

## Chapter 8

### The Modern Forest Products Industry: Resource Management

The exploitive logging of the 1850s through the 1950s is no more. A combination of dwindling old-growth stands, better understanding of the need for forest management, public outcry, and regulation have resulted in a very different industry than previously existed. Where loggers once cut and got out, modern companies manage their resources for long-term benefits. Companies have come to realize the economic necessity of not only harvesting trees sustainably and caring for their resources, but also of maintaining good public relations, lest laws become even more restrictive and compliance more expensive. Today's timber industry generally seeks to practice sustained yield forestry, with at least as much new wood grown each year as is harvested.

Different people, of course, have differing opinions as to what is the best use of a forest. Some favor ever-increasing amounts of protection and preservation in parks. Even those who favor preservation sometimes disagree. Such things as how much and what kinds of human use should be allowed, how much development should occur, whether cutting of some trees should be allowed, whether fire should be used to try to replicate natural conditions, whether invasive species should be removed and, if so, how, are important issues. How much regulation of privately-owned forest land is appropriate, and how much access to public forest land timber companies should have, are questions for which answers are not easy to develop.

#### Teaching Idea



*Project Learning Tree has an activity titled "A Forest of Many Uses" in which students discuss and role-play making forest management decisions. See Appendix IV.*

Others focus on harvesting of timber to meet the demands of California's growing population. The worldwide average for wood products consumption is about 0.7 cubic meters per person per year. We in the United States average almost three times that much, and the average for Californians is higher than the U.S. average. Meeting that demand, now and in the future, requires the modern timber company to carefully manage its forests, especially since timber harvests from public lands are down more than 90% from what they were in the 1980s (Dekker-Robertson, 2004). Modern timber management involves development of new tools, new methods, new knowledge, and new attitudes. California's laws and political climate provide more environmental protection than most other places. Since we are going to use wood products, a case can be made for using California-grown wood, which is a renewable resource grown under heavy regulation.

A growing concern is the subdivision of large blocks of forested land into smaller units that are more difficult to manage for timber or to protect. There is increasing pressure to sell forested land for development, especially in the central redwood region. This is due both to attractive profits to be made from land sales and to the increasing costs of taxes and complying with regulations. Landowners have rights and obligations with regards to how they use their lands. Those rights and obligations must be balanced with societal needs.

Whether logging old-growth or young-growth trees, the redwood logging industry has changed tremendously over the years. Some modern practices are described below.

### **Planning and Permits**

Logging in the redwood region generally requires the filing of a **Timber Harvest Plan (THP)** or, if the landowner has "small" holdings (less than 2,500 acres), a "Non-Industrial Timber Management Plan" (NTMP) with the California Department of Forestry and Fire Protection (Berger, 1998). The plan, which must be prepared by a registered professional forester, is intended to ensure compliance not only with the Forest Practices Act, but also with the California Environmental Quality Act, the Water Quality Act, and the Endangered Species Act.

The major elements of a Timber Harvest Plan are listed below, not necessarily arranged as they are in the THP forms. Many of them require contracting with trained professionals such as soils specialists, hydrologists, wildlife biologists, archaeologists, and various governmental agencies.

- A. Introduction, including the location and boundaries
- B. General Physiographic Features: climate, geology, slope, soil types, etc.
- C. Forest Description: type of forest, description of the site and previous cuttings, roads
- D. Cumulative impacts on such things as wildlife, water quality, wood supply, soil, recreation, and visual impacts
- E. Management Objectives: wood products, range, water course and lake protection, wildlife protection, recreation, and economics
- F. Silvicultural Treatment: site preparation, logging practices, erosion control, pest protection, reforestation, etc.
- G. Forest Regulation: cutting cycles, allowable cut, future cuts, planning for sustainability
- H. Other Management Factors: road development, fire protection, impacts on neighboring properties, cultural and archaeological resources, unusual circumstances

Just completing all of the required steps for filing a Timber Harvest or Management Plan is a major task. After the plan is filed, there is opportunity for public input, but if the company has followed all of the required procedures, they are generally allowed to proceed with their cutting.

As part of the planning, surveys of the plants and animals present in the area are required. Special attention is paid to "listed" species, *i.e.*, those that are considered endangered or threatened.

Also as part of the planning, the area is marked or "flagged." This means that the boundaries, roads, trees to be cut (or, alternatively, those to be left), and areas for the operation, such as yarding and landing areas, are marked. As part of the approval process for the plan, changes may be required.

In addition to the state rules and laws, some counties have adopted their own Forest Practice Rules which have stricter standards than the state regulations. Most of these counties are in the southern redwood region and, as of 2003, included Marin, San Mateo, Santa Cruz, Santa Clara, and Monterey Counties.

