

Characteristics of the demand structure for Standing Timber and logs in the Central Sierra Nevada Region

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Research on the characteristics of the market for standing timber—stumpage—and logs from small woodlands of less than 5,000 acres, was started in 1957 in the forested portions of El Dorado, Placer, and Nevada counties west of the Sierra Nevada summit.

A previous study on the supply side of the market revealed that small woodland owners marketed their product as stumpage direct to sawmills, or to independent logging operators who sold the logs to a sawmill. Independent loggers account for a substantial share of open market purchases and have considerable influence on market institutions and practices, but the sawmill is the key demand element in the market. Both the amount of timber purchased directly by mills and the purchasing activity of independent loggers depend upon the aggregate demand of sawmills. Only relatively small markets for veneer logs and bolts, poles and piling, and pulpwood exist in the Central Sierra Nevada counties. Consequently most land owners and independent loggers in the region must depend on the demand for stumpage and logs by sawmills as a market outlet. The operational and market characteristics of the mills therefore determine the nature of the market.

Sources of Supply

The pattern of forest land ownership places the market for logs and stumpage in a strategic position in the region's forest economy. About half the 1,870,000 acre commercial forest area is public land held, primarily, by the United States Forest Service. The remaining forest area is controlled by private owners in a diversified, complex ownership pattern involving 6,000 individual properties held for a variety of uses. Sawmill operators directly control an estimated 13% of the total commercial forest area and 26% of the privately owned acreage. Results of a 1960 survey showed that of 25 sawmills operating in August, 14 had no timber

ownership. The remaining 11 mills owned timberland in amounts ranging from less than 1,000 acres to more than 50,000 acres. Four mills owned less than 5,000 acres, six controlled 5,000 to 49,999 acres, and one mill had over 50,000 acres.

The survey showed that the extent of timberland ownership was related to mill size. Of the 14 mills with no timber ownership, 11 were small mills, producing from 1.0 to 9.9 million board feet annually. Nine of the 11 mills owning timber were of medium size, producing 10.0 to 24.9 million feet annually, or large size plants, producing 25.0 million feet or more annually. Whereas only two of 13 small plants owned timberland, seven of nine medium-size mills and all three large mills had timberland or were operated by firms holding timberland in a separate company. Average timberland ownership in the small-mill class was 6,750 acres; in the medium-size class, 5,800 acres; and, in the large-mill group, 55,000 acres.

Most mills are wholly or in part dependent on open market purchases of stumpage or logs from public and private timber holders for raw materials. This is particularly true of small and medium-size mills. Such plants owning timberland

can provide only a portion of their log requirements from their own holdings. Mills without timber ownership necessarily rely on open market purchases. Large mills with extensive timber holdings generally can exercise a greater degree of choice in obtaining timber, either harvesting from their own lands or buying from other private and public owners.

All mills studied obtained some proportion of their 1959 timber supply from sources other than land controlled by the mill. The table in column 2 shows the relative importance of timber supply sources for each mill size class, based on 1959 data for 22 mills. Three small mills which were contract sawing for other mills were omitted. The small mills were mainly dependent on small private lands, obtaining 42% of their supply from that source. National forests were next in importance, providing 33% of the supply. Mill-owned and other large private lands were relatively unimportant timber supply sources. The size and contract requirements of national forest timber sales usually discourage small mills from bidding on them. However the United States Forest Service is developing a program under which it plans to offer sales of a size appropriate for small operators bids, and several operators indicated they expected to obtain a greater portion of their future supplies from public lands.

The procurement pattern of medium size mills was more evenly distributed between mill-owned lands, small private lands, and national forests. Although mill-owned lands were the most important single source, supplies from other than mill-controlled lands amounted to 63% of the total volume received. While all large mills owned large forest properties or were linked to one by a common organization, such plants procured 77% of their log supply from other sources. National forests were the most important sources, providing 37% of the total. One mill obtained a large portion of its supply from a site being cleared for a munic-

Percent of Stumpage and Log Supplies Obtained from Various Sources, by Mill Size Class, 1959

Mill size class	Supply sources					Totals
	Mill owned lands ¹	Other private lands		National forests	Other public ²	
		Large (5,000 ac. or more)	Small (less than 5,000 ac.)			
		Per cent of supply				
Small-mills (1.0-9.9 million bd. ft. annually)	5	12	42	33	8	100
Medium-mills (9.0 to 24.9 million bd. ft.)	37	3	27	33	-	100
Large-mills (25.0 million or more)	23	5	3	37	32	100

¹ Lands controlled by the mill itself.

² Municipal water reservoir site.

