Forest Lands of the Continental United States

By Fred C. Hall

The United States is blessed with a rich mixture of tree species on its 494 million acres of productive forest land. About 50 conifers and 90 hardwoods grow throughout the country.

Productive forest land, which makes up 22 percent of the land area, are those lands which can produce 20 cubic feet of wood or more per acre per year. This is equivalent to about 100 board feet per acre per year.

These forests have other uses beside wood production. Fall colors can be beautiful with the yellows of western larch and quaking aspen silhouetted against rich green conifers of the West, or the brilliant red leaves of maple and the yellow of birch contrasted against pines in the New England States. The forests furnish a home for wildlife, protect watersheds from erosion, and may contribute gum for turpentine, sap for maple sirup, and forage for livestock.

Six major forest types are found in the United States. The Eastern United States is divided into northern forest, central oak-hickory, southern forest, and bottomlands. Western forest land is divided into the highly productive west coast and less productive interior forest.

Wilderness, Park Areas

Not all these lands are available for commercial wood production. Twenty million acres are reserved for uses such as Wilderness and National Parks, or have been deferred for possible inclusion in these kinds of

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dedicated areas. About 234 million acres, or 10 percent of the land area of the United States, is classed as unproductive forest land, land not capable of growing 20 cubic feet of wood per acre per year.

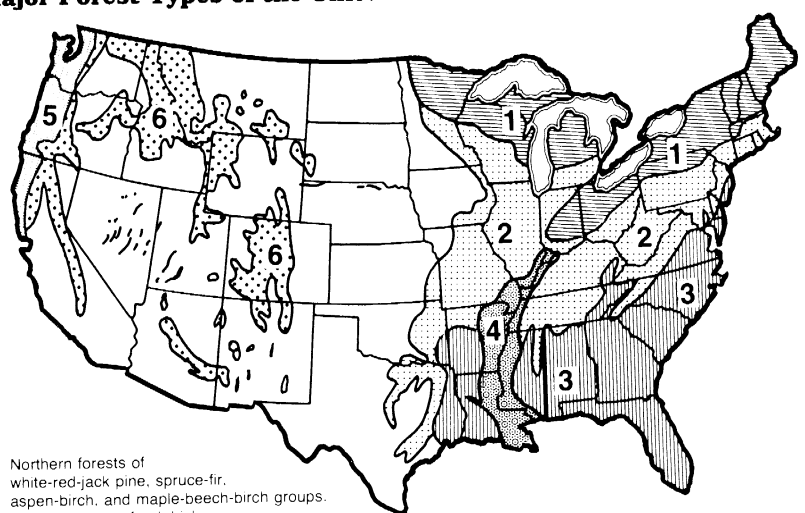
Climate and soil are primary, natural factors influencing distribution of the 19 forest groups that make up the six types of forests. Climate changes from cold in the North to warm in the South, while precipitation is too low in the Great Plains and in many parts of the West to support forests.

But precipitation and temperature are not the only climatic factors influencing forests. Storms affect them too. Hurricanes along the southeast coast influence the kind of tree species growing there and often disturb the forests. In the west, southeast and northern forests dry lightning storms start natural fires which tend to create or maintain some forest groups.

Soil is the other major natural factor influencing forests. In many cases, soils are poorly suited to agriculture due to low fertility, stoniness, or steep slopes.

Where topography permits, the better forest land soils have remained in cropland. Many farms occurring on poorer soils have been abandoned and have reverted or have been planted back to forest. These soils often pro-

Major Forest Types of the United States



1. Northern forests of white-red-jack pine, spruce-fir, aspen-birch, and maple-beech-birch groups.
2. Central forests of oak-hickory.
3. Southern forests of: Oak-pine, loblolly-shortleaf pine, and longleaf-slash pine groups.
4. Bottom land forests of oak-gum-cypress.
5. West coast forests of: Douglas-fir, hemlock-sitka spruce, redwood, and some western hardwood groups.
6. Western interior forests of: Ponderosa pine, lodgepole pine, Douglas-fir, white pine, western larch, fir-spruce, and some western hardwood groups.

duce a limited amount of wood and tend to grow only certain tree species.

Each combination of climate and soil produces unique environments in which only a few tree species can compete and grow. The same is true for shrubs and herbs growing under a tree canopy. It is the entire plant community—trees, shrubs and herbs—that produces habitat for wild animals, esthetic pleasure for people, and which protects our watersheds.

The People Factor

Climate and soil are natural environmental factors over which we have little control. However, people have been and will continue to be the major factor influencing vegetation. People have influenced forest land vegetation by logging, clearing for farming, and controlling fire.

Natural fire produced some of our most magnificent coniferous forests, such as red and white pine in the Lake States, Douglas-fir on the West Coast, ponderosa pine in western interior forests, and the productive southern pine forests.

When fires are stopped, trees that can grow in the shade will eventually dominate these forest groups. Hardwoods invading under pine often grow more slowly and produce a different quality of wood, wood that is of less value in the marketplace. Planned burning under forest stands is being used to maintain desired species in many parts of the country.

Forests have been converted to other uses ever since the days of colonization. Forests were cleared for farms, many of which were scratched out on poor, infertile soil.

Eighty years ago New England was about 60 percent forested, whereas today it is 80 percent forested. On 20 to 30 percent of the present forest area the original forest was destroyed, the land plowed and tilled, then abandoned, and now a new forest has developed. The same thing has happened in many areas in the South. This is a rather striking influence by people.

Top Quality for Kings

But disturbances to the forest such as fire and farming have affected less area than timber harvesting. During colonial days, highest quality white pine stands were reserved for the kings of England and France to supply masts for their sailing ships of war. Black walnut was selectively harvested for furniture and weapon stocks. Chestnut, at one time extensively used, was eliminated when people introduced chestnut blight from Europe.

The greatest impact on forest lands probably occurred during the industrial revolution, between 1860 and 1900.

During this time, clearcutting of red and white pine progressed from New England through the Lake States where, in 1900, the

"inexhaustible stands of timber" suddenly disappeared in western Minnesota. Alarm over the devastation of timber caused the Federal Government to create Forest Preserves in the West, initiate fire suppression, and protect scenic areas as National Parks.

Since 1900, increased attention has been focused on sound management of forest lands. Low productivity farmland has been replanted to trees, and areas clearcut during the late 1800's have been reforested.

The concept of sustained yield forestry has gained nationwide acceptance. The forest industry has found it necessary to use sustained yield management to stay in business. This concept, of course, is required by law for management of National Forests and many other Federal and public lands.

Eastern Forests

The four eastern forest types are composed of 10 groups. They occupy about 80 percent of New England, 50 percent of the Atlantic Coast States, and 15 percent of the Central States where forestland soils are often amenable to farming.

The northern forest consists of four groups: white-red-jack pine, spruce-fir, aspen-birch, and maple-beech-birch. Maple-beech-birch occurs mainly on upland sites in the New England, Middle Atlantic, and Lake States Regions. In the Lake States, some sites are dominated by the aspen-birch group, composed of relatively short-lived species, that have occupied large areas following logging and fires.

Spruce-fir forests grow from New England and the Lake States north into Canada. They occur after long periods without fire.

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Pines and the South

Southern forests consist of the oak-pine, longleaf-slash pine, and loblolly-shortleaf pine groups. Oak-pine includes residual hardwoods left after merchantable pine has been selectively cut. On many timber industry lands, oak-pine is being converted back to nearly pure stands of pine.

Longleaf-slash pine occurs in the Southern States and along the Atlantic Coast, while loblolly-shortleaf pine tends to grow at higher elevations and further north. Both of these groups have been maintained in the past by planned burning under the pine canopy. They change to hardwood forests if steps are not taken to regenerate pine.

Southern bottomland forests of oak-gum-cypress are found primarily along the Mississippi River drainage. They include such valuable species as sweetgum, cherrybark oak, tupelo and bald cyprus. Productivity is often high.

Forests of the West

Western forests have been separated into the highly productive west coast area and the less productive western interior forests.

West coast forests consist of the Douglas-fir, hemlock-Sitka spruce, redwood and some western hardwood groups. They include some of the most productive forest areas in the United States. However, lack of prompt reforestation following clearcutting has converted some highly productive Douglas-fir and hemlock-Sitka spruce groups to red alder, one of the more productive western hardwood types.

Western interior forests consist of the ponderosa pine, lodgepole pine, interior Douglas-fir, white pine, western larch, fir-Englemann spruce, and some western hardwood groups.

Lodgepole pine, white pine, and western larch generally resulted when crownfire destroyed the previous stand and permitted these shade-intolerant species

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This Douglas-fir forest on the West Coast produces 120 cubic feet of wood or more per acre per year. It requires only 16 years for one acre to grow enough wood for a three-bedroom house.

to dominate. Selective cutting tends to convert these stands to true firs and Douglas-fir. Ponderosa pine was maintained by natural burning under the forest canopy. Many stands are now changing to fir because of fire suppression.

Ownership, Productivity

Management of productive forest land is significantly influenced by objectives of the landowner. Ownership may be summarized according to: National Forest, other publicly owned land such as state and municipal governments, industrial-owned by timber companies, and farm ownership.

Farmers and other individuals who own forests generally do not produce a sustained profit from forest products because tracts are small and because the owners are interested in other endeavors, such as farming or recreation.

National Forests account for 18 percent of the productive forest land, other public 9 percent, forest industry 14 percent, and farm ownership 59 percent. Over half the western forest land is in National Forests. In the East, three-fourths is in farm and individual ownership.

Productivity of forest land varies dramatically from less than 20 cubic feet of wood to greater than 120 cubic feet of wood per acre per year. For example, an acre of forest producing 20–50 cubic feet per year requires 63 years to grow enough wood for an average three-bedroom home. An acre of forest producing 140 cubic feet per year takes only 16 years to produce the same amount of wood.

Average wood productivity for eastern forests is 74 cubic feet per acre per year. The West Coast averages 102 cubic feet compared to 62 cubic feet per acre per year for western interior forests.

Overall, 10 percent of the productive forest land produces 120 cubic feet or more of wood per acre per year. Twenty-five percent falls in the 20–50 cubic foot class. Much of this low productivity occurs in the western interior forest which also contributes significant forage for livestock grazing, wildlife habitat, and recreation.

A relatively large proportion of the better sites, above 85 cubic feet, are in forest industry ownership. National Forests and other public owners have a relatively high proportion of the poorer sites.

Forest Productivity

One cubic foot of wood equals 5 board feet of lumber. About 11,000 board feet of lumber are required to build an average three-bedroom home (1,600 square feet).

	Cubic Feet of Wood per Acre			
Conversions	*20–50*	*50–85*	*85–120*	*120 +*
Average cubic feet	35	67	102	140
Board feet	175	335	510	700
Acres required to build one home	63	33	21	16
Years required for one acre to grow wood for one home	63	33	21	16

Forest Succession

The 19 forest groups are identified by trees that dominate the overstory. In many cases, these trees became established following a disturbance such as logging, fire, or farming. They require full sunlight for best growth and tend to be replaced by more shade-tolerant species.

The change from sun-loving to shade-tolerant species is called succession. Shade-tolerant groups include spruce-fir, oak-hickory, and maple-beech in eastern forests, and fir-Englemann spruce, and hemlock-Sitka spruce in western forests. Most of the other groups are successional to more shade-tolerant species.

Take, as an example, oak regenerating under 40-year-old slash pine planted on abandoned farmland. After the final harvest of slash pine, oak will dominate the site and it will become an oak-hickory forest.

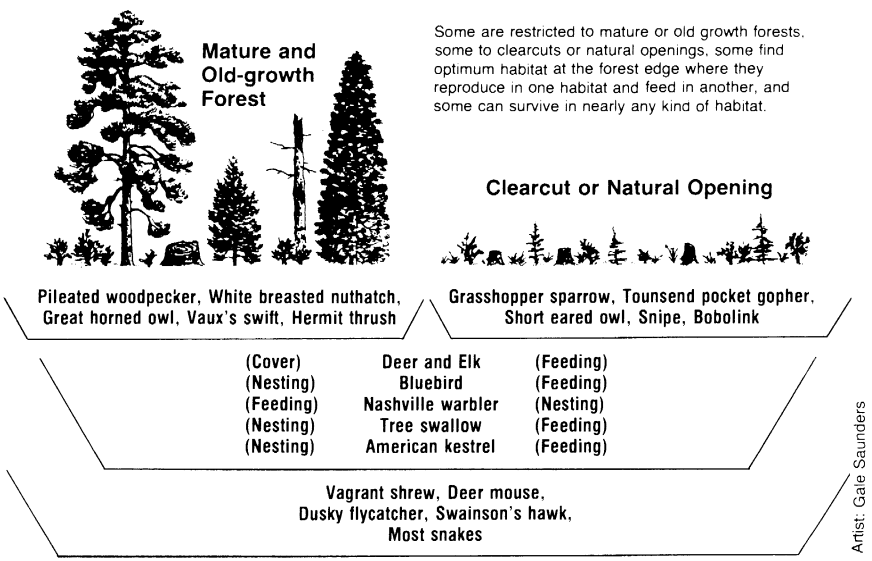
Western larch, white pine, and lodgepole pine generally reproduce poorly in shade and will be replaced by firs. Many ponderosa pine stands maintained in the past by natural fires are now, with fire suppression, being colonized by fir. A similar situation occurs in the West Coast Douglas-fir group, where western hemlock tends to replace it.

