



# STATE FOREST NOTES

Office of the State Forester  
Sacramento

No. 57

December 1974

## JACKSON STATE FOREST - CASPAR ORCHARD EUCALYPTUS GROVE HISTORY AND VOLUME TABLES

Brian R. Barrette and Raymond E. Jackman<sup>1/</sup>



<sup>1/</sup> Foresters, California Division of Forestry, Jackson State Forest, Fort Bragg, California; the former now a staff forester in Sacramento and the latter staff forester in Monterey.

This note partially based on field data collected in 1957 by R. H. Bawcom, W. Emrie, and R. J. Hubbell, all foresters previously on Jackson State Forest.

About 1895, some 1,000 or more blue gum (*Eucalyptus globulus*) were planted along the edge of the Caspar Orchard to serve as a windbreak to protect the extensive planting of apple trees (64.5 acres). This area, which belonged to the Caspar Lumber Company, was sold along with most of their holdings in 1947 to the State of California and is now part of Jackson State Forest. The area is located east of Caspar in Mendocino County in Sections 9 and 10, Township 17 North, Range 17 West, M.D.B. & M.

The original planting was restricted apparently to 2 rows of eucalyptus around the west, northwest and northeast sides of the orchard. The age of the stumps recently cut on the northeast side indicates that the oldest trees are on the edge of the former orchard and the younger trees are on both sides of these.

The Caspar Orchard eucalyptus stand is scattered over some 94 acres. However, there are areas several acres in size on which no eucalyptus are growing. It is estimated that the eucalyptus is occupying an actual area of about 50 acres. Even on this 50 acres, the eucalyptus is not a pure stand. Cruise information indicates 59 percent of the volume is eucalyptus and 41 percent is native conifers.

The initial planting was in 2 rows with six foot spacing. This indicates that the original area planted was about one acre in size. Eucalyptus starts seed production at about ten years of age and begins to produce regularly at 20 to 40 years of age. The majority of the stumps checked had from 45 to 65 annual rings, indicating that some seed was produced 10 years or less after the initial planting.

The spread of the area covered by eucalyptus has been from one acre to some 94 acres in 75 years. This tremendous spread would probably not have occurred if the planting had been concentrated in a square plot, but since it was a long narrow planting, there was more opportunity for seed dispersal.

The area around the west end of the Caspar Orchard, adjacent to the eucalyptus stand, was logged in 1964. The eucalyptus reproduction in 1968 was 100 to 200 yards further down the hill. This spread was mainly down the skid trails, although wherever bare ground was exposed eucalyptus reproduction had become established.

The area involved is a good timber growing site. It is a high Site II <sup>2/</sup> with excellent stocking and yield per acre. Commercial species are eucalyptus, coast redwood and Douglas-fir with some bishop pine, grand fir and hemlock. The eucalyptus appears to compete vigorously with the associated species. Initially it showed height growth advantage but it apparently did not "capture" the site so the spread is not considered incompatible with planned forest management on Jackson State Forest.

---

<sup>2/</sup> McArdle, Richard E. and Walter H. Meyer. 1930. The yield of Douglas-fir in the Pacific Northwest. USDA Tech. Bull. 201, 74 pp. Rev. 1961.

A 1968 cruise included 12 plots with eucalyptus on them. These plots showed eucalyptus accounted for 59 percent of the total stand volume. The eucalyptus on these plots averaged close to one 16 foot log more in height than the native conifers even though they were about the same age. Within the Caspar Orchard stand were a considerable number of eucalyptus over 200 feet in height. The tallest of these was carefully measured in 1969 and was 238 feet tall.

Unfortunately, very little information is available on the growth rates for blue gum. Most yield tables for eucalyptus go only to 20 years as this is about the maximum age used for pulpwood in most countries. The closest comparison found was the growth rates for the one acre blue gum grove on the campus of the University of California at Berkeley. <sup>3/</sup> This stand is older than the Caspar Orchard stand.

The Berkeley stand is maintaining a growth rate of over 200 cubic feet per acre per year or approximately 1,300 board feet per acre per year. Using this figure of 1,300 board feet per year and assuming the Jackson State Forest stand to be 59 percent eucalyptus, the volume increment for the eucalyptus may be 750 board feet per acre per year and the conifers may be growing about 550 board feet per acre per year giving the total growth per acre per year figure of 1,300. Similarly aged all conifer stands on the same site yield from 1,100 to 1,400 board feet per acre per year, so the figure of 1,300 is reasonable. <sup>4/</sup>

In 1969, a 100 percent cruise was made of all trees 11 inches d.b.h. and over. Ring counts from 43 stumps in the northeast corner indicated a wide variation in ages (24 to 73 years), and in sizes (10 inches to 36 inches at stump height). In most cases, ring width was decreasing in the older trees, but many of the 10 inch to 16 inch trees were from 45 to 50 years old, while a couple of the 16 inch and 17 inch trees were around 25 years old. This indicates that there are suppressed trees within the stand and these should be removed to make room for the faster growing trees. Blue gum lives to an age of from 200 to 400 years, but appears to put on its greatest diameter growth in the first 60 years. This is based on the ring counts of 40 trees. Two of the stumps studied showed trees that had reached 17 inches in diameter (stump height) in 25 years, or an average annual diameter growth of nearly seven-tenths of an inch since they were planted in 1895.

The 1969 cruise showed a gross volume of 1.095 million board feet and a net volume of 1.026 million board feet. Diameters ranged from 11 to 64 inches. The average diameter was 19 inches with 68 percent of the trees between 11 and 20 inches in diameter.

---

<sup>3/</sup> Metcalf, Woodbridge. 1950. Eucalyptus Serves Many Purposes. University of California, College of Agriculture, Agricultural Extension Service. 19 pp.

