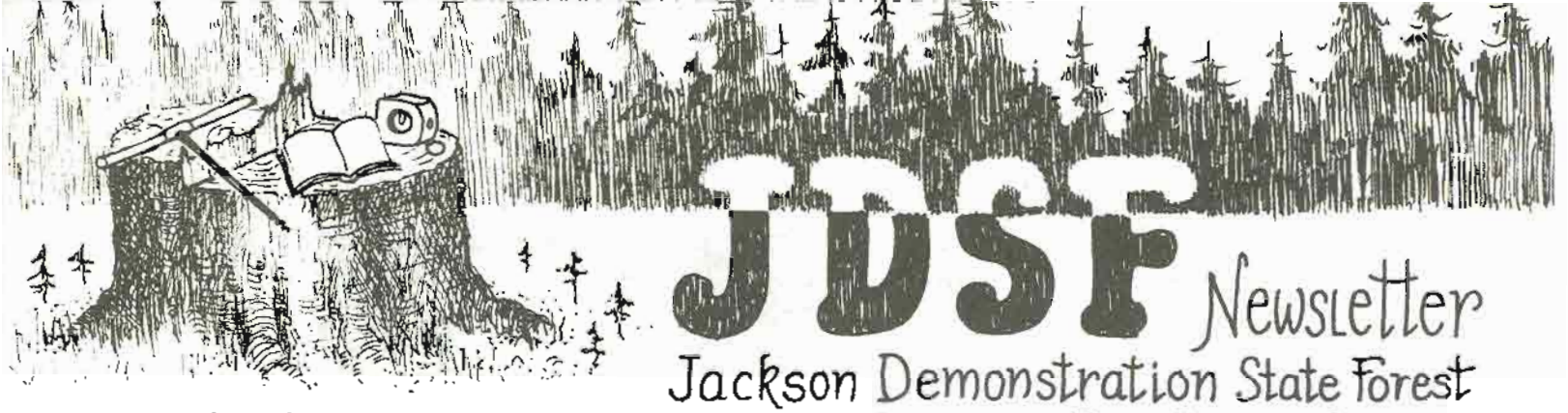

JDSF Newsletter
Jackson Demonstration State Forest
State of California Dept. of Forestry P.O. Box 1185 Fort Bragg, CA. 95437

No. 14 May 1984

HARDWOOD UTILIZATION EXPERIMENTS

Dana Cole[1]

JDSF was recently contacted by the UC Forest Products Laboratory (FPL) with a request for madrone and tanoak logs for experimental testing. The only requirement was that the logs be a minimum of 18 inches in diameter at the small end. Chief Sales Officer Hank Land and Heavy Forestry Equipment Operator Mike Williams were equal to the task. They felled, bucked and loaded the logs onto University trucks. A total of 15 eight-foot logs were shipped to FPL's Richmond laboratory.

Since madrone and tanoak are among the densest woods in North America, they have a high potential for many uses. Ironically, this very "hardness" is the major limitation to their usability. For one thing, boards cut from these species typically experience a high degree of warping and twisting during the drying process. One of the experiments being done with the lumber sawn from our logs is to test combinations of shading, temperature control, and the use of weights to improve drying results.

Another study is being conducted by wood physics researcher Chappell Hayes to test a new technique of bending and forming these woods. Since dense hardwoods tend to be extremely brittle, special treatment is necessary to prepare the wood for deformation.

Upon arrival from JDSF the logs were immediately placed on spraying decks in order to slow moisture loss and prevent checking. After several weeks the logs were sawn into 5/4-inch and 2-inch boards, and an end-coating was applied to prevent rapid moisture loss from the fresh-cut ends. The boards were then allowed to air-dry in a cool, shady environment for another three weeks, after which they were milled into three-foot-long "sticks." Eventually, these sticks will be placed in kilns and dried to a moisture content of 20 percent.

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[1]Demonstration and Experimental Forester I, JDSF, Fort Bragg, Ca. 95437.

At that point, the wood will be ready for experimentation. First, the sticks will be subjected to steam for several hours in order to reverse the collapse of cells. It is hoped that this "re-hydration" following careful drying will increase the wood's plasticity. Next, the wood will be placed in a vaccuum chamber that will remove the remaining air from the wood cells. Then the chamber will be heated, pressurized, and filled with ammonia gas, which has a higher vapor pressure than water and is able to penetrate more deeply into the wood. This relieves stress in the wood fibres while preserving the natural hardness and strenth of the wood. In this state of pressurized injection, the wood is more plastic. The only catch is that there is no way a human can work in such a caustic vaccuum, so Hayes has developed a remote control pneumatic bending device. While the madrone and tanoak sticks were not yet ready for testing when I visited the lab, Hayes showed me samples of California black oak that had literally been tied in knots using this process.

