

Forest Levels

Just as the soil has several layers on the forest floor, forest trees can be grouped into several levels. The trees that grow largest in a stand are called dominant. They receive full sunlight from above and partial light from the side. Their crowns are larger than those of other trees. The co-dominant trees, or medium-sized trees that receive sunlight from the top but not very much from the side, grow in between the dominant trees. These trees form the canopy, or the "roof" of the forest. Intermediate and suppressed trees make up the understory. These trees are shorter and overtopped because the dominant trees block most of the light. Below the understory is the shrub level, including grasses and ferns. Nearest the forest floor are the mosses, lichens and other small plants.

Some forests feature all of these levels, but many forests do not. Your forest area may have only tall trees, and no shrub level. In other forests you may find it difficult to tell the difference between levels. Have your leader help you with this.

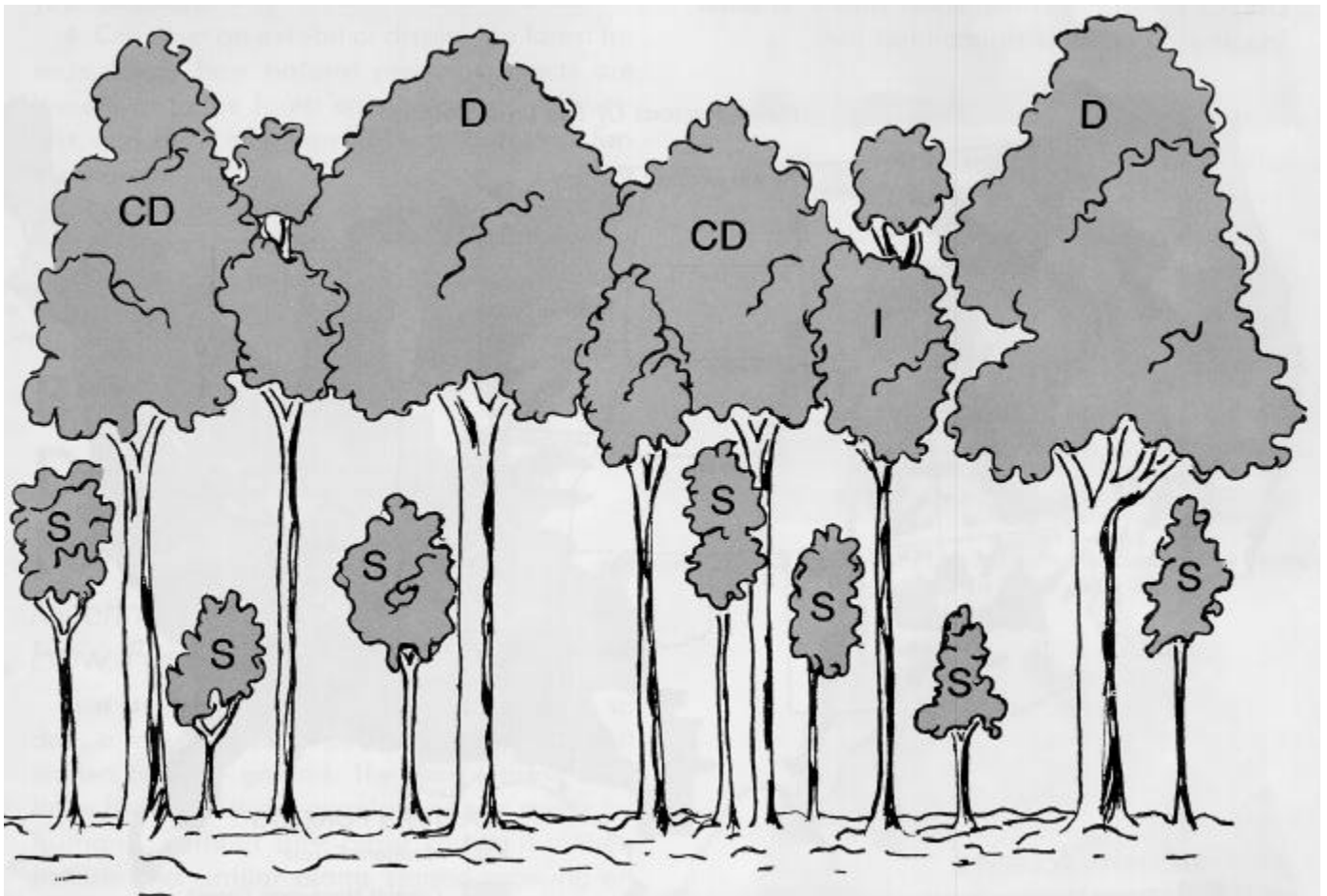
Things You Can Do

1. Agricultural crops are one example of subclimax growth. If we do not re-plant each year, another plant community begins to grow. Find a field near your home that was once used to grow crops but which now grows wild. Describe in your notebook what plants are growing there now. Compare them to what was growing there before.

