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ALASKA'S LUMBER MARKETS

by
ROBERT SNYDER

INTRODUCTION

In 1961, Alaska's lumber mills supplied 46 per cent of the Alaska market. However, by 1968, their share of the market had declined to only 23 per cent. During the seven-year period, the amount of Alaska-produced lumber sold within the state went from 25.5 million board feet (MMBM) to 13.9 MMBM, a decrease of 11.6 MMBM, or 45.5 per cent. This decline in the share of the in-state market occurred at the same time that Alaska's population, timber harvests, and lumber production increased markedly, and at the same time that the demand for lumber in Alaska also increased.

Between 1961 and 1968, Alaska's population grew 21 per cent from 235,000 to 285,000. Total timber harvests increased 74 per cent from 339 MMBM to 590 MMBM, and lumber production increased 418 per cent from 73 MMBM to 305.2 MMBM. (See Table 1.) The demand for lumber in Alaska increased 9.3 per cent during the same period, going from approximately 55 MMBM to 60 MMBM.

Most of the lumber used in Alaska is imported from the Pacific Northwest states, while the bulk of the lumber produced in Alaska is exported, primarily to Japan. In 1961, Alaska lumber mills shipped about 57 per cent of their output to foreign markets. By 1968, export shipments accounted for 94 per cent of sales, thus partially offsetting the loss of Alaska markets.

Among the reasons for the decline in the share held by Alaska's producers in the state's markets were (1) the development of transportation facilities that lowered the cost of using lumber (and lumber substitutes) from "outside," and (2) dissatisfaction on the part of many of Alaska's dealers, contractors, and other consumers with the domestically produced lumber products.

There is some evidence that indicates that since 1968 the declining trend in in-state consumption of Alaska-produced lumber has been arrested. Several mills in the Southcentral and Interior regions, much of whose product is for the Alaska market, have increased production, and, within the last year, at least two mills have installed dry kilns and modern remanufacturing facilities. This latter action in particular may increase the share of Alaska-produced lumber in the state's markets. According to a survey made in late 1970, a major source of the dissatisfaction with the domestically produced lumber product

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James D. Babb, Jr.
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Robert Snyder
Author

was that it was improperly graded dried, and cured. If so, further steps taken by local producers to obtain accurately manufactured and consistently dried and graded lumber, will improve their position in the Alaska market.

ALASKA CONSUMPTION PATTERNS

In 1961, per capita lumber consumption in Alaska was about 234 board feet. By 1968, per capita consumption in Alaska of lumber from all sources had declined by 9.3 per cent to about 211 board feet. In comparison, overall United States per capita consumption rose 6.7 per cent from 193 board feet in 1961 to 206 board feet in 1968.

Because Alaska is one of the fastest growing states, with large amounts of construction, much greater relative per capita consumption might be expected. One explanation for the apparent disparity is that approximately 35 per cent of the lumber reported in the overall U.S. per capita consumption data is used as inputs to major lumber-using industries (furniture manufacturing, mill work, flooring, containers,

TABLE 1.

Sales of Alaska Lumber Mills, 1961 and 1968[a]

Market Area	Southeast		Southcentral		Interior		Southwest		Total	
	1961	1968	1961	1968	1961	1968	1961	1968	1961	1968
Alaska										
Within 100 mi.[a]	7,210	---	3,453	---	805	---	240	---	11,708	---
Over 100 mi.[a]	7,283	---	6,156	---	253	---	178	---	13,870	---
Southeast	---	4,750	---	---	---	---	---	---	---	24,750
Southcentral	---	---	---	6,200	---	---	---	---	---	6,200
Interior	---	---	---	400	---	1,500	---	---	---	1,900
Southwest	---	---	---	---	---	---	---	550	---	550
North	---	---	---	300	---	200	---	---	---	500
Total Alaska	14,493	4,750	9,609	6,900	1,058	1,700	418	550	25,578	13,900
Washington	5,970	4,350	70	---	---	---	---	---	6,040	4,350
Foreign	41,500	286,900	---	b	---	---	---	---	41,500	286,900
Total All Sales	61,963	296,000	9,679	6,900	1,058	1,700	418	550	73,118	305,150

[a]Alaska marketing areas were specified in the 1961 survey as either within or more than 100 miles from the mill site. Regional sales for 1968 reported to the nearest 50 MBM.

[b]Southeast foreign shipments include shipments from one Southcentral mill (consolidated to avoid disclosure of individual mill operations).

SOURCE: Data for 1961 provided by Mr. Keith Hutchison, Institute of Northern Forestry, United States Forest Service, Juneau. Production areas in the 1963 publication (Bones, J.T., *Wood Processing in Alaska—1961*, USFS Resource Bulletin NOR-1, 1963.) were specified as being either coastal or interior; using the data supplied by Hutchison, these data were restructured to reflect the area breakdown used in the present study. Data for 1968 were obtained by questionnaire, supplemented by estimates furnished by Mr. Verner Clapp, USFS, Juneau.

pallets, and prefabricated products), and only 65 per cent, or 133 board feet per capita, is used for construction and maintenance. In Alaska, there are very few secondary wood-using industries, and almost all lumber, approximately one-third more per capita than throughout the rest of the nation, is directed to construction and maintenance.

