvested outside inventoried roadless areas above what is currently planned.

Alternatives 2 through 4, if applied to the Tongass, may decrease the likelihood of gaps in species distribution, since an estimated 95% to 100% of the timber harvest scheduled to occur in inventoried roadless areas would be eliminated. Accordingly, Alternatives 2 through 4 may be very low risk to old-growth ecosystems, species viability, and diversity, and may have potential risk levels that are somewhat comparable to those predicted for TLMP FEIS Alternative 1 (USDA Forest Service 1997d).²⁶ The TLMP FEIS Alternative 1 emphasized high-quality fish and wildlife habitat and retention of unroaded areas. Timber management was limited to small-scale timber harvesting using silvicultural prescriptions to maintain forest structure and function.

Alternatives 2 through 4, if applied to the Tongass, would lower risk to fish and wildlife species that are valued for recreational hunting, fishing, and viewing opportunities and for subsistence. Similarly, the wild and unspoiled nature of many inventoried roadless areas would be maintained. Thus, current levels of remote and semi-remote recreational opportunities, which are commonly sought on the Tongass National Forest, would be maintained. Some detrimental effects to recreation uses may also occur. Prohibitions would likely reduce future development opportunities; particularly developments that would require short segments of roads.

Alternatives 2 through 4, if applied to the Tongass, can be expected to have a substantial effect on the forest's timber program. As previously noted, nearly two-thirds of the forest's timber sale volume is scheduled to come from inventoried roadless areas. Under Alternative 2, annual timber offerings from the Tongass would be reduced from 176 to 73 MMBF. Under Alternatives 3 and 4, annual timber offerings would be reduced to 68 MMBF. As a result, timber harvest activity, currently projected at 124 MMBF annually, would likely be reduced to around 50 MMBF. The prohibitions are unlikely to have an immediate effect on harvest activity as the industry currently has access to a supply of volume under contract that can be used to maintain operations for 2 to 3 years.

Alternatives 2 through 4 will restrict the timber supply available to the industry and bring about a fundamental shift in the region's timber market. Relative to current industry operations and projected timber demand, the prohibition alternatives may result in a harvest shortfall of approximately 73 to 77 MMBF of timber annually. In the short term, the immediate effect of supply shortages is likely to be intense competition and bidding

²⁶On May 23, 1997, Regional Forester Phil Janik signed a Record of Decision (1997) approving the "Revised Land and Resource Management Plan for the Tongass National Forest" (1997 Land Management Plan). The Plan was accompanied by a final EIS that outlined the effects of the Plan as well as other alternatives to the Plan. Shortly following approval, 33 individual notices of appeal were filed on the 1997 Record of Decision. The Undersecretary of Agriculture issued a new Record of Decision in 1999. That 1999 Record of Decision is currently used to manage the Tongass National Forest.

activity for the timber sales that are made available. As time goes by, competition will drive out the least efficient operations, thereby reducing mill capacity and the associated long-term demand for Tongass timber. In the long term, a sustained harvest level of 50 MMBF may support some but not all of the existing and planned timber processing facilities in the region. It is impossible to predict which businesses will successfully compete for the remaining timber supply. Companies that have taken steps to diversify their product mix (e.g., adding veneer manufacturing capability) or increase the efficiency of the overall operations are more likely to remain viable.

The economic effects under Alternatives 2 through 4 would be concentrated in Southeast Alaska where mill closures and reduced logging activity would trigger direct job losses of 364 to 383 employees in the private sector and direct income losses estimated at \$16.7 to \$17.6 million. These job losses would occur in communities where mills and logging companies are located (Ketchikan, Coffman Cove, Craig, Thorne Bay, Klawock, Metlakatla, Wrangell, Petersburg, and Hoonah). Over the long term, as the effect of the direct job losses and business closures progressed through the economy, another 218 to 230 jobs may eventually be lost along with an additional \$10.1 to \$10.6 million in income. Because non-residents comprise a relatively high percentage (29.6%) of the workforce in the Southeast Alaska timber industry, the actual economic effects of Alternatives 2 through 4 within the State of Alaska may be smaller than estimated here. Non-residents are more likely to spend their earnings at home rather than in Alaska. Therefore, job losses affecting this segment of workforce would result in a slight reduction of economic activity in other States. The indirect effect would be more widely spread throughout the region, impacting retail and service providers in urban and rural communities. The immediate impact to mill operations would be buffered to some extent, as short-term operational needs would be met by the supply of volume under contract.

Alternatives 2 through 4 would have a direct effect on Forest Service operations in Alaska. Timber and road construction dollars accounted for more than 40% of the budget allocation for the Tongass National Forest in fiscal year 2000. For some Districts, these programs accounted for 60% to 70% of program dollars. Timber and road dollars also contribute to indirect project costs, thereby supporting the administrative workforce, office operations, and associated infrastructure on the forest.

The relationship between Forest Service employment and timber output is complex and difficult to quantify. Unless Forest Service budget allocations reflect a significant change in programs and priorities, Alternatives 2 through 4 would likely reduce Forest Service employment in the Alaska Region. Alternative 4 could reduce Forest Service employment by 141 jobs, or 30% of the current Tongass workforce. The associated loss in personal income is estimated at \$7.1 million. Over time, cutbacks in Forest Service payroll and program expenditures would likely trigger additional job and income losses in other sectors of the economy. These indirect consequences may eventually lead to a loss of another 141 jobs and \$3.4 million in personal income, with impacts occurring throughout the economic region. The number of Forest Service jobs lost would be greatest in communities with both a Supervisor's Office and a District Office (Sitka, Petersburg, and Ketchikan).

The total effect of applying Alternatives 2, 3, or 4 to the Tongass National Forest is estimated to be a loss of 864 to 895 jobs and \$37.3 to \$38.7 million in personal income in Southeast Alaska. Job losses in the timber industry would likely occur over a 2- to 3- year period as mills deplete their stockpiles of volume under contract and face increasing competition for a smaller timber supply. A similar period would be expected for Forest Service employment reductions, as difficult choices would be made about office closures and personnel actions. Indirect effects from lost wages and cutbacks in program expenditures would occur over a number of years and may be offset by growth in other economic sectors.

As mentioned, impacts to sub-regions of the Southeast Alaska economy would likely be more significant than impacts to the region as a whole. Communities or sub-regions where the timber industry continues to be a cornerstone of the economy, and where the Forest Service has a strong presence would especially be at risk of economic decline. Under this assumption, the social and economic consequences under Alternatives 2 through 4 would likely be concentrated in the Prince of Wales Island sub-region, Wrangell, Petersburg, Hoonah, and Ketchikan.

Tongass Exempt

Alternative selected for the rest of
National Forest System lands
would not apply to the Tongass

Under this alternative, land management would continue as outlined in the 1999 Record of Decision for the TLMP (USDA Forest Service 1997d). Projected risk to ecosystem health would remain unchanged, human uses would continue at levels projected under the TLMP, and social and economic values would be affected as described within the current TLMP and TLMP FEIS (USDA Forest Service 1997d).

The 1999 TLMP Record of Decision is comparable to the other TLMP FEIS alternatives that were ranked among those having lower species risk ratings. Based on comparisons, under the current TLMP there is a moderate to high likelihood that habitat conditions will support well-distributed species. According to the TLMP (USDA Forest Service 1997d), it is likely that population interactions will occur with a possibility of limitations; permanent gaps in historic range are not likely to occur.

Within the Tongass, there are several areas (central and northern Prince of Wales Island and northeast Chichagof Island), which have been intensively managed for timber production. As a result, there has been a marked decline in the amount of productive old growth in these areas and concern over habitat loss or increased mortality rates due to increased human access. The relevance of this disturbance pattern is integrally tied to the heightened sensitivity of the Tongass to further fragmentation. Based on the extensive amount of roading and harvest currently projected under the current TLMP and the intensive even-aged techniques that are used to harvest timber on the Tongass, forest fragmentation may increase in the areas where harvest is scheduled. These include many areas that are adjacent to existing heavily fragmented areas. Thus, there is a higher

likelihood for less desirable species viability outcomes under the Tongass Exempt Alternative than under the other Tongass alternatives.

Under the current TLMP, the total projected timber offer in inventoried roadless areas on the Tongass in the next 5 years (fiscal years 2000 to 2004) is 539 MMBF, requiring 291 miles of road construction and reconstruction, including 77 miles of temporary roads. This represents nearly half the timber volume projected to be offered from inventoried roadless areas nationwide for this 5-year period. Given the projected offer level, it is estimated that 76.6 MMBF of timber would likely be harvested annually from inventoried roadless areas on the Tongass (Table 3-80). This level of harvest is estimated to support 383 direct jobs and accounts for \$17.6 million in direct income and \$1.7 million in Payments to the States. The projected offer under Alternative 1 would provide for a harvest level that is consistent with current projections of market demand.

Table 3-80. Estimated average annual economic impacts from Tongass alternatives (1997 dollars).^a

Tongass alternative	Affected harvest volume (MMBF)	Direct jobs (number)	Total jobs (number)	Direct income (\$1000)	Total income (\$1000)	Payments to states (\$1000)
Tongass Not Exempt	76.6	383	613	17,604	28,166	1,685
Tongass Exempt	0	0	0	0	0	0
Tongass Deferred ^b	76.6	383	613	17,604	28,166	1,685
Tongass Selected Areas	34.0	170	272	7,800	12,500	748

^a For purposes of comparing the Tongass alternatives, the effects of applying Alternative 3 with mitigations on the Tongass are displayed.

