

Raw Materials from the Public Lands in Century 21

H. Fred Kaiser and James E. Granskog, USDA Forest Service

Forest management *on* public lands is **undergoing fundamental change**. To **understand forest management on U.S. public lands in the future**, an **understanding of the concept of ecosystem management will be** needed. Ecosystem management is not a goal unto **itself**, but a means to an end-and that **end** goal is sustainability of all resources.

A **number** of commitments **have been** made by U.S. Government officials to use ecosystem management principles in managing the Nation's forest resources. At the **June 1992 United Nations Conference on Environment and Development (UNCED) meeting in Rio de Janeiro**, **the United States announced a policy** Of ecosystem management for natural **resources**. President Clinton in **the April 1993 "Forest Plan for a Sustainable Economy and a Sustainable Environment" (Forest Plan)** **announced that** ecosystem principles will be **used** in forest planning. And in the September 1993 **report**, "Creating a Government That Works Better and Costs Less," **Vice President Gore directed** that ecosystem planning and management be used by federal land management agencies.

Although there are several interpretations of what "ecosystem management" means, most definitions encompass the same key **concepts**. **Two** key components are **biodiversity** and sustainability. **Biodiversity refers** to the variety of life in an area and their interactions, and sustainability means that desired ecological conditions of flows of **benefits** can **be** maintained over time. Fundamentally, ecosystem management is an approach **to the** management of natural resources that strives to maintain or restore **the** sustainability of ecosystems and to provide present and future generations a continuous flow of multiple benefits.

Historical Setting

A review of U.S. **resource** trends will provide a context for understanding the current **emphasis on ecosystem management and the prospective future** for renewable resources. **Much progress has been made over** the past several decades in resource production and enhancement of **productivity**, although forest resources have been substantially altered as a **result of** human **development**. An analysis of the resource situation shows that forest **resources** are resilient, but **their condition** has changed over time in response to changing human demands and resource management

In 1817, President James Madison stated, "Prudence will no longer delay to **economize** what remains **of** woodland: To foster the **second** growth where it is taking place in convenient spots: and to commence **where necessary** plantations of the trees recommended by their utility and quickness of growth". Since President Madison's time, **American** society has changed from rural and agrarian to urban and industrialized.

Although this change has been accompanied by a corresponding physical and psychological separation of people from the land, today's urbanized nation is no less dependent on the products of its forests and fields than were the subsistence farmers of America's past.

The current forest situation suggests a continued capability to meet society's demands:

- Following two centuries of decline, the area of forestland has stabilized. Today, the U.S. has about the same forest area as in 1920.
- The area consumed by wildfire each year has fallen 90 percent: it was between 20 and **50** million acres in the early 1900s and is between 2 and 5 million acres today.
- Nationally, the average volume of standing **timber** per acre in U.S. forests is 30 percent greater today than in 1952.
- Tree planting on all forest land rose dramatically after World War II, reaching record levels in the **1980s**. Many private **forestlands** are now actively managed for **tree** growing: 70,000 **certified** tree **farms** encompass 95 million acres of privately **owned** lands.
- The tens of millions of acres of **cutovers** or "**stumplands**" that **existed** in 1900 have long since been reforested. Many of **these** areas today are mature forests. Others have been harvested a **second** time, and the cycle of regeneration to young forests has **started** again.
- **Eastern forests have staged a major comeback**

Although forest resource conditions have improved in the last **century**, increasing human **demands** will **continue** to impact natural **resources**. The ability of forest systems to **maintain a balance of successional** stages through natural disturbance **has been reduced** by human development. For example, the present forest **area** does not have the same stand structure, **and therefore cannot** support the same groups of plants and animals as found in large, natural forested areas. As **a** result, the distribution and abundance of biological **communities** has **been** significantly altered.

Timber Supplies

For the first time in its history the U.S. does not have a large, **unreserved** volume of softwood **sawtimber** to draw upon to meet the Nation's **needs** for building materials and **other** uses. First the **Northeast**, then the Lake States, the South, the West Coast, and the South again provided the timber for increased **softwood** lumber production.

There are 737 million acres of forest classified as forest land—land that is at least 10 percent stocked with trees, or formerly had such cover, and not developed for other purposes. The two-thirds of the forest land (490 million acres) that can grow more than 20 cubic feet of industrial wood per acre per year is called timberland. Most of the timber harvested for roundwood products comes from this part of the forest resource base. Nearly three-quarters of the timberland is in the eastern half of the country, while the remaining timberland in the West is found primarily in the Pacific Coast States and in Montana, Idaho, and Colorado.

About one-third of U.S. forestland is in Federal ownership. These lands are concentrated in the Rocky Mountains and Pacific Coast States. Some of these lands are high elevation forests that have great scenic beauty and are important recreation sites. Most of these areas have not been harvested for timber, and they contain a large part of the Nation's softwood timber inventory.

The Nation's timberlands contain over 858 billion cubic feet of roundwood: 92 percent of this is in growing stock (live, sound trees suited for roundwood products) and the remaining 8 percent is in rotten, cull, and salvable dead trees. Some of the latter may be suitable for lumber and veneer, but most is usable only for pulp, fuel, and other products where there are no significant log quality requirements.

Timber inventories rise when net annual growth (total growth less mortality) is greater than the volumes removed by timber harvesting, clearing, or changing land use (timber removals). The overall growth-removals balance for the United States is positive for all species (1.33), but it is lower for softwoods (1.09) and higher for hardwoods (1.8). The ratios in the North are very high, indicating continued substantial increases in growing stock volume. However, the softwood ratio for the South has been declining and was 0.88 in 1991. This is the first time since 1952 that softwood removals exceeded growth in the south.

The current growth-removal balances for timber show that hardwood forests and some eastern softwood forests can support additional harvests. However, these balances will change. Future harvests, particularly in the decades beyond 2000, could vary over a wide range. Nonetheless, assuming that timberland owners continue to respond as they have in the past to price and inventory changes and manage their stands as projected, timber harvests from private land⁸ will be increased substantially in most regions. Total softwood roundwood harvests are projected to rise from 11.4 billion cubic feet in 1991 to 14.5 billion cubic feet in 2040, an increase of 27 percent. Projected hardwood harvests will rise from 6.8 billion cubic feet in 1991 to 10.6 billion in 2040. Regionally, the largest increases will be in the South.

Public Lands

Most public lands that produce timber in the U.S. are managed under some form of

for control of fire, insects, disease, and weeds. Regarding softwood supplies from private lands, forest industry **ownerships** are projected to be managed intensively and nonindustrial private **ownerships** are projected to **increase** their acreage in plantations. For the South, an effect of these assumptions is that the area of pine plantations increases to about 45 million acres by 2040, up from about 23 million acres today. Timber **harvest** from these plantations is projected to increase from 831 million cubic feet currently to 6.1 billion cubic feet **annually** in 2040. Harvest from other forest management types in the South is projected to decline. Most of the net increase in U.S. softwood harvest of 4 billion cubic feet between 1992 and 2040 is projected to come from pine plantations in the South.

if these plantations are not established as projected, prices for timber products **will** rise more than **projected**, especially in the long term. In addition, increased state and local regulation of private lands could detract from investments for timber production, **causing** further pressures on softwood prices. In some situations, regulations such as mandatory reforestation may enhance forest management, however.

Timber resources can also be conserved and extended through improved utilization. Some examples include: increasing the useful life of wood products by preservative treatments, improving designs of new structures, and renovating and maintaining existing structures; improving **efficiency** in harvesting, milling, **construction**, and **manufacturing**; utilizing unused wood materials such as logging residues, **treetops** and limbs, salvable **dead trees, trees in urban areas, and urban wood wastes; and increased recycling of paper** and paperboard.

Increased recycling of paper **and** paperboard will have wide-ranging and significant impacts on the timber **industries** and shift the timber demand/supply outlook **Increased** **paper recycling represents a** fundamental long-range development which will characterize the U.S. pulp and paper sector for the foreseeable future. In 1988, **28 percent** of the paper and paperboard **consumed in the United States** was recovered for recycling. Of the total amount recovered, about **four-fifths** was recycled in U.S. paper and board mills, and about **one-fifth** was exported. **We project that the rate of paper recovery for recycling will reach 48 percent by 2000 and 57 percent by 2040.**

Projected **increases** in **paper recycling** result in **slower** projected growth in pulpwood consumption and **slower** growth in timber harvests than indicated in previous analyses. This will help to extend **U.S. timber** supplies, especially for **pulpwood-quality** timber. **Softwood pulpwood prices in the South are projected to remain relatively stable.** Hardwood pulpwood **prices** in this region are projected to remain relatively stable for the **next** two decades and then **increase** beyond 2010 because of **declines** in hardwood pulpwood inventories.

The Role of Ecosystem Management

A common concern **regarding recent** assessments of timber resources and

availability is whether they have adequately taken into account possible environmental constraints. One aspect of this concern is the projected availability of timber from federal forest lands in the future as ecosystem management concepts are implemented.

