

CLEAN LOGGING

In The REDWOODS



By

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Forester

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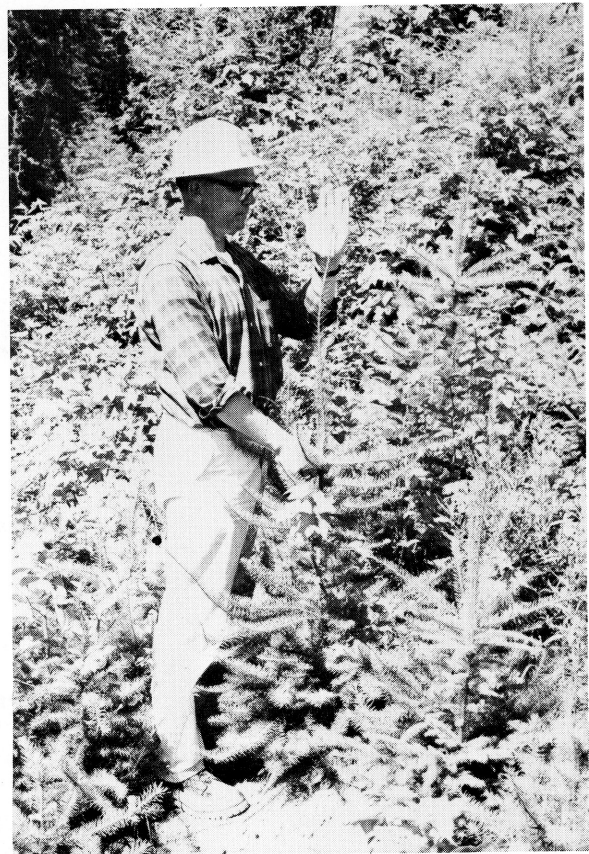
Reprinted from a slide talk by the author presented
at the 52nd Session of the Pacific Logging Congress,
November, 1961, San Francisco, California

The tree farm management described in this brochure has resulted in growth responses shown by photographs taken August 4, 1964, at the Forest Renewal Exhibit of Arcata Redwood Company.



Natural seed fall from seed trees left adjacent to the logged area provided the redwood seedling components of this new forest. Exhibit attendant Darwin Richards points out the amount of height growth of redwood that occurred in the fourth growing season.

Helicopter distribution of Douglas-fir seed on November 17, 1960, resulted in fourth year growth pictured at the right. Here, company forester, Eugene A. Hofsted indicates the extent of growth this year.



REFORESTATION SUCCESS CAN ONLY BE MEASURED IN TREES

Clean Logging in the Redwoods

During the summer of 1959 Arcata Redwood Company gave serious consideration to the development of an alternate plan of logging which would remove all stumpage from a setting in a single cut. Application was made to the Redwood District Forest Practice Committee in February 1960 and the plan of clean logging was approved by the California State Board of Forestry in April. This was the first such primary logging plan of clean logging granted in the Redwood Region.

The plan stems from an objective of maximum conservation in the use of old growth redwood timber. The obstacles encountered in achieving this goal include: an overmature timber stand condition with frequent hollow centered trees, broken or short ground, and strong winds accompanying heavy rainfall which causes recurring windthrow of timber.

Previously employed systems of cutting were carefully evaluated to find a satisfactory solution. A tree selection system showed heavy growth loss following the first cycle cut. Salvage relog operations destroyed regeneration established on bare ground following prime logging. Excessive slash accumulations resulted from broken waste materials. On settings where the ground surface was not disturbed nor the slash burned, brush grew rampant and species composition was undesirable. In addition, these areas had high rodent population and rehabilitation appeared extremely difficult.

To overcome the major faults of past systems a combination of clean logging and artificial reseedling was adopted. The term clean logging was taken from the 1960 annual report of the Pacific Northwest Forest and Range Experiment Station. "Clean logging is accomplished in a single stage, wherein the main yarding operation itself is designed for special handling of small material."

