

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social, and economic environments relevant to the alternatives, and the potential changes to those environments because of the alternatives.¹ This effects analysis is structured around the two sets of alternatives described in Chapter 2: the prohibition alternatives and alternatives specific to the Tongass National Forest. The effects of the prohibition alternatives are divided into major resource sections including: Ecological Factors, Human Uses, and Social and Economic Factors. Specific resource categories are identified within each of those sections. In each case, the affected environment is described first, followed by the effects of Alternative 1 – No Action Alternative, which provides a baseline for evaluation and comparison of the other prohibition alternatives.

The effects of the Tongass National Forest alternatives are organized and described in a manner similar to the prohibition alternatives. The combined effects of these three sets of alternatives are described at the end of this chapter. For the effects analysis, a short-term time frame of 5 years (to 2004) has been used. Quantifiable data for proposed **road construction**² projects and planned **timber sales** is available for this period. For long-term effects, benchmark dates of 2020 and 2040 were selected. These dates coincide with the end of revision cycles for land management plans. The long-term effects are largely qualitative.

Overview of Inventoried Roadless Areas

The affected environment described in this chapter focuses primarily on the 31%³ of the 192 (USDA Forest Service 2000b) million acres of National Forest System (NFS) lands (Figure 3-1) that are included in **inventoried roadless areas**. Figure 3-2 shows that 18% of NFS lands are designated as **Wilderness** that already prohibit or restrict roading. Approximately 51% of NFS lands are managed for a wide variety of other uses and activities. All NFS lands are managed under the concept of multiple-use, including Wilderness.

Environmental effects under each alternative may differ substantially in different parts of the country. These environmental effects are important to disclose and discuss. Forest Service administrative regions are typically used to display the effects of national policies and programs. In addition, this FEIS relies on these administrative regions to display environmental effects where they differ geographically. Throughout this chapter, Forest Service regions are referred to by their numeric identifier (1 through 6 and 8 through 10; there is no Region 7). Forest Service regions are shown in Figure 3-1.

¹This chapter is based on resource specialist reports, which are available from the Roadless Area Project Team, USDA Forest Service, and P.O. Box 96090, Washington, DC 20090-6090 and online at roadless.fs.fed.us. Each resource specialist's education and experience is listed in Chapter 4.

²Throughout this document, at first reference in each chapter, terms defined in the Glossary are in bold typeface.

³Minor discrepancies among figures cited in the text, tables, or database are due to rounding.

The inventoried **roadless areas** analyzed in this FEIS encompass 58.5 million acres in 120 national forests located in 38 States and the Commonwealth of Puerto Rico. Within these areas, **road construction** and **reconstruction** are already prohibited on about 24.2 million acres under current land management-plan decisions. Most of the analysis in this chapter is directed at the remaining 34.3 million acres of inventoried roadless areas where road construction and reconstruction might occur under current land **management direction**. The locations of these areas are displayed in Volume 2 of this FEIS in a series of State-, and forest-level maps. Acreages of the inventoried roadless areas by State and national forest are summarized in Appendix A.

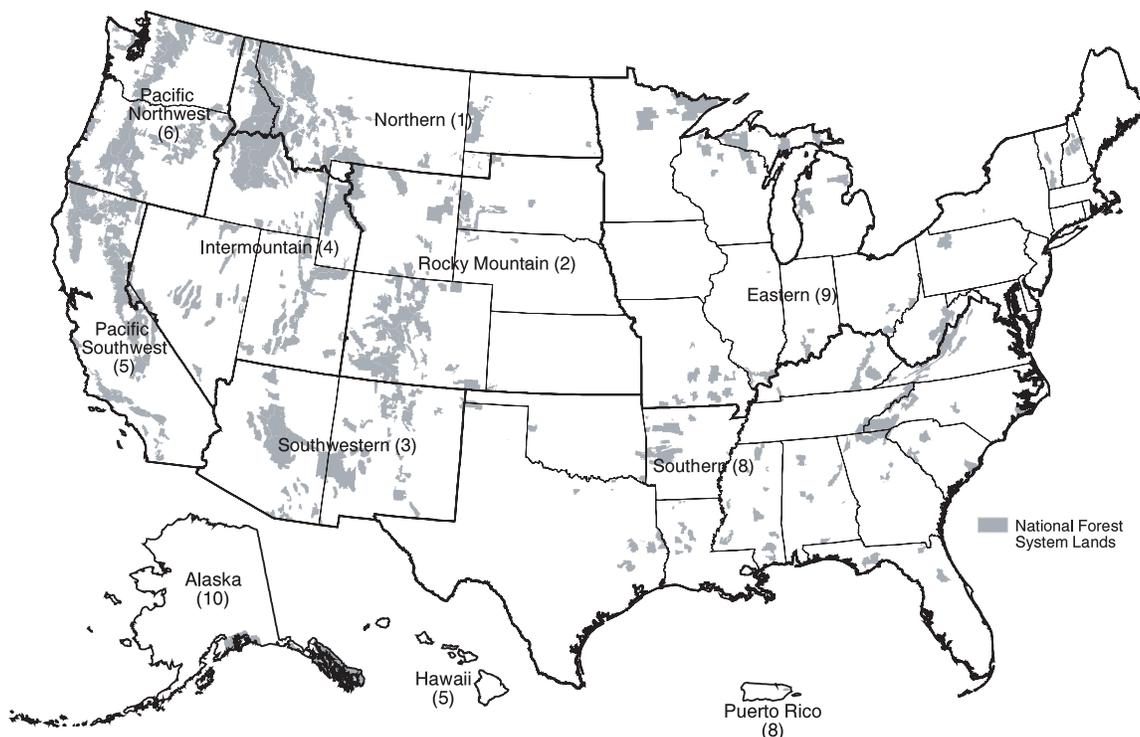


Figure 3-1. Location of National Forest System lands by Forest Service region. Numbers in parenthesis indicate the region number.

(Roadless Database 2000)

Approximately 3.6% of all inventoried roadless areas are in the Eastern United States. As shown in Table 3-1, more than 96% of all inventoried roadless areas are located in 12 Western States. Most of the areas are concentrated along the Coast and Cascade Mountain Ranges of Northern California, Oregon, and Washington; the Rocky Mountains from New Mexico to Idaho; and the Alexander Archipelago of Southeast Alaska.

Because of their locations, inventoried roadless areas are characterized by a smaller set of ecological regions than the nation or the National Forest System. Approximately 60% of the 58.5 million acres of inventoried roadless areas occur at elevations ranging from 5,000 to 11,000 feet above sea level. Mixed conifer forest is the predominant vegetation cover type, with minimal hardwood forest represented.

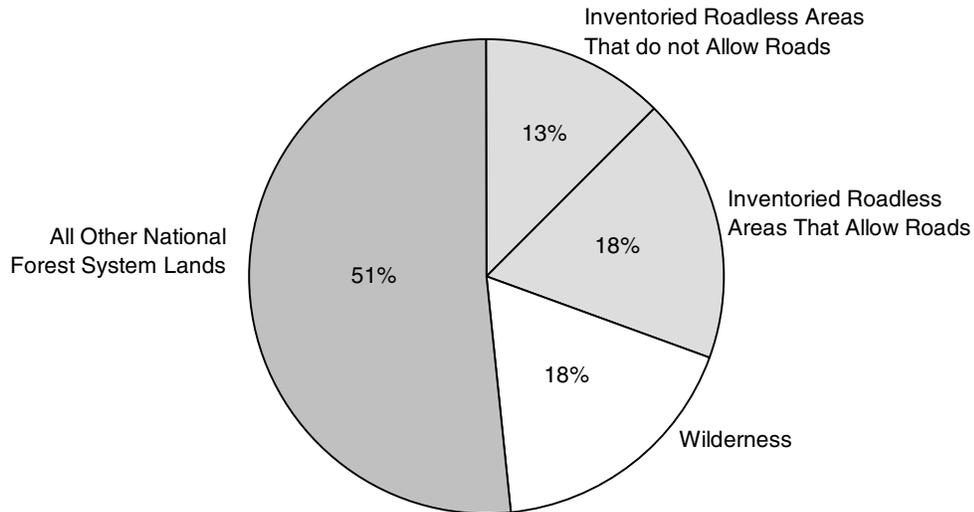


Figure 3-2. Major categories of National Forest System land designations.

(Roadless Database 2000)

There are 2,827 inventoried roadless areas in the National Forest System. Although the majority of these areas are larger than 5,000 acres, 20% are smaller. These smaller areas are generally the remaining portions of larger **RARE II** areas that were not designated as Wilderness, or parcels identified under a different set of criteria mandated by the Eastern Wilderness Act of 1975 (P.L. 93-622). Variation in size is closely tied to geographic location. Figure 3-3 shows the small size and number of inventoried roadless areas in the East compared to the West and Alaska. More than 2,300 of the 2,827 inventoried roadless areas are in the Western United States.

According to 1990 census data, 192 of the 555 cities in the United States having 50,000 or more people (slightly less than 35%) are within 60 miles of an inventoried roadless area. However, only 10% of the 2,827 inventoried roadless areas fall within this radius. These 192 cities contain approximately one-third of the nation's **urban** population. Thus, a small percentage of inventoried roadless areas likely receive a disproportionate level of use. Inventoried roadless areas that are closest to large urban populations occur in California, the Pacific Northwest, along the front range of the Rocky Mountains, near Phoenix, AZ, and near Salt Lake City, UT (Figure 3-4).

Many inventoried roadless areas contain characteristics summarized in the following list:

Soil, water, and air – These three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; help maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.

Table 3-1. Summary of inventoried roadless areas.

State	Acres (thousand)	Percent of total
Alaska	14,779	25.3
Idaho	9,322	15.9
Montana	6,397	10.9
Colorado	4,433	7.6
California	4,416	7.5
Utah	4,013	6.9
Wyoming	3,257	5.6
Nevada	3,186	5.4
Washington	2,015	3.4
Oregon	1,965	3.4
New Mexico	1,597	2.7
Arizona	1,174	2.0
Subtotal	56,554	96.6
Virginia	394	0.7
North Dakota	266	0.5
New Hampshire	235	0.4
West Virginia	202	0.4
North Carolina	172	0.3
Arkansas	95	0.2
Tennessee	85	0.2
South Dakota	80	0.1
Wisconsin	69	0.1
Georgia	63	0.1
Minnesota	62	0.1
Florida	50	0.1
Subtotal	58,327	99.8
Missouri	25	<0.1
Pennsylvania	25	<0.1
Vermont	25	<0.1
Commonwealth of Puerto Rico	24	<0.1
Michigan	16	<0.1
Oklahoma	13	<0.1
Alabama	13	<0.1
Illinois	11	<0.1
Indiana	8	<0.1
South Carolina	8	<0.1
Louisiana	7	<0.1
Maine	6	<0.1
Texas	4	<0.1
Kentucky	3	<0.1
Mississippi	3	<0.1
Total	58,518	100.0

(Roadless Database 2000)

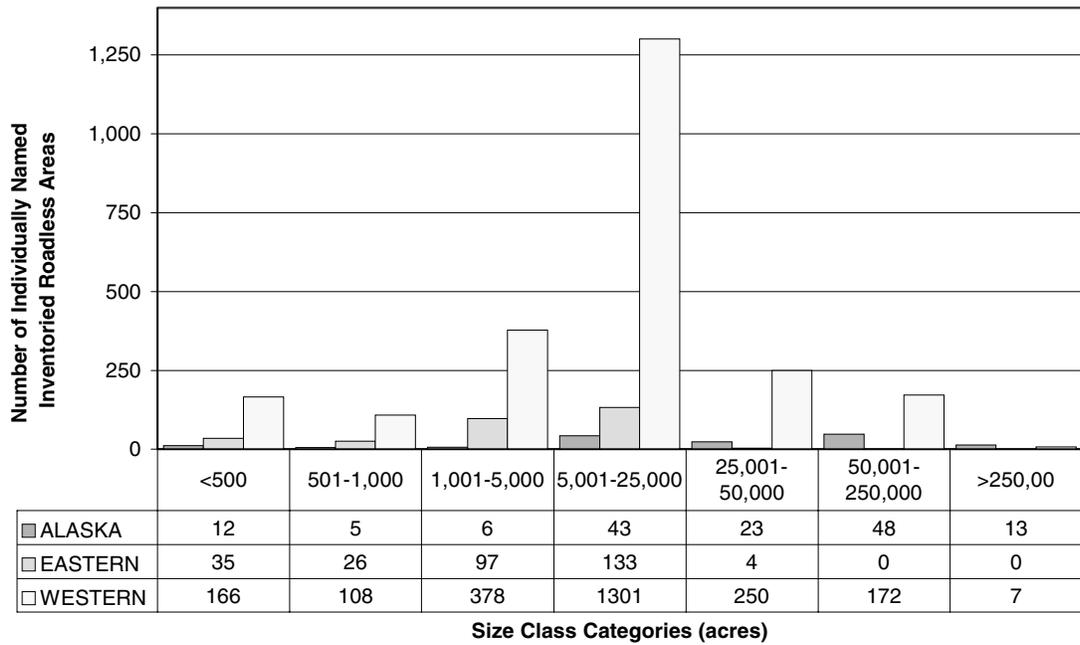


Figure 3-3. Size, in acres, and number of inventoried roadless areas by geographic region.
(Roadless Database 2000)

Sources of public drinking water – NFS lands contain watersheds that are important sources of public drinking water. Careful management of these watersheds is crucial in maintaining the flow of clean water to a growing population.

Diversity of plant and animal communities – Unroaded areas are more likely than roaded areas to support greater **ecosystem health**, including the diversity of native and desired nonnative plant and animal communities, due to the absence of **disturbances** caused by roads and accompanying activities. Inventoried roadless areas also conserve native biodiversity, by providing areas where **nonnative invasive species** are rare, uncommon, or absent.

Habitat for **threatened, endangered, proposed**, candidate, and **sensitive species** and for those species dependent on large, undisturbed areas of land – Inventoried roadless areas function as **biological strongholds** and refuges for many species. Of the nation’s species currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act, approximately 25% of animal species and 15% of plant species are likely to have habitat within inventoried roadless areas on NFS lands.

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities – These areas often provide outstanding recreation opportunities such as hiking, camping, picnicking, wildlife viewing, hunting, fishing, cross-country skiing, and canoeing. While they may have many Wilderness-like attributes; unlike Wilderness, the use of mountain bikes, and other mechanized means of travel is often allowed.

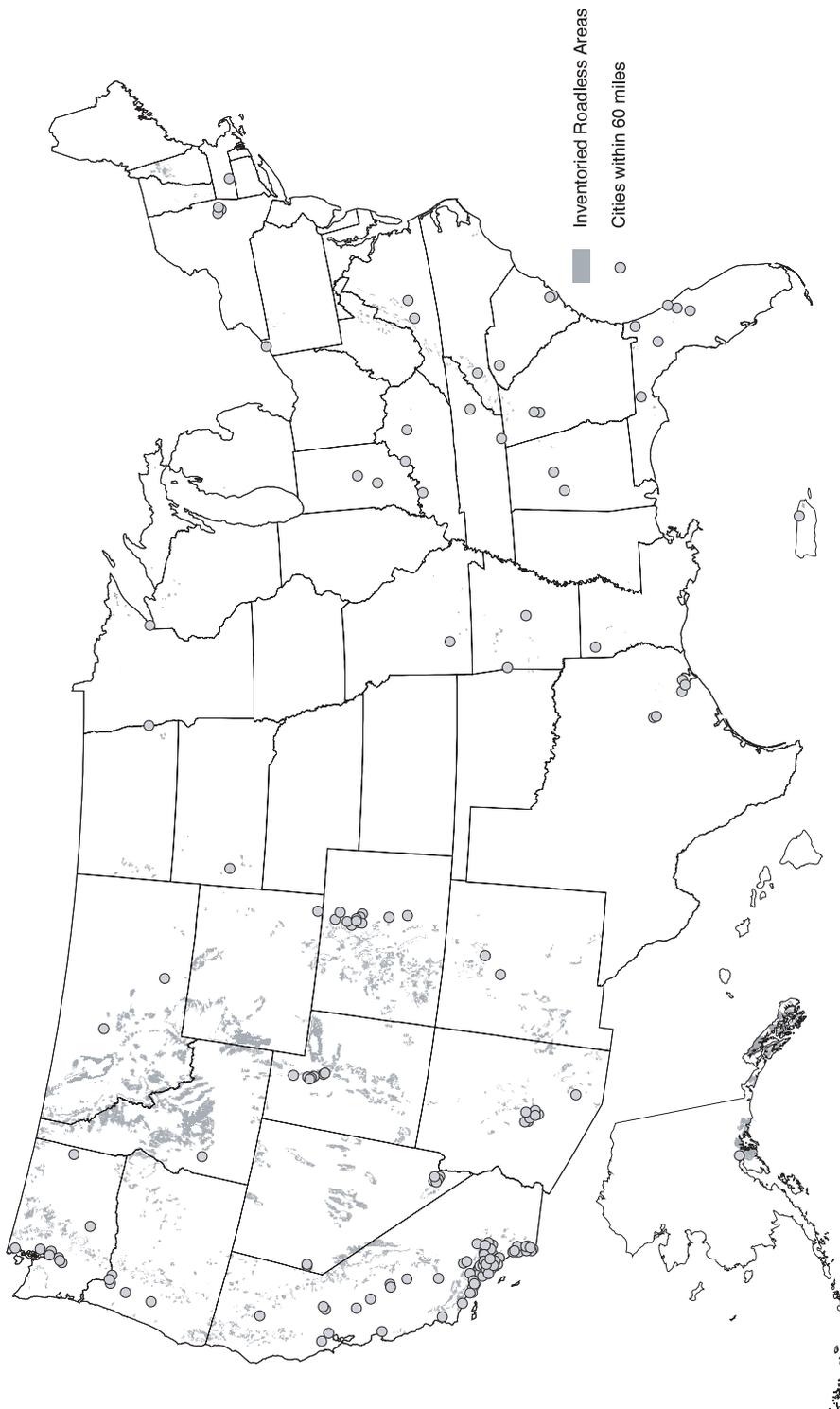


Figure 3-4. Cities with more than 50,000 people within 60 miles of an inventoried roadless area.
(Roadless Database 2000)

Reference landscapes – The body of knowledge about the effects of management activities over long periods of time and on large **landscapes** is very limited. Reference landscapes can provide comparison areas for evaluation and monitoring. These areas provide a natural setting that may be useful as a comparison to study the effects of more intensely managed areas.

Landscape character and scenic integrity – High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. In addition, quality scenery contributes directly to real estate values in neighboring communities and residential areas.

Traditional cultural properties and sacred sites – Traditional cultural properties are places, sites, structures, art, or objects that have played an important role in the cultural history of a group. Sacred sites are places that have special religious significance to a group. Traditional cultural properties and sacred sites may be eligible for protection under the National Historic Preservation Act. However, many of them have not yet been inventoried, especially those that occur in inventoried roadless areas.

Other locally identified unique characteristics – Inventoried roadless areas may offer unique characteristics and values that are not covered by the other characteristics. Examples include uncommon geological formations, which are valued for their scientific and scenic qualities, or unique wetland complexes. Unique social, cultural, or historical characteristics may also be dependent on the roadless character of the landscape. Examples include ceremonial sites, places for local events, areas prized for collection of non-timber forest products, or exceptional hunting and fishing opportunities.

Demographic Trends

The number of people in the United States has grown about 1% per year since 1980, and it continues to increase at a steady rate. In 2000, the United States population is estimated at 278.5 million (USDC Bureau of the Census 2000). This is an increase of 10.4% from the 252.3 million persons recorded by the 1990 U.S. Census. Table 3-2 shows past and projected United States population figures for 10 geographic regions of the country, illustrated in Figure 3-5.

Population growth in the United States has not been evenly distributed across the country. Over the last two decades, overall population growth has been greatest in the Southeast and Pacific Southwest. Population in the South Central United States is also increasing rapidly. However, eight of the 10 States with the fastest percent increase in population between 1990 and 1998 are in the West. They are Nevada, Arizona, Idaho, Utah, Colorado, Washington, Texas, and Oregon (USDC Bureau of the Census 1999).

Figure 3-6 shows the distribution of the United States population in 1990 in relation to inventoried roadless areas. Between 2000 and 2005, the United States population is expected to increase by 4.2%; between 2000 and 2020, it is expected to increase by 17.5 %; and, between 2000 and 2040, the United States population is expected to increase by

37.4%, to a total of 377.4 million people. This represents an average annual population growth rate of 0.8 % between 2000 and 2040. While the population will continue to increase steadily over the next 40 years, the rate of increase is expected to be slightly lower than it was during the preceding two decades.

Table 3-2. Past and projected United States population, in millions, by multi-State regions of the United States.

Region	1980 population	1990 population	2000 population	2005 population	2020 population	Population increase 1980-2020	2040 population ^a
Northeast	67.3	69.5	71.8	72.8	77.2	9.9	
North Central	42.8	43.4	46.4	47.4	50.0	7.2	
Southeast	29.6	35.7	41.7	44.3	51.0	21.4	
South Central	38.4	41.9	47.5	49.9	56.7	18.3	
Great Plains	5.3	5.4	5.8	6.0	6.5	1.2	
Intermountain	11.4	13.7	17.7	19.2	22.0	10.6	
Pacific							
Northwest	6.8	7.7	9.3	9.9	11.6	4.8	
Pacific							
Southwest	24.6	30.9	33.8	35.8	47.0	22.4	
Alaska	0.4	0.6	0.7	0.7	0.8	0.4	
Puerto Rico	3.2	3.5	3.8	4.0	4.3	1.1	
Total	229.4	252.3	278.5	290.0	327.1	97.3	377.4

^aThe U.S. Census Bureau does not project population estimates by State beyond the year 2025. (USDC Bureau of the Census 2000)

The composition of the population will also change in the future. The average age in the United States is increasing. By 2030, 20% of the American population will be over 65, compared to 12% in 1990 (USDA Forest Service 1999d). The ethnic diversity of the American population is also increasing as minority populations grow, largely because of immigration. By 2050, racial and ethnic minorities will comprise nearly 50% of the United States population, compared to 18% in 1999 (USDA Forest Service 1999d).

Table 3-3 compares the estimated 2000 United States population to the acreage of inventoried roadless areas by the multi-State regions of the United States illustrated in Figure 3-5. In general, the regions with the highest populations and/or densities have the least amount of inventoried roadless area. The most noteworthy include the Northeast, North Central, Southeast, and South Central regions, and Puerto Rico.

Most of the United States population is concentrated in **urban areas**. Between 1950 and 1990, the percent of the United States population residing in urban areas rose from 64% to 75.2%, while the percent of rural residents fell from 36% to 24.8% (USDC Bureau of the Census 1996). This shift was the result of population migration to urban areas, and land conversion in rural areas, causing some rural land to become reclassified as urban.

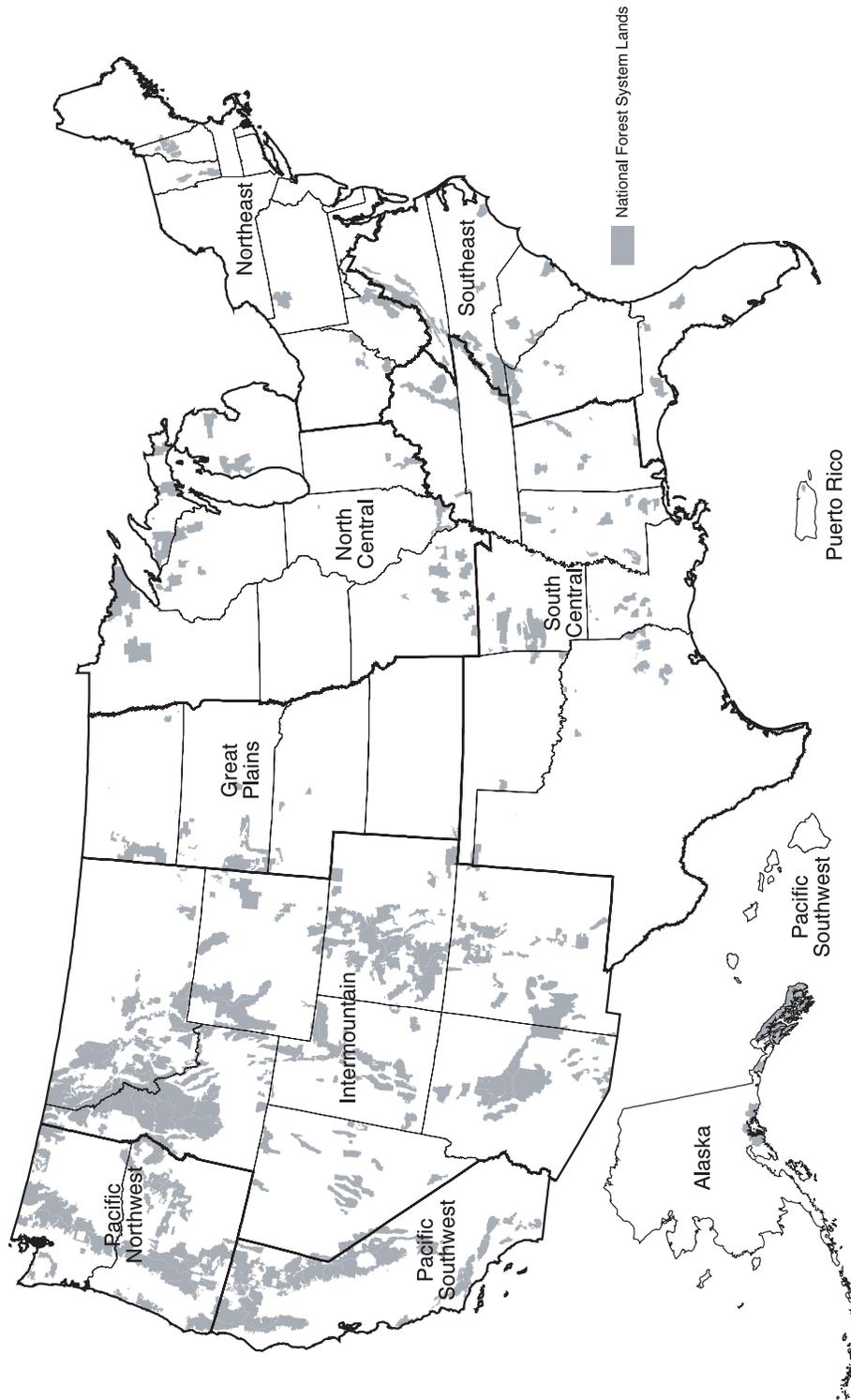


Figure 3-5. Multi-State regions used for population analysis.

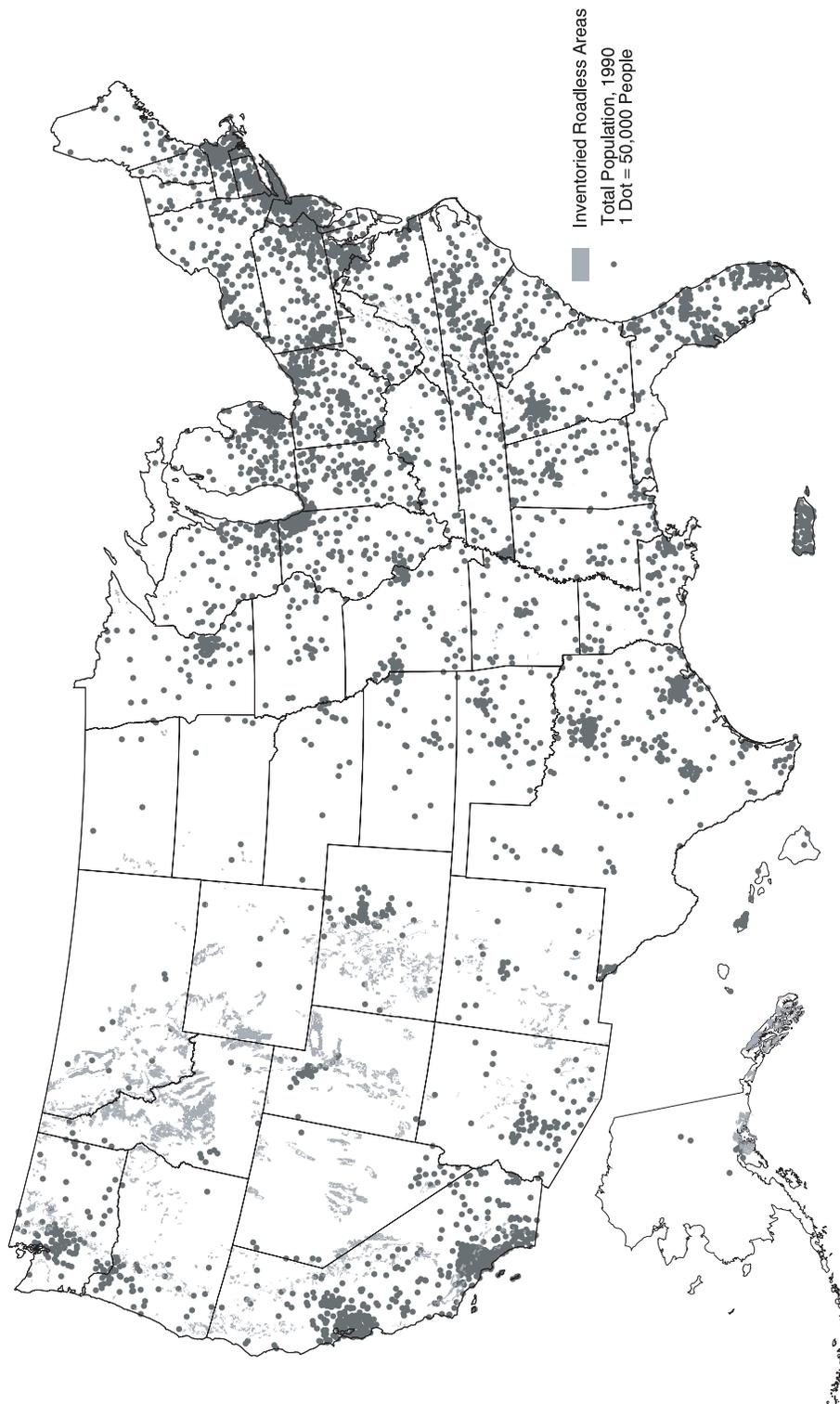


Figure 3-6. Distribution of the 1990 United States population relative to inventoried roadless areas.
(Roadless Database 2000)

Table 3-3. Estimated 2000 United States population relative to inventoried roadless areas by geographic region.

Region	Total population (millions)	Average population density (people/sq mile)	Inventoried roadless areas (acres)
Northeast	71.8 (26%)	299	493,000 (0.8%)
North Central	46.4 (17%)	113	191,000 (0.3%)
Southeast	41.7 (15%)	178	687,000 (1.2%)
South Central	47.5 (17%)	78	223,000 (0.4%)
Great Plains	5.8 (2%)	19	346,000 (0.6%)
Intermountain	17.7 (6%)	20	33,379,000 (57%)
Pacific Northwest	9.3 (3%)	56	3,980,000 (6.8%)
Pacific Southwest	33.8 (12%)	211	4,416,000 (7.5%)
Alaska	0.7 (<1%)	1	14,779,000 (25.2%)
Puerto Rico	3.8 (1%)	1,125	24,000 (0.04%)
Total	278.5 (100%)	77	58,518,000 (100%)

(USDC Bureau of the Census 2000; Roadless Database 2000)

The percent change in urban population was greater from 1950 to 1970 than between 1970 and 1990. In the year 2000, 80% of the United States population is estimated to live in urban or suburban areas (USDA Forest Service 1999d). Urban growth has been most pronounced in Alaska, the Intermountain West, the Southeast, the South Central, and the Great Plains regions. The Bureau of the Census does not project future urban vs. rural population growth. However, if past trends continue, the percentage of the American population living in urban areas will keep growing. As urban centers expand in response to population growth and urbanization, surrounding private forestlands will come increasingly under pressure for conversion to more urban or developed uses (Cohen 1999).

Although the percentage of rural populations has been declining overall, many rural Counties containing NFS lands have been increasing in population. This is particularly true in the West. Approximately one-third of the total population increase that occurred in the United States between 1980 and 1999 occurred in Counties that contain NFS lands.

This trend is expected to continue. One reason for rapid population growth in rural areas close to NFS lands is that these areas have many **natural amenities**. Population growth in these Counties is often linked to their appeal as retirement and recreation destinations (McGranahan 1999).

Over the last decade, urban residents of all ages have been moving to or building second homes in rural communities in the West that are high in natural amenities (such as good climate, variable topography, and surface water bodies) (McGranahan 1999; Thrush 1999). These migrants are seeking a better quality of life in a physically attractive environment. Three factors behind this trend are the retirement of baby boomers, technological advances that enable people to work remotely, and economic diversification in rural communities, meaning that other jobs are increasingly available (Thrush 1999). This phenomenon is also taking place in the Northeast (Egan and Luloff 2000).

Meanwhile, as urban populations grow, forest, pasture, rangeland, and cropland continue to be converted to urban and developed areas, and rural infrastructure (such as roads, airports, and railways). Table 3-4 indicates the amount of non-Federal land that was developed between 1982 and 1997. An average of 3.2 million acres per year were developed between 1992 and 1997. In comparison, 1.4 million acres per year were developed between 1982 and 1992. The rate of land development between 1992 and 1997 was more than twice the rate in the previous decade, while the population growth rate remained constant. This rapid development expansion can be explained by the unprecedented growth of the United States economy that occurred in the 1990s.

As with population growth, land conversion from undeveloped to developed uses has not been distributed evenly across the United States. Figure 3-7 shows the geographic distribution of land development in the United States between 1982 and 1997. Most of this development has been concentrated in the Eastern United States. The Northeast, Southeast, and South Central regions have experienced the most rapid land development in the country. However, the Northeast, Southeast, and Pacific Southwest have undergone the highest percentage of change in land development. While the Southeast and South Central Regions are also undergoing relatively rapid population growth, land conversion trends do not necessarily correspond geographically to population growth trends.

Population growth, combined with economic growth, leads to increasing demands for natural resources. Economic growth has outpaced population growth in the last decade. Between 1970 and 1995, per capita disposable income grew by 50%, while population grew by 28% (Cinnamon and others 1999). As a result, there is more income to spend on goods and services. Disposable income and gross domestic product are both projected to increase more rapidly than population growth in the future.

The demand for goods and services continues to increase as population and income grow. The United States accounted for about one-third of total world materials consumption (by weight) in 1995, although the United States population accounts for only 5% of total world population. World consumption grew at nearly double the rate of United States consumption (Cinnamon and others 1999). In the future, the growing population will

demand more goods that depend on natural resources such as timber, mineral, water, and other forest products. At the same time, demand for recreation, open space, scenic quality, clean air and water, and **biological diversity** is also increasing. These demands must be met from a finite land base.

Table 3-4. Amount of non-Federal land, in million of acres developed between 1982 and 1997.^a

Region	Total surface area ^b	Total non-Federal land 1997	1982	1987	1992	1997	1982 to 1997	Non-Federal developed land 1997 (%)
Northeast	159.3	147.7	14.3	15.5	16.6	20.3	6.0	13.7
North Central	267.1	247.6	14.9	15.8	16.6	18.7	3.8	7.6
Southeast	156.0	134.1	11.5	13.1	15.2	19.0	7.5	14.2
South Central	398.0	370.9	16.1	17.7	19.2	22.8	6.7	6.2
Great Plains	196.8	187.8	5.6	5.7	5.9	6.3	0.7	3.4
Intermountain	552.7	283.5	5.9	6.6	7.2	8.3	2.4	2.9
Pacific Northwest	106.2	60.6	2.6	2.7	3.0	3.5	0.9	5.8
Pacific Southwest	105.7	56.6	4.3	4.6	5.2	5.9	1.6	10.4
Total	1,941.8	1,488.9	75.2	81.7	89.0	104.8	29.6	7.0

^aData unavailable for Alaska or Puerto Rico.

^bExcludes surface water.

Conversion of non-Federal undeveloped lands to developed uses reduces the non-Federal land base available to meet growing demands for forest and rangeland resources, amenity uses, and other values. These conversions have been concentrated in areas with a relatively small Federal land base (the Eastern half of the United States) and are increasing the importance of Federal lands in these areas.

At the same time that demands are increasing for most natural resources, some people do not want to see resources from public lands used for commodity purposes. The increasing value placed on the non-commodity benefits provided by NFS lands (such as recreation, **ecosystem** services, scenic quality, and wildlife habitat) are viewed by some as more important than commodity uses, which are often viewed as being harmful to other forest and rangeland values. This view is often strongly held for roadless areas. However, if resources are not obtained from NFS lands, they will be obtained from other ownerships in the United States or in other countries, since demand for these products continues to increase. If commodity production continues to decline on NFS lands, there will be displacement effects on non-NFS lands. These effects are addressed in the Timber Harvest and Energy and Non-energy Minerals sections of the Social and Economic Factors section.

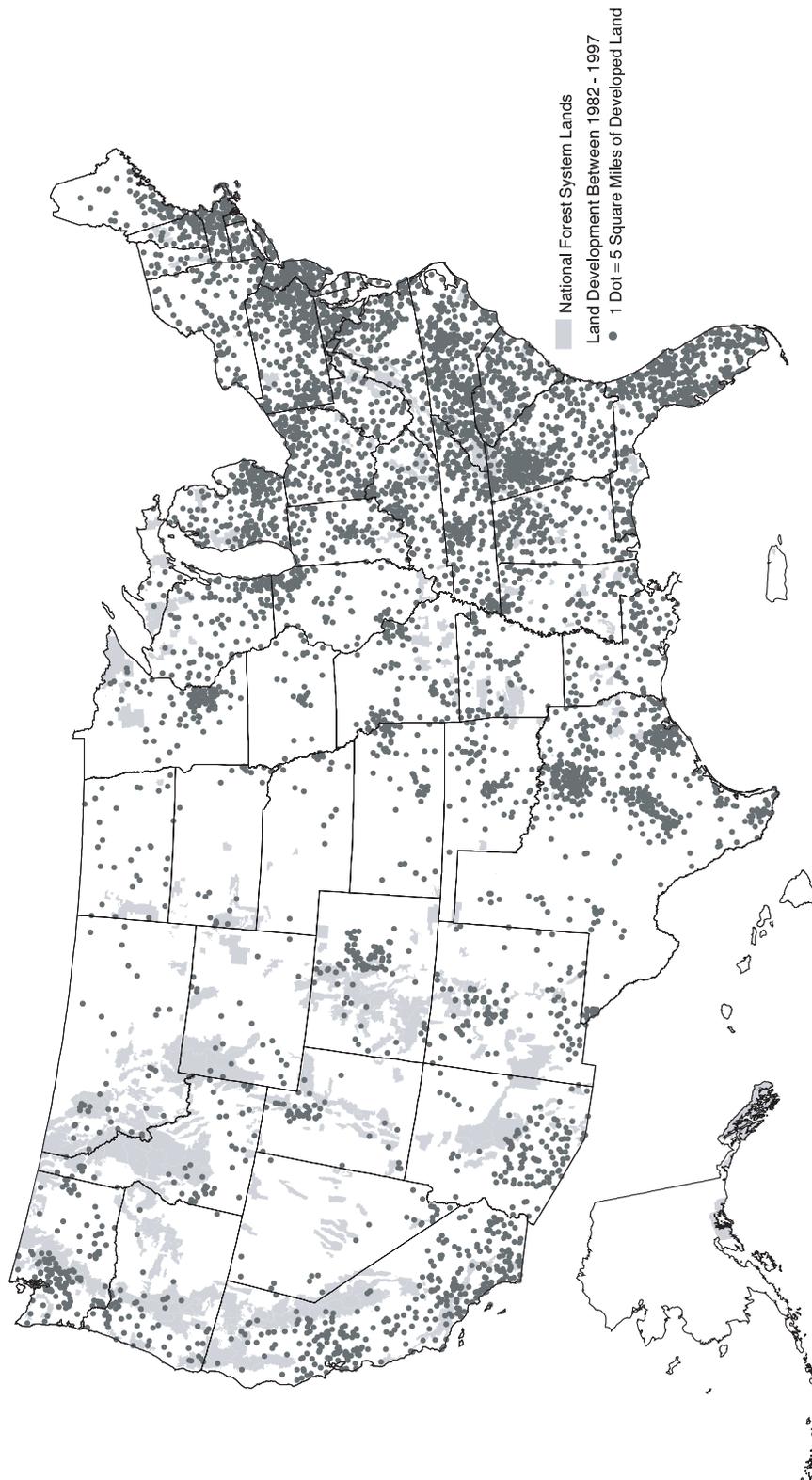


Figure 3-7. Geographic distribution of land development in the United States between 1982 and 1997.

The demographic changes described earlier will affect demands on resources on NFS lands. For example, the growing percentage of senior citizens will likely demand **developed recreational** opportunities, amenities, and services associated with roads (Ewert 1999). Also, the growth in the population of ethnic minorities will likely result in increased demands for the kinds of uses preferred by them, such as the harvest of non-timber forest products, **subsistence** hunting and fishing, and developed recreation (Cinnamon and others 1999; USDA Forest Service 2000e).

Population growth and the spatial distribution of the United States population are important variables that will affect the use and management of roadless areas. The Northeastern and Southeastern United States (Figure 3-5) have a high population density, a small amount of public land, and only about 2% of the inventoried roadless areas. These regions are also experiencing the highest rate of land conversion from rural to urban uses in the United States. As a result, one can expect high demand for the variety of benefits provided by roadless areas in the East, which are not readily available in alternate locations. Conversely, the Western States (including Alaska) have a relatively low population density (with the exception of California), a high percentage of public land, and 96.4% of the inventoried roadless areas. The supply of roadless areas in the West is high relative to the demand for the benefits they provide.

Urban population growth means that demand for recreation in forested areas close to cities will be increasing at the same time that land conversion adjacent to cities is increasing. Time and money are the two most limiting factors to outdoor recreation participation (Cordell and others 1999b). Because local forests are close, accessible, and low cost, urban forests will see increasing use (Ewert 1999). The result is likely to be increasing pressure for both developed and **primitive** recreational opportunities on NFS lands close to urban areas.

Because the United States population is largely urban, urban values regarding forest use and management often predominate. Specifically, urban dwellers tend to prefer management of Federal lands for ecological, recreational, and spiritual and aesthetic values, rather than for the uses that are valued by rural people who engage in commodity production (i.e., logging, grazing, and mining) (Vaske and Donnelly 1999; Ewert 1999). In rapidly growing rural areas, the immigration of exurbanites that bring urban environmental values with them is likely to cause tension with historic residents that depend on extractive industries for employment.

The expansion of urban areas into adjacent forested lands, combined with migration to rural areas containing NFS lands, leads to the spread of development around NFS boundaries. Increasing development at the **wildland-urban interface** can lead to high levels of congestion and high natural resource impacts on and around NFS lands (Ewert 1993). It also creates challenges for fire management, including increased risk of fires, increased threats to people and damage to structures, and growing challenges for fire protection (Chase 1993). People living at the wildland-urban interface also tend to value preservation and recreation as forest management priorities. High recreation impacts on NFS lands are particularly evident in this zone. As population numbers increase at the wildland-urban interface, there will be increasing demands on an increasingly limited and impacted resource.

Balancing Demands

One of the central questions that frame the debate over roadless area management is how commodity and non-commodity uses of these lands should be balanced. Since the earliest days of land management, the Forest Service has managed NFS lands according to the principle of multiple use. However, this management approach was not codified into law until 1960, with the passage of the Multiple-Use Sustained-Yield Act (Public Law 104-333). This Act specified that the national forests should be managed for a variety of purposes, including outdoor recreation, range, timber, watershed, and fish and wildlife (16 U.S.C. 528). Under the Act, the Forest Service was to manage resources to best meet the needs of the American public, with flexibility to respond to changing needs and conditions (Snow 1997).

The balance of multiple uses and the emphasis on commodity versus non-commodity uses on NFS lands has shifted over time in response to changing public values. There has been an evolution in the public's conception of the purpose of national forests in America over the last century. Whereas many people once valued national forests primarily as sources of commodities, such as timber, minerals, water, and rangeland, the majority now values them for their recreational, ecological, and scenic values (Hays 1998; Shands 1988).

Commodities produced from NFS lands provide benefits to society in a variety of products. These include lumber, minerals, beef, gasoline, heating oil, herbs, decorative boughs, and other greens. NFS lands also provide a variety of non-commodity benefits to society. Ecosystem services, recreation opportunities, and biodiversity protection are examples. While individuals recognize and enjoy a range of values associated with NFS lands, there is often disagreement over how the various uses should be managed.

Some people believe that commodity production is appropriate on NFS lands, and that it is not detrimental to protecting the non-commodity values associated with these lands. Many of these people appreciate both the commodity and non-commodity values of NFS lands. They recognize humans as users of the land, trying to make use of natural resources on a sustained yield basis to meet their needs (Grumbine 1999). They view NFS lands as providing goods and services for people.

Commodity use was embodied in the “wise use” conservation vision espoused by Gifford Pinchot, founder of the Forest Service. Pinchot emphasized three principles of conservation: development (the use of natural resources for the benefit of people), prevention of waste, and the conviction that natural resources should be developed and conserved for the benefit of the greatest number of people (Cawley 1993). Pinchot believed that this conservation philosophy would bring about economic prosperity. The concept of sustained yield accompanies the commodity use orientation: maximize the stream of outputs of renewable resources to the extent possible, without compromising long-term resource productivity (Kennedy and others 1998). The belief that resources should be protected for future generations accompanies the sustained yield management philosophy.

Non-commodity values can be grouped into three general categories, following Bengston and others (1999): recreation values, ecological values, and spiritual and aesthetic values. Recreation values are associated with developed and primitive, motorized and non-motorized uses of the natural forests and grasslands. People who hold these values appreciate the recreational and tourism opportunities that NFS lands provide, and their associated social and personal benefits. People who hold ecological values view NFS lands as valuable because of the life-supporting environmental functions and services they provide. Spiritual and aesthetic values toward forests include the belief that NFS lands have intrinsic value, and a right to exist; that current generations have an obligation to pass on healthy wild lands to future generations; that forests have heritage and cultural values; that forests are sacred; that forests have spiritual value; and that they have scenic and aesthetic values. People also have personal emotional attachments to NFS lands, and value them for this reason (Bengston and others 1999). Most people share a mix of values and perspectives and do not fall into any one category. Again, many people believe that both commodity and non-commodity values can be accommodated on NFS lands. Others, however, view them as being mutually exclusive.

Research, polls, and surveys indicate that the American public cares about ecologically sound management of NFS lands and in general supports multiple-use management of these lands. Most studies indicate that the majority of the American public places a higher priority on non-commodity uses than on commodity uses of public lands. Nevertheless, commodity uses are an important component of public land management to many members of the public.⁴

In 1994, a random sample of the American public was questioned about their views concerning NFS lands management (Hammond 1994). This poll found that the overriding concern of the public was that the Forest Service maintains healthy public forests and grasslands. The public also felt strongly that creating recreation opportunities on NFS lands was important, and that the Federal government should balance the wilderness and recreation uses of public land with logging, mining, and grazing. Respondents thought the Forest Service should increase regulation of commercial uses, and ensure that the long-term health of the forests is not sacrificed for short-term natural resource demands. They also believed that the consumer needs of the American public should not be satisfied at the expense of forest and grassland health. There was low support for the statement that natural resources on NFS lands should be made available for commodity production.

In 1991, Cramer and others (1993) conducted a survey of Forest Service line officers (forest supervisors and district rangers) that asked them to rank what they thought the priorities of the public were regarding the multiple-use management of NFS lands. Line officers perceived the public's priorities as follows, on a scale of 1 to 10 (with 10 being the highest priority): recreation - 9, wildlife habitat - 8.7, water - 7.6, timber - 4.8, grazing - 2.8.

⁴The limitations of poll and survey data are discussed in the Socioeconomic Specialist Report.