^b Effects would be delayed until 2004.

As stated, recreation opportunity demand is currently well below supply and is expected to be met in the near future for all ROS classes except Semi-primitive Motorized (SPM). Under the current land management plan, many land-use designations allow for certain types of site-specific recreation developments that may be important to help meet some of the increasing SPM demand. These developments have been termed “minor” or “major” developments depending on the amount of development possible. Cabins, hiking or cross-country ski trails, and small docks are examples of minor development; these could occur in most land use prescriptions. Major developments include lodges, destination resorts, and full-service campgrounds, which might require short segments of roads to connect them with existing roads or docking facilities. Major developments would be concentrated on relatively few acres but could take advantage of the surrounding undeveloped natural setting.

Tongass Deferred Alternative

No prohibitions at this time;
determine whether road construction
should be prohibited in inventoried roadless areas
on the Tongass as part of the 5-year Plan Review

This alternative defers a decision regarding prohibitions on the Tongass to the local level and to the 5-year Plan Review in 2004. At such time an evaluation of inventoried roadless areas on the Tongass would be completed to determine whether road construction and reconstruction should be prohibited in inventoried roadless areas of the Tongass. The responsible local deciding official would have responsibility for completing the analysis and making the decision on whether or not to apply prohibitions.

A substantial amount of timber harvest and roading (539 MMBF and 291 miles of road) is projected to occur in inventoried roadless areas of the Tongass in fiscal years 2000 to 2004. Under this alternative, the beneficial effects of prohibitions applied immediately to the Tongass would be foregone for some ecological resources. The delay would benefit local communities by providing them an opportunity to adjust to the 1999 TLMP Record of Decision.

Predicting the outcome of the analysis and decision to be made as part of the 5-year Plan Review is very speculative. Currently, most of the vegetative treatment needs identified in the current planning cycle are likely to be even-aged treatments that maximize timber volume yield within unroaded portions of the forest. Where they are implemented, such treatments are not likely to conserve roadless area characteristics. However, such treatments were evaluated in the current TLMP FEIS and provided for in the 1999 Record of Decision. Consideration of roadless areas and roadless area qualities was an important focus of the 1997 TLMP FEIS and 1999 Record of Decision

Issues and resources on the Tongass are managed in an extremely complex social, legal, and political context that is undergoing much change. The analyses and rationale for the current Plan will be reviewed in the context of the social, legal, and political climate on the Tongass in 2004. Because of this complex social, legal, and political climate, the effects of the Plan Review in 2004 cannot be predicted with any accuracy. At best, it may be reasonable to project that after further review of all inventoried roadless areas on the Tongass prohibitions may be applied in some of the areas considered.

Tongass Selected Areas Alternative

Prohibit road construction and reconstruction in Old-growth Habitat, Semi-Remote Recreation, Remote Recreation land use designations, and LUD IIs within inventoried roadless areas on the Tongass

Under this alternative, prohibitions would be applied to inventoried roadless areas within Old-growth Habitat, Semi-Remote Recreation, and Remote Recreation Land Use Designations (LUDs), and LUD IIs. Collectively, these four LUDs encompass approximately 7 million acres (approximately 80%) of the land in inventoried roadless areas on the Tongass National Forest.

These four LUDs emphasize maintenance of mostly natural settings rather than development (Appendix E).²⁷ For this FEIS, they were categorized as inventoried roadless areas where roading is not allowed. However, on the Tongass, like other NFS lands, there are certain situations where roading is allowed in inventoried roadless areas that have been characterized as not allowing roading. There are perhaps more circumstances on the Tongass where allowances have been made for roading within these areas than on other national forests. For example, all four of the LUDs allow road construction to access adjacent lands for development purposes, such as timber harvest, if it is the only feasible option.

For most resources, the effects of this alternative would probably not be noticeably different from those under the Tongass Exempt Alternative. The amount of road construction that would be prohibited under this alternative is likely to be minimal relative to roading in other areas of the forest. Prohibitions applied in these four LUDs have important implications to timber, ecological, and recreation resources. Thus, the discussion for this alternative focuses on these resource areas. There are also social and economic effects that may occur because of changes in the timber, ecological, and recreation resource areas. These relationships and causative factors influencing expected effects were discussed previously this chapter.

The amount of road construction occurring under the 1999 Record of Decision in inventoried roadless areas within the Old-growth Habitat, Semi-Remote Recreation, and Remote Recreation LUDs, and LUD IIs can be predicted. Predictions can be made based on the situations in which road construction is permitted, the spatial distribution of the LUD on the forest, and the total acres of each LUD.

Based on the considerations outlined below, higher amounts of road construction might be anticipated to occur within the Semi-Remote Recreation LUDs and Old-growth Habitat relative to the Remote Recreation LUDs and LUD IIs.

- The Old-growth Habitat, like the other three designations, allows roading to access adjacent LUDs if it is the only feasible access option. These situations are more likely within the Old-growth Habitat because of the spatial distribution of Old-growth Habitat.

²⁷The complete description of the goals, objectives, and desired future condition for the Old-growth Habitat, Semi-Remote Recreation, Remote Recreation, and LUD II, and land-use designations from the TLMP, Chapter 3 – Management Prescriptions (USDA 1997c) is in Appendix E.

Old-growth Habitat are often much smaller, more widely distributed, and often occur adjacent to and within moderate and intensive LUDs. In contrast, the other three LUDs usually occur in larger contiguous blocks that sometimes encompass entire small islands.

- New roads are not explicitly stated as inconsistent with the goals, objectives, and desired condition of the Semi-Remote Recreation LUDs. An exception to allow roading to link existing roads is described within the transportation standards and guidelines for Semi-Remote Recreation and exceptions for major recreation development, which could require road construction, are included within the recreation standards and guidelines. In contrast, the desired condition for Remote Recreation is characterized by extensive, unmodified natural environments, a goal to manage the LUD II areas in a roadless state, and the standards and guidelines for Old-growth Habitat describe roads as generally inconsistent with the objectives of Old-growth Habitat.

Despite the relative abundance of these LUDs on the Tongass National Forest, the amount of roading that is likely to occur within these four LUDs under the current TLMP would be a very small percent of the total amount of roading that is expected to occur on the forest. Most of the roading is projected to occur in inventoried roadless areas with moderate and intensive Development LUDs, which do not prohibit roading and timber harvest. In most cases, new road construction is likely to be minimal and to occur near the fringes of these areas. As with all projects, such road construction would require environmental analysis and mitigation, consistent with applicable law and Agency policy. Most of the roading projected to occur in inventoried roadless areas on the Tongass would take place on moderate and intensive Development LUDs, which do not prohibit roading and timber harvest.

Timber Volume Outputs – For purposes of analyzing this alternative, the Tongass National Forest estimated the acres of Development LUDs that would be isolated if roading through inventoried roadless areas within these four LUDs were prohibited (Table 3-81).

Table 3-81. Tongass National Forest land-use designations by road construction prohibitions.

Designation	Acres isolated	Percent of the timber base isolated
LUD II	0	0
Old-growth Habitat	54,461	6
Semi-Remote Recreation	11,528	1
Remote Recreation	540	0
Total	66,529	7

(Wilson Personal communication)

The analysis for Old-growth Habitat only considered large and medium sized reserves, since small reserves were not mapped in the 1999 TLMP Record of Decision. The Tongass reported that in most projects currently in process, small reserves would preclude access to the suitable land base needed to achieve the ASQ. They further estimated that an additional 4% of suitable land base could be isolated if roading through inventoried roadless area in small old-growth reserves was prohibited. Thus, an estimated 7% to 11% of the suitable land base would likely be isolated if the prohibitions were

applied to all Old-growth Habitat. The short-term effect of this loss of roading capability is estimated to be a 291 MMBF reduction from the current 10-year timber sale plan. Most of this decrease would occur in the first 5 years (241 MMBF in the first 5 years as compared to 50 MMBF in the last half of the 10-year period).

The preceding projections are based only on the availability of roading access and do not consider feasibility. Feasibility and the economics of the timber market including alternative harvest methods may play a role in whether the timber is harvested. However, feasibility considerations are unlikely to alter these predicted outcomes drastically since the economics generally do not support alternative harvest methods. The regional data for inventoried roadless areas as a whole indicate a 95% drop in timber volume outputs largely because the current economic situation does not support more expensive harvest techniques. Additionally, situations where extensive segments of road are needed to access some of the acres identified as isolated under this alternative may similarly not be supported economically.

The projections did not include road miles required to access the acres identified as potentially isolated under this alternative. Based on the discussion of projections with the forest, it is clear that the majority of roading needed for access among the four LUDs analyzed in this alternative would involve Old-growth Habitat. The forest estimated that there would be 13 instances where roading through large or medium reserves might be required to access adjacent Developed LUDs. Additionally, in a couple of those cases, the road segments required for access might be extensive.

The Tongass Selected Areas Alternative would have a significant effect on the short-term timber supply (i.e., the scheduled timber offer in the first 5 years of the 10-year schedule). Over this time, the forest would be prohibited from offering an estimated average of 48 MMBF per year. This equates to roughly one-third of the scheduled timber supply. The associated reduction in timber harvest may trigger the loss of up to 170 direct jobs, \$7.8 million in direct income, and \$748,000 in Payments to States. The job loss may come in the form of temporary layoffs or permanent mill closures as the industry adjusts to a short-term supply disruption. Companies with an ample supply of volume under contract are better prepared for a timber shortage and are not likely to be heavily impacted.