The reseedling phase of our program follows regeneration research in California by the U. S. Forest Service, where full site preparation is advocated. "Full site preparation means the complete removal of all vegetation on the planting area. This makes possible high initial survival and rapid juvenile growth essential for plantation success." While such preparation was envisioned as a rehabilitation measure, we proposed to apply it in harvesting the crop.

The following slide series was designed to illustrate for you our specific problem and our solution through clean logging.



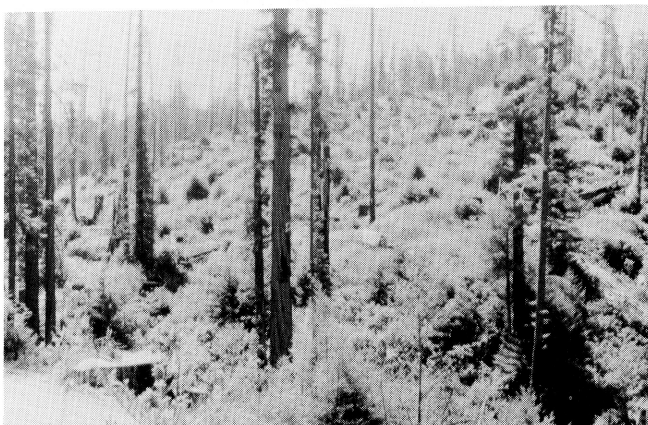
Arcata Redwood Company Tree Farm is located in northern Humboldt County, California at the south boundary of Prairie Creek Redwoods State Park.



The product we seek is "punkins". Here you can detect the center pocket rot which constitutes a felling problem in saving the maximum scale of clear logs.



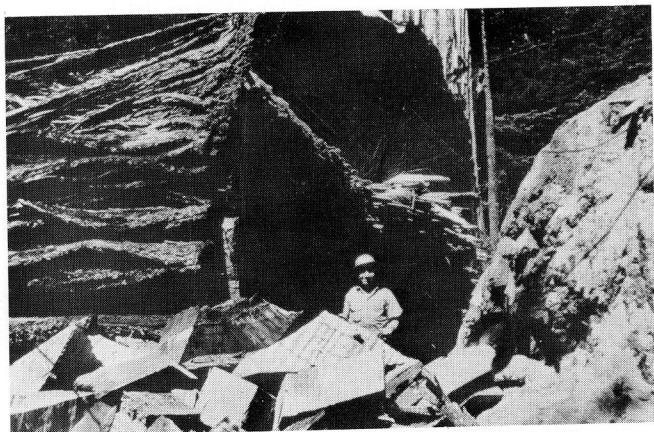
This is Mill "A", one of our modern electric sawmills situated adjacent to the timber supply at Orick, 45 miles north of Eureka.



From 1945 until 1955 the company logged with yarder settings such as this. In 1952 a salvage sawmill was built in the woods and the yarder settings were relogged with tractors.

Yarder logging commonly associated with clear cutting has certain definite characteristics. Leaners are chopped first and fall with the lean, which results in

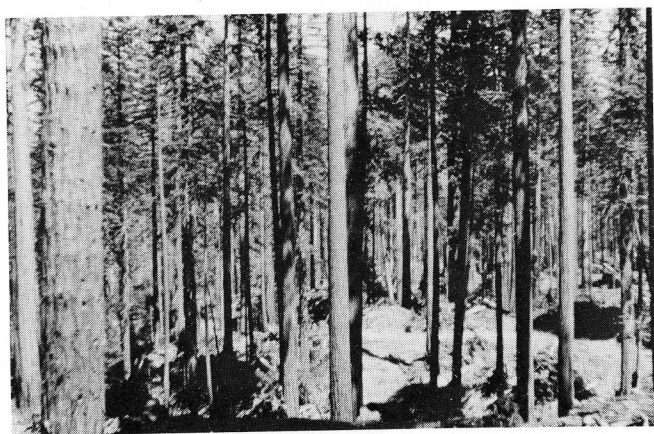
unavoidable breakage. The bedding work that could be done to save trees is accomplished using small timber and white wood species. During yarding, the ground surface is roughed up but soil and brush cover is not greatly displaced. Regeneration favors the understory species present and some of this land now supports non-coniferous species.



