Chapter 4
The Redwoods: 1900s to the Present

As the population of California continued to grow, so, too, did the demand for redwood products. As technology changed in the first half of the 1900s, it became easier and cheaper to cut and process larger and larger trees, resulting in great profits for redwood lumber companies, especially during economic upturns and the building booms that came with them. Recognizing the need to regulate the logging industry, California passed a Forest Protection Act, and hired the nation's first state forester in 1905. At this time, 85-90% of the redwood forests remained unlogged.

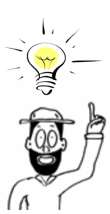
After the 1906 San Francisco earthquake, the City by the Bay was rebuilt largely with redwood. With the new technology making the harvesting of ever more trees profitable, logging operations continued to expand. The supply of trees remained vast; in 1925, after nearly a century of logging, about 67% of the original redwood stands still remained uncut. From 1900 until 1929, the annual cut of redwoods was about 520 million board feet, with about 80% coming from north of the Golden Gate.

The general slowdown in the economy during the Great Depression also slowed down the harvesting of the redwoods. Many logging companies went out of business or temporarily shut down. The post-World War II building boom saw a revival in redwood logging, as loggers returned from the war and technologies such as improved tracked vehicles allowed logging redwoods on slopes that had previously been considered too steep.

After World War II, California experienced a building frenzy that was unprecedented. The demand for redwood and Douglas-fir soared. The number of coastal sawmills more than tripled between 1945 and 1948 (Barbour *et al*, 2001).

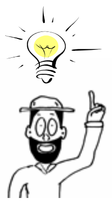
By 1953, over a billion board feet of redwood lumber was being produced annually. Another housing boom in the 1960s further increased the demand for redwood lumber. Japan's building boom of the '60s added to the demand.

Teaching Idea



A "board foot" is a volume of wood equivalent to a board that is one foot square and one inch thick…144 cubic inches. Teachers can probably obtain a sample of wood from a local lumber yard to illustrate a board foot. Note, though, that what is called a "one by twelve" board (nominally one inch thick by twelve inches wide) is only ¾ inches thick and 11 ½ inches wide if it is finished (smooth). (As a result, 12 board feet of finished lumber would have a volume of less than a cubic foot. Also, keep in mind that a cubic foot of a log or tree would yield much less than 12 board feet of lumber because converting a round log to a rectangular board results in removal of the rounded outer sections, sawdust, and trim. When foresters estimate how many board feet are in a tree or a stand of trees, however, they *use tables that take into account such things as the species and shape of the tree.) You might ask for samples of both "rough" and "surfaced" wood. Samples of varying dimensions and shapes can be used to teach volume and area of geometric shapes. If the lumber yard can't help, check with a junior high or high school wood shop teacher.*

Teaching Idea



A million is a pretty incomprehensible number, let alone a billion! Work with the students to calculate the area in square feet of a significant portion of the school grounds…the playground or field, for example. Then divide that number into a billion (or 304 million, to use the 2005 harvest) to determine how many playgrounds could be covered with an inch thick layer of one year's production of redwood lumber, or how deep the playground would be covered by such a volume.

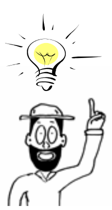
It is important to realize (and to point out to the students), though, that even though 300 million plus board feet is a lot of wood (and a lot of trees), it is a small percentage of the wood that is growing on commercial property.

A useful resource for younger students may be the book <u>*How Much is a Million?,*</u> *by David M. Schwartz (1985).*

From the 1950s to the mid-1970s, the annual redwood harvest stayed around one billion (1,000 million) board feet per year. The harvest then began to decline so that less than 500 million board feet were being harvested annually by the late 1990s and only about 304 million board feet were harvested in 2005.

According to the *2004 Statistical Yearbook of the Western Lumber Industry*, redwood made up roughly half of the lumber produced in the "California Redwood Region" from 1996-2004, with the other major species being Douglas-fir. During that same period, redwood constituted between roughly one-fifth and one-quarter of the lumber produced in California.

Teaching Idea



Discuss with the students possible reasons for the decline in redwood harvested. Is there less demand? Does harvesting less increase the price and profits (supply and demand)? Is less timber available, and if so, why? Is the industry switching from harvesting old-growth to young growth? Did regulations, lawsuits, or taxes cause companies to leave the redwood area? Was land set aside for parks or used for other purposes such as development? Are there other reasons?

These questions generally don't have simple answers, and they might be interesting to ask of timber companies, government agencies, and environmental groups. See the Appendix III for some addresses.

See the activity "Harvest Math" in Section IV.

Today, over 95% of the original redwood forest area has been logged at least once. Much of that logged forest land now supports young-growth forest. Several companies have sold off their redwood lands, which is part of the explanation for the decreasing harvests since the 1950s. Most redwood lumber produced today comes from second- or third- growth forests, *i.e.,* forests that have already been logged once or twice. Timber companies have little old-growth left to cut. Over 95% of the remaining old growth is in parks and preserves. Some old-growth is on privately owned non-industry land, and when landowners seek to cut their timber, it may result in controversy.