The reduced timber supply would cause a short-term disruption in the region's timber market. Relative to current industry operations and projected demand, the Tongass Selected Areas Alternative would lead to a shortfall in annual harvest of approximately 34 MMBF for the first 5 years in the 10-year schedule. Because of the long lead time involved in timber sale planning on the Tongass, it is unlikely that substitute volume could be made available to take the place of the sales dropped from the sale schedule. After the initial 5-year period, future timber offerings are planned for areas of the forest that are largely outside the focus of this alternative, which may allow the industry some chance of recovery.

Ecological Considerations – Beneficial effects to old growth and old-growth dependent and disturbance sensitive species could occur from a prohibition in Old-growth Habitat. Old-growth Habitat was chosen for their high value to old growth dependent and

disturbance sensitive species. Thus, roading within reserves, as has been projected by the region under the Tongass Exempt Alternative, would likely affect ecological resources. Based on the estimated frequency where roading is needed in Old-growth Habitat (approximately 10% of the large and medium reserves and other small reserves), the ecological benefits under the Tongass Selected Areas Alternative are not expected to lower forest-wide risks to species from that predicted under the current TLMP. Instead, the ecological benefits of the Tongass Selected Areas Alternative would likely be localized in nature. However, where these benefits occur at the local level, they could be quite meaningful and easily identified.

The effects to individual reserves, if roading occurs within the reserve, would depend on the location of the road and the extent that effective mitigation measures could be developed and implemented. Old-growth Habitat occurs in small, medium, and large reserves. Approximately 150 medium and large reserves were designated. Many small reserves are distributed throughout the forest. The value of large and medium reserves is better understood at the forest-plan level. The value of the smaller reserves is strongly related to site-specific information, which was difficult to obtain at the land management-plan level. A provision to adjust the location of the reserves was included in the TLMP based upon further consideration of the site-specific characteristics of individual small reserves.

Even a limited amount of roading in isolated small reserves could compromise their value. Thus, for smaller reserves the ability to adjust reserve boundaries to include old growth of equivalent or higher value would influence whether there are effects, and if so, the magnitude of the effects. A road that completely transects a larger unroaded area might also compromise its overall ecosystem health, although few such instances are expected to occur. Where roading through large and medium sized old-growth reserves may be necessary to access Development LUDs, the amount of road needed within the reserve is generally expected to be less than 5 miles.

Under the Tongass Selected Areas Alternative, projected effects to the timber base include isolation of more than 66,000 acres of suitable timberlands in moderate and intensive Development LUDs. In general, lands in the suitable timber base are often quality old-growth habitat. Retention of these lands in an unroaded, undisturbed condition would benefit ecosystem health by retaining more old-growth habitat and reducing fragmentation that would otherwise occur under the current TLMP. Some of these effects may be short-term and depend on the economics of the timber market in Southeast Alaska. For example, at some time in the future the value of the timber in some of the areas isolated by road access could be high enough to support other harvest methods that do not require additional road construction.

Roading through Old-growth Habitat under the current TLMP to reach Development land-use designations is likely to occur more commonly than in the Semi-Remote Recreation, Remote Recreation, and LUD IIs. Thus, the beneficial effects to ecological resources because of prohibitions within the Semi-Remote Recreation, and Remote Recreation LUDs, and LUD IIs are likely to be much less than a prohibition applied to the Old-growth Habitat.

Recreation – Road construction within Remote Recreation LUDs or LUD IIs could compromise primitive recreation opportunities. However, because of the spatial distribution of these two designations, roading through them to access adjacent LUDs is likely to be very uncommon. In fact, the Tongass National Forest did not predict any instances in which roading through LUD IIs would be necessary to reach adjacent lands available for timber harvest.

Roading through Semi-Remote Recreation for purposes other than semi-remote recreation may compromise semi-remote recreation opportunities. The Tongass National Forest predicted that roading through Semi-Remote Recreation LUDs to reach adjacent lands designated for timber harvest would be uncommon. Thus, a prohibition of roading in Semi-Remote LUDs is also likely to have beneficial effects to dispersed recreation and scenic values.

A prohibition of roading in Semi-Remote Recreation LUDs could have negative effects on certain new recreational development opportunities allowed for under the current TLMP. As described, many LUDs currently allow certain types of minor and major site-specific recreation developments that are expected to occur from the continued growth of the tourism industry in Southeast Alaska.

Recreation developments requiring road construction are discouraged and generally incompatible with the LUD II and Remote Recreation LUDs, but are considered compatible and likely to occur within the Semi-Remote Recreation LUDs. Their development is most likely to occur adjacent to marine access sites. Many sites with potential for such development have been identified, but no firm proposals exist at present and the actual future amount of development opportunities is unknown. If the current rate of recreation and tourism growth continues, it is possible that 1% to 3% of the acreage within the Semi-Remote Recreation LUDs could experience such development in the future. Conversely, if road construction were prohibited in Semi-Remote Recreation LUDs, potential future developments of this type would not be possible in these LUDs.

Effects of Social and Economic Mitigation on the Tongass National Forest

This FEIS identified social and economic mitigation measures where roading or timber harvest in inventoried roadless areas may be authorized. A complete description of these exceptions is included in Chapter 2. One of the mitigations that could be included under the Tongass Not Exempt Alternative would delay implementation of prohibitions on the Tongass until the 5-year Plan Review in 2004. The delay would allow roading and timber harvest in inventoried roadless areas to occur as currently projected under the 1999 Record of Decision (USDA Forest Service 1999n). Harvest would drop to approximately 50 MMBF total annual forest harvest when the prohibitions are applied in 2004. The delay would benefit local communities by providing them an opportunity to adjust to the 1999 TLMP Record of Decision and prepare for changes in 2004. Beneficial effects to ecological resources that could occur under prohibitions during that 5-year period would be foregone.

The Southeast Alaska economy is in a period of transition. Some sectors, such as tourism and other amenity-based industries, are growing rapidly. Forces outside of Southeast Alaska and even the United States can have a substantial effect on the growth and decline of industries within the region. For example, increased competition in the timber industry has eroded Alaska's market share and competitive position in the global timber market. If this trend continues, market demand may continue to decline. Thus, 5 years from now the effect of the prohibitions might have a very different effect on the local economy than what is projected today.

The deciding official, as part of the final rule, may select a mitigation that would allow the Secretary to approve State highway transportation projects, if they are in the public interest or consistent with the uses for which the land is reserved. Several proposals for State highway corridors are identified in TLMP, including a corridor between Juneau and Haines. Currently, none of the transportation corridors identified in TLMP have received serious local or State support, and none are on any approved project lists. For example, the Juneau and Haines corridor is not supported by the Governor or by local governments. Instead, increased attention is currently focused on the Alaska Marine Ferry System for transportation needs between Juneau and Haines. It appears that in the reasonably foreseeable future, construction of State highways through inventoried roadless areas in Alaska may not be an issue. In the absence of the proposed mitigation regarding State highways, future proposed transportation corridors would be prohibited within all inventoried roadless areas under the Tongass Not Exempt Alternative, and in Semi-Remote Recreation, Remote Recreation LUDs, Old-growth Habitat, and in LUD IIs under the Tongass Selected Areas Alternative.

The remaining mitigation measures were developed in conjunction with prohibition Alternatives 2 through 4. Where possible, roading or timber harvest that could occur under these exceptions has been identified for analysis purposes. On the Tongass, roading or timber harvest occurring under the mitigations is expected to be uncommon. For example, no roading needs for mineral leasing activities, and no vegetation management or timber harvest activities to benefit T&E species are currently identified on the Tongass. Therefore, the impact of roading or timber harvest actions occurring under these other mitigations is speculative and not likely to be noticeable on the Tongass.

Other Indirect and Cumulative Effects on the Tongass National Forest

Local Context – In 1999, Under Secretary of Agriculture Jim Lyons signed a new Record of Decision for the Tongass National Forest Land and Resource Management Plan Revision (USDA Forest Service, 1999n). The 1999 Record of Decision modified the 1997 Regional Forester's decision by strengthening a standard and guideline, adding another standard and guideline, and changing land use designation for 18 areas of the Tongass National Forest. The change in land use designations from development to mostly natural for the 18 areas encompassed approximately 234,000 acres. The standard and guideline that was added increased the timber harvest rotation from 100 to 200 years in 42 separate Wildlife Analysis Areas broadly distributed throughout the forest.

Collectively, the changes made in the 1999 Record of Decision built on the old-growth strategy and species-specific management contained in the 1997 decision.

The Under Secretary's 1999 Record of Decision incrementally reduced risk to: 1) deer abundance for subsistence use, 2) the amount and distribution of old-growth forest, and 3) areas of special interest valued for old-growth ecosystem viability, species viability, roadless condition, subsistence use, recreational opportunities, scenic quality, and tourism development. His decision also reduced the allowable sale quantity of timber from an annual average of 267 MMBF in the 1997 Record of Decision to 187 MMBF in the 1999 Record of Decision.

Over the long term, the Tongass Exempt Alternative, when considering the reasonably foreseeable increases in habitat fragmentation and loss of connectivity in adjacent landscapes, would pose a higher risk of adverse cumulative effects to biodiversity. In contrast, over the long term, the Tongass Not Exempt Alternative, the Tongass Deferred Alternative, and the Tongass Selected Areas Alternative would be more likely to result in measurable beneficial cumulative effects on the forest's ecological resources. The Tongass Not Exempt Alternative, because it could apply prohibitions to all inventoried roadless areas, would likely have the greatest beneficial cumulative effects to biodiversity.

