



# STATE FOREST NOTES

Office of the State Forester  
Sacramento

No. 22

September 1964

## ARTIFICIAL PROTECTION OF FIRST-YEAR NATURAL SEEDLINGS ON THE MOUNTAIN HOME STATE FOREST IN 1963

Floyd L. Otter<sup>1/</sup>

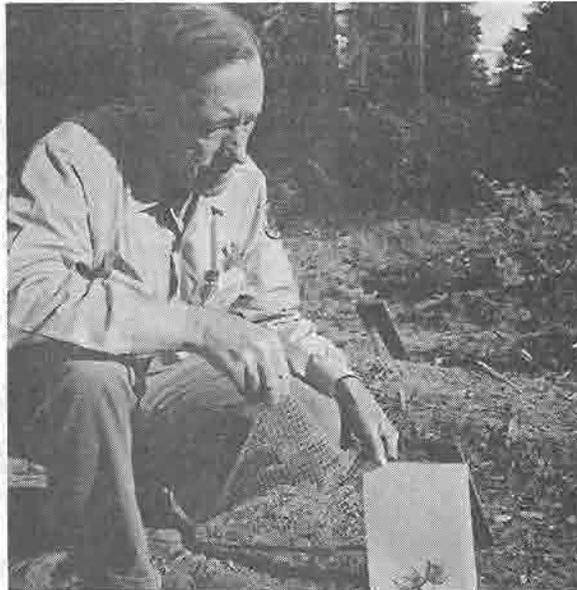


Fig. 1. Wire-mesh cones and shingles used as protectors and shade for newly germinated natural seedlings of sugar pine. The seedlings were about 6 weeks old.

---

<sup>1/</sup> Forest Manager, Mountain Home State Forest, California Division of Forestry, Springville, California.

The year 1962 was an exceptionally good seed year for sugar pine (Pinus lambertiana) on the Mountain Home State Forest in Tulare County, California. During the fall months of that year, a 33-acre area on the Forest was logged and a thorough job of slash cleanup and site preparation was done. The slash and cull material from this logging and the debris from earlier redwood split-products and logging operations were bunched by bulldozer and burned in October, November, and December (fig. 2).



Fig. 2. Bulldozer preparing logged area for burning slash and debris in October 1962.

The treated area is designated as a sub-unit in the State Forest Management Plan, and the logging was part of the normal timber management program. In this instance, a heavy cut (nearly 100%) was made of the sawlog-sized white fir (Abies concolor) left from the logging

operations of 1943 to 1945. The purposes were to salvage weak and dying trees, make a beginning in the control of dwarf-mistletoe in white fir, and make available for tree growth the large areas covered with debris from the unregulated operations of the years prior to acquisition of the Forest by the State.

Remaining on the sub-unit after the logging job were several dozen large Sierra redwoods (Sequoia gigantea) well distributed over the area, a smaller number of mature sugar pine not so well distributed, and groups of pole and small sawlog-sized white fir. There were also a few groups of white fir and redwood seedlings and saplings, but about half the total area was bare ground exposed by bulldozer and the burning of slash piles.

Besides the excellent crop of sugar pine seed, there was, in 1962, a normal seed crop of redwood and a fair to poor crop of white fir.

The sub-unit and some of the surrounding area were treated twice during the fall months to reduce the rodent population. Strychnine was used the first time and "1080" the second.

Prompt and successful reproduction after logging has been rare on the Mountain Home State Forest in recent years. Plans were made, therefore, to watch very carefully the incidence and progress of natural reproduction on the sub-unit, and to try any available measures that might protect emerging seedlings from losses.

Several hundred galvanized wire-mesh protectors<sup>2/</sup> of conical shape were prepared beforehand and a close watch kept for new seedlings (fig. 1). The first seedlings noted were sugar pine. Knowing that without some systematic way to be sure of the identity of individual seedlings we might overlook seedling losses because of their replacement by additional germination, we set up four 0.004-acre plots and marked each seedling (or "bunch" of seedlings) with wire pins a few days after their emergence. This was done on June 23, 1963. In each plot we covered 2 or 3 seedlings (or bunches) with wire-mesh protectors and shaded them with shingles. We left the other seedlings unprotected. In all, there were 49 unprotected seedlings and 25 protected. The latter were under 11 wire-mesh protectors. (This total of 74 seedlings is equivalent to over 4600 per acre).

Seven days later, on June 30, seventeen of the unprotected seedlings had disappeared, the cotyledons on one had been partially cut off, and one had died. There were no losses among the protected seedlings. The result of this and later mortality counts is shown in

---

<sup>2/</sup> Anon. 1953 Direct seeding, Timber Tip No. V. Small Woodland Council Publ. Calif. Div. of For., Sacramento, May 1953.

Table 1. On August 9 only 16 of the original 49 unprotected seedlings were alive. In contrast, the 25 original protected seedlings were all alive on August 25 and, in addition, showed one-quarter to one-half inch more height growth than the average unprotected seedling.

Table 1. Results of shading and protecting wild seedlings on four plots, 1963, sub-unit E-1.

Date (1963)	Survival (Number of Seedlings)		Mortality (Percent)	
	Protected	Not Protected	Protected	Not Protected
June 23	25	49		
June 30	25	31	None	37
July 14	25	23	None	53
July 21	25	19	None	61
July 28	25	17	None	65
Aug 9	25	16	None	67

The causes of the seedling losses were not definitely determined. The prime suspects were Oregon juncos (Junco oregonus) and deer mice (Peromyscus maniculatus). No deer tracks were found. Rabbits normally are not found in the vicinity of this sub-unit.

The heavy losses that were noted on June 30 among the unprotected seedlings gave sufficient reason to extend the experiment. Therefore, over the ensuing 2 weeks, 497 protectors were put over new sugar pine seedlings at approximate 10 foot spacing. Shingles were added for shading. This required only a few hours of labor and supervision.

A survival count in October showed that 92 percent of the wire-mesh cones were still occupied by live seedlings. No records were made either in July or October that reveal the losses among the unprotected seedlings outside the four plots. However, the difficulty in October of finding seedlings not covered by wire-mesh protectors indicates that, if a good stand of sugar pine develops from the 1963 seed crop, it will be composed very largely of seedlings protected by wire-mesh cones.

When the protectors were put out, very few seedlings were seen of species other than sugar pine. By late summer, however, many Sierra redwood seedlings were noted. Apparently they were so small as to be overlooked earlier in the year, so none were given wire-mesh

protection. Indications are that the new stand will have a heavy admixture of redwood. The white fir seedling crop was negligible in 1963.

The results of this preliminary field test are not conclusive, but they strongly suggest the need for tests with better surveillance and more precise evaluation. Before the next seed year, project plans will be made for further experimental work that will provide better information on the causes of seedling losses, and quantitative data on the degrees of protection given by wire-mesh protection, by shading, and by other methods that may be devised. The use of treated seed artificially sown may be compared as a method possibly more economical and more flexible than dependence upon seed trees, although results from previous seeding trials have been erratic<sup>3/</sup>.

In conclusion, reproduction in those parts of one sub-unit in which seedlings were given artificial protection appears to be adequate and composed of the species most desired. This result, so rarely achieved so soon after logging, is almost certainly due in some measure to the artificial protection of natural seedlings within a few days after their emergence from the ground.

---

<sup>3/</sup> Otter, Floyd L. 1963. Tree planting and seeding on Mountain Home State Forest 1950-1962, State Forest Notes No. 18, Calif. Div. of For., Nov. 1963.

From  
CALIFORNIA DIVISION OF FORESTRY  
301 State Office Building No. 1  
Sacramento, California 95814

TO