2. Find what you think to be the oldest tree in your forest. Estimate its age, and write down how you figured the tree to be this old.

3. Visit a section of the forest that has been harvested. Estimate the year of the cutting by figuring the age of the trees that have grown up in place of the trees that were cut.

4. Make a list of "sudden" changes that you have seen in your forest that were made by natural forces or by people. These could be changes caused by fire, storms, insect attack, disease, logging practices or agricultural use.



*Tree Crown Classes:
D, Dominant; CD, Co-Dominant
I, Intermediate; and S, Suppressed*

Meeting 7 Forest Regions and Cover Types

Forest Regions in Eastern Forests

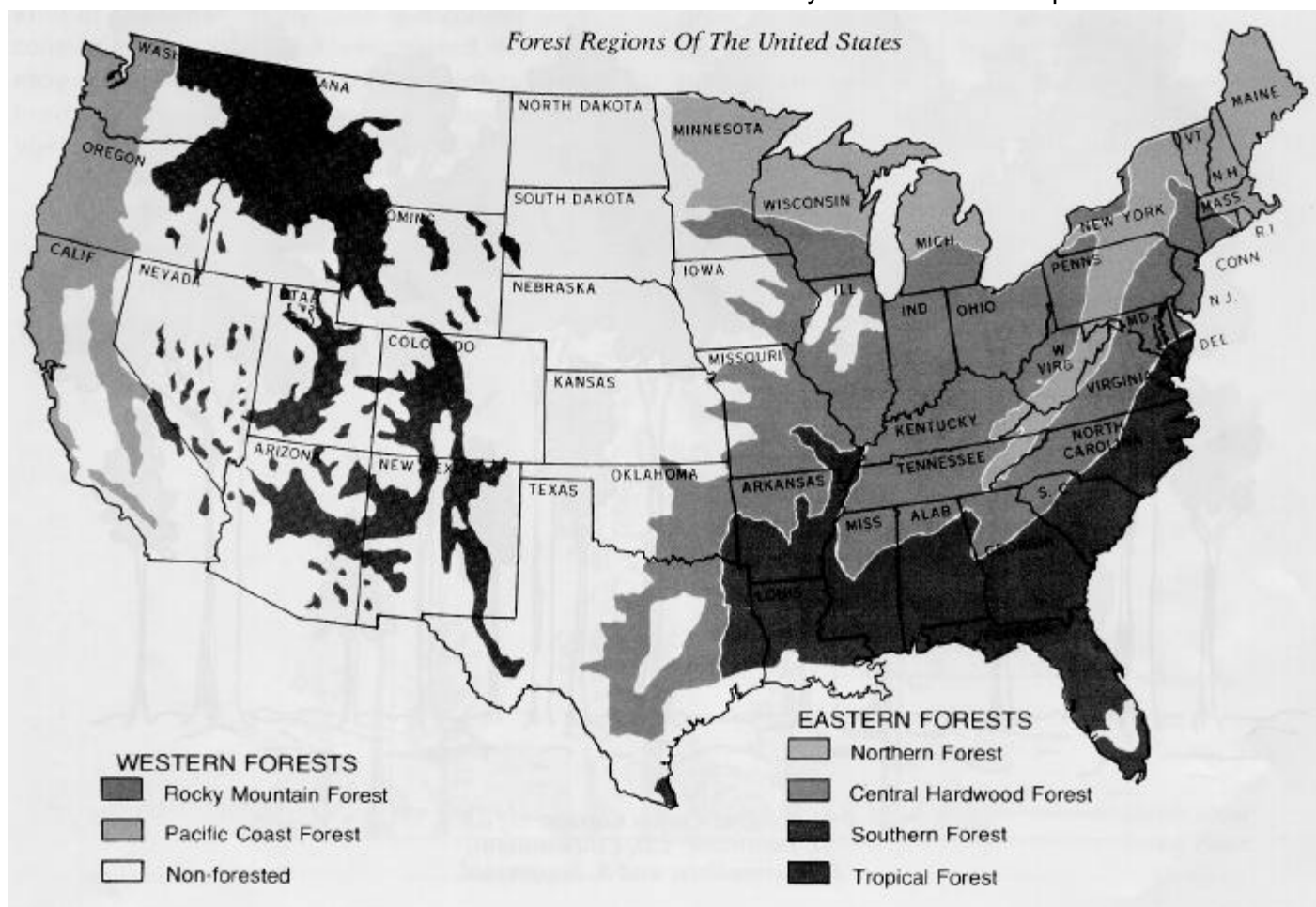
In the eastern part of the United States there are three major forest regions. These are the northern, central hardwood, and southern forest. This classification has been determined according to the kinds of trees and the number of each kind found on the land. Florida and Texas have small areas of tropical forest. Large unbroken forest areas still exist in some parts of the eastern half of our nation. These are in northern New England, northeastern New York, parts of the Great Lakes states, central Pennsylvania, and the Appalachian region of the South Atlantic and Gulf states. Other forest lands are mainly in small tracts on farms and other small properties. These small forests make up two-thirds of the total forest land in the United States.