Over the long term, the Tongass Not Exempt Alternative, the Tongass Deferred Alternative, and the Tongass Selected Areas Alternative may result in measurable cumulative effects relative to human uses. However, the effects may be either beneficial or detrimental depending on the particular type of use. For example, such alternatives would likely reduce the harvestable timber supply, which would have a negative cumulative effect on human uses that depend on that supply. The action alternatives may also preclude expansion of some developed recreation opportunities in inventoried roadless areas. Conversely, such alternatives would likely have a long-term positive cumulative effect on human uses that depend on sustainable fish and wildlife populations, natural scenery, and feelings of remoteness.

Over the long term, the cumulative social and economic effects of the Tongass Not Exempt Alternative, the Tongass Deferred Alternative, and the Tongass Selected Areas Alternative on the Tongass National Forest would be commensurate with the type and extent of human use effects. Beneficial effects may be associated with the preservation of economic opportunity associated with remote recreation and adventure tourism. Detrimental effects may come from the loss of economic opportunity associated with timber-dependant industry and reduced opportunity for regional economic diversification. The net cumulative economic effects of such alternatives will depend on broader economic trends affecting resource-based industries, and the ability of the individual communities to take advantage of changing opportunities.

However, the economic and social effects of the Tongass Deferred Alternative, the Tongass Selected Areas Alternative, and in particularly the Tongass Not Exempt Alternative, may be of considerable consequence at local levels where the timber industry is a cornerstone of the local economy and where the Forest Service has a strong presence. The direct effects are expected to occur over a period of 3 years, as mills deplete their

stockpiles and face increasing competition for a smaller timber supply. In addition, Forest Service staffing levels may change and offices may close in response to expected timber output declines, further adding to the economic decline. The risk of economic decline would be highest under the Tongass Not Exempt Alternative and would most likely occur in Wrangell, Petersburg, Hoonah, Ketchikan, and communities on Prince of Wales Island. While the effects on local communities may be dramatic, particularly in the near future, those effects would likely be of lesser consequence to the Alaska economy over the long term. Indirect effects from lost wages and cutbacks in program expenditures would likely occur over a number of years and could be offset by the growth of other economic sectors. The effects of prohibitions are of no consequence to the national economy in either the short or long term.

Southeast Alaska Context – The Tongass National Forest comprises the majority of the land in Southeast Alaska and the Northern Pacific Coast ecoregion, a globally significant ecoregion. Because of its dominant status with respect to land ownership, the Tongass plays an important role in the cumulative effects occurring in Southeast Alaska and the Northern Pacific Coast ecoregion. Scattered throughout Southeast Alaska and adjacent to Tongass National Forest lands, Native Corporation lands comprise the second largest segment of the land base in Southeast Alaska. While Native Corporation lands comprise a smaller component of the land base, timber harvest outputs over the past decade on Native Corporation lands have been roughly the same as those from the Tongass National Forest. However, local communities depend on timber from National Forest lands because much of the timber from private land is not processed locally. Specifically, milling and the local economy that milling supports depend, almost solely, on timber from NFS lands. Outputs from NFS and Native Corporation lands have recently declined, as described in the affected environment section of this analysis, and they are projected to be similar in the future (around 150 MMBF annually).

The majority of species in the ecoregion are old-growth dependent or disturbance sensitive species, and the majority of habitat and strongholds supporting these species exists on NFS lands. Because the majority of lands in Southeast Alaska outside the Tongass have been intensively managed for timber harvest, the Tongass plays a critical role in conserving the biodiversity in Southeast Alaska and the Northern Pacific Coast ecoregion.

National Context – Within this FEIS and other literature cited, the ecological uniqueness of the Tongass National Forest has been noted, including the karst geology that underlies much of the Tongass and the island biogeography as it relates to forest fragmentation, metapopulations, and species endemism. Also unique is the quality and quantity of unroaded areas that contribute to the pristine character of the ecosystem and low numbers of federally TEP species on the forest and in the Northern Pacific Coast ecoregion as a whole. The ecologically unique character of the Tongass and current high degree of ecosystem health are important nationally and globally when considered in the context of changing social values.

Past social values and scientific information led to natural resource management throughout the United States, on private and public lands alike, that greatly impacted

biodiversity in many nationally and globally significant ecoregions. Currently, risk to biodiversity in many North American ecoregions remains high because of direct, indirect, and cumulative impacts, resulting from multiple-use management across all land ownerships (Ricketts and others 1999). Scientific understanding of ecosystems and societal values are changing (Botkin and others 2000). As a result, management approaches on Federal land are shifting from an emphasis that is primarily on sustainable resource outputs, to one where resource production outputs are often a consequence of management to achieve other ecologically oriented objectives (MacCleery and Le Master 1999). Current and reasonably foreseeable multiple-use management on Federal land is therefore, more likely to conserve or at least slow the loss of biodiversity within some ecoregions.

In most instances, the current shift in values and management is occurring after irretrievable loss of biodiversity has occurred, particularly in forest ecosystems (Ricketts and others 1999). Few opportunities remain to implement a management approach emphasizing resource production outputs as a consequence of ecological objectives that minimize incremental loss of habitat and species abundance in a largely pristine forest ecosystem. The Tongass, as the major land base within the Northern Pacific Coast ecoregion, presents such an opportunity.

Incremental loss of habitat and species abundance in various locations on the Tongass is expected to occur under the Tongass Exempt Alternative, without posing what is currently considered an unacceptable level of risk to biodiversity across the Tongass as a whole (USDA, Forest Service 1999, USDA, Forest Service 1997). Incremental loss, although less than losses expected under the Tongass Exempt Alternative, are also expected to occur under the Tongass Deferred and the Tongass Selected Areas Alternatives. In contrast, prohibitions could be applied immediately to the Tongass under the Tongass Not Exempt Alternative, greatly reducing much of the expected incremental loss of habitat and species abundance and posing very little risk to biodiversity.

The Tongass Not Exempt Alternative is somewhat similar to Tongass FEIS Alternative 1 (TLMP 1997d), which limited timber harvest to small-scale timber production to maintain forest structure, function, and dynamics similar to existing natural conditions. Such a management approach is consistent with the fundamental shift in societal values held by a growing segment of the American public, and the ongoing shift in Federal land management to emphasize outputs resulting from managing to achieve other ecologically oriented objectives. The rare opportunity to apply this approach to a large, unique, and largely intact ecosystem, before further incremental compromises to the ecosystem occurs, is what makes the Tongass alternatives consequential at a national scale.

Other Ongoing Rulemaking and Policy Effects – Immediately following this section is a Summary of Cumulative Effects of the proposed Roadless Rule alternatives with other Federal Policies. Some of these, such as the Forest Service Cohesive Fire Strategy, will have little or no effect on the management of the Tongass. Other policies, such as the Roads Policy, Planning Regulations, Unified Federal Policy, and Forest Service Strategic Plan may cumulatively affect the ecological, social, and economic conditions on the Tongass National Forest.

Collectively, other ongoing rulemaking efforts can be expected to result in additive beneficial cumulative effects to ecological resources when added to the incremental effects of the Roadless Rule. Specific aspects of these efforts include integrating the contributions of science into the planning process through science consistency evaluations and science advisory boards, giving priority to decommissioning unneeded roads, emphasizing the maintenance and upgrading of heavily used roads, and identification of priority watersheds through watershed assessment. The analysis prescribed under all ongoing rulemaking efforts can be expected to slow development activity, thereby retaining natural landscapes over the long term.

The cumulative effects of ongoing rulemaking efforts, including the proposed Roads Policy, may affect the timber supply available to meet market demand in the reasonably foreseeable future. Currently, the proposed Roads Policy contains language that requires a compelling need to build new roads for an interim period. The effects of the proposed Roads Policy on the timber supply would then depend on decisions made at the local level in response to analyses required by the policy.

Summary of Cumulative Effects

Effects of the Prohibition Alternatives Across Resources

Cumulative effects of past, present, and reasonably foreseeable future actions for individual resources were discussed under each resource section in this chapter. These sections disclose the cumulative effects of maintaining inventoried roadless areas in the context of the collective resource impacts. Using the benchmark dates of 2004, 2020, and 2040, these analyses assume the Roadless Rule will remain unchanged through the next three rounds of land management-plan revisions. While it is possible that changes to roadless area conservation could happen by legislative, executive, or Agency action during this time period, the possibilities for change are speculative and therefore, not discussed. This section presents the “synergistic interaction of different effects” disclosed under each resource section as they qualitatively relate to each other (Council on Environmental Quality 1997). The following discussion focuses on the cumulative effects of the proposed Roadless Rule in conjunction with ongoing and recently finalized Federal rules and policies.

The most consistent change exhibited across all resources, which directly or indirectly affects NFS lands management, is our growing population and our increasingly affluent standard of living. Population growth has intensified the pressure on our natural resources. There is a prolific demand for wood products, minerals, recreational activities, and, to a lesser extent, for special uses, such as power line rights-of-way, irrigation diversions, or communication sites, on both a national and global scale. Cumulatively, the pressure exerted on these resources is likely to increase the adverse effects to biodiversity.

Increasing national economic prosperity is driving the demand for more consumer goods, such as the softwood lumber needed for larger homes. Today's average American single-family home is 48% larger than it was in 1970 (MacCleery 1999). Economic growth is also influencing recreation demand, and the type of recreation activities that people are choosing. However, there is an increasing demand to provide recreation opportunities and facilities and access to those activities and facilities close to population centers. Mineral and energy development are also associated with intensified consumer demand from economic growth.