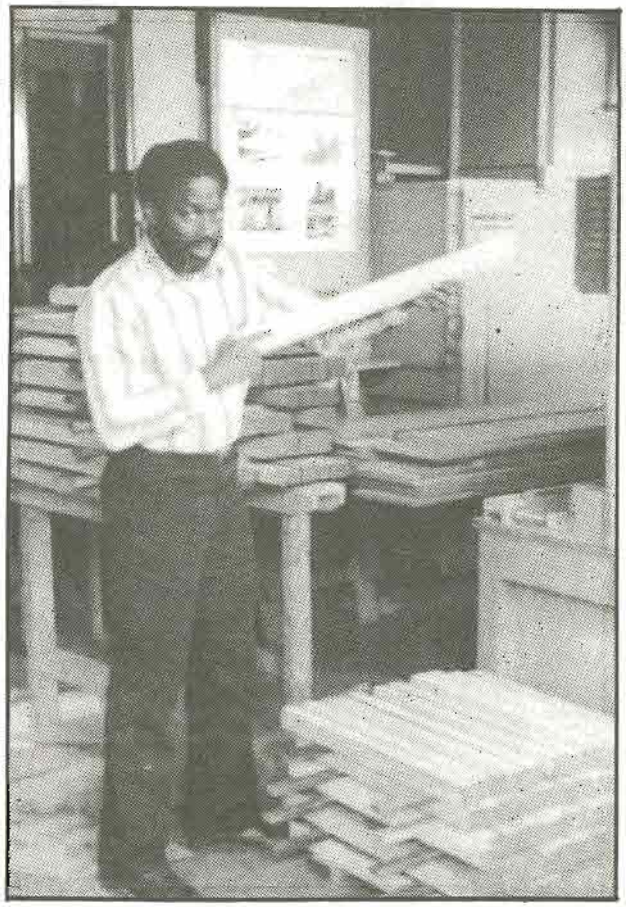

Fig. 1. U. C. wood physicist Chappell Hayes with some of the madrone "sticks" to be tested.

If these experiments prove successful, they may lead to new products and markets for two hardwood species that are now largely considered valuable only as firewood. For example, few woods have the richness of color and grain found in Pacific madrone, qualities that make it a potentially valuable wood for furniture manufacture. Hayes also believes that tanoak has potential as a laminate for use in sporting goods such as tennis raquets.

In the meantime, we are pleased to participate in the development of this new technology.

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REDWOOD REFORESTATION BY THE CASPAR LUMBER COMPANY

William H. Gibbs[1]

March, 1931

(**Editor's note:** This paper was recently uncovered in JDSF's archives. To my knowledge, it has never before appeared in print. It represents probably the earliest comprehensive documentation of artificial regeneration in the Redwood Region. The first of two parts is presented here exactly as written by W.H. Gibbs, who was Caspar Lumber Company's forester from 1923 until 1930. The area described is now part of JDSF, which was created in 1947, when the State purchased Caspar Lumber Company lands.

Part II, entitled "Shade, Survival, and Recommendations," will appear in our next newsletter.)

Part I: "Purposes, Methods, and Costs"

What has been written concerning redwood reforestation in the redwood region has covered the region as a whole and has of necessity been of a very general nature. It is thought by the writer that a paper covering reforestation as applied to a specific condition, such as that of the Caspar Lumber Company, Mendocino County, California, will bring out in greater detail what has been done and what the results are to date. Deductions from such a paper may be applicable to future reforestation in the region.

The purpose of this paper is to cover reforestation as it has been practiced at Caspar, California, by the Caspar Lumber Company. All data relative to this paper was gathered by the writer in the period from July 1923 to April 1930, when he held the position of Forester for the company.

The Caspar Lumber Company became interested in reforestation of their cut-over lands as early as 1906 when Eucalyptus trees were set out on a few trial areas. Later they attempted to establish California nutmeg and California laurel in some of the Hare Creek openings by direct seeding methods. This method failing, they raised nutmeg and laurel trees in the company garden, and planted the seedlings. This experiment resulted in some survival but both the species turned out to be very slow-growing.