The eastern regions contain only about one-third of the nation's standing sawtimber, meaning those trees large enough to saw into boards. Yet, over half of the annual harvest comes from these forested areas. About one-fourth of all sawtimber

in the eastern forests is southern yellow pine. The yellow pine forests have enough moisture, good soils and favorable temperatures to provide for a rapid growth rate.

There are more than 150 different commercially important tree species in the eastern forest. Foresters plan pine regeneration on pine sites and hardwood regeneration on hardwood sites. New stands of pine are started by planting nursery-grown seedlings or by direct seeding with aircraft or ground equipment. Some hardwood tree seedlings are also planted to make sure that there will be enough of that kind of timber for the next harvest, and to control the natural dominance of other species.

There are about 5,000 wood products made from eastern forests. The best markets for forest products are the urban areas of the eastern part of our country. Cities such as Boston, New York City, Baltimore, Norfolk, Washington D.C. and Atlanta use many wood products. A few of the many wood products from the eastern forest are lumber, plywood, furniture, turpentine, paper, utility poles, piling, rayon, baseball bats, firewood, charcoal, railroad ties, pine oil, musical instruments, caskets, cellophane, solid alcohol, paints and varnishes. You may want to add other products to this list.



The Northern Region of the eastern forests covers most of New England and New York. It extends southward over the Appalachian Mountain highlands to northern Georgia and westward into the Great Lakes state, including most of Michigan, Wisconsin and Minnesota.

The Central Region covers a large part of the central portion of the eastern half of the United States. It extends almost to the Atlantic Coast. It starts in Southern Minnesota and extends eastward to Connecticut. Excluding the southern Appalachian Mountain Highlands, the Central Region extends south through the Cumberland Plateau to the northern parts of the southern states.

The Southern Region provides the most important source of softwood (pine) sawtimber in the eastern United States. This region extends along the Atlantic and Gulf Coastal Plain from eastern Maryland to eastern Texas. It includes parts of Missouri, Arkansas and Oklahoma.

The Tropical Region covers a very small area. This region includes the Florida Keys, the southern tip of Florida and a 200 mile coastal strip in Texas from the Mexican border to Corpus Christi.