Population and economic growth are causing shifts in development patterns. More privately owned rural land is converted into housing developments, community infrastructures, commercial centers, and industrial sites. While these development patterns are not on NFS lands, some are adjacent to or surrounded by NFS lands. Between 1992 and 1997, this development trend converted nearly 16 million acres of privately owned forest, cropland, and open space into urban and other uses. This type of land conversion has escalated problems for rural firefighters and heightened the demand from homeowners for wildland fire protection at the wildland-urban interface. Nationally, there is growing concern over the loss of open space in and around urban areas and elsewhere. This reduction of open space is compromising the quantity and quality of available habitat for some aquatic and terrestrial animal and plant species. Accelerated demand for recreation and special uses on NFS lands is also linked to changes in development patterns.

Social values and paradigms are shifting across our nation as we learn more about ecosystem function and open space scarcity.²⁸ With the increasing urbanization of privately owned lands, a growing number of people are valuing Federal lands as a repository of biodiversity and conservation. Many people appreciate NFS lands more for their inherent "naturalness" than for the commodities, such as timber, minerals, and grazing, that these lands can provide. These societal changes, along with implementation of environmental laws, are changing some programs and activities for Federal land-management agencies like the Forest Service, National Park Service, and Bureau of Land Management. Examples include the recent National Park Service decision to limit snowmobile use in selected parks and the Bureau of Land Management announcement in January 2000 to develop a strategy to improve management of off-highway vehicle use.

Additionally, Forest Service actions have paralleled shifts in social values and responded to increasing environmental concerns. Past Agency actions that relate specifically to issues of roadless area management are Wilderness recommendations, road development, and timber harvesting. Understanding these three areas helps to understand the current need for action.

The Forest Service conducted the first inventory of roadless areas in 1972 in an effort to identify areas greater than 5,000 acres that were suitable for inclusion in the National Wilderness Preservation System as required by the Wilderness Act of 1964. Congress enacted the Eastern Wilderness Act in 1975, which affected specified NFS lands east of

²⁸For a discussion on the recent changes in scientific viewpoints, see *Forces of Change: A New View of Nature* (Smithsonian 2000) and other works listed in the Reference Cited section of this analysis.

the 100th meridian (Figure 1-1). A second and final review (RARE II) was finalized in 1979 and resulted in an updated inventory of roadless areas, again to make Wilderness recommendations to Congress. In 1984, Congress passed 21 separate Wilderness Acts for individual States; Montana and Idaho did not receive an act. These State Wilderness Acts included language that released non-wilderness areas from further wilderness review until land-management plan revision. Since RARE II, additional reviews have been conducted through the land management planning process and other large-scale assessments. The debate continues concerning whether roadless areas that were released from consideration for Wilderness recommendation under current land management plans, should remain undeveloped. Road construction, reconstruction, and certain types of timber harvest are the principle Agency activities that initiate development of roadless areas.

From 1944 until the present, the number of road miles on national forests has risen from an estimated 100,000 miles to approximately 386,000 miles. The majority of these roads were constructed to support timber harvest activities. Partly because of the reduction in the timber program during the 1990s, the decline in available funding for road maintenance created the current backlog of \$8.4 billion in deferred maintenance and capital improvement needs, which has raised some of the environmental concerns discussed previously. Agency priority under the Natural Resource Agenda has shifted road management from enlarging the forest road system to decreasing the deferred maintenance problem, providing for safe travel, and improving the balance between access and environmental protection.

Before the end of World War II, harvesting timber from the national forests was principally custodial. With the housing demands following World War II, harvesting from national forests increased rapidly from 1945 to 1965. Harvesting through the 1960s, 1970s, and 1980s continued at relatively high levels (7 to 12 BBF). To maintain these timber harvest levels, greater reliance on inventoried roadless areas was needed in many parts of the country. Greater environmental awareness in the late 1980s and throughout the 1990s brought a sharp decline in timber harvesting. The volume of timber sold from NFS lands declined from more than 11 BBF in 1987 to 2.2 BBF in 1999. The annual reductions in timber harvest (60 to 220 MMBF per year) under Alternatives 2 through 4 are only a small fraction of this prior decline in timber harvest across NFS lands, and adds little cumulatively to this past decrease.

As land management plans have been revised in recent years, there has been a substantial decrease in the allowable sale quantity and designation of suitable acres for timber harvesting. This decrease in timber harvesting coincided with the increased recognition that roadless areas are important for ecological and human-centered reasons. This section and other cumulative effects discussions in this FEIS demonstrate the interrelationship among water quality, biodiversity, and wildland fires, which are major resource areas of concern regarding road access and certain timber harvest practices in inventoried roadless areas.

Various factors, including land use activities, land conversions, and laws, rules, and regulations, affect water quality, biodiversity, and fuels management. On NFS lands, the Agency timber program has experienced a major decline in volume over the past 10

years. Entry into inventoried roadless areas to harvest timber has been controversial and costly to plan and implement. Nationally, inventoried roadless areas have not provided a large share of the timber program, yet on some forests, timber sales from inventoried roadless areas contribute to the local economy.

The Agency's fuels treatment program is focused on developed portions of NFS lands. Few treatments are expected in inventoried roadless areas over the next 20 years because of higher priorities for treating managed timber stands and protecting property. Roughly, 99% of all human-caused ignitions and 92% of all lightning-caused ignitions occur on State and Federal land outside of inventoried roadless areas. If the majority of the 14 million acres potentially needing fuel treatment in inventoried roadless areas remain untreated over the next 20 years, the number of large wildland fires and total average annual acres burned by wildland fires in inventoried roadless areas will increase slightly. However, when these 14 million acres are compared to the 580 million acres of Federal, State, and private lands outside of inventoried roadless areas that are ranked as potentially needing fuel reduction treatment, the increase (2.4%) is insignificant.

Approximately 31% of NFS lands are in inventoried roadless areas. Their value as biological strongholds for terrestrial and aquatic plants and wildlife and as sources of clean water have become increasingly important as habitat loss, habitat degradation, nonnative species invasions and development continues to occur on other NFS lands and other lands nationally. For example, dams, water diversions, stream-channel control projects, and development have affected more than 3 million miles, or about 98%, of the streams in the United States. In every State in this country, the Environmental Protection Agency (1998b) has found stream and lake sediments polluted by contaminants from surrounding watersheds, and this Agency estimates that about 10% of the stream and lake sediments in the United States contain contaminate levels sufficiently high to pose risks to fish-consuming wildlife and humans. In the mid-1980s, the U.S. Geological Survey estimated that the number of wetland habitats in the contiguous United States have diminished more than 50% since European colonization in the early 1600s; estimated change from 221 million acres to 103 million acres (USDI Geological Survey 1997b). With the exception of Alaska, few large, relatively undisturbed areas remain in this country outside of designated Wilderness Areas, increasing the relative value of the waters, wetlands, and other habitats that inventoried roadless areas support, and the biological diversity that they foster.

Conserving inventoried roadless areas will have mixed effects on recreation activities. Inventoried roadless areas have traditionally been viewed as places where future developed recreation, such as resort development, may potentially expand. A prohibition on road construction and reconstruction in inventoried roadless areas will maintain the current recreation land availability while preventing road-based recreational developments. The effects on dispersed recreation opportunities are especially mixed. Currently, inventoried roadless areas are seen as important places where dispersed motorized and mechanized uses may sometimes occur. However, as motorized recreation expands into inventoried roadless areas, there are direct conflicts with other users who may be seeking quiet and solitude. Motorized and mechanized uses can also conflict with other resources including soil and water protection and plant and animal habitat quality. Maintaining a balance between competing uses in inventoried roadless areas has been

increasingly difficult as large areas available for dispersed recreation decline due to development.

Overall, NFS lands satisfy approximately 5% of the nation's timber demand. Inventoried roadless areas are anticipated to provide up to 7% of the Agency's total timber harvest or about one-third of 1% of the national demand. While this 7% is small in comparison to the national program, it can be critical to the economies of certain local communities. Nationally, any decrease in timber harvest from inventoried roadless areas would likely be compensated with offerings from private lands or imports. Mineral and energy resources from inventoried roadless areas can be of substantial value, and lack of road access for exploration and development could have effects on future development of these resources. On a national scale, mineral and energy contributions from inventoried roadless areas are small, but, similar to the timber resource, these contributions can have critical economic impacts on local communities. Other Federal, State, and private lands, or imports would likely offset any decrease in mineral and energy supply from inventoried roadless areas.

As population growth and land conversion due to urbanization and development in the United States increase, the value of the ecological and social characteristics of inventoried roadless areas will continue to increase relative to the economic values of the commodity resources, such as timber and mineral production, contained in these areas. In the Western, northeastern, and north central States, and in Southeast Alaska, rural communities that are highly dependent on timber harvest or mineral extraction from NFS lands view inventoried roadless areas as important economic resources. During the past 13 years, many of these communities experienced the economic effects of a reduction in national forest timber harvesting levels, which have dropped from more than 12 BBF in 1987 to less than 3 BBF in 1999. The majority of this harvest has always come from the roaded portions of NFS lands. Further economic loss from a reduced timber program, or additional loss from a reduction in the minerals program, without corresponding new local employment opportunities at the same wage scale, could add to the social and economic problems faced by rural communities unable to diversify. Reductions in resource production may require some residents to relocate to obtain comparable employment.