As noted earlier, future forest management for public lands must consider ecosystem management principles. The emphasis on ecosystem management for public lands is occurring in part because of the **cumulative** effects of past management activities on public and private lands. Past management has focused more on selected parts of ecosystems than on the whole or in the processes that keep ecological systems *healthy*, diverse, and productive. Ecosystem management recognizes that natural systems-their composition, **structure**, and function-must be sustained in order to meet the social and economic needs of future generations. Managing for healthy ecosystems **conserves** biological diversity, allows for sustainable development, and thus provides for economic opportunities.

Projections of National Forest softwood timber harvests were substantially lower in the 1993 RPA Update from those indicated in the 1989 RPA Assessment, reflecting the impact of **recent court** actions and policy changes. The current outlook is that **softwood** timber harvests **will increase from** mid 1990 levels (about 4 billion board feet including salvage) **as we approach** the end of this decade, and gradually **thereafter**. However, there is about 25 billion board feet of growth per year on the National Forests, with about 8 billion-board feet of mortality.

The National Forests can not go on accumulating growth indefinitely without increasing mortality. That is **inconsistent** with the **principles of ecosystem management and maintaining forest health**. **Therefore**, it is consistent policy to have timber **harvesting** if it sustains forest **health**. Future harvests will be at **a lower level than in the past, but may be** higher than was **projected** in the last RPA Update. Defining that level, however, will depend on the **next round of forest** planning, and **will become clearer as forest plans are reviewed and completed**.

Strategically, the Forest Service is concentrating its approach on implementing ecosystem management concepts on three desired outcomes: 1) **to enhance protection of ecosystems**, 2) **to restore deteriorated ecosystems**, and 3) **to provide a variety of benefits within the capabilities of ecosystems**. **Achieving these goals will** require actions in the following **areas**:

- **Changes in Policies and Laws**. One of the most important changes expected in the future will be a change of policies to implement ecosystem management on the National **Forests and Grasslands**. Existing natural resource laws are being reviewed to see if there are ways to implement **ecosystem management more efficiently**. New regulations are being prepared to **streamline the land management planning process** and to base it upon ecosystem management principles.

- **Applications.** Ecosystems are incredibly complex and it is unlikely that we will ever completely understand how they work. There is, however, much known about individual ecosystems. The Forest Service plans to build on our collective knowledge to develop more tools to measure the health of our forests, rangelands, and plant and animal communities. Such tools are essential in developing and implementing strategies to conserve biological diversity and maintain aesthetic values, while producing needed commodities.
- **Monitoring and Evaluation.** A key element of ecosystem management is a consistent monitoring effort. The Forest Service has begun a national strategy for monitoring and evaluation as an integral part of ecosystem management. This evaluation can be used to adapt our management to incorporate new information.
- **Science In Decisionmaking.** The underpinning of good resource management has always been and will continue to be science. In implementing ecosystem management, the use of science (social as well as physical and biological research) in the decisionmaking process will be enhanced.
- **Collaboration and Partnerships.** Ecosystem management will require a commitment to working with more partners than the Forest Service has in the past, because ecosystems cross boundaries. By working with its partners, the Forest Service can encourage the use of non-regulatory approaches, respect for private property rights, and information sharing with interested and willing partners.

Future U.S. forest management on public lands will involve ecosystem management principles, but ecosystem management does not eliminate the necessity for making tough choices. The range of natural ecosystem variability is likely to differ in some important respects from future conditions of ecosystems and landscapes desired by society. In virtually all landscapes, a compromise must be struck between natural processes and societal demands. In attempting to reach a desired future condition, managers may alter the hierarchy of ecosystems and create resource interactions in both space and time. The nature of ecosystem disturbance and recovery will in part determine these interactions.

Conclusion

Past performance clearly indicates that U.S. forest resources are resilient, renewable, and responsive to management. The resilience and renewability of forests account for the management opportunities we have today to increase their products and uses as well as to enhance the environment. But the U.S. is in an unprecedented situation with regards to softwood sawtimber supplies. For the first time in its history the U.S. does not have a large, unreserved volume of softwood sawtimber to draw upon to meet the

Nation's needs for building materials and other purposes. **Also**, future timber production from U.S. forests are especially sensitive to assumptions about investments in plantations and trade which will involve policy considerations.

In the coming decades, Americans' perspectives on natural resources and ecosystem management will change in terms of problems, opportunities, and the appropriate mix of management inputs to manage the country's renewable resources. And increasingly, international dimensions of U.S. forestry will be part of the framework for addressing problems and opportunities. Periodic assessments of the renewable resource situation will continue to be essential in providing the factual basis for future policy development.