Percentage Distribution of Stumpage and Log Volume Delivered to Each Demand Source, by Type of Ownership, 1959

Type of ownership ¹	Demand source			Totals
	Small mills	Medium mills	Large mills	
	Percent of volume delivered			
Large private lands....	39	18	43	100
Small private lands....	41	52	7	100
National forests....	19	34	47	100
Other public.....	6	-	94	100

¹ Omits lands controlled by an individual mill, though large private and small private lands could include lands controlled by a mill other than that cutting the timber.

ipal reservoir, a temporary source. Some large mills follow a policy of purchasing national forest timber, holding their own timber in reserve in event of failing to get a sufficient supply from other areas. The general unimportance of other large private lands, other than mill-controlled lands, as a supply source for any mill group is explained by the fact that only an estimated 8% of the commercial forest area is in this ownership class.

Sources of Demand

Because the percentages in the table in column 3, page 8, apply to mill groups whose aggregate production varied, the data shown infer but do not directly identify the primary sources of demand for each supply or land ownership group. Accordingly, estimates were made which show the demand structure associated with each ownership type. Together, the tables on page 8 describe the supply and demand structure for stumpage and logs in relation to sources and relative quantities exchanged in 1959. The tables show the two-way dependence of small mills on small woodlands as a timber supply source and of small woodlands on small and medium size mills as market outlets. Small and medium size mills together received over 90% of the volume originating from small woodlands. The market for timber from national forests, in contrast, is mainly represented by large mills. Large and medium size mills received 81% of the volume purchased from national forests.

Mills in the several mill-size groups differ in their operation, organization, products, and market characteristics, and these differences have a direct influence on the nature of the market demand faced by small woodland owners.

Small sawmills characteristically were operated by single-plant firms organized as single ownerships or as partnerships.

Types of Lumber Manufacturing Facilities and Percentage of Mills in Each Mill Size Class with Such Facilities, 1959

Manufacturing facility	Mill size		
	Small	Medium	Large
	Per cent of mills		
Band saw	23	56	100
Circular saw	77	45	...
Cant gang saw	69	66	33
Edger	100	100	100
Trimmer	92	100	100
Hog	8	22	67
Chipper	11	67
Burner	92	100	67
Drying yard	23	89	100
Dry kiln	31	45	100
Planing mill	23	56	100
Number of mills	13	9	3

All were permanently located plants, two-thirds of which began operations before 1950. However, two-thirds of the mills had changed ownership at least once between 1950 and 1960, indicating instability of the firms operating them. As a rule, the mills shut down during the winter months. Ten plants operated for periods of eight months or longer in 1959, but only two operated throughout the year. The main reasons for shutting down were inclement winter weather, need to make repairs and overhaul machinery, and lack of logs. Few mills are able to store logs for winter operation, either because of a lack of physical facilities or inability to finance the necessary log inventory.

In obtaining timber supplies, small mills are faced by keen competition. Most operators reported competition from 6-12 other mills for wood supplies in the firm's timber supply area. Among the important timber purchasing problems of the operators were the difficulty of purchasing mill requirements, the competition from other mills, high prices, and scarcity of timber. A declining inventory of available private timber and the resulting rise in stumpage prices and competition probably comprise one set of factors explaining the large reduction in small mill operations which has occurred in recent years.

Most of the lumber produced by small mills is manufactured from young-growth timber. In 1959, an estimated 63% of the log input of 12 small mills was young-growth. Typically, young-growth timber is relatively poor in quality, yielding primarily common grades of lumber and little of the select and moulding grades. Extent of manufacturing often is limited by a lack of finishing equipment. A typical small mill is equipped with a circular head saw, cant gang saw, edger, and trimmer. Usually such plants do not have equipment or facilities for drying and planing lumber. For example, only three of 13 plants were equipped with both drying and planing equipment. Seven mills had no drying or planing equipment and produced only rough green lumber. The remaining mills had either a drying yard, and thus could produce rough dry lumber, or else had finishing facilities available as part of a multi-plant operation. About half of the mills did not have facilities for holding a lumber inventory, and few had warehouses for indoor storage.

Because most small mills do not have finishing equipment, sales of unfinished lumber are proportionately greater than for other mill-size groups. In 1959, 41%

of the volume marketed by 10 mills was rough green lumber, and 51% was either rough green or rough dry. One consequence of this product mix is that the mills must market their product through channels where finishing facilities are available or to buyers who use unfinished lumber. Thus 46% of the volume marketed in 1959 went to yard wholesalers and 29% to remanufacturers. In some cases remanufacturers were box plants, while others were larger mills which bought rough green lumber from small mills for further processing in their own plants. Due to the small volumes sold, individual mills usually had no more than two or three buyers. The small mills with drying and finishing equipment differed from this pattern, generally selling through office wholesalers and marketing a larger proportion of finished lumber.

All three large mills studied were operated by firms organized as corporations, two of which were multi-plant firms. Two of the firms were independently controlled by individuals and one by a larger parent company. All of the mills had begun operations before 1950, and one had changed ownership between 1950 and 1960. The large mills generally operate on a year around basis, building up log inventories during the summer to carry them through the winter months. Their timber supplies are primarily from the national forests and from their own lands. In purchasing timber, the large mills face a smaller number of competitors than do small mills. Each mill reported competition from two or less mills in its timber supply area.