Regardless of the system used, redwood timber is huge and presents special problems. This butt cut is 15' in diameter at the stump.



Bucking required a team of men. The man on top of the tree used a 7' bar which is visible, while the man on the ground is completing the cut with a 5' bar.



In 1956 timber marking and tree selection were started. Layouts saved the big timber and leaners were pulled uphill with tractors and cable. This view is typical of the selection system practiced in 1956, '57, and '58. Following a severe but common wind and rain storm in early 1959 this same site looked like this. (see next photo).



Another part of the stand looked like this before the storm and like this (see below) after the storm.



Another stand looked like this following careful falling and protection of the residual stand, and from the same



photo point, this after the storm.



These root wads show the shallow anchor system of redwood on this tree farm.



Douglas fir—redwood—and Western hemlock were equally subject to windthrow.



Protection by a ^ovier leave stand has been suggested by some foresters as the way to avoid such losses. Here is the center stem protected closely, which snapped off in the wind.



This is the sound 36-inch top section that parted.



Typical of the loss is this shattered bole destroyed after a half millenium of growth. Continuous inventory plots measured for growing seasons after establishment showed a regression in volume on the selection residual stand.

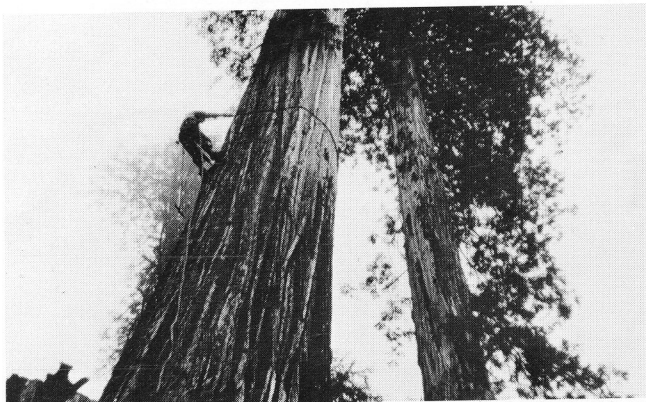
Recovery of 7.4 million board feet of windthrow salvage material was achieved in 1959. During the process, established seedlings were destroyed and the stand remained in an extreme condition of fire hazard.



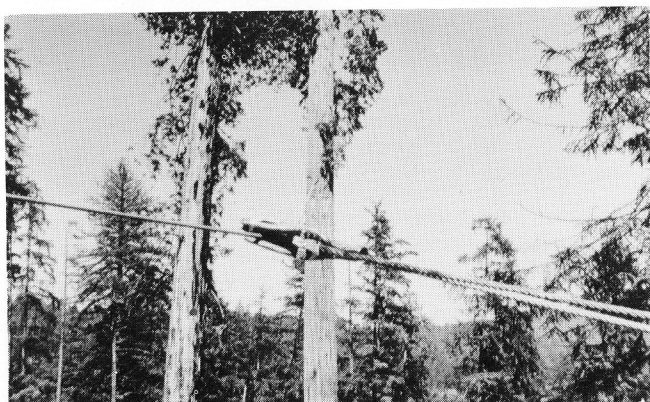
This is the intermediate stage of clean logging which commenced with the approval of an Alternate Plan of harvesting granted by the California State Board of Forestry.



This is a later stage on the same ground, note the steep slope running to 70%.