Other Federal Policies

The Forest Service and other Federal agencies have a number of ongoing or recently finalized rulemaking and policy efforts that alone or in combination with the Roadless Rule affects NFS lands management. As these public rulemakings and policies are finalized, the Agency may choose to integrate and clarify certain provisions within each rule or policy to ensure consistency, clarity, and effectiveness with other ongoing initiatives. The Forest Service recognizes that the Roadless Rule together with the other proposed and finalized rules and policies could have cumulative effects. These other efforts are discussed below.

National Forest Management Act Planning Regulations

The proposed Planning Regulations were published in the Federal Register on October 5, 1999 (64 FR 54074). This rule has been finalized. These regulations guide land management planning for the National Forest System and describe the required planning process for and content of land and resource management plans. Three key elements are emphasized in the Planning Regulations: 1) collaboration with interested and affected parties; 2) ecological, social, and economic sustainability; 3) science based assessments and planning. Key provisions include new requirements for integrating the contributions of science into the planning process through evaluations and advisory boards; collaboration and adaptive management planning with government, Tribal, and other interested groups; and a management priority to maintain and restore ecological sustainability.

In the final Planning Regulations, roadless areas and unroaded areas are recognized as possible special designations. The rule intends that direction for these areas would be integrated into land management plans to the extent possible. The rule does not specify criteria or characteristics for roadless area delineation or management. However, the rule does rule that all undeveloped areas that are of sufficient size as to make practicable their preservation and use in an unimpaired condition will be evaluated for Wilderness designation during the plan revision process (36 CFR 219.29). These are typically unroaded areas exceeding 5,000 acres.

The proposed procedural criteria and characteristics for specified roadless areas are identified in the proposed Roadless Rule at §294.13 (65 Federal Register 30276). This direction would provide the procedures that could be used to consider the roadless areas and unroaded areas called for in the final Planning Regulations for plan revisions. In other words, the proposed Roadless Rule would provide one of the tools that local land managers could use when implementing the special designations section of the final Planning Regulations. Therefore, in this context, the two rules (Planning Regulations and Roadless Rule) are complementary, not additive. However, given that a purpose of the Roadless Rule is to conserve roadless characteristics, if the two rule are implemented together, it is reasonable to predict that more inventoried roadless areas would be allocated to management uses that maintain undeveloped roadless characteristics than may have been allocated by the Planning Regulations alone. To what extent this would occur is not predictable since it would occur through the local decision making process.

Forest Service Transportation Policy

On February 12, 1999, the Forest Service issued a final Interim Roads Rule that temporarily suspended permanent and temporary road construction and reconstruction in certain unroaded areas²⁹ of NFS lands. This suspension was in effect until a final

²⁹This final interim rule was published as 36 CFR Part 212 Administration of the Forest Development Transportation System: Temporary Suspension of Road Construction and Reconstruction in Unroaded Areas; Interim Rule, February 12, 1999 (64 FR 7290). The rule expired according to its own terms on September 1, 2000.

National Forest System Transportation System policy was developed or for 18 months, whichever was sooner.

A final National Forest System Transportation System rule and policy (Roads Policy) is being developed. It was thought that a final Roads Policy would be in place before the expiration of the Interim Rule. However, as of the publication of this FEIS, a final Roads Policy has not been promulgated. The proposed Roads Policy would amend 36 CFR 212, 261, and 295 and Forest Service Manual 7700 and 1920. The proposed changes would shift the emphasis from transportation development to managing access within the capability of the land. The proposed rule would change definitions and road management objectives, establish information to be contained in the road atlas (maps and inventory), and direct officials to identify the minimum transportation system needed that would best serve current and anticipated management objectives and public uses of NFS lands.

Under the Roads Policy, unneeded roads would be given decommissioning priority if they were causing environmental impacts. Changes to the provisions in the transportation manual (FSM 7700) would prioritize unneeded road decommissioning, emphasize maintenance and reconstruction of heavily used roads, and established new definitions for the transportation system. In addition, changes to FSM 7700 would only permit construction of new roads or reconstruction of existing roads in inventoried roadless areas, and other certain unroaded areas, for compelling needs until a comprehensive road inventory and road analysis is accomplished and integrated into the applicable land management plan. A compelling need may include restoration and protection of critical resources, maintenance of public safety, or ensuring a legal right.

The proposed Roads Policy requires a determination of a compelling need for road construction and reconstruction in certain unroaded areas. Alternative 2 through 4 in this FEIS would augment the provisions of the proposed Roads Policy that address inventoried roadless areas, since under these alternatives road construction and reconstruction in inventoried roadless areas would be prohibited. However, projects would be allowed under an exception to the prohibitions of the Roadless Rule, would be subject to the analyses and guidance required by the Roads Policy until a forest-wide roads analysis process was completed and land management plans amended as necessary.

The proposed Roads Policy also requires that a science-based roads analysis process is accomplished forest-wide. The roads analysis process is also useful to help analyze effects to unroaded areas in conjunction with land management amendments or revisions and project planning.

The increased screening and analysis for certain unroaded areas of NFS lands provided by the Roads Policy is beyond the requirements of the Roadless Rule. Additionally, the proposed Roads Policy, through the roads analysis process, would result in better road planning and a probable decrease in road construction overall. The proposed Roads Policy is complementary to the proposed Roadless Rule and provides an additional level of review and analysis in certain unroaded areas of NFS lands.

Unified Federal Policy

On February 22, 2000, the Secretary of Agriculture and Secretary of Interior proposed a Unified Federal Policy (UFP) for watershed management in response to the President's Clean Water Action Plan (65 FR 8834). The UFP was finalized and signed by eight departments and agencies in October 2000. The Clean Water Action Plan is a blueprint for cleaning up America's rivers, lakes, and coastal waters. The Plan contains 111 action items, many of which are already underway. The UFP is one of the action items. The purpose of the UFP is to develop a consistent approach to watershed management among Federal agencies, States, Tribes, and interested stakeholders. The foundations of the policy are the "watershed approach" to Federal land and resource management and an emphasis on collaboration to identify and solve watershed problems. A key task of the UFP is identification of priority watersheds through watershed assessments. Agencies agree to work more collaboratively and cooperatively with Federal, State, Tribal and local governments; monitor water quality and management activities; and share training, information, and resources. The policy would be implemented only to the extent possible within existing planning programs.

There are no provisions within the UFP that address the management or role of inventoried roadless areas in fulfilling its goals and objectives. The UFP is consistent with the prohibitions on road construction and reconstruction in inventoried roadless areas in the proposed Roadless Rule and the proposed Roads Policy. The roads analysis process required by the Roads Policy can become a component part of watershed analyses required by the UFP. These watershed analyses are also consistent with the requirements of the Planning Regulations.

Report to the President on the Wildland Fires of 2000

On August 8, 2000, President Clinton asked Secretaries Babbitt and Glickman to prepare a report that recommended how best to respond to the severe fires of 2000, reduce the impacts of wildland on rural communities, and ensure sufficient firefighting resources for the future. This report, titled "Managing the Impacts of Wildland Fires on Communities and the Environment: A Report to the President in Response to Wildfires of 2000," was completed on September 8, 2000. The report recommended a large budget adjustment of \$2.8 billion for fiscal year 2001 for Department of Interior appropriations to be used to increase cooperative programs in support of local communities, treat fuels, and restore burned areas. The report emphasizes a continuing priority on firefighting resources throughout the remaining 2000 fire season, restoring landscapes and communities, investing in projects to reduce future fire risks, working directly with communities, and being accountable.

All of the action items called for by the Report to the President are compatible with the proposed Roadless Rule. The alternatives will have little direct effect on prioritization of fuel treatment since most high priority treatment areas (the wildland-urban interface, municipal watershed, and threatened and endangered species) occur outside inventoried roadless areas.

The alternatives would prohibit road construction and reconstruction for burned area restoration in inventoried roadless areas. Seldom has road construction or reconstruction been necessary for emergency fire rehabilitation and recovery projects in the past. Therefore, the potential limitation of the alternatives would not be a significant impediment for implementing the restoration and recovery components outlined in the Report to the President.

The restoration of damaged landscapes could require removal of small diameter trees and brush. Under Alternatives 2 through 4, restoration work involving removal of trees in inventoried roadless areas would be limited without road construction or reconstruction. Tree removal under Alternative 4 would not be possible. Therefore, Alternatives 2 through 4 could limit certain long-term full attainment of the goals outlined in the Report to the President, however, such reductions are expected to be minimal.

Cohesive Strategy

Protecting People and Sustaining Resources in-Adapted Ecosystems: A Cohesive Strategy has been developed and is currently prepared for release to the public. This strategy is a management framework for restoring and maintaining ecosystem health in fire adapted ecosystems primarily in the Western United States. The Cohesive Strategy does not mandate where a specific fire-hazard reduction project should take place. However, it strategically guides land managers to place a high priority on forests and shrub lands that have historically burned frequently and can be classed as moderate to high risk from uncharacteristic wildfire effects. Specific Cohesive Strategy priorities are:

- Wildland-urban interface,
- Readily accessible municipal watersheds,
- Threatened and endangered species habitat, and
- Maintenance of existing low-risk Condition Class 1 areas.

The Cohesive Strategy contains three core elements: 1) institutional, 2) program management, and 3) social. Institutional elements would include linking the Cohesive Strategy to the Government Performance and Results Act of 1993 and establishing performance elements for annual reporting and procedures for assessing the status, risk, and priorities of projects and activities. The program management elements include the Forest Service budget structure, criteria for setting priorities, authorities, workforce and program review, and oversight. The social elements include emphasis of collaborative planning, science-based assessments, and assistance to local communities in fire planning. At full program implementation, the Cohesive Strategy will identify a need for mechanical or prescribed fire treatment annually on 3 million acres in the West, and 1.2 million acres in the Eastern and Southern United States over the next 15 years. The cost of such a program is estimated to be \$825 million annually.