The most majestic stands of redwoods were (and are) generally found on flood plains and alluvial flats along river bottom land. There, the trees have ample moisture, a supply of minerals that is periodically replenished by flooding, and sunlight from the opening made by the river. When equipment was developed that could handle the giant trees, the logging companies soon started harvesting them, and they were the first for which protection was sought. A redwood forest area will generally include some areas in which the redwoods are mixed with Douglas-fir and other species, especially in the drier lands above the creeks and rivers and farther inland. In fact, most of the redwood forest consists of redwoods growing on hillsides, often in stands mixed with other species, and those redwood trees are generally much smaller than the spectacular giants growing in the alluvial flats in parks.

Groups such as Save-the-Redwoods League and the Sempervirens Fund continue to raise money to purchase land to add to the parks. Conservation efforts are discussed in Chapter 7.

Current redwood logging and management practices are discussed in Chapter 8.

Chapter 5
Early Logging Practices

In the early days of California, the great size of the coast redwoods presented loggers with problems. The equipment simply could not handle the large trees, nor was there a need to cut the largest trees because there were plenty of smaller trees that were easier to cut, transport, and mill. The largest trees, or those in hard-to-reach areas, were left behind. When the medium-sized trees were removed from a stand, the opening allowed more light into the forest, which increased the growth rate of the remaining trees. As lumber prices rose and new technologies were developed, loggers often returned to previously cut areas to take the large trees that had been left.

Early cutting down, or **felling**, of trees was usually done with axes, with the logs simply rolled downhill to creek bottoms or **skid trails**, which were built by placing logs across creek bottoms or other areas to provide a surface on which the logs could be pulled without having them dig into the ground. It could take three or more days for a two-man team to fell a twelve foot diameter tree. Larger logs were often split into manageable sizes, sometimes using explosives. When large crosscut **whipsaws** were developed, a crew might cut one or two large trees a day.

In addition to their great size, the nature of redwood trees also presented loggers with other problems. Large old-growth redwoods are very brittle, so care had to be taken to cushion the tree as it fell. Sometimes smaller trees were used as a cushion if the redwood was going to fall on uneven ground. Redwoods often have a larger, sometimes significantly larger, diameter at the base than a few feet higher up the tree. In addition, sometimes the freshly cut, water-saturated wood at the base was so dense that it would sink when dumped into a river or mill pond. To get above the base, loggers cut notches in the thick bark, inserted boards called **springboards** into them, and used the springboards as scaffolding while they cut the tree several feet off the ground. The actual cut might be ten feet or more off the ground. (Figures 78, 79)

Figure 78. The wood at the base of a large redwood is often not as straight-grained as the rest of the tree, it may be harder, and it is often significantly greater in diameter than the trunk a few feet off the ground. Fallers cut notches in the thick bark and inserted spring boards to create a scaffolding or platform, sometimes ten or more feet off the ground. (Photo courtesy of the Humboldt State University Partain collection.)

Figure 79. Logging with axes was hard, dangerous, time-consuming work. To fell the large trees, special axes with longer handles were made. The introduction of the whipsaw made the felling of the giants easier and faster. (Photo courtesy Clarke Museum.)

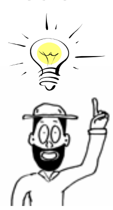
See the activity "Determining Density" in Section IV.

The first cuts were made on the side of the tree towards which the loggers wanted the tree to fall. This was usually the uphill side so that when the tree fell, the stump and the angle of the branches would keep it from sliding downhill. After cutting a huge notch, called an **undercut**, the choppers made the **back cut** from the other side. Eventually **cross-cut saws**, called whipsaws or **misery whips**, were made large enough to cut through the trunk, but axes were used in the early days. (Figure 80.)

After the tree was felled, the limbs and bark had to be removed. The branches, tops, bark, and other waste were called **slash**, and it was left on the forest floor to decompose or piled to dry for burning in the late summer or fall. Slash fires often resulted in accidental burning of nearby uncut forest, but generally didn't harm the larger redwood trees. Repeated burning of this slash discouraged the growth of Douglas-fir, spruce, hemlock, and other species while favoring the re-growth of redwoods. When slash was burned, of course, other plants were also burned, as were animals that could not escape.

After the trees were cut and the branches removed, the main stem, called the **bole**, had to be cut up, or **bucked**, into pieces of a manageable size. In the early 1800s, bucking was done with axes, which was not only time consuming but wasteful, as much of the valuable wood was reduced to chips. By the early 1900s, large bucking saws, measuring over 30 feet in length, were used to cut the trees into sections. (Figure 80) Cumbersome gasoline powered **drag saws** were developed in the late 1800s, and lighter gasoline saws were developed in the early 1900s, but human-powered saws and axes remained the main tools in the redwood forests until after World War II. (Figure 81.)