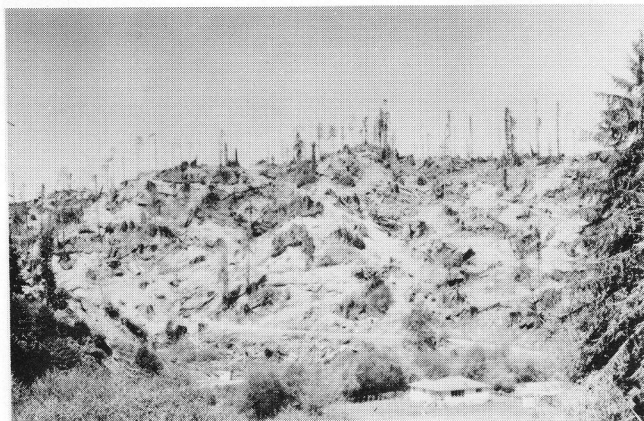
Leaners are saved by special attention during felling. Here a climber fastens the cable 100 feet up the tree. Rigging operations take about 30 minutes.



This is the cable in position ready for the final cut, with the tree in tension. A drum line, $\frac{7}{8}$ -inch, and 240' long is used in conjunction with 125 feet of tree rigging line.



Using prepared b more bare soil is exposed than the combined area of skid trails and tractor roads on the average tractor logging operation. Material for the layout is loose soil. Here the tree rests in a prepared bed. Note the mounds of soil used to cushion the tree. This loose soil texture is typical of much of our area. A high clay content accounts for the heavy soil subject to shallow rooting of dense timber.



Here is a completed setting with chunks salvaged and slash burned. A special splitter fixed to the drum housing of a tractor is used to rive out merchantable chunks during logging. This device is also used to split oversize butt logs at the stump for yarding and trucking.



A close-up view of clean logging.

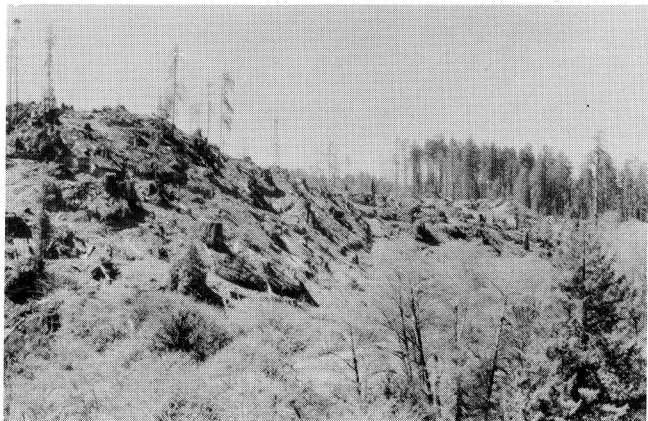


Logging manager Harry Wier and chopping boss Don Wright watch preparations of seed for helicopter sowing.

Douglas fir and Sitka spruce, components of the original stand, were selected for application. The seed was collected in the coastal zone for the company by Perpetual Forest, Inc., contractors for seed and application.

Endrin rodent repellent was applied to this seed just prior to dispersal.

Application was made with Douglas fir in one hopper, metered at $\frac{3}{4}$ pound per acre, and Sitka spruce in the other hopper, metered at $\frac{1}{5}$ pound per acre.

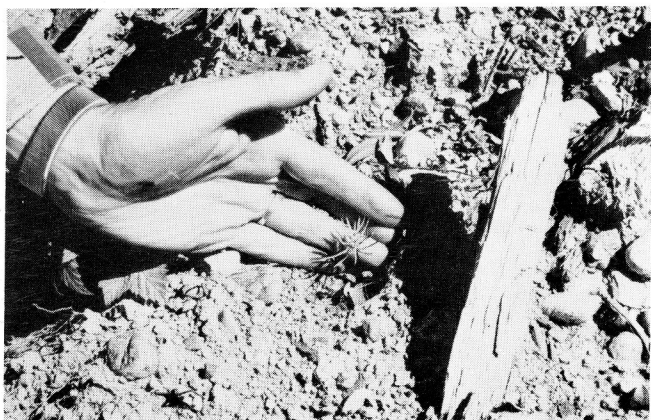


Here is a typical area. Note the tree with 45 degree downward branch habit.

