

Teaching Idea



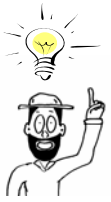
Students can build models of high-lead and sky-line systems. Some parents (or grandparents) might also be interested in building models that can be kept for use in future years. They might even include model trains.

During the steam donkey era, there was less repeated burning of slash. Not burning the slash tended to favor the growth of Douglas-fir, grand fir, and hemlock. Some companies began planting redwood seedlings.

In the 1800s, as much as 35% of the wood from a redwood tree was left in the forest as unusable branches, stumps, chips, and shattered trunks. Since there was so much high quality wood, wood that was less than prime was often left, as were cut trees that had hidden rot, charring, or other defects. Most of this material was left to **decompose** in the forest or burned up by slash fires. Another 30% of the tree was often wasted at the mill in the form of sawdust and scraps. Consequently, sometimes only about a third of the cut wood actually became usable lumber (Adams, 1969?).

(Note: Today, modern logging techniques result in much less waste in the woods, and modern mills waste very little wood. Ninety-nine percent of the "mill residue" is used for fuel, pulp, wood products, or other uses. See Chapter 8.)

Teaching idea



Students can prepare graphics to represent the amount of wood that was left in the forest and wasted at the mill during the early logging era (up to 65%) to the less than 1% currently not used. They can use computer graphics programs to make bar or pie graphs, or can develop pictographs. Also, a discussion of the idea that slash left in the forest will eventually decompose to nutrients can lead to greater understanding of natural cycles and the importance of recycling materials.

While most of the wood was used to make lumber for building, much was put to such uses as grape stakes, shingles, railroad ties, and fence posts. The rot-resistant wood was even used to make water pipes and rain gutters! Modern techniques and equipment are much less wasteful, with almost all of the tree used except for the branches, which are generally left in the forest to decompose or to be burned to reduce the fire hazard. (Figures 86, 87.)

Railroads were important in moving the logs out of the forest to the mills. Originally small cars with a few logs were pulled by horses or mules. Sometimes logs were used as rails. Steam locomotives were added in the 1870s. The steep, narrow, twisting canyons of the north coast made building railroads especially difficult, and truly spectacular railroad trestles were built. Some rail lines were built with the intention of moving them after only a season or two. The expense of building railroads in the rugged redwood country required the companies to **clear-cut** in order to make a profit. Once again, clear-cutting and disruption of steeply sloped hillsides caused in more erosion.



Figure 88. The rugged terrain of northern California required the building of some impressive railroad trestles. Note the nearly clear-cut hillside, and also that young trees have started to grow. For scale, see the man standing on a log near the middle of the train. (Photo courtesy of Pacific Lumber Company collection.)



Figure 89. Temporary horse- or mule-drawn "railroad" with wooden tracks. Sometimes logs were used for tracks instead of boards. Note the wide wheels on the cart.
(Photo courtesy of the California Redwood Association.)



Figure 90. Railroad trains were often used to move logs to the mills. Scene at Freshwater in 1890.
(Photo courtesy Pacific Lumber Company.)



Figure 86. Huge trees were sometimes "bucked up" (cut into sections) with whip saws to make railroad ties, grape stakes, shingles, or other split goods.
(Photo courtesy Pacific Lumber Company.)



Figure 87. Shingles and boards were needed for building houses. Redwood's resistance to rot made it ideal for shingles, grape stakes and railroad ties. Here "split product," probably shingle wood, is moved by horse-drawn cart to a shingle mill, port or railroad loading area. (Photo courtesy Clarke Museum.)

In the southern redwood region, the trains brought lumber to established rail lines and shipping points.

While the railroads made it easier to get redwood out of the groves, they also made it easier for tourists to visit the remaining stands. Ironically, many of those visitors were inspired to join forces to try to stop the logging of the redwoods. Even after railroads were no longer used for log trains, the paths cleared for the rails often became roads that made it even easier for people to visit the groves.

The first sawmills were simple two-man operations consisting of a pit over which a log to be cut was laid. A whipsaw was used to cut the log into boards, with one man in the pit and the other over the log above. This pit style "sawmill" was used in the Mexican and Spanish eras, and there was one at Fort Ross.