While small mills process primarily young-growth logs, the large mills utilize old-growth, which yields a greater proportion of the higher priced shop, moulding, and select grades of lumber than young-growth. In 1959, the log input of the three large mills was 85% old-growth and 15% young-growth. Also in contrast to small mills, the large mills have drying yards, dry kilns, planing mills, warehouses for indoor storing of lumber, and ample facilities for holding inventories. Two of the mills utilized slabs and edgings by converting such material into chips. In 1959, 67% of the lumber marketed was surfaced dry lumber and 78% was either surfaced green or surfaced dry. No rough green lumber was sold. Of the volume sold, 78% was marketed through office wholesalers, and the balance to yard wholesalers or remanufacturers. Except for one mill, the number of buyers dealt with was much greater

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Spider Mites on Field Corn

on two San Joaquin Delta islands

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Spider mites attack field corn in most corn growing areas of California. In the interior valleys, and especially in the San Joaquin Delta region, the mite populations become so abundant in some years that they may cause premature drying of the foliage.

During the summer of 1960 experiments were conducted on Staten and Tyler islands in the San Joaquin Delta to determine the effectiveness of certain acaricides in controlling spider mites attacking field corn.

A survey on Staten and Tyler islands showed that three species of mites were attacking field corn: the two-spotted spider mite—*Tetranychus telarius* Linn.—the Pacific mite—*Tetranychus pacificus* McGregor—and a grass mite—*Oligonychus pratensis* (Banks). The two-spotted mite and the grass mite were the predominant species in most locations, frequently

occurring along with smaller populations of the Pacific mite. The grass mite and the two-spotted mite were also infesting Johnson grass in the area.

A field of young corn with a moderate mite infestation was selected for the acaricide evaluation test. The two-spotted mite and the Pacific mite were the only species present in the selected field. The two-spotted mite occurred in a ratio of about 4:1 of the Pacific mite.

Experimental Materials

Tedion at the rate of 0.5 pound per acre, Trithion at 1.0 pound per acre, and ethion at 1.0 pound per acre were formulated as emulsion sprays and applied by airplane in 15 gallons of water per acre. Kelthane 3% dust was applied by airplane at the rate of 40 pounds per acre.

All of the materials tested—except

ethion—are for experimental use only and do not have Federal registration for commercial use on corn.

The insecticides were applied once on August 11, 1960 beginning at 9:30 a.m. Each treatment was replicated twice and each replication was 120' wide and 0.5 mile long, approximately 7.3 acres. The entire trial, including the untreated check areas, covered 75 acres.

Pre-treatment and post-treatment counts of mites were made by taking 30 infested leaves from each plot on each sampling date. Ten leaves were taken from a level on the plant 1' above the ground, 10 from the 3' level, and 10 from the 6' level. A cork borer— $\frac{1}{2}$ " outside diameter—was used to outline a heavily infested area on the underside of each leaf. One such area from each of the 30 leaves constituted a sample for a given plot. These areas were examined

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than in the case of small mills. One mill, for example, sold through more than 200 wholesalers in western and eastern areas.

As a group, medium-size mills are intermediate between small and large mills in most characteristics. Some resemble small mills, while others resemble large mills. The stability of firms operating medium-size mills has been greater than that of small-mill firms, but less than large-mill firms. The plants typically operate for more than 10 months a year, but only three of eight plants operated 12 months in 1959.

The 1959 log supply utilized by these plants was 69% old-growth and 31% young-growth timber. Some plants were processing primarily old-growth, while others processed mostly young-growth. All of the mills were equipped to produce dry lumber, and five of nine had planing mills, thus enabling them to produce surfaced lumber. In 1959, 34% of the lum-

ber sold by six mills was rough green, while 46% was surfaced dry. The differences in the relative volumes marketed through various channels by small and medium size mills is explained by the differences in their product characteristics. With a higher proportion of finished lumber to market, medium-size mills sold 54% of their output through office wholesalers, 17% through yard wholesalers and 24% to remanufacturers.

Significance of Differences

The significance of the differences in the characteristic of the several mill-size groups, in this study, depends on how they influence each group's demand for stumpage and logs.

A statistical time-series study of the price-quantity lumber sales experience of the several mill groups in relation to their market channels, and the relationship of that sales experience to purchases of stumpage and logs, is planned.

The mill characteristics observed sug-

gest that the operational and marketing behavior of mills obtaining their supplies from small woodlands is likely to be more unstable than that of other industry segments. The marketing position of small mills in general appears poorer than in the case of large and some medium-size mills. Smaller quantities are marketed through fewer buyers; the product is of poorer quality and needs further processing before being sold into final markets. Because the mills operate intermittently it is necessary that they reestablish their contact with buyers each season. Some of the outlets for small mill lumber are likely to stop purchasing from them during periods of low demand, which typically re-occur in a cyclic fashion in lumber's markets. Also, the low prices prevailing during such periods are much more likely to cause the small mills to shut down than the larger mills.

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The foregoing article is based on one phase of Western Regional Marketing Project WM-42.