Having a plan is not, of course, the same thing as following the plan. Nature does not always cooperate, accidents do happen, and corners are sometimes cut. It is noteworthy that the California Department of Forestry (CDF) is now called the "California Department of Forestry and Fire Protection." Fire protection and suppression receives 85-90% of the department's budget, leaving only a fraction for enforcement of the Forest Practice Rules. In fact, a law has been passed saying that the department may now be officially referred to as CAL-FIRE.

On the whole, though, redwood logging is a much different proposition than it was only a couple of decades ago. Should a logger or company be found to be in violation of the rules or laws, or not follow the plan, they can be made to take corrective action, be fined, have the operation stopped, be put in jail, or be put out of business. A forester who repeatedly submits inadequate plans can lose his license to practice forestry.

According to the CDF office in Fortuna, a typical timber harvest project will include a pre-harvest visit by a CDF inspector, one or two inspections during the active harvesting phase, another inspection upon completion, and an inspection of the restocking portion of the project. Given the numerous aspects of a typical project, it is not uncommon to find minor, easily corrected violations. Major violations are uncommon, especially for projects done by larger timber companies. In the Humboldt/ Del Norte county region, for example, there are about 14 CDF inspectors overseeing about 900 active Timber Harvest Plans in a given year, but only two to four infractions are typically taken to court each year. Those infractions are often by operators working on small projects in which a small landowner is cutting a few trees, often without a TMP or THP. Overall, the timber industry, especially the larger companies, does a good job of complying with regulations. (McGrath, 2006)

## **Falling (Felling)**

Using chain saws to fall (or fell) the trees is faster and easier than using axes. (See Figures 78-80, 96, and 97.) Mechanical de-limbers have further streamlined the work in the woods where small trees are being harvested.

Some operations, especially the larger ones, use such modern machines as mechanical harvesters or feller-bunchers. Mechanical harvesters can cut the tree down, remove the branches, and cut the tree to desired lengths, and the entire process is controlled by a computer so that the maximum volume of lumber is harvested from each tree. Feller-bunchers can cut and bundle several small trees at once, or can fell a single tree and carefully control where it falls. Use of these machines in the redwood region is limited, however, by the steep terrain and large size of even young growth redwood trees.

Part of the management plan indicates the type of harvest—clear-cut, single tree, small group or other. (If the harvest is more than 2.5 acres, it is considered a clear-cut.) A goal of modern management of clear-cut (or "even aged") areas is to sort of mimic natural disruptions such as fire, flood, or landslide. Uneven aged stands require more frequent re-entry for subsequent harvesting, and that, too must be taken into consideration in the plan.

Management plans require Watercourse and Lake Protection Zones of varying widths, depending on the situation. These "buffer zones" are intended to protect fragile aquatic habitats and vary in width depending on such things as the presence of fish and the slope of the hillside. Some trees can be harvested from the buffer zones, but, depending on the stream and types of fish that live in it, 50-85% of the canopy cover must be left to shade the streams.

Some maintain that the required buffer zones are inadequate to effectively protect the streams from silt eroding from soil loosened and exposed by logging operations. Increasing stream buffer zones to 200 feet has been proposed. In the redwood region, a stream or watercourse need not have water in it year-round, or have fish in it, so a 200-foot buffer zone would greatly reduce the amount of area that would be available for harvesting timber.

## **Yarding or Skidding**

The practice of bringing logs to a landing where they are gathered for hauling is called yarding or skidding. As previously noted, early methods of yarding were extremely destructive, especially when logs were skidded or "gulched" to the streams. Another major impact of yarding was the disruption of the soil, both from logs digging up the soil as they were dragged across it and from compaction by the tires or treads of the equipment, especially where the soil was damp. Modern practices seek to avoid damaging streams and a variety of methods are used to reduce soil disruption.



Figure 96. To cut the huge redwoods, extra-large chain saws were created. Compare to Figure 97. (Photo courtesy of Humboldt State University Humboldt Room collection.)



Figure 97. Most redwoods currently harvested are much smaller than those of 60 or 70 years ago. The modern chain saw enables faster cutting with less waste. (Photo courtesy Mendocino Redwood Company.)

Road building is one of the most potentially damaging aspects of logging, especially on steeper slopes. Modern timber plans include not only where the roads will be built (often on ridge tops, away from streams), but how they will be built to minimize erosion. Standard practices even include planning where to fell trees with regards to the roads—or planning where to build the roads or skid trails with regards to where the trees will be felled.