Western Forests

The main forest regions of the western forests are the Rocky Mountain, Sierra Nevada, Cascade and Pacific Coast. Here, there are large bodies of timber extending over the main mountain ranges of the west. Large areas of the dry foothills are covered with low forests of juniper and pine.

Heavy stands of Douglas-fir, spruce and hemlock grow in the Pacific Coast Forest region. In the southern part of the region, the timbered lands are surrounded with narrow margins of low hardwood trees or chaparral. About two-thirds of the nation's sawtimber is in the West. One-fourth of this total is Douglas-fir.

TABLE 1

Soil Moisture	Region	Major Uses
Dry Average Wet	Northeastern Forest Region Jack pine Northern pin oak Aspen Gray birch – red maple Black spruce Black ash – American elm – red maple	pulp, sawtimber, wildlife lumber, pulp, aesthetics, recreation boxes, pulp, aesthetics furniture, lumber, aesthetics pulp lumber, pulp, aesthetics
Dry Average Wet	Central Forest Region Post oak – black oak Pitch pine White oak yellow-poplar – hemlock Atlantic white-cedar	railroad ties, pulp, lumber lumber, pulp Furniture, barrels, lumber, wildlife Furniture, lumber, pulp fences, lumber, small boats
Dry Average Wet	Southern Forest Region Sand pine Longleaf pine – scrub oak Swamp chestnut oak – cherrybark oak Sweetgum – yellow-poplar Pond pine Balddypress – water tupelo	pulp poles, piling, lumber, pulp pulp, lumber, veneer, furniture furniture, lumber, pulp lumber, pulp lumber, pulp
Dry Wet	Tropical Forest Region Mahogany Mangrove	wildlife, aesthetics prevent soil erosion, aesthetics, wildlife
Dry Average Wet	Rocky Mountain Forest Region Ponderosa pine Rocky Mountain juniper Western white pine Western larch Grand fir Engelmann spruce – subalpine fir	lumber, paneling wildlife, aesthetics, posts lumber, paneling, veneer lumber, plywood, poles lumber, pulp lumber, aesthetics, watershed
Dry Average Wet	Pacific Coast Forest Region Arizona cypress Aspen and cottonwoods Sitka spruce Western red cedar Douglas-fir and western hemlock Red alder	posts, stakes, corral poles boxes, crates, pulp furniture, doors, sash, pulp shingles, lumber, posts, poles lumber, plywood, pulp furniture

The western forests have been supplying nearly half of the timber cut each year for lumber, pulp, piling, veneer, plywood, laminated timber, particleboard and chemicals. However, an increasing share of the total volume of timber being cut is now shifting to the eastern forests, especially as the use of wood as an energy source is increasing.

The timber growth rates vary greatly. Moisture, elevation, slope and soil types affect how trees grow. The drier and higher elevations produce the poorest growth conditions, especially on shallow or rocky soils. The best growing places are on deep well drained soils at middle elevations. Most of the commercially important trees in the West are conifers.

Markets for western forest products include such western cities as Seattle, San Francisco, Los Angeles, Phoenix, Denver, as well as many central and eastern urban centers.

The Rocky Mountain Region of the western forests is spread over a vast expanse of mountains and high plateaus. The Rocky Mountain forest region is in the centralwestern part of the country reaching from Canada to Mexico, a length of about 1,300 miles. It stretches from the Great Plains to the great basin of Nevada and eastern parts of Oregon and Washington, a width of about 800 miles.

There are many kinds of soils and climates across the United States. These give us over 1,000 different native species of trees. For various reasons many more species have been imported from other countries. There are 106 forest types in the eastern forest regions and 50 in the western regions. A few examples of forest types and their uses to people are given in Table 1 on page 15.

Things You Can Do

1. Using the map of U.S. forest regions, locate and trace the borders of the six regions of the eastern and western forests. Make a list of states that have little or no forest land. Make a list of states with only one type of forest land and a list of states with two or more forest types. You should have three lists, each labeled clearly.