<sup>4/</sup> Lindquist, James L. and Marshall N. Palley. 1963. Empirical Yield Tables For Young-Growth Redwood, University of California, Division of Agricultural Sciences, California Agricultural Experiment Station Bull. 796. 47 pp.

The market for eucalyptus in 1969 was limited to pulpwood, piling, hardboard chipstock, and firewood. Only two companies in northern California were utilizing eucalyptus (one for pulp and the other for hardboard). Together these companies then cut in California about 3-½ million board feet of eucalyptus each year.

Three timber sales have been made from this eucalyptus stand on Jackson State Forest. In 1957, 250,000 board feet were sold and in 1965 some 60,000 board feet were cut. These cuts were made from the west end of the orchard and from the east side respectively. The majority of these stumps have sprouted and the 1957 stump sprouts were several inches in diameter in 1969. Many grew over 20 feet in height in two years.

In 1969 it was decided to harvest all the eucalyptus over 20 inches in diameter leaving two control areas for study purposes and to protect the tallest trees.

With a State owned truck weighing scale nearby and with the known weight to board foot ratios from the 9 loads of eucalyptus cut in February of 1969, it was decided to base the method of payment entirely on weight. The gross weight from the nine loads averaged 13.79 pounds per board foot and the net weight was 14.71 pounds per board foot. This sale, which was completed in May of 1969, was probably the first one in California where logs were sold solely on a weight basis.

#### Discussion

As eucalyptus is compatible with native forest species and has proven to have very good growth and regeneration characteristics, it may someday prove to be a valuable species for intensive forest management. Apparently its principal value is a rapid growing source of strong wood fiber. Unfortunately at this time and place, the market for timber for fiber purposes only is not adequate to give the species a comparative value sufficient to warrant active forest management. On the other hand, it would take considerable effort to eliminate the Jackson State Forest eucalyptus stand to favor currently more valuable timber species. Because of sprouting and early seeding, present management activity on the Forest seems to encourage eucalyptus regeneration. Like some other introduced plant species, for example, gorse (Ulex europaeus L.) and Scotch broom (Cytisus scoparius L.), eucalyptus shows a natural tenacity once it is established. It seems only a matter of time before the market will develop for increased use of this strong fiber species.

The two volume tables (Table 1 and 2) developed from measurements of felled trees on Jackson State Forest should be useful to timber management planners, foresters, timber operators, and owners of an estimated 50,000 acres of eucalyptus that have been planted for windbreak purposes in California.

Table 1  
 EUCALYPTUS VOLUME TABLE  
 Jackson State Forest

Board feet to a 6-inch top - Spaulding Rule  
 16.8' Logs - 1.5' Stump Height

<u>DBH</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>DBH</u>
11	20	48	80	117	160						11
12	25	52	86	128	170						12
13	32	60	97	140	182						13
14	42	75	110	152	199						14
15	60	91	125	173	220	300					15
16	77	110	145	192	240	328					16
17	99	133	170	218	269	357	427	512	665		17
18	122	160	193	249	300	392	466	555	710		18
19		190	226	282	337	432	510	601	770		19
20		222	261	322	375	472	555	650	815		20
21			300	362	418	520	605	705	875		21
22			351	405	460	580	655	760	938		22
23			386	452	510	622	715	821	1005		23
24			438	502	560	680	772	885	1072		24
25				559	618	741	840	952	1145	1279	25
26					673	803	910	1028	1225	1350	26
27					742	875	981	1102	1305	1439	27
28					815	949	1060	1182	1392	1527	28
29					887	1023	1142	1271	1482	1620	29
30					965	1101	1228	1358	1572	1715	30
31					1047	1190	1313	1450	1670	1812	31
32					1130	1275	1402	1541	1765	1917	32
33						1367	1502	1640	1820	2020	33
34						1460	1596	1745	1973	2129	34
35						1557	1695	1847	2080	2233	35
36						1655	1798	1947	2185	2342	36
37						1760	1900	2050	2295	2455	37
38						1860	2002	2155	2402		38
39						1970	2110	2263	2520		39
40								2375			40
41								2490			41

Based on 136 scaled trees. Table developed in 1969 by Brian R. Barrette. Original field data collected in 1957 by R. H. Bawcom, W. Emrie, and R. J. Hubbell.

Table 2  
EUCALYPTUS VOLUME TABLE  
Jackson State Forest

Cubic Foot to a 6-inch top  
16.3' Logs - 1.5' Stump Height

<u>DBH</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>DBH</u>
10	8	12								10
11	9	13								11
12	10	14								12
13	11	16	21	28						13
14		18	24	30	37					14
15		20	27	34	41	49	56			15
16			30	39	47	55	63	72		16
17			33	43	52	61	71	80		17
18			36	47	58	68	79	88		18
19			40	53	64	75	87	97		19
20				58	70	82	95	106		20
21					76	89	103	116		21
22					84	97	112	126		22
23					90	105	120	136	152	23
24					97	114	131	148	165	24
25					104	122	140	159	178	25
26					112	131	152	171	191	26
27					120	141	163	184	204	27
28						152	174	197	219	28
29						161	186	210	236	29
30						171	199	224	249	30
31						182	212	237	263	31
32						193	224	251	279	32
33						204	236	266	294	33
34						216	249	280	309	34
35						228	263	295	324	35
36						240	277	309	339	36
37						252	290	324	354	37
38						265	304	338	369	38
39						278	317	352	382	39
40							331	366	396	40
41							344	379	409	41
42								402		42
43								404		43

Based on 136 scaled trees. Table developed in 1969 by Brian R. Barrette. Original field data collected in 1957 by R. H. Bawcom, E. Emrie, and R. J. Hubbell.

California Division of Forestry  
1416 Ninth Street  
Sacramento, California 95814

TO: