

# Assessment of the Status and Trends of Natural Resources From U.S. Forest and Range Lands

## 15 KEY FINDINGS



## The Forest Service continues to assess the status and trends in the Nation's renewable resources

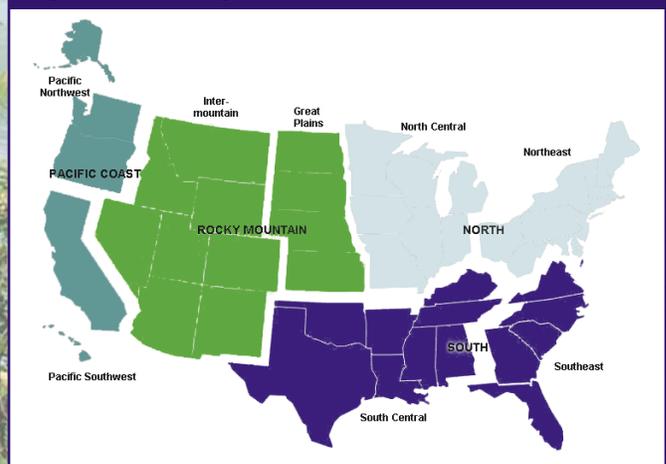
The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) directed the Secretary of Agriculture to prepare a renewable resource assessment every 10 years. The U.S. Department of Agriculture Forest Service decided to do interim updates of the decennial assessments because of the fast-changing nature of issues affecting the status and trends of renewable resources. This interim update highlights issues and trends affecting recreation, timber, water, biodiversity, and range. Analyses of cross-cutting issues such as globalization and climate change are presented as part of the interim assessment.



# Contents

- The U.S. population will continue to grow and change in ways that will affect our natural resources
- Forests cover one-third of the total land area
- Total forest area has been relatively stable for the past century
- Globalization, structural change, and consolidation continue to affect U.S. forests and rangelands
- Reserved forest area is increasing
- Water withdrawals have leveled off
- Private lands account for over 90 percent of domestic timber harvest
- Projected timber supply and demand situation leads to small increases or declines in product prices
- The number of family forest owners is increasing and the area of forest land in smaller tracts is increasing
- The area burned by wildfire in 2005 was the largest in the last 45 years
- Growth in many recreation activities outpaces the growth in population
- Urban land area will continue to increase
- Climate change affects natural resources
- What's happening to the Nation's biodiversity?
- Forest and rangeland health has many dimensions
- Range provides many values

Figure 1. RPA Regions



## The U.S. population will continue to grow and change in ways that will affect our natural resources

The U.S. population is projected to grow from 300 million today (2006) to over 400 million by 2050. Areas of fastest growth are likely to occur along the coasts and in the southwest. The average age is increasing, the population is more diverse racially and ethnically, and the population is becoming increasingly urban and suburban. Average per capita income is expected to continue to outpace inflation, increasing the overall purchasing power of the American public.

These changes in the U.S. population will likely lead to increasing demands for goods and services coming from forest and range resources.

## Forests cover one-third of the total land area

The total forest area in the United States was just under 750 million acres in 2002—about 2.5 acres per person. The South accounts for 29 percent of the forest area; the North, 23 percent; the Rocky Mountain region, 19 percent; and the Pacific Coast region, 29 percent.

## Total forest area has been relatively stable for the past century

Forest area increases in the North and Rocky Mountain regions have been offset by declines in the Pacific Coast and South regions. Although total forest area has been relatively stable over time, this stability belies the very dynamic nature of land use and land cover change. The many acres of forest that have been lost to development have been balanced by gains, mainly from abandoned pasture land.

Figure 2. U.S. population, 1980-2050

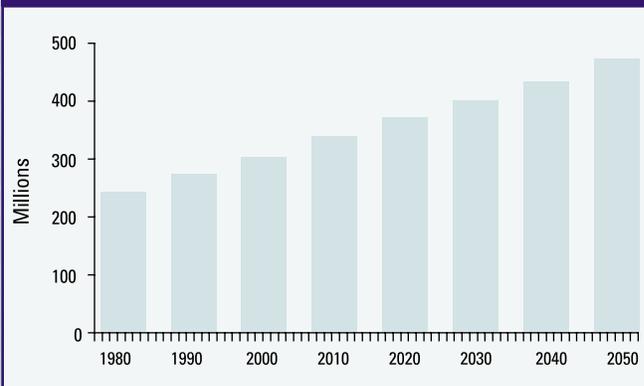


Figure 3. Forest area by region

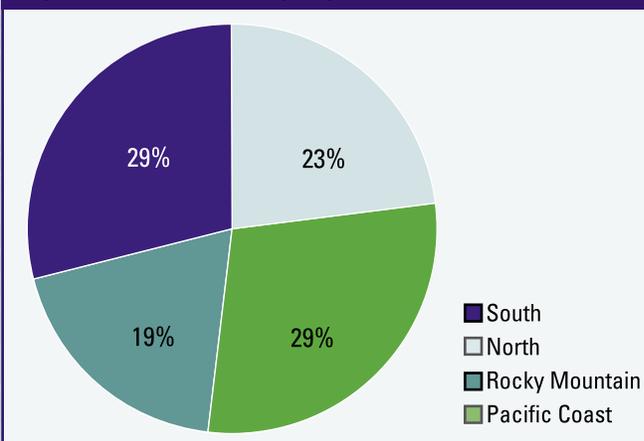
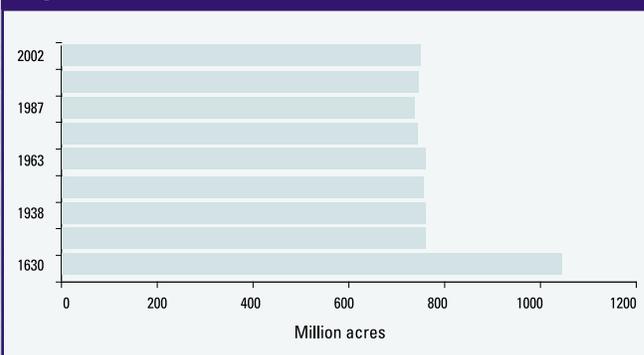


Figure 4. Forest land area



## Globalization, structural change, and consolidation continue to affect U.S. forests and rangelands

In 2004, imports of timber products amounted to the equivalent of 30 percent of U.S. consumption, up from 18 percent in 1980 and 19 percent in 1990. Exports as a percent of production declined from 15 percent in 1990 to 11 percent in 2004. Since 1990, much of the U.S. wood household furniture industry has moved to other countries, especially China, and U.S. imports from those countries have been increasing. Between 1992 and 2005, domestic shipments of wood household furniture have fallen 22 percent while imports are up several hundred percent. During this time, imports of softwood lumber and structural panels increased and domestic pulp production decreased. Globalization has resulted in a more rapid pace of structural change and consolidation in the domestic wood products industries, reducing domestic harvest and thereby affecting most measures of forest resource condition.

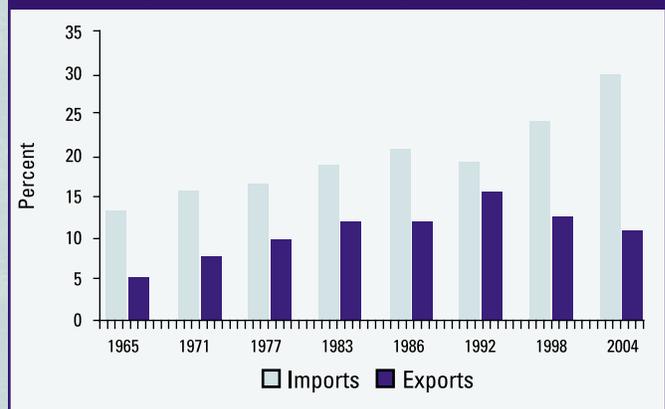
## Reserved forest area is increasing

The area of forest land in reserved status amounted to about 77 million acres in 2002—a tripling of reserved area since the early 1950s. More of the reserved area is in the West, reflecting the larger area of public land in the West.

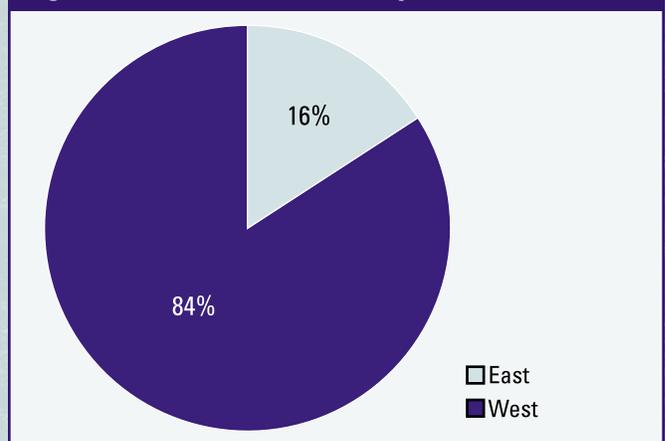
## Water withdrawals have leveled off

About 53 percent of the Nation's water supply originates on forest land, 26 percent on agricultural land, and 8 percent on rangeland. About 24 percent of the water supply in the contiguous 48 States originates on Federal lands; 18 percent originates on National Forest System lands alone, even though these lands occupy only about 11 percent of the surface area. Water withdrawals in the United States have nearly leveled off in recent decades and are projected to increase less than 10 percent over the next 50 years, despite projected population increases of over 40 percent. This suggests significant gains in water use efficiency and conservation.

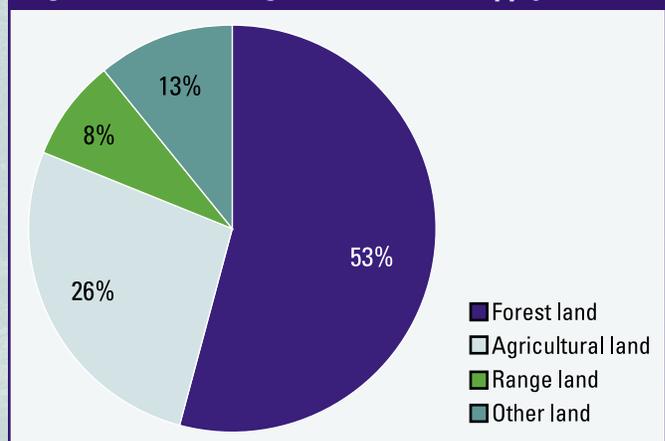
**Figure 5. U.S. imports of timber products as a percent of consumption and exports as a percent of production**



**Figure 6. Reserved forest land by East and West**



**Figure 7. Surface origin of U.S. water supply**



## Private lands account for over 90 percent of domestic timber harvest

In 2002, private lands accounted for 92 percent of domestic timber removals; national forests, 2 percent; and other public lands, the remaining 6 percent. The South accounted for 64 percent of the domestic harvest; the North, 17 percent; the Rocky Mountain region, 3 percent; and the Pacific Coast, 16 percent. In 2002, domestic harvest amounted to 73 percent of the roundwood equivalent of consumption of wood used for making products.

## Projected timber supply and demand situation leads to small increases or declines in product prices

By 2050, 60 percent of softwood harvest is projected to be from managed plantations that occupy about 9 percent (46 million acres) of total U.S. timber land area. Product imports are projected to be about 25 percent of domestic consumption. Aggregate U.S. forest inventory is expected to rise 31 percent for all owners as forest growth exceeds harvest over the next five decades. Solidwood products prices rise more slowly than historical rates, and paper and paperboard prices are projected to decline in real terms. Consumption is expected to increase as population increases.

Figure 8A. Timber removals by ownership class

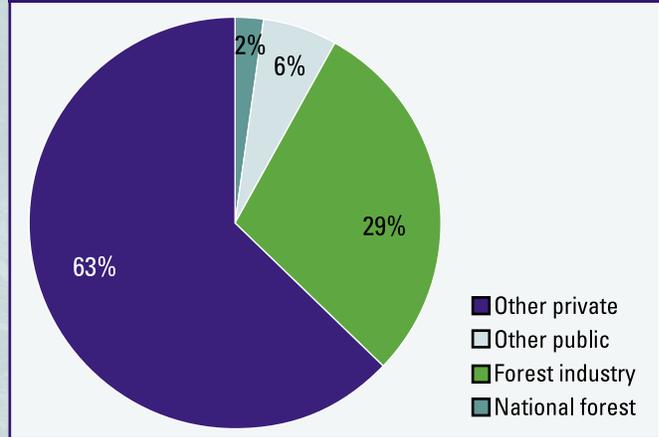


Figure 8B. Timber removals by region

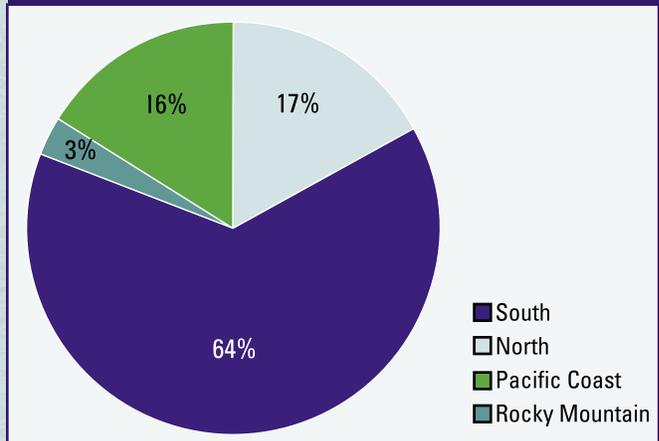
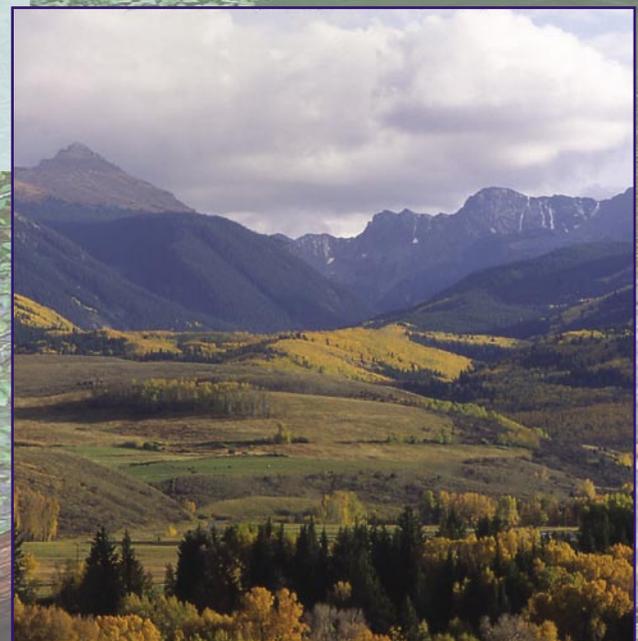
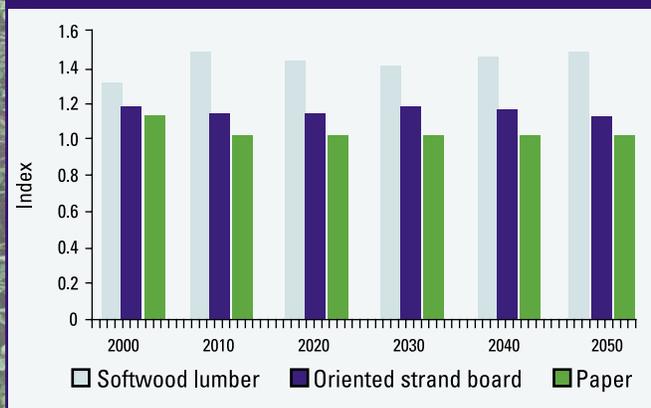


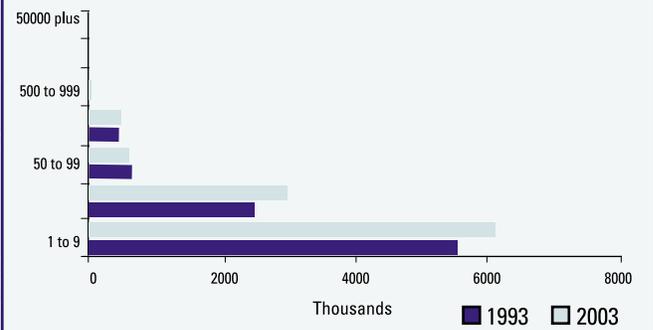
Figure 9. Real price indexes for selected wood products (1982=1.0)



## The number of family forest owners is increasing and the area of forest land in smaller tracts is increasing

There are an estimated 10.3 million family forest owners in the contiguous States, and they account for 42 percent of the Nation's forest lands. Nearly 9 of 10 family forest owners have their land in the Eastern United States. Most family forest owners hold relatively small tracts—9 out of 10 owners control 1 to 49 acres. Owners with 50 or more acres hold 69 percent of the family forest land, but account for only 11 percent of the family forest owners.

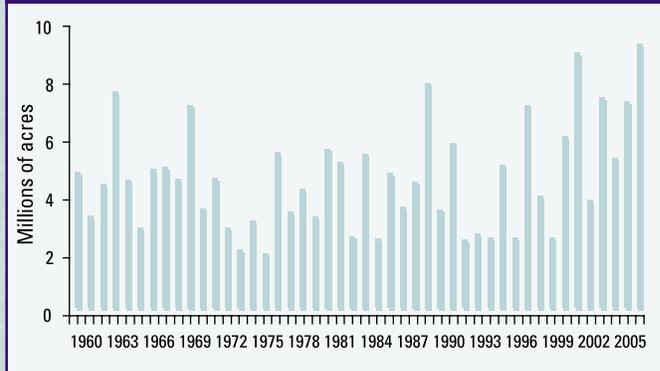
**Figure 10. Number of owners by size class of holding, 1993 and 2003**



## The area burned by wildfire in 2005 was the largest in the last 45 years

Fire suppression resulted in relatively stable areas burned during the decades of the 1950s through the 1970s. Beginning in the 1980s, the area burned by wildfires in the West began to increase again, due in part to unprecedented success of fire suppression and its effects on forest conditions. Fire suppression caused increased forest density and biomass, changes in forest composition and the resulting increases in insect and disease susceptibility and mortality, and build up of fuels.

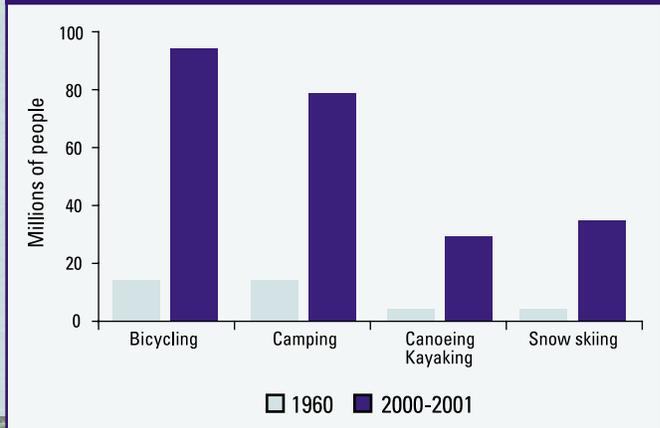
**Figure 11. Area burned by wildfire**



## Growth in many recreation activities outpaces the growth in population

In part because of rising income and in part because of new technologies that enable recreation, the growth in participation continues to outpace the growth in population. For example, the number of people age 12 and over increased from 131 million people in 1960 to 229 million in 2000 to 2001—a 75-percent increase. The number of people participating in bicycling, camping, canoeing/kayaking, and snow skiing increased severalfold—far more than 75 percent.

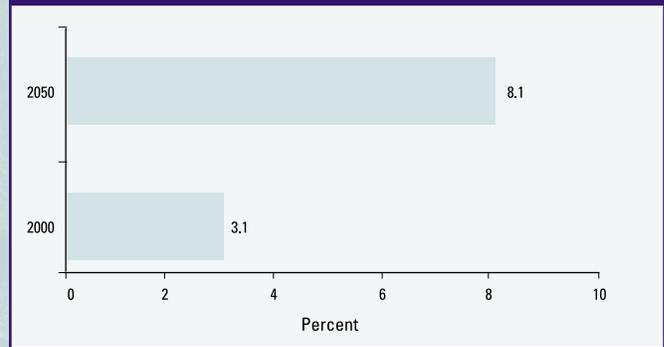
**Figure 12. Participation in selected outdoor recreation activities, 1960 and 2000-2001**



## Urban land area will continue to increase

Urban land is expected to grow from 3.1 percent of the total area in the coterminous States to 8.1 percent in 2050. Understanding how and where these urban areas and urban forests are changing is critical to helping develop policies and management plans to help sustain this growing resource and its numerous benefits, and to minimize negative urban effects on surrounding forests. Urban forests provide many services such as carbon sequestration, improved air and water quality, wildlife habitat, and recreation, but the change in land use to urban and developed forever changes the nature of the affected ecosystems.

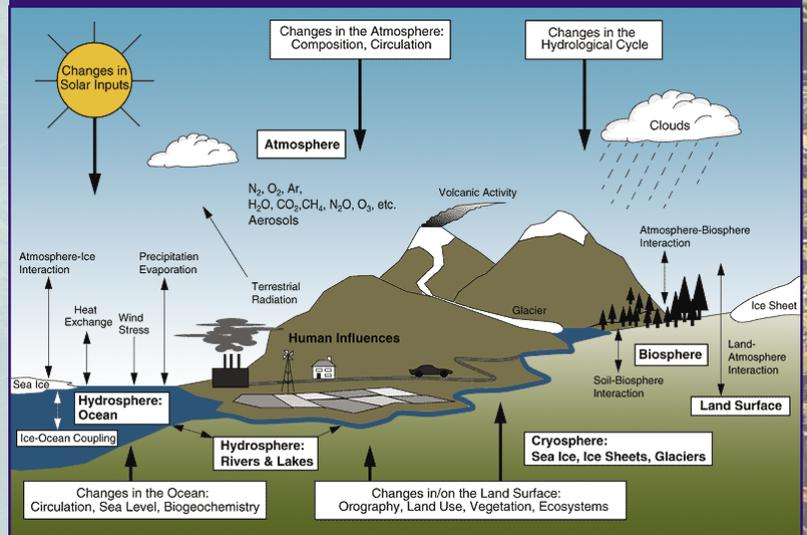
**Figure 13. Urban area as a percent of all U.S. land, 2000 and 2050**



## Climate change affects natural resources

Increasingly, the relationship between human-caused emissions and a warming climate is being documented. While uncertainty exists in projecting the amount of future emissions on climate, a global warming of 1.4 to 5.8 degrees Centigrade is projected by 2100. Melting of glaciers, reduction in arctic sea ice, and rising sea levels are expected to continue. Adapting to climate change and its potential impacts poses challenges and opportunities for management of resources, infrastructure, and the economy. Research is documenting changes in the breeding and migrating patterns of animals and the flowering of plants, especially in northern latitudes. Concurrent with climate change could be land cover and land use changes, increases in atmospheric pollutants such as ozone and nitrous oxides, and potential expansion of exotic plants and animals, some of which may be considered invasive. Management to mimic the range of historic variation in resource conditions may no longer be plausible if climate change overwhelms the intent of the actions: Management must adjust to dynamic conditions.

**Figure 14. Components of the global climate system (atmosphere, clouds, land, ocean, rivers, lakes, biomass, human influences), their processes and interactions (thin arrows), and some climate-influencing aspects, such as changes in the chemical composition of the atmosphere, changes in the hydrological cycle, or changes in or on the land surface (for example, vegetation and land use).**



*Taken from Trenberth, K.E., Houghton, J.T., Filho, L.G. Meira. 1996. The Climate System: an overview, Chapter 1. IN: Houghton, J.T., Filho, L.G. Meira, Callander, B.A., Harris, N., Kattenberg, A., Maskell, K. (editors). Climate Change 1995. Cambridge, Great Britain: Cambridge University Press.*

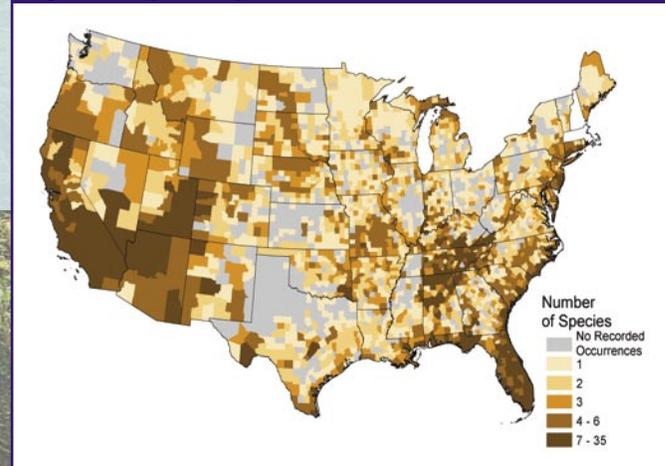


## What's happening to the Nation's biodiversity?

Animals that have adapted well to humans or that are prized for recreational hunting have done well in the past century—since the mid-1970s, big game have increased throughout much of the United States. Others have not fared so well. Since the mid-1970s, species sought by small game hunters have tended to show declines. A comparison of recent abundance trends (1980-2004) between permanent resident and Neotropical migrant birds indicates that permanent resident have fared better than long-term migrants—an indication that environmental factors of the breeding areas may be playing a role in observed population dynamics. Geographic areas where threatened and endangered species are concentrated have remained unchanged for the past decade and include the southern Appalachians, coastal areas, and the arid Southwest. States that have recently lost the most species occur prominently in the South. More than 30 species have been lost from the biota of California, Texas, Tennessee, Alabama, and Florida. Data on the distribution of nearly 700 tree species and nearly 1,500 terrestrial animals show that biodiversity is concentrated in the Southeast and the arid Southwest. Future concentrations of biodiversity will be affected by global climate change. Land use intensification and housing development are associated with reduced native diversity and increased exotic diversity. Potential impacts include an overall simplification of biological communities that may reduce the goods and services that humans derive from ecosystems.



Figure 15. Number of threatened and endangered species by county



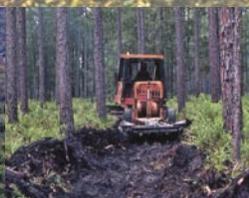
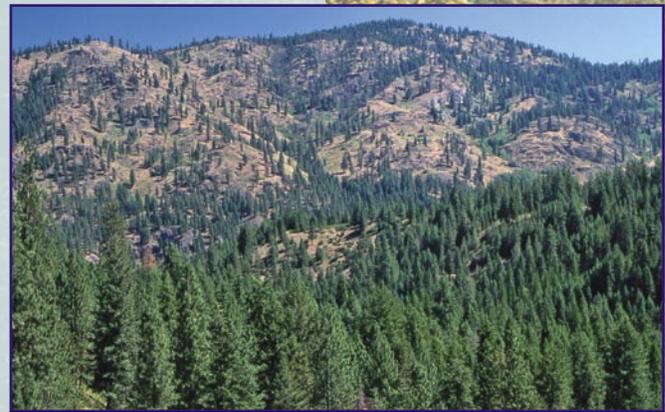
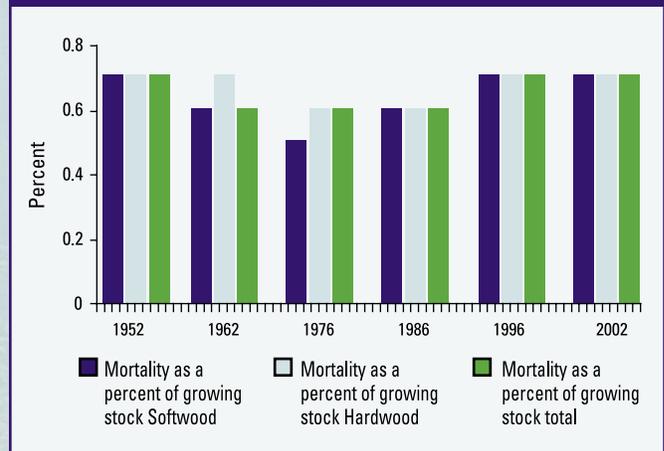
## Forest and rangeland health has many dimensions

The forest and rangeland resources of the United States have always been affected by insects, diseases, fire, and other natural disturbances. European settlement brought land clearing, new domestic animals, new species of plants and animals, and other sources of disturbance beyond the range of historic variation for North American ecosystems. Human activities over the past three centuries have forever changed the nature of some forest, grassland, and shrubland ecosystems in the United States. Pre-European conditions will never again exist for the bulk of U.S. forest and rangeland ecosystems. The range of natural variation in existing ecosystems has yet to be established in terms of disturbance, pollutants, and the functioning of fundamental processes. The forest health-monitoring program of the Forest Service is establishing a base line to be used to evaluate changes in forest ecosystem health and vitality. As more States are included, results from this program will provide the basis for more wide-scale statements regarding ecosystem health and vitality. Until there is such a baseline, episodic outbreaks and damage from insects and disease, fuel build-ups, invasive exotic species, and other disturbances will continue to be of concern and will be the source of speculation about their role in ecosystem health and vitality.