2. Make an exhibit of the more common timber types of your state or region. Use photos, sketches or wood products that correspond with each timber type. Name the species, and if possible, make a map that shows their distribution. (Refer to Unit A for instructions on getting specimens and preparing exhibits of a tree's foliage, fruit and bark.)

3. Select one forest type you have identified in your forest. Write a description of the plant cover

as you saw it on the ground or the understory of the forest. Include a drawing if you wish.

4. Learn the difference between a national forest and national park. Write down two or three characteristics of each. Find out from a history book the efforts of President Theodore Roosevelt to establish these systems and report to the group.

5. Read about the giant redwood or the sequoia trees and make a report to club members. Illustrate the report so that the age and size of these trees are shown in comparison with other trees or objects.

B-4 Forest Management

Meeting 8

Gathering the Facts

In Unit B-2 we discussed various influences on forest growth. These were climate, topography, soil factors, animals and insects and silvicultural characteristics. Many times people themselves are a very important influence on how forests grow. The amount of land changed somehow by people increases each year. We should consider these changes to be important in the future management of our forests.

(Before going on you may wish to go back to the introduction to review forest values.) The forest manager has to make plans and choices in deciding which values to seek in a particular forest. This unit's meetings will help you learn how we get the most value from our forests.

At one time forests covered much more of our country than they do today. For hundreds of years nature was the only manager of our North American forests. North American Indians used some management practices such as agriculture and prescribed burning. They set fires for warfare, to open up travel routes, to allow more small plants to grow for game animals to eat and to run these animals out of hiding for a richer hunting area. But overall they changed very little of the vast amount of forest land on our continent.

When the European settlers arrived, they changed the forest quickly. They harvested timber for fuel, ship building and homes. They sent wood back to Europe, too. Some of these people had different beliefs about forests than we do today. To the early settlers, trees were in the way of progress. They had to be removed as quickly as possible for homesteading and farming. Many times the settlers simply set fire to the trees and let

them burn. At that time there was plenty of forest land, and not enough open land, so they did not feel wrong in doing this. In time more forests were cut down, and homesteads became settlements.

Our country came to realize that as cities grew, our forests were decreasing both in size and quality. About a century ago the federal government passed a law to set aside special vested areas to be owned by the people. These areas became the basis of the National Forest system.

We still do not fully understand how nature manages the forest ecosystem. Therefore many times people can spoil resources without realizing what they are doing. But through careful scientific research we have learned how to change the forest for the better. For example, a well managed forest will actually provide more water and wildlife than most climax forests. But to be successful managers of our different uses of the forest, people must work in harmony with nature.

Management And Land Use

Management is planned, orderly ways to reaching goals. Forest management isn't just for large forest-industry holdings or publicly owned forests. It is needed on even the smallest of farm woodlots. When the area is small, the manager may not have as many goals. The opportunities for management may be few, but the need remains.

Owners of private woodland are becoming more mindful of community values. Nevertheless, many forest owners still have the idea that land is theirs to do with as they please without consideration for others. For example, one landowner may control the watershed for a whole community. This owner may decide to graze goats or sheep on the land. If the owner is not careful, over-grazing can kill the plant cover. Then rainfall runs off rapidly, carrying along soil and causing floods. Meanwhile during dry periods, very little water will soak into the ground to feed springs and streams. Silting damages streams and reservoirs. Actions such as these have an impact on not just the owner, but the entire community.

The future use of the land involves not just one person but many people. Good forest managers consider community needs and proper use. The wisest plan for a landowner is a single use. This may mean harvesting, setting aside the land for

aesthetic purposes or using it for recreation. On private land a single practice may allow some other use in the future. For example, the owner who used his land to harvest some fine oak timber may find increased hunting for rabbits, quail and other game animals. A new plant cover replaces the harvested oak, and different food is available for different wildlife.

A more difficult plan is multiple use of land. This attempts to take into account many needs and values over the same period of time. The same general forest area may produce water, wildlife, wood and other forest products and recreation. For instance, let's say the manager of a city watershed is interested in maintaining the water supply. The manager may harvest some of the trees so that more rainfall will reach the surface of the watershed. As a result of more openings in the trees, some wildlife habitats are sacrificed but other kinds are gained.