Various types of skidders are used today. Tracked skidders enable logging on steep slopes, while rubber-tired skidders are faster. Since the weight is concentrated on a smaller area, though, tired skidders tend to compact the soil more, especially where the soil is wet or exposed.

Moving the logs by cable is common today, especially on steep terrain. The cable might drag the logs along the ground (ground lead...usually most disruptive to the topsoil), drag the logs with one end elevated on a "high lead" cable, or move the log while it is suspended above the ground with a "skyline" (the least disruptive method). Sometimes logs are pulled to the tractor, rather than the tractor driving to the log. Logging inevitably disturbs the soil. Modern management seeks to keep the disturbance to an "acceptable" level.

Where the terrain is especially steep or other circumstances warrant, helicopters are sometimes used. This is a very expensive proposition, however, and is only economically feasible when other things such as too many streams, steep terrain, or exceptionally valuable wood exist.



Figure 98. The use of a cable yarder operating from high on the hillside or on the ridge enables logs to be pulled uphill rather than dragged through stream beds. Compare this picture with Figure 84. (Photo courtesy of Mendocino Redwood Company.)

## Hauling

Most hauling is now done by trucks driving on roads that are engineered to minimize erosion. Erosion still occurs, but much less than in earlier times. In areas that have already been logged, old roads or railroad beds are sometimes re-contoured to reestablish the original slope, and old stream crossings are sometimes removed or replaced to improve fish habitat and reduce erosion. Modern operations often build roads on ridges to facilitate cabling operations and effectively reduce sedimentation of streams.



Figure 99. A one-log truck load. Since the old-growth timber has almost all been cut, most loads now consist of 10-20 logs. See also Figures 100 and 101. (Photo courtesy of Pacific Lumber Company.)

## Milling

As noted elsewhere, early logging operations sometimes left about a third of the wood in the forest as chips, slash, or other waste. Of the two-thirds that came to the mill, half was often wasted as sawdust, trimmings, or other waste. In the 1940s and 1950s, this mill waste was generally burned in "tipi burners."

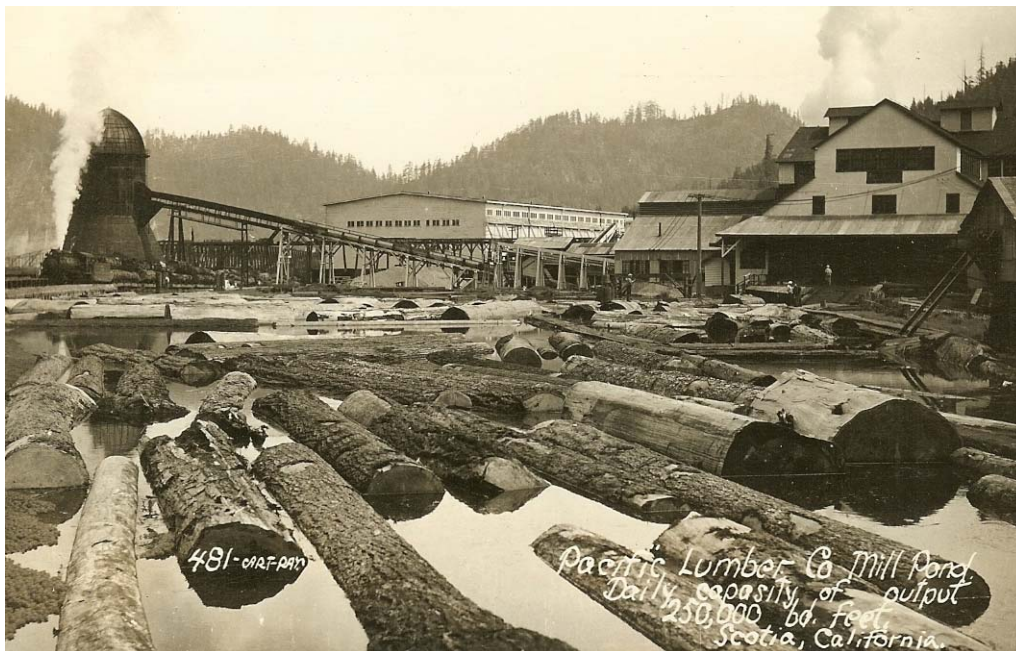


Figure 100. Large logs in the Pacific Lumber Company mill pond, probably taken in the mid-1950s -1960s. (Photo courtesy Clarke Museum collection.)



Figure 101. Pacific Lumber Company logs in 2006. Compare the size of the logs with those in Figure 100. Note also the automation, which is one of the causes of the decline in employment in the industry. (Photo by Michael Roa.)