The highest fuel treatment priorities resulting from applying the Cohesive Strategy are for protection of communities and private property, community watersheds, T&E species, and air quality. The Strategy does not advocate treating all acres at risk but supports

strategically placing fuel treatment areas across a landscape to substantially reduce the adverse effects of fire.

Even though inventoried roadless areas are not identified as potentially needing fuel treatment in the short term, fuel management work may be required in these areas. Prohibitions on road construction and reconstruction in inventoried roadless areas (Alternatives 2, 3, and 4) could hinder fuel reduction treatments on some inventoried roadless areas that are at moderate to high risk from uncharacteristic wildfires effects. This would be due to the increased cost of treatments associated with using non-road dependent techniques to accomplish the fire hazard-reduction objectives. Some of these untreated areas would burn as wildland fires under a **natural management** regime with the anticipated effects to air, water, soil, and other resources as described previously in this chapter.

Forest Service Strategic Plan

The Forest Service Draft Strategic Plan became final in October 2000. This plan contains four broad strategic goals for the Agency: 1) ecosystem health, 2) multiple benefits to people, 3) science and technical assistance, and 4) effective public service. The Natural Resource Agenda, which is tied directly to the Strategic Plan, identifies road management as a key issue that needs to be addressed by the Agency. The Roadless Rule and Roads Policy are intended to initiate a change in road management emphasis.

The Strategic Plan is a framework strategy under which the Roadless Rule fits. There are no direct cumulative effects in connection with the Strategic Plan and the Roadless Rule since the Strategic Plan does not lead to any direct action on the ground or compel any policy development or implementation. The proposed Roadless Rule and proposed Roads Policy, with their emphasis on road management, would complement the Strategic Plan.

Sierra Nevada Framework

The Sierra Nevada Framework will amend 11 land management plans in the Sierra Nevada Range. The key issues being addressed are old-forest ecosystems, riparian ecosystems, fire and fuels, noxious weeds, and lower west-side hardwoods. Resolution of these issues is not dependent on the construction or reconstruction of roads in inventoried roadless areas. The DEIS of the Sierra Nevada Framework was made available to the public in April 2000. The analysis in the DEIS addressed effects that would result from the proposed Roadless Rule and proposed Roads Policy. The DEIS states that all alternatives are consistent with the proposed changes to the Roads Policy and the proposed Planning Regulations. However, depending on the scope of the final Roadless Rule, some aspects of some alternatives considered for the Sierra Nevada Framework could be affected. These effects are believed to be small and connected with the ability to treat fuels where road construction may be required. Road construction and reconstruction in inventoried roadless areas is unnecessary to attain the goals, objectives, or standards in the preferred alternative of the DEIS for the Sierra Nevada Framework. However, Alternatives 1, 4, and 7 in the Sierra Nevada Framework DEIS may be difficult to achieve under Alternatives 2 through 4 in this FEIS.

Interior Columbia Basin Ecosystem Management Project

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) will provide a context for Forest Service and Bureau of Land Management managers within the Columbia River Basin to make sound local decisions while considering effects, particularly cumulative effects, at a scale larger than individual administrative units. The preferred alternative of the March 2000 Draft ICBEMP Supplemental EIS, anticipated only minimal entry into inventoried roadless areas. The ICBEMP plan recognizes the importance of inventoried roadless areas to provide critical wildlife habitat and serve as key watersheds for supply of high quality water. The proposed ICBEMP is consistent with the purpose and need for the Roadless Rule. Therefore, the prohibition alternatives in this FEIS are expected to minimally affect the ICBEMP.

Lynx and Other Listings by the Fish and Wildlife Service

In response to the uncertain status of Canada lynx populations and habitat, an interagency lynx coordination effort was initiated in March 1998. The U.S Fish and Wildlife Service, Forest Service, Bureau of Land Management, and National Park Service have participated in this effort. In July 8, 1998, the U.S. Fish and Wildlife Service proposed a rule to list the lynx as a threatened species and, effective April 24, 2000 (65 FR 16051), the U.S. Fish and Wildlife Service listed the Canada lynx as threatened for the contiguous United States, pursuant to the Endangered Species Act of 1973, as amended.

Three products important to the conservation of the lynx on federally managed lands have been produced through the interagency effort the: 1) Scientific Basis for Lynx Conservation, 2) Lynx Conservation Assessment and Strategy, and 3) a Lynx Conservation Agreement. These products were developed to provide a consistent and effective approach to conserve the Canada lynx on Federal lands in the contiguous United States.

The Lynx Conservation Assessment and Strategy identifies a number of conservation measures to address lynx risk factors. One large-scale risk factor is fragmentation and degradation of lynx habitat affecting mortality and movement. The Strategy does not identify specific habitat areas, but rather generally identifies habitat conservation as an element in a long-term conservation strategy for lynx (and other large carnivores). Alternative 2, 3, and 4 of this FEIS would conserve inventoried roadless areas that contain significant amounts of habitat for species like the lynx. The inventoried roadless areas occur throughout the range of the lynx in the contiguous United States and therefore, this Roadless Rule cumulatively contributes to conservation of the lynx and other T&E species occupying similar habitats.

With more than 400 TE species habitats on NFS lands, it is likely that more conservation strategies similar to the one for lynx will be implemented, especially for

wide-ranging furbearers, and where groups of species are combined under one strategy. In a few cases, these strategies may require manipulation of vegetation for the benefit of a specific species. However, it is anticipated that all alternatives in this FEIS would meet the need for management of future listed species.

Land Management Planning

The Forest Service has 36 forests and grasslands that have published notices in the Federal Register of their intent to revise or establish their land management plans. Six units anticipate completion of their plans in 2001, seven anticipate completion in 2002, and nine in 2003. Implementation of the prohibition alternatives in this FEIS may affect their analysis schedules.

The Roadless Rule does not require amendment or revision of any land management plans. Implementation of any of the prohibition alternatives will supercede direction contained in existing and newly revised land management plans. Therefore, it will remain up to the local responsible officer to determine how best to conform ongoing planning for a land management to the selected action resulting from this FEIS. Affect to land management-plan-revision schedules because of implementation of any of the prohibition alternatives cannot be predicted.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR §1502.16). The Multiple-Use Sustained-Yield Act (Public Law 104-333) defines productivity as part of multiple-use management. Specifically, “multiple use means that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.”

In this context, implementation of any of the alternatives does not require an on-the-ground action to occur; therefore, they do not compel short-term uses. If implemented, the prohibition on road construction and reconstruction in inventoried roadless areas would maintain long-term productivity by reducing loss caused by road construction to watersheds, soils, critical habitat, and dispersed recreation activities in inventoried roadless areas when compared to Alternative 1 (Tongass Exempt). Alternatives 3 and 4 would further maintain the long-term productivity of these resources by reducing effects caused by timber harvesting.

Among the Tongass National Forest alternatives, the effects of the Tongass Exempt Alternative would be similar to those under Alternative 1. Applying the requirements in

Tongass Deferred Alternative would maintain short-term uses, such as road construction and timber harvest, at current levels through 2004 and, in this regard, is similar to the Tongass Exempt Alternative. Implementation of the prohibitions in the four LUDs under Tongass Selected Areas Alternative would cause an immediate reduction of some short-term uses in these land use designations. Under the Tongass Not Exempt Alternative, not granting an exemption for effects is the same as those discussed under the prohibition Alternatives 2 through 4.

Unavoidable Adverse Effects

Selection of Alternative 1 would continue any unavoidable adverse effects of road construction and timber harvesting in inventoried roadless areas. Final implementation of Alternative 2, 3, or 4 would also cause some unavoidable adverse effects such as a reduction in the number of acres available for forest health and fuels management treatments (see Forest Health and Fire Ecology section this chapter).

Reduction in the timber program would have continued social and economic effects on some dependent communities (see Forest-dependent Communities section of this chapter). Because a reduction in timber demand is not expected, further reduction in the Agency's timber program would produce off-site adverse effects caused by increased substitution of timber harvest from private or foreign lands (see Timber Harvest section under the Social and Economic Factors section this chapter).

Tongass Exempt and Tongass Deferred Alternatives would avoid most adverse social and economic effects. Short-term unavoidable social and economic effects would likely occur under the Tongass Selected Areas Alternative. The most extensive unavoidable social and economic effect would occur under the Tongass Not Exempt Alternative. Continued development in inventoried roadless areas under the Tongass Exempt Deferred and the Tongass Selected Areas Alternatives would likely have unavoidable adverse effects to many of inventoried roadless areas.

Mitigation Options

The programs described in this section are examples of those that could help establish and implement economic mitigation measures. Actual implementation of any economic mitigation measures would depend on a Forest Service budget request to Congress and subsequent funding in a final appropriation bill. The effects analysis in this chapter is independent of these or any other mitigation measures being implemented. If implemented however, these measures would mitigate some of the economic and social effects described in this chapter.

The analysis contained in this FEIS indicates that prohibitions on road construction, reconstruction, or timber harvest in inventoried roadless areas would have little economic impact to the national economy or to the forest products industry. The Forest Service has determined that 32 national forests have scheduled timber offer volumes of at least 5 MMBF over the next 5 years in inventoried roadless areas. Various combinations of the

prohibitions in these areas could have some adverse economic impacts on communities in or near those forests. USDA Rural Development Program, Rural Business-Cooperative Service, and the Rural Community Assistance Program are available to provide funding to assist communities. Anticipated effects under any alternative would partially be mitigated by these programs.