In multiple-use forestry all the uses have to be well-managed over the entire forest for the maximum benefit of the people. Some uses, if improperly managed, may conflict. Such as poor logging practices and recreation or horsback trails and motorized bike trails. Foresters and land planners must be careful to prevent conflicts between different users of the forest. One special use of specific areas of our national forests is wilderness. By its very definition, a wilderness does not permit any non-recreational uses.

To gather facts needed to make decisions about forest trees, managers often use the cruise method. This is a plan for gathering information on timber volume and growth, as well as other important facts about the forest. A complete cruise is a listing of all the facts known about a given forest. Some cruises are made from measurements of sample plots or strips through the forest. Some are made from aerial photographs.

The forest manager must think of costs and benefits. The manager must think economics. He or she must ask such questions as how much the stand is worth now, as compared with the future, or what will be the future dollar value of the increased tree growth as a result of thinning the trees. A land manager's job grows more difficult when other values must be considered, such as natural beauty, recreation and keeping the forest ecosystem intact.

Kinds of Information Obtained in a Forest Cruise

Land	Trees	Community	Economics
soil quality topography location	kinds quality quantity	recreation watershed protection natural beauty	markets price cost

Timber is a term applied to trees that have a certain size and quality. This wood is used for making lumber, plywood and beams for building and construction. What is left over in the making of the lumber is then made into chips for paper and fiberboard. The commercial values of a standing tree may differ greatly. Its value in dollars depends on the species, quality and location of the tree. (A local forester can explain to you how the commercial value of a tree is decided.)

For example, consider the following case. A stand of 24-inch diameter trees 100 feet tall may contain thousands of board feet. If the stand is sold to a timber buyer while it is standing in the forest, its lumber could be made to build valuable wood products. This same stand may be worth much more if it forms a shady grove on a street or in a city park. We look on this stand then as valuable not for timber but for shade and beauty. It is much more difficult to put a dollar value on a stand of trees that is appreciated more for its beauty than for its timber.

Things You Can Do

1 . Construct a map showing the extent of North American forests in the years 1600 and 1900 as compared with today. Use your encyclopedia for help.

2. How would you show the person who over grazes that the forest ecosystem may be upset? Think of the different natural cycles taking place in the forest, and how plants and soil rely on each other. Draw an example of this interdependence and label the different parts.

3. Name the three best trees in your area for street or park planting. Give several reasons why each is considered best. Visit your city planing commission to find out what trees they suggest for planting on city streets and in parks.

4. How can we determine the value of forest recreation benefits? Is it fair to charge campers, picnickers, horse riders, hikers, vehicle drivers, fishermen, hunters, wilderness seekers and others for their recreational use of forests?

Meeting 9

Forest Management Practices

Once a forest manager gathers the facts and sets his priorities, the manager must decide which practices will best meet the community's goals. To produce a steady supply of wood products, wildlife, water and recreational sites, foresters must use various practices to manage forest resources, such as:

- a. Insect and disease control
- b. Fire control and prescribed burning
- c. Harvesting practices
- d. Thinning and pruning
- e. Reforestation

We already know the effects that insects, disease and fire can have on forests, and a little about how they can be prevented or controlled. Below you will read about ways forest managers harvest and regenerate the forest. Foresters can use certain harvesting practices that not only provide timber, but which meet other goals as well. For instance, planned tree cuttings and other management practices can improve food supply and cover for wildlife. Often wildlife can be encouraged without giving up other goals.

In some cases sacrifices must be made. Management is needed to help the endangered red-cockaded woodpecker. This bird needs old living pines with decaying heartwood. This is where it builds its nests. To provide trees for nesting, the forester must keep some older trees which will not be sold. This is a sacrifice. Besides loss of money, this practice can result in tree snags which may be struck by lightning or blown over. In this case, the forest manager must decide which value is more important, and then choose one or the other.