In 1922 the Company joined with the other companies in the redwood region in a general plan to put their operations on a sustained-yield basis and reforest cut-over lands by planting. A

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[1] William H. Gibbs was Company Forester for the Caspar Lumber Company from 1923 until 1930.

consulting forester was retained to make a survey of the property and on his recommendation a resident forester was employed to take charge of reforestation and fire control. In 1929 selective logging principles were introduced into the woods. In 1930 planting operations were temporarily suspended because of business conditions and to date they have not been resumed.

To effect the program of sustained yield adopted in 1922 reforestation was undertaken as possibly the proper method. Furthermore such a program would build up a good will from the standpoint of public opinion and lead to favorable legislation. The publicity which would follow such a program would be good advertising.

Deciding on a silvicultural method to use in the region, several factors had to be considered. The topography is very rough, the timber large, and the stand heavy. Under such conditions high power logging methods are needed to get the logs out at low cost. The leaving of seed trees complicates such a method, raises the cost of logging, and the survival of such trees through logging and slash disposal is doubtful. Because of the size of the timber and roughness of the ground, breakage is high, and utilization not close. It is the custom to peel the bark from the trees and leave it in the woods. An understory of tan oak, which is broken up by felling and logging operations, adds to the heavy slash on the ground. Under such conditions slash disposal by such methods as piling and burning, if at all practicable, would be prohibitive in expense. It has been the policy for years for the company to broadcast burn before logging. The company was not in favor of changing this system of slash disposal and logging because it may raise logging costs.

Secondly, redwood sprouts from the stump and can be depended upon to re-establish the species on 20% of the area. A planting cost would thereby be reduced by such an amount.

Thirdly, under artificial reproduction they could insure full stocking and control of species.

Considering the above-mentioned factors, it was decided to continue the system of clear cutting, but follow it by planting in the openings between the sprouts.

A plan was drawn up which called for planting each year an area equal to the area logged and gradually to increase the acreage planted to cover as much of the older cut-over area as it was practical to plant.

Redwood was chosen as the principal species to plant for the following reasons. It is native and will re-establish itself on 20% of the area through sprout reproduction. Because of this faculty for sprouting, redwood once planted will subsequently reproduce itself from sprouts. Furthermore, the species is fire-resistant and will resprout after fire. It is fast growing and the most valuable species in the region. Characteristics of the

wood which tend to make it rot resistant put it in the specialty wood class and insure a relatively high price. The company has developed a market for redwood and maintains a plant and organization for redwood manufacture.

Other species, such as Port Orford Cedar, Douglas fir, and Sitka spruce were planted, but only for experimental purposes.

The choice of stock depended on a balance between costs and results. A choice had to be made between 1-0 redwood costing $7.50 per thousand and 1-1 redwood at a cost of $10 per thousand. The first year 500 1-0 and 4500 1-1 redwood trees were set out. The survival count on 100 staked trees of each age-class showed 75% for the 1-0 stock against 60% for the 1-1 stock. The 1-1 stock was the thriftier looking and showed better growth. Subsequent plantings showed that 1-1 was to be preferred because it had a slightly higher average survival and showed greater evidence of thriftiness and rapid growth, which would allow it to compete with the brush which would come in on the area a few years after planting. Consequently the stock changed from a 5 to 1 ratio in favor of 1-0 in 1923-25, to 100% of 1-1 in 1929.

The stock used came from two sources: The Union Lumber Company's nursery at Fort Bragg and the Caspar Lumber Company's nursery at Caspar. The majority of the stock was secured from the Union Lumber Company's nursery on a cooperative basis. The Caspar nursery was maintained as a demonstration nursery, principally to develop nursery practice and provide experimental stock.

The planting method used at Caspar is similar to the one-man method developed by the Forest Service and known as "the side-hold method."

In this method the planter digs the hole and plants the trees in contrast to other methods where one man digs the hole and another plants the tree. The advantages of such a method are that it fits itself to a rough country covered with slash and brush, such as is found in the redwood region. One man is responsible for the planting of the tree and crew efficiency is better and costs less. The method in detail is as follows:

The man uses a special planting mattoch and carries his own trees in a bag designed for the purpose. The tree roots are kept moist in a medium of damp moss. He clears off a space approximately two feet square and digs a hole in the center, squaring up the back of the hole to insure vertical planting. He then holds a tree against the vertical face of the hole, shoves in a little dirt and tamps it against the roots from the side, insuring packing the entire length of the root. He next fills in the rest of the hole, and mulches the top surface to reduce evaporation.