Figure 102. Aerial photograph of the "Arcata Bottom" taken in 1948. Note the numerous "tipi burners" used to burn mill waste. See also Figure 103. (Photo courtesy Humboldt State University, Schuster Collection.)



Figure 103. Abandoned "tipi burner." Such burners, once used to dispose of sawmill waste, were common until the 1970s. Now the wood that was formerly wasted has many uses, and the air pollution from burning waste is not allowed. See also Figure 102. (Photo by Michael Roa.)

Modern computer-controlled mills waste little. Bark, chips, and sawdust are used in a variety of ways, including landscaping materials, livestock bedding, pulp for paper production, nursery products, filters, and others. Small pieces of wood that used to be burned are glued together to make larger boards. Shavings from producing surfaced lumber are used to make fiber board. Sawdust can be compressed to form fireplace logs or glued to make particle board. Some companies use mill residue to generate electricity to use on-site. Some mills even generate excess electricity which they sell to the Pacific Gas and Electric Company. The table below shows the "disposition of sawmill residue" from north coast (Del Norte, Humboldt, Mendocino, and Sonoma counties) in 1992 (Ward, 1992).

Pulp	Boards	Fuel	Miscellaneous	Total used	unused
22%	23%	41%	13%	99%+	<1%

### Teaching Idea



*Some mills or timber management companies welcome students and other groups for tours. See the Appendix III and IV for some contacts.*

**See the activity "Paper Making" in Section IV.**

### Cleanup and Mitigation

Various regulations govern what a logging operation has to do after the timber has been harvested. Depending on the situation, slash might be removed, chopped up to reduce its volume, burned, or, in most cases, simply be left in the woods to decompose. Potential pollution of streams from sediments/silt, slash, chemicals such as oil, or other materials, is a major consideration in the post-logging cleanup operation, and all forms of pollution are illegal. The timber harvest plan must include pollution prevention and mitigation plans.

As noted above, roads are a major concern. Preventing erosion is important, and the plans must include both locating and building the roads to try to minimize erosion.

**Waterbars** or other means such as ditches are used to reduce erosion. Some companies even cover the road with the slash and drive tractors over it to crush it so that there is a covering to further reduce erosion.

Redwoods are famous for their ability to sprout new trees from their base or root crown. This sprouting is an important way that new trees are produced, both in nature from fallen or injured trees and from stumps after logging. (See Section 1, Chapter 2.) Modern timber companies don't rely solely on stump sprouting, however. They generally replant with seedlings, often grown in their own nurseries and selected for such characteristics as rapid, straight growth with branches that grow at 90 degree angles to

the trunk, thereby reducing the impact of knots on the finished lumber. (Some are concerned that replanting with such cloned trees reduces the diversity of the timber stock, making it more susceptible to possible diseases. Forest geneticists make recommendations about how many different clones to use in restocking cut stands, and sprouting from the original stock adds to the genetic diversity.)



Figure 104. Millions of redwood seedlings are grown in nurseries for planting in cut areas. As early as the mid-1800s, nurseries were producing 4.5 million redwood seedlings for restocking cut stands annually. (Photo by Michael Roa.)



Figure 105. The Scotia Inn (Hotel) in 1907. Compare the hillside in the background to the regrown hillside circa 1970s-1980s (Figure 106). (Photo courtesy Pacific Lumber Company.)



Figure 106. Scotia Inn, early 1970s. Compare to Figure 105. Note the regrowth of the redwoods on the hillside behind the Inn. (Photo courtesy Pacific Lumber Company.)

The days of massive cutting and waste in virgin redwood stands are over. Over 95% of the original redwood forest has been logged, and 95% of the remaining old-growth is now in parks or reserves. Redwood logging companies have learned that their survival depends on sustainable management practices, both to ensure a continued supply of redwood products and because of regulations and the public concern that result in political pressure.

There are now certifications available to lumber companies that harvest timber "sustainably." In California, certification is done through the Forest Stewardship Council or the Sustainable Forestry Initiative. According to the California Redwoods Association (2002) about 80% of the commercial redwood acreage is now certified. The main criteria are:

- 1) timber is harvested "sustainably," i.e., growth equals or exceeds harvest
- 2) the forest ecosystem is maintained and protected
- 3) socioeconomic impacts are such that the area has financial stability

To receive certification, companies must show that their land use practices meet current environmental protection standards. One study showed that among the reasons that the landowners sought certification were:

- To gain access to or create markets that only sell wood from certified forests
- To reduce criticism from environmental organizations
- To develop a constructive dialogue with environmental individuals and groups

That study also showed that landowners were more likely to seek certification in areas where "environmental activism" was high (Dicus and Delfino, 2003).