Bengston and others (1999) have used content analysis of the news media to examine how frequently different forest values are expressed in news stories. This method has been shown to produce results very similar to attitude surveys and opinion polls. These researchers found that during the 5-year period 1992 through 1996, non-commodity benefits and values of forests were expressed in news media stories 68% of the time nationwide, and commodity values were expressed 32% of the time. Of the non-commodity values, recreation benefits and values of forests were expressed most frequently, and increased in frequency over time from about 30% to 42%. Ecological benefits accounted for about 22% of the total and showed no trend over time. Spiritual and aesthetic forest values were expressed in news stores least often (about 10% of the time), increasing only slightly over time. Commodity values declined in frequency from about 38% to 23% during the 5-year period.

A social assessment conducted by the Forest Service for the Ozark-Ouachita Highlands in Missouri, Oklahoma, and Arkansas summarizes the findings of opinion surveys regarding public attitudes, values, and opinions towards land and resource management in that region (USDA Forest Service 1999s). The assessment found that most people believe forests should be managed for multiple uses, and to provide a range of goods, services, experiences, and values. They also believe that forest benefits should not come at the expense of long-term **forest health** and environmental quality. Some surveys found that 40% to 50% of respondents did not support timber cutting for commodity purposes on public lands. **Timber harvest** on public land for **stewardship** purposes, or with environmental protection measures accompanying it, was supported by as many as 70% of the respondents in other surveys. A study from Missouri found however that 40% to 50% of the population might be opposed to logging, regardless of how or where it occurs (USDA Forest Service 1999s).

A survey of environmental attitudes toward forests that administered to residents of the Southern Appalachian region as part of a Forest Service-sponsored social assessment found that 72.1% of those surveyed believed that there should be no more timber harvesting on national forests (Southern Appalachian Man and the Biosphere 1996b). Furthermore, 72.5% of the respondents believed that land that provides critical habitat for plant and animal species should not be developed. Finally, 68.6% of the population believed that more land that is public should be set-aside as Wilderness.

In the Pacific Northwest, a study of forest values among the Oregon public found that the majority of people did not believe that Federal forests should be used primarily for the production of timber and wood products, or products that are useful to humans (Steel and others 1994). Research from this region reported in USDA Forest Service and others (1993) indicated a consistent pattern of support for environmentally oriented management policies, and a consistent lack of majority support for commodity-based policies. However, people from this region are also concerned about protecting forest-dependent communities. An overview of surveys on environmental values conducted in the Western States indicated that most people in the West care about environmental protection and commodity production, in addition to developed recreational use on public lands, and believe that these uses can co-exist; they support multiple use (Nie 1999).

These studies indicate that there is a wide range of opinion on NFS land management, although the multiple-use concept is generally supported. Some individuals believe that commodity production is inappropriate on Federal lands in general, or in roadless areas specifically; others believe that management of NFS lands has over-emphasized non-commodity values. This chapter provides the relevant ecological, social, and economic information necessary for evaluating and analyzing the potential effects of protecting roadless areas of NFS lands.

Active and Passive Forest Management

Another question that is central to the debate over roadless area management is that of whether roadless areas should be managed at all. Road construction provides access to NFS lands so that management activities to promote protection of forest health, fire prevention, habitat improvement, and ecosystem restoration can be carried out. Stewardship timber harvest might be an integral component of these strategies.

Some members of the public believe that the Forest Service should take a passive approach to land management; in other words, it should let nature manage itself, and not intervene. They believe that nature knows best. Some believe that even if “natural” and more sustainable conditions can be achieved through the **active management** of a disturbed forest in the short term, the forest will get to its natural condition on its own over the long term. People of this opinion believe that society should take the long view in this regard, and think beyond the human life span as their period of reference. People who support the **passive management** approach are likely to support a prohibition on road construction and timber harvest in roadless areas.

The passive management view is rooted in a belief that undisturbed nature is good. Historically, many ecologists believed that undisturbed nature would achieve balance, constancy, and stability and, that human beings interfere with and destroy this balance of nature (Botkin 1990). Today, most ecologists accept the view that nature is dynamic and changing. However, those who favor passive management assume that even if undisturbed nature changes, it will change for the best, achieving its natural and best state on its own. If nature is disturbed, it will return to a condition that represents its natural and ecologically desirable state once the disturbance is removed. Nature functions perfectly well without human intervention. This view requires that people have no preconceived notions about what they want nature to look like, and that they be willing to accept the outcome of passive management, no matter what happens (Botkin 1990).

Other members of the public believe that the Forest Service should actively manage NFS lands to maximize environmental health, and to promote the most desirable conditions of these lands. For example, some people argue that NFS lands are not in a natural state due to a century of aggressive **fire suppression**. The result is forests that are unnaturally dense, have a disproportionate number of small trees, and are insect and disease prone. Many of these people believe that roads are needed for conducting management activities and that sufficient scientific knowledge exists to achieve the intended management outcomes. They are concerned that a prohibition on road construction or timber harvest in roadless areas would make it impossible to undertake beneficial management activities,

and are opposed to national level prohibitions on road construction and timber harvest for this reason.

The active management view is rooted in the belief that management might be necessary to achieve the outcomes we want (Botkin 1990). Tinkering with nature might enable us to improve upon it, or to return it to its natural state if it has been disturbed. Many people who support active management believe that there is no place on earth that is truly “wild” or “natural”, independent of human influence, as people have been interacting with and changing the natural environment for millennia (Cronon 1996a; Botkin 1990). Therefore, active management is consistent with a human history of influence over environmental conditions. People should take an active role in conservation. Furthermore, resource harvest for utilitarian purposes might serve the interest of conservation, and the goals of resource utilization and conservation might be met through one active management approach. Active management requires that people develop a vision of what state they want nature to be in, a desired future condition, that serves as their management goal (Botkin 1990).

The Forest Service has stated that its goals for roadless area management are to protect and enhance the characteristics of these areas, which are listed at the beginning of Chapter 3. The Forest Service recognizes that some management activity may be needed to achieve the most desirable ecological conditions in roadless areas. However, management activities can be achieved in the absence of roads.

One common goal of land management is to achieve environmental conditions that are “natural” and/or desirable to human beings. The question of what is natural and what is desirable is complex, provokes disagreement, and determines the goals of either an active or a passive management approach. Nature is always culturally constructed in this regard (Cronon 1996b). People must choose the kind of environment they want, which might be one that has been altered through management (Botkin 1990). One poll conducted for the Forest Service found that 75% of the respondents believed that human intervention is necessary to maintain the health of public lands (Hammond 1994).

Whether nature should be actively or passively managed is not necessarily an either/or question. For some areas, active management might be most appropriate; for others, a passive approach might be most desirable. When active management is favored, there are many tools to achieve it, and many do not require road construction, though costs might increase without it. Clearly, people have different views about what kind of natural environment they want to see maintained on public lands. These views shape their opinion of what management approach to take towards roadless areas, which in turn has implications for whether or not they support a prohibition on road construction and/or timber harvest in these areas.