Globalization of the world economy will mean more travel, trade, and opportunities for the spread of exotic insects and diseases. Fragmentation of landscapes and changes in land use will continue to stress forest and rangeland health and increase the likelihood of invasion by exotics. Air pollution remains a threat to many forest and high elevation alpine and subalpine ecosystems. Although sulfate levels are declining, regional haze, ozone, and nitrogen deposition have increased for some areas and pose increasing problems for sensitive forest, range, and aquatic ecosystems. In some areas, wildlife populations have increased to the point of being threats to forest and rangeland ecosystem health and vitality.

Climate change adds yet another dimension to the evaluation of forest and range health and vitality. Climate change may lead to land cover and land use changes, increases in atmospheric pollutants such as ozone and nitrous oxides, and potential expansion of invasive species.

Figure 16. Mortality as a percent of growing stock

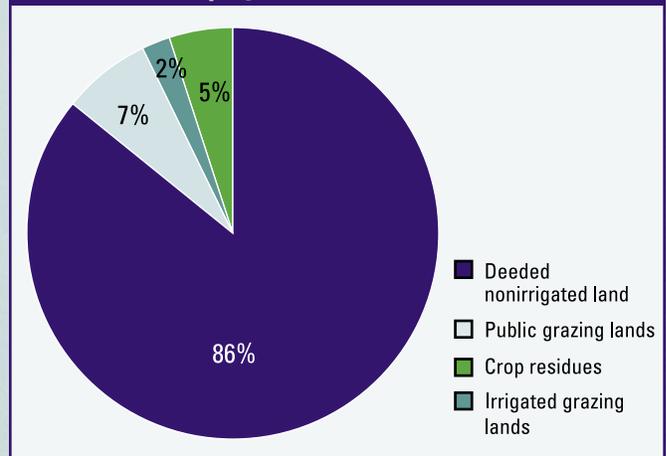


## Range provides many values

Rangelands provide many values in addition to forage. They contribute to meeting peoples' needs for recreation, they conserve biodiversity, they are sources of clean water, and they provide vistas and other amenities enjoyed by many people.

The demand for forage from range is dependent in part on the demand for red meat, which has remained relatively stable on a per capita basis. Beef cattle and sheep consume some 431 million animal unit months of grazed forages each year. Of this total, 86 percent comes from deeded nonirrigated lands, 7 percent comes from public grazing lands, 2 percent from irrigated grazing, and 5 percent from crop residue. In addition to domestic livestock, wild herbivores depend on range forage for a portion of their dietary needs.

Figure 17. Distribution of grazed forages by beef cattle and sheep by source



## The assessment is unique

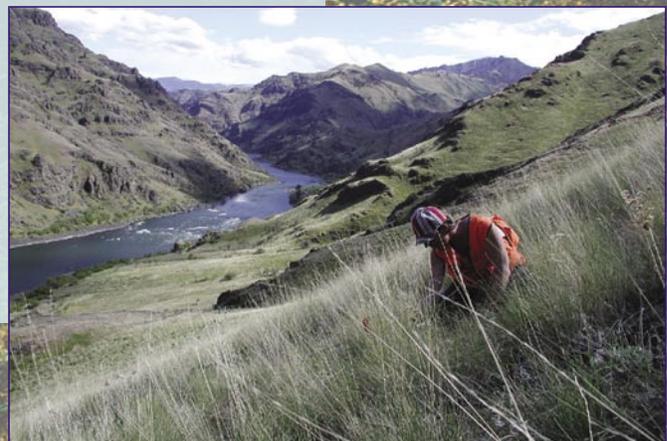
The RPA assessment and its interim updates are unique in providing analyses of historic trends, as well as projections of resource use and condition. These analyses are useful in helping to understand the sustainability of resource use. Projections of area change provide a sense of what might happen to this basic resource. They are useful to resource managers in planning for future contingencies. Discussions of globalization, climate change, and other cross-cutting issues help to understand where these issues may lead the resource situation in the future.



## To read more

For a full report with more detailed analysis, go to: <http://www.fs.fed.us/pl/rpa/> and click on the Interim Update of the 2000 RPA Assessment. Also on the Web site are supporting documents for the interim update, as well as past assessments and supporting documents starting with 1989.

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Forest Service

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