The crew consists of from 8 to 12 men under a competent foreman. Each man has his position in the crew. The best men

are put on the ends. They set the pace and guide the crew. The crew, as a rule, works up and down the slopes and across the contours. A planting interval of 8 X 8 having been established, each man keeps eight feet from his neighbor and plants a tree every eight feet. Variations from this eight-foot interval are allowed when it becomes necessary to pass stumps which will sprout, to skip occasional natural reproduction, or to take advantage of natural shade. On south slopes the men are encouraged to place chunks of wood, with which the areas are usually littered, around the trees to shade them. Shading experiments have shown the justification of this procedure.

Such a crew will plant from 400 to 600 trees per 9-hour day, depending on such factors as: soil class, type of cover, steepness of slope, amount of stumps, trash, etc. present, and distance of the operation from camps.

Success or failure of the field planting in the region depends to a very great extent on the ability of the foreman to gain the loyalty of the crews, and maintain an interest in careful planting. Lax methods are not tolerated.

Table I gives costs of planting. These are actual average yearly costs. They include preliminary burning, planting labor, cost of stock, surveying and staking, transportation and supervision. The costs range from $20 to $23 per thousand or from $7.39 to $14 per acre, varying according to the number of trees planted per acre abd percentage of 1-1 stock.

Average costs are around $21 per thousand and $10 per acre for 483 trees per acre. Basic daily costs per man were:

Labor: $4.00
Field Supervision: $5.00
Forester: $10.00
Cost of Stock: 1-0 $7.50 per thousand
1-1 $10.00 per thousand

It is the belief of the writer that costs can be further reduced. He is certain that the cost of planting stock has been high and believes that field planting costs can be reduced under large-scale planting programs.

TABLE I

Year	Trees Per Acre	Cost Per M.	Cost Per Acre
1925	352	$21.00	$ 7.39
1926	425	$21.00	$ 9.60
1927	470	$22.00	$11.45
1928	375	$23.00	$ 8.62
1929	740	$20.00	$14.00
1930	545	$21.00	$11.44
Average:	483	$21.33	$10.42

STAFF NOTES

Yes, folks, it's profile time again. In this issue, the spotlight is on Glen "Goober" Pinoli.

Glen was born in Ukiah and spent his first ten years in Philo where he began his education by attending a little red schoolhouse near Boonville. Throughout his youth, Glen was active in scouting, becoming an Eagle Scout before graduating from Montgomery High School in Santa Rosa in 1967. That same year, he joined the Marines and eventually spent 13 months in Vietnam as a Scout Sniper.

When he got out of the Marines, Glen went to Italy for two years where he served a mission for the Church of Latter Day Saints. Today, he serves as First Counselor in the Bishopric of the Fort Bragg Ward of the LDS Church.

Glen's forestry career started while he was still in high school. He worked two summers as a CDF firefighter out of Hopland. While in college, he worked summers as a US Forest Service firefighter out of Logan, Utah.

After graduating from college, he worked briefly as a forest technician for the Masonite Corporation before returning to CDF in late 1977 as a Forestry Graduate Trainee in Riverside. He soon moved up to Junior Forester, working out of Norco Conservation Camp until 1979, when he promoted to Forester I at JDSF. Glen recently celebrated his fifth anniversary as a JDSF Timber Sale Officer, a job he still enjoys. He has been a Registered Professional Forester for three years.

Among his other accomplishments, Glen is multi-lingual, speaking Italian and Boontling as well as English.

Glen's wife of 13 years, Gayle, is a Registered Professional Nurse. They have two sons, Mario, 4, and Nicolo, 7.

In other staff news, we would like to welcome back Forestry Aides Darcie Mahoney and Kelley Keenan. Darcie will be working primarily on our five-year remeasurement of Continuous Forest Inventory plots, while Kelley will be assigned to the Caspar Watershed Study.

Also working on the Caspar Watershed Study are Manuel Martinez and Pete Cafferata. Manuel is a US Forest Service Hydrologic Technician assigned to JDSF for the Caspar study and is responsible for instrumentation and monitoring. Pete is a CDF Junior Forester and currently serves as JDSF's Forest Hydrologist, having recently transferred from CDF's Mendocino Ranger Unit Headquarters in Ukiah. He will serve as a sort of staff hydrologic troubleshooter, with primary emphasis on the Caspar Watershed study.

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