USDA Rural Development is committed to helping improve the economy and quality of life in rural America. The financial programs support such essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities, and electric and telephone service. These programs promote economic development by supporting loans to businesses through banks and community-managed lending pools. Rural Development offers technical assistance and information to help agricultural and other cooperatives get started and improve the effectiveness of their member services. Rural Development also provides technical assistance to help communities undertake community empowerment programs.

The mission of the Rural Business-Cooperative Service is to enhance the quality of life for rural Americans by providing leadership to build competitive businesses including sustainable cooperatives that can prosper in the global marketplace. The Service meets these goals by investing financial resources and providing technical assistance to businesses and cooperatives located in rural communities and establishing strategic alliances and partnerships that leverage public, private, and cooperative resources to create jobs and stimulate rural economic activity.

The Rural Community Assistance Program was originally authorized by the 1990 Farm Bill. This program serves eligible communities with populations of 10,000 or less, and Counties not contained in a Metropolitan Statistical Area that have at least 15% dependency on natural resources and forest products related employment.

One mitigation measure would be to request, and if approved, receive funding for one of these existing programs. Eligible communities impacted because of the preferred alternative described in this FEIS could access the funds. This would be done in much the same way that eligible communities in the Pacific Northwest were able to participate in Rural Community Assistance Program funds set aside for the Northwest during implementation of the Northwest Forest Plan. Such funding would be annually appropriated from Congress, responding to administration requests, and would be included in the Forest Service's budget.

If funded, and before implementation of the program, the Forest Service would identify cities and Counties in or near the affected national forests that may be eligible for these funds. A procedure would be developed by the Forest Service to permit communities not directly eligible for this program to become eligible if they can demonstrate a particular need based on implementation of the preferred alternative.

Irreversible and Irrecoverable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irrecoverable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.³⁰

Implementation of a prohibition on road construction or reconstruction in inventoried roadless areas under Alternative 2, 3, or 4 would not cause an irreversible or irrecoverable commitment of resources because a prohibition of activities would prevent any on-the-ground action. If implemented, the proposed prohibition would reduce road-caused irreversible and irrecoverable commitments to watersheds, soils, critical habitat, and dispersed recreation activities in inventoried roadless areas on NFS lands compared to the potential roading effects under Alternative 1. Under Alternatives 3 and 4, the additional prohibition on timber harvest would further lower the probability of irreversible or irrecoverable commitment of resources when compared to Alternative 1.

Under the Tongass Not Exempt Alternative, prohibitions could be applied to the Tongass and no irreversible or irrecoverable commitment of resources would occur. The Tongass Exempt Alternative would allow irreversible and irrecoverable commitment of resources to occur at a level similar to that under Alternative 1. The Tongass Deferred Alternative would allow irreversible and irrecoverable commitment of resources to occur at a level similar to that under Alternative 1 for the short-term (to 2004). Irreversible and irrecoverable commitment of resources would occur under the Tongass Selected Areas Alternative.

Other Required Disclosures

NEPA at 40 CFR §1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements³¹ concurrently with and integrated with ... other environmental review laws and executive orders.” None of the prohibition alternatives are an action that requires consultation under the Fish and Wildlife Coordination Act because they do not require water to be impounded or diverted, or with the National Historic Preservation Act because there would be no ground disturbing actions. Informal consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in accordance with the ESA implementing regulations is on going.

Requirements for USDA rulemaking procedures under regulatory laws and Executive Orders, such as the Unfunded Mandates Reform Act, Executive Order 12988, and the

³⁰In the DEIS, road effects to inventoried roadless area characteristics were described as irreversible on page 1-10 and 3-11. This has been corrected to irrecoverable.

Civil Justice Reform, were discussed in the preamble for the preferred rule published in the Federal Register on May 10, 2000 (65 FR 30276). They will be discussed in the preamble to the final rule.

There are no anticipated effects to any State or County laws because of exceptions for existing rights. Effects to other Federal lands or non-Federal lands are disclosed under each resource section if an effect is anticipated.

Other Required Disclosures (cont.)

Cohesive Strategy - A national programmatic strategy to restore and maintain ecosystem health in fire-adapted ecosystems was published by the Chief of the Forest Service on October 13, 2000. The strategy, *Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy*, is based on the premise that sustainable resources are predicated on healthy, resilient ecosystems. In fire-adapted ecosystems, some measure of fire use – at appropriate intensity, frequency, and time of year – should be included in management strategies intended to protect and sustain watersheds, species, and other natural resources over the long term.

The Strategy is also based on the premise that, within fire-adapted ecosystems, fire-maintained forests and grasslands are inherently safer for firefighters and the public than ecosystems in which fire is excluded. The Strategy establishes a framework to restore and maintain ecosystem health in fire-adapted ecosystems for the interior West. Priorities include:

- Wildland urban interface areas,
- Readily accessible municipal watersheds,
- Threatened and endangered species habitat, and
- Maintenance of existing low risk condition class 1 areas.

In Title IV of the fiscal year 2001 Appropriations Act for the Department of Interior and Related Agencies, Congress directed the Forest Service to publish in the Federal Register the *Cohesive Strategy* and to explain any differences between the *Cohesive Strategy* and certain rulemakings and planning efforts prepared pursuant to the National Environmental Policy Act.

The *Cohesive Strategy* was published in the Federal Register in November 2000. The discussion below explains how the *Cohesive Strategy* was integrated into the analytical framework of the Forest Service Roadless Area Conservation Final Environmental Impact Statement (FEIS). Any differences or inconsistencies between the *Cohesive Strategy* and the FEIS are highlighted for each alternative.

The framework for the fuel management section of the Roadless Area FEIS was structured using the same fuel management classification system as the *Cohesive Strategy*. The affected environment for inventoried roadless areas was described in terms of fire-adapted ecosystems (Fire Regimes 1 & 2) and the risk that a wildfire would cause uncharacteristic wildfire effects (Condition Classes 1, 2 and 3).

The analysis showed that approximately 14 million acres of inventoried roadless area are in fire regimes 1 and 2 and condition classes 1, 2, and 3. Of those, 3 million acres were rated as low risk of damaging soil, water, air, habitat, or human communities. An additional 7 million acres as “moderate risk” and 4 million as “high risk.”

It is essential to remember that very little fire hazard reduction work has occurred in inventoried roadless areas in the past and very little is anticipated in the future. For example, the *Cohesive Strategy* directs resource managers to focus their restoration efforts on priority areas: wildland urban interface areas, readily accessible watersheds, threatened and endangered species habitat, and maintenance of low risk areas. By definition, very few accessible municipal watersheds are

found within inventoried roadless areas. Similarly, very few inventoried roadless areas are found adjacent to wildland urban interface areas. Finally, none of the alternatives would prohibit or prevent work needed to recover threatened and endangered species.

Unless an imminent threat to public safety, private property, water quality, or threatened or endangered species exists, inventoried roadless areas would be a low priority for fuels treatment for the next 20 years, because higher priority areas are more common outside roadless areas. In spite of the fact that roadless areas are low priority for present or future treatment, if fuel reduction work were to occur in inventoried roadless areas, the effects of alternatives 1-4 on implementation of the Cohesive Strategy are described below.

Alternative 1: There are no differences or inconsistencies between the *Cohesive Strategy* and the Roadless Area Conservation rule. Since few concentrated human populations or permanent dwellings are in or near roadless areas, the highest priority for fuel treatment will continue to be outside roadless areas. Although it is unlikely that few, if any, inventoried roadless areas would be identified as priorities for hazardous fuels reduction, all of the fire regime 1 and 2 and condition class 1, 2, and 3 lands in inventoried roadless areas could be treated.

Alternative 2: This alternative prohibits road construction and reconstruction. It is unlikely that few, if any, inventoried roadless areas would be identified as priorities for hazardous fuels reduction. Nonetheless, all of the fire regime 1 and 2 and condition class 1, 2, and 3 lands in inventoried roadless areas could be treated. Fuel treatment methods requiring mechanical pretreatment prior to prescribed burning, may cost more than in roaded areas. Alternative Two presents no differences or inconsistencies to implementation of the *Cohesive Strategy*.

Alternative 3: This alternative prohibits road construction and reconstruction, and commercial timber harvest, except for stewardship purposes. It is unlikely that few, if any, inventoried roadless areas would be identified as priorities for hazardous fuels reduction. Nonetheless, all of the fire regime 1 and 2 and condition class 1, 2, and 3 lands in inventoried roadless areas could be treated. Fuel treatment methods requiring mechanical pretreatment prior to prescribed burning may cost more than in roaded areas. Alternative Three presents no differences or inconsistencies to implementation of the *Cohesive Strategy*.

Alternative 4: This alternative prohibits road construction and reconstruction, and all timber cutting. It is unlikely that few, if any, inventoried roadless areas would be identified as priorities for hazardous fuels reduction. Nonetheless, there may be a decrease in the amount of fuel management work that *could* occur in portions of the fire regime 1 and 2, and condition class 2 and 3 in inventoried roadless areas. Mechanical fuel treatments that do not involve cutting trees such as crushing, piling, or limbing would still be permitted.

Tongass Specific Alternatives: National forests in Alaska were not analyzed in the Cohesive Strategy because of the low fire hazard and fire occurrence associated with their temperate rain forests.

Firefighter and public safety: Road construction needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic events that without intervention would cause the loss of life or property is allowed under all the alternatives.