Timber harvesting methods greatly influence which species will dominate a forest stand. Selective cutting of southern pine encourages succession to slow-growing oak. The same treatment applied to ponderosa pine may convert it to fir. If successional forests are to be maintained, cutting and regeneration techniques such as clearcutting or shelterwood must be used.

Wildlife Relationships

Different wildlife species tend to be associated with each of the 19 forest groups. Species found in the northern forest of white-red-jack pine tend to be different from those found in the loblolly-slash pine of southern forests. Within southern forests, wildlife species found in loblolly-slash pine are different from those found in oak-hickory. As forest succession changes from pines to hardwoods, the wildlife communities change.

Preference of 20 Wildlife Species for Different Forest Habitats



Not only do wildlife species change with forest succession, but there also are different species within a forest stand and an adjacent opening.

Wildlife may be placed into four general categories: Those that reproduce and feed in mature- to old-growth forests, those that prefer openings or clearcuts, those that find optimum habitat at the forest edge, and those that survive in both forested and nonforested areas.

In the Blue Mountains of eastern Oregon, for example, the pileated woodpecker must excavate a nest hole every year in a tree larger than 22 inches in diameter measured at 4½ feet above the ground. Since this bird is a year-round resident, it also requires a supply of snags that house carpenter ants, its staple winter food supply. It clearly needs large diameter, mature, or old growth forests.

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A clearcut or open area is a preferred habitat for many animals. In the Blue Mountains of Oregon, for instance, about 40 percent of the wildlife species depend on natural openings or clearcuts for optimum habitat.

Gopher, Bluebird Needs

In contrast, the Townsend pocket gopher lives exclusively on clearcut sites or old burns. It leaves a burned or clearcut area when tree crowns merge.

The western bluebird lives at the forest edge. It nests in a cavity excavated by a woodpecker, yet prefers to feed in the open, not within the forest. Therefore, it needs a combination of trees near an open area.

Many wildlife species use both forest and open space for reproduction and feeding. The deermouse is a classic example. It can be found in moderate numbers within the closed forest. After clearcutting, however, the number of deer mice commonly doubles or triples because they can find more food.

In the Blue Mountains of eastern Oregon, about 40 percent of the wildlife reproduce and feed primarily in natural openings or clearcuts, 40 percent live primarily in mature- and old-growth forests, and about 20 percent can survive in both. The distribution of natural openings, or clearcut areas, has an important influence on the kinds and distribution of wildlife species.

Outlook for Timber

The land area in forests has been changing. For a while after 1900, abandoned farms were returned to timber production. This offset the conversion of forest land to residential areas, highways, and industrial sites. At the present time, however, there seems to be a gradual, steady but slow decrease in forest land area. While a gradually shrinking forest land base is a problem, the real concern is increased growth of wood and demand by the American people for wood products. Our increasing population demands more housing and other wood products such as paper, firewood and furniture.

The demand on U.S. forests can probably be met with improved timber management despite a shrinking land base. This does not mean, however, that we can supply all our wood needs. The United States has been consuming more wood than it produces since about 1945. In 1952, wood imports supplied 13 percent of our demand. By 1976 it had risen to 21 percent. Projections to 2030 suggest imports will be about 15 percent.

Demand, exports, imports, and supply of timber products from U.S. Forests with projections to 2030

	Billion Cubic Feet						
						*Projected**	
Item	*1952*	*1962*	*1970*	*1976*	*1990*	*2010*	*2030*
Total U.S. Demand	11.9	11.6	12.5	13.4	18.8	22.8	25.5
Exports	.1	.5	1.5	1.8	1.5	1.5	1.3
Imports	1.5	1.9	2.4	2.8	3.8	4.2	3.8
Demand on U.S. Forests	10.8	10.2	11.6	12.4	16.5	20.1	23.0
Supply from U.S. Forests	10.8	10.2	11.6	12.4	16.5	20.1	23.0

*Projected based on relative prices rising from their 1970 level (inflation).

Further Reading

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