Teaching Idea



Some of the pictures, especially from before the 1970s, show very wasteful practices that resulted in great disturbance of both the land and streams. In many of them, the loggers pose happily, seemingly oblivious of the scene of apparent devastation around them. To men working with hand tools, the redwood forest must have seemed inexhaustible. Discuss with the students how attitudes and methods have changed to reduce damage done by logging, as well as to reduce waste, and also how what appears to be total devastation can often recover as new plants grow, in time, into stands of young-growth redwoods. Discuss the difference between "logging" and forest resource management, logging being cutting and removing, and management involving much more, such as replanting, stream protection, leaving trees and snags for wildlife, etc..

See the activity "The Case of the Runaway Topsoil" in Section IV.

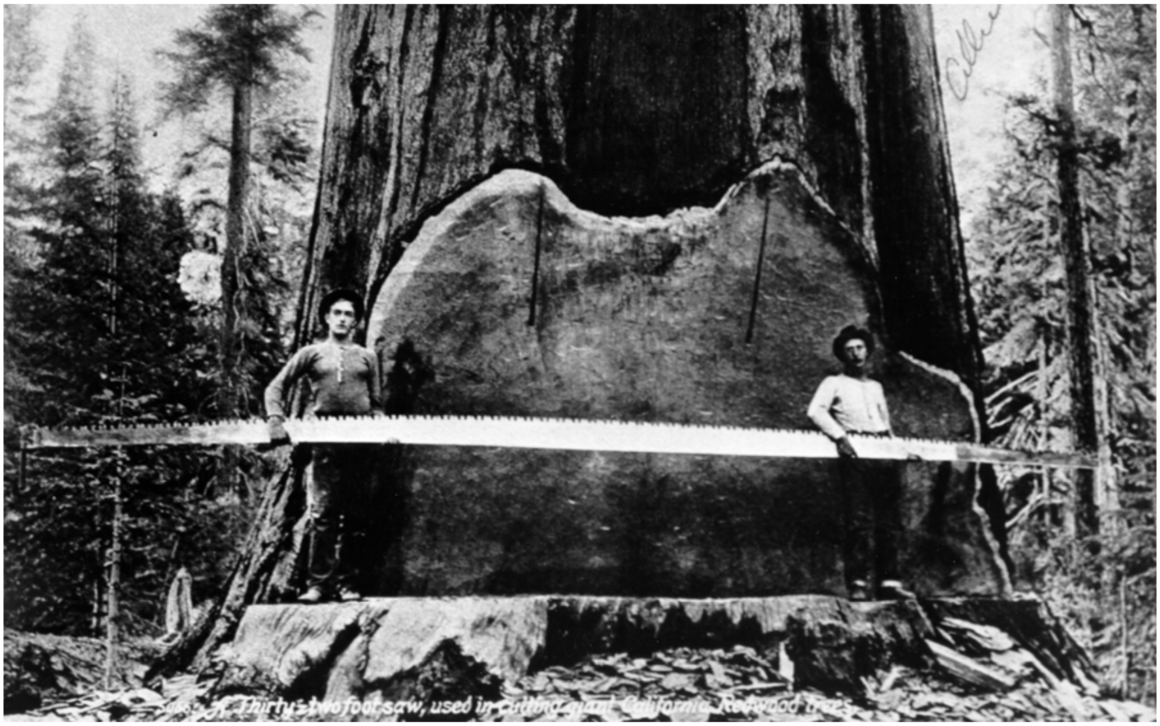


Figure 80. Use of a "misery whip" not only allowed trees to be cut in less time, but less wood was wasted than when trees were cut down with axes. The caption on the original photograph reads " A thirty-two foot saw, used in cutting giant California Redwood trees." (Photo courtesy Pacific Lumber Company collection.)

Figure 81. The gas powered drag saw proved cumbersome in the rugged north coast redwood range. (Photo circa 1940.) (Photo courtesy Pacific Lumber Company collection.)

Figure 82. Teams of mules or horses were used to drag logs to the rail landing, or to a river. Skid trails of logs were made to keep the logs from digging into the ground. Many trees were often left standing because only the best trees were cut. (Photo courtesy of Pacific Lumber Company collection.)

Figure 83. Oxen were often used to drag logs on the skid roads to the landings. Because travel was slow, loggers often lived in logging camps set deep in the woods. (Photo courtesy Clarke Museum.)

Figure 84. The Dolbeer Donkey engine, named for its inventor, John Dolbeer, a partner in the Dolbeer and Carson Lumber company of Eureka, made it easier and faster to move logs to a landing. It also was harder on the forest plants and forest floor. (Photo courtesy Humboldt State Library Humboldt Room collection.)

Figure 85. Sky-line cabling moves logs to landings with the whole log suspended on cables. Both high-lead and sky-line cabling systems require the removal of trees and brush along the route to prevent the logs and cables from getting tangled in the intervening trees. Compare this picture with Figure 97. (Photo courtesy Clarke Museum collection.)