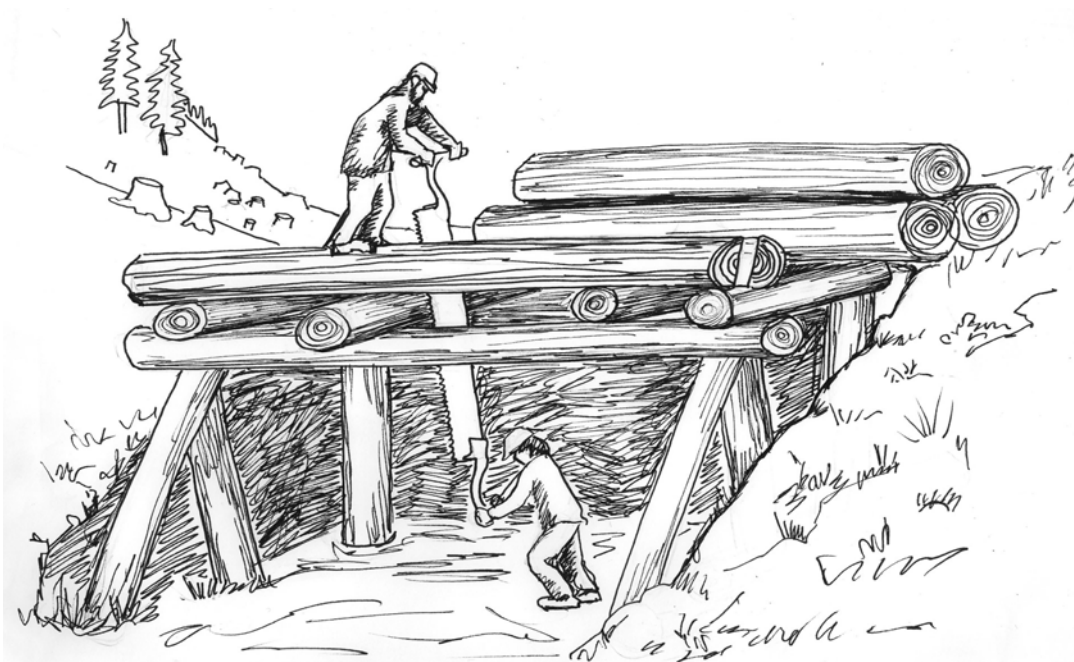


Figure 91. A two-man sawmill. The pit type of sawmill was used at Fort Ross and in some other early operations before large amounts of redwood lumber were required. (Illustration by Faith Rumm.)

In the 1830s and 1840s, water-powered mills were built in the San Francisco Bay area, with the first power-operated commercial sawmill in California being on Mark West Creek near Santa Rosa (Schubert, 2005). There were even experiments with wind-powered mills. These early mills could only handle the smaller redwood logs. Sometimes, though, larger logs were split into manageable size with black powder explosives.

Prior to the 1880s, sawmills were small and could be taken apart and moved to a new area as the trees in a section of the forest were cut. Later, large permanent mills were built near the mouths of rivers along the coast. Logs were floated downstream to the mills.

Smaller streams could only float logs during the rainy season, and the logs would tear up the streambed as they moved downstream. To try to prevent log jams, streamside vegetation was often removed. Sometimes, logs were stored in rivers and streams until rains came to swell the streams enough to carry the logs downstream. Dams were sometimes built to store both logs and water. When the dams were broken, the flash flood carried the logs downstream to the mill. Between the scouring of the streambed by logs and the erosion caused by the removal of streamside vegetation, many creeks and rivers were significantly damaged, especially with regards to their suitability for salmon **spawning** grounds.

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There are a number of curriculum programs that help students learn about freshwater habitats. See page Appendix III (Organizations and Agencies) for information on Salmon in the Classroom, Adopt-a-Creek, and Adopt-a-Watershed and others.

In some areas, long chutes and flumes were used to move smaller logs downhill.

By the early 1900s, railroads had essentially replaced floating logs down the streams, but logs were still floated down Big River in Mendocino County as late as the mid-1930s (Hyde and Leydet, 1963).

During the gold rush era, railroads and wagons moved the lumber to markets in the San Francisco Bay area from the southern forests. The lumber was brought from the North Coast by hundreds of sail and steam-powered **schooners**, which carried redwood not only to the San Francisco Bay area, but also to San Diego, Hawaii, and Australia.

Beginning in the 1920s, diesel-powered **caterpillar** tractors began replacing the steam-powered bull-donkey. These machines were able to work in steep terrain, maneuver around standing trees, bulldoze roads, push slash into burn piles and perform many other useful functions in the woods. The California Division of Forestry and the U.S. Forest Service encouraged the use of these "cats" because they allowed for more selective logging. Their steel tracks, however, first tore up the topsoil and then, especially when the soil was wet, compacted it, sometimes making sprouting of erosion-reducing plants more difficult. Often, though, the disturbed soil provided good conditions for the germination of redwood seedlings, and sometimes buried branches actually sprouted into new saplings. (Figure 92.)

(Modern management practices seek to limit soil disturbance to an "acceptable" level by limiting when and where tractors can be used. In addition, there are regulations intended to protect streams.)



Figure 92. Tractors with "caterpillar" treads allowed dragging of the huge logs from the forest, but caused in much soil disturbance, resulting in erosion of soil into the streams. (Photo courtesy of Pacific Lumber Company.)

By the 1930s, trucks were rapidly replacing both schooners and railroads, at least for shipping lumber within California. By the 1930s, too, some redwood companies were practicing **sustained yield** logging, leaving a certain number of seed trees per acre, and some had even started their own redwood nurseries. By this time, redwood seedlings were being grown by the millions in Humboldt County, and the value of stump sprouting for reforestation was recognized.