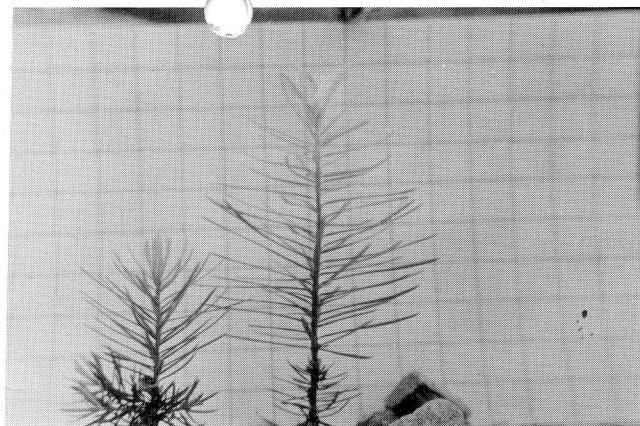


Helicopter at center near the reference tree. Flight is at an elevation of 200 feet, swath width is 120 feet, coverage is 8 acres per minute.

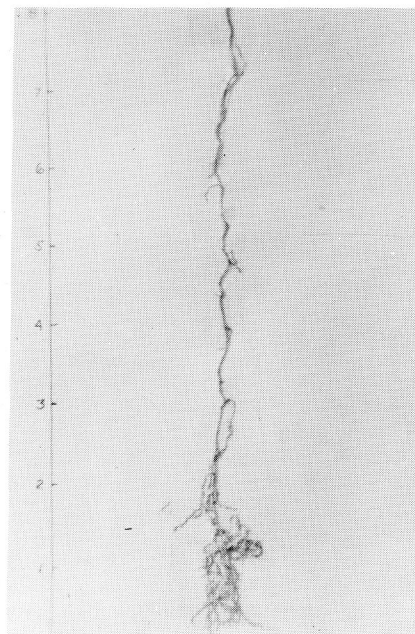
The 'copter returns on the next strip offset about 90 feet air space. State forest technician Robert Maclean has suggested that the helicopter may well become to western industrial forestry what the planting machine has become to industrial forestry in the southern states.



April 19, 1961, five months after seeding, these seedlings were photographed. Although difficult to see, there is a seedling in front of each card. Shale surface here did not inhibit germination. In addition to the applied seed, natural redwood seed fall occurred in measurable quantity on 93% of the treated area. One foot square wire traps were used for this determination.



Fifteen months after broadcast dispersal of treated seed, a typical Douglas fir seedling looked like this. One-half inch squares, this tree is $4\frac{1}{2}$ inches tall.



Another fifteen-month old broadcast seeded Douglas fir sample tree measured nine inches, with $7\frac{1}{2}$ inches of the total length as root.

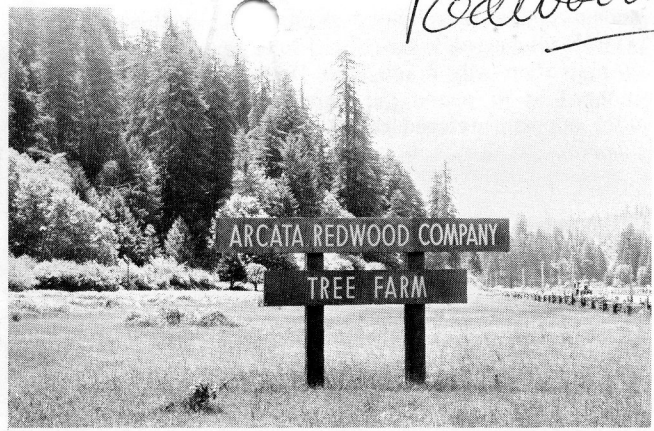


The new crop is seriously endangered by elk depredation. Here an enclosure is being erected to evaluate the damage factor.

Redwoods



Good public relations on Highway 101 call for informing the motorist what happened. This sign tells the story.



This concludes the pictorial presentation of our Clean Logging Story. We think it is the most workable plan for this particular area. This sign and a visual **Forest Renewal Exhibit** explained by a forester, tell the story.

Keep

The Redwood Region

Green