Another reason that per capita lumber consumption in Alaska appears less than might be expected for a rapidly growing state is that the traditional methods of home construction have been yielding to factory-built structures. (It has been forecast that by 1980 one of every five Americans will be living in a factory-built home.) Alaska's high construction costs (see box) provide an additional impetus favoring the selection of mobile or modular structures.

Although population increased in all regions of Alaska from 1961 to 1968, the growth rate in Southcentral was more than double that of any other region. Table 2, showing regional population changes from 1960 to 1970, indicates that by 1970, well over one-half of the state's population was concentrated in Southcentral Alaska. Paradoxically, this growth within a major market area had disadvantageous effects upon the Southeastern lumbermen, who were the largest Alaska suppliers of the state market in 1961.

ALASKA CONSTRUCTION COSTS

A construction cost index published by the Army Corps of Engineers indicates that Anchorage construction costs are 70 per cent greater than Seattle. The building cost differentials for other Alaska cities are: Juneau, 80 per cent; Fairbanks, 90 per cent; and Barrow, 250 per cent.* Comparing different modes of housing, in Fairbanks the installed per square foot cost of mobile homes reportedly ranges from $15.00-to-$17.00, modular units cost about $18.50-to-$24.00 per square foot, and stick-built on-site construction costs about $30.00-to-$40.00 per square foot. To the extent that these factory-built structures are manufactured outside of Alaska, there is a loss of markets for lumber in Alaska (but, of course, not necessarily a loss of markets for Alaska-produced lumber).

*U.S. Army Corps of Engineers, "Construction Cost Index for Alaska," August 1971.

Because of the economic growth of the area tributary to Southcentral ports, transport efficiency to the region was improved, and the entry of competing carriers was encouraged. The "Railbelt," reaching from Seward to Fairbanks, is the closest approach to an integrated market area in Alaska (in contrast to the fragmented pockets of population in other regions), and growth has apparently resulted in scale

TABLE 2.

Alaska Population by Region: 1960 and 1970

	Population		Change	Distribution	
	1960	1970	1960-70	1960	1970
Alaska	226,167	302,173	33.6%	100.0%	100.0%
Southeast	35,403	42,565	20.2	15.7	14.1
Southcentral	108,851	163,792	50.5	48.1	54.2
Southwest	21,001	26,491	12.6	9.3	8.8
Interior	49,128	56,479	15.0	21.7	18.7
North	11,784	12,846	9.0	5.2	4.2

SOURCE: 1960 data from Rogers, George W. and Richard A. Cooley, *Alaska's Population and Economy—Volume II*, University of Alaska, Institute of Social, Economic and Government Research, 1963. 1970 data from U.S. Department of the Census, *1970 Census of Population*, PC(VI)-3, Advance Report—Alaska, December 1970.

TABLE 3.

Sawmills in Alaska by Region—1968[a]

	Southeast	Southcentral	Interior	Southwest	Total
Active Mills	11	15	9	9	44
Japanese trade[b]	5	1	--	--	6
Local trade	6	14	9	9	38
Inactive Mills	8	22	14	5	49
Total Mills	19	27	23	14	93
		Mill Sales			
Over 4,000	5	1	--	--	6
1,000 to 4,000	2	3	1	--	6
400 to 1,000	--	1	--	--	1
100 to 400	3	3	1	1	8
Less than 100	1	7	7	8	23

[a]Existing mills, excluding houselog and shingle mills.

[b]Mills shipping over 80 per cent of output to Japan.

economies to the carriers, as well as making it possible for customers to utilize cheaper carload rates. (According to one shipper, it costs an average of about $16 more per ton to ship lumber from outside to Juneau than it does to Anchorage.)

By 1968, there were no lumber shipments to other Alaska markets from Southeastern, which had formerly supplied a sizeable proportion of the lumber needs to the Southcentral and Interior regions. Mr. John Daly, the manager of the Ketchikan Spruce Mills, testifying in 1968 before a committee of the U.S. Senate, stated:

> My company operates three sales yards in Alaska and we import lumber from Oregon and Washington for resale because our sawmill cannot meet the price . . . (in 1966) I told my yard managers that they were to sell lumber to make a profit . . . Since that day, our sawmill has not sold a stick of lumber to any of these yards.

The decline of in-state lumber sales by Southeastern manufacturers was primarily a reflection of the loss of the railbelt market and of a shift of some mills to almost total concentration of foreign markets. Yet even sales within the Southeastern region were lost by manufacturers there. In 1961, Southeastern mills sold 7.21 MMBM in the market area within 100 miles of each mill; by 1968, their sales to the total Southeast market had declined to 4.75 MMBM (Table 1). In-state sales of Southcentral mills declined from 9.68 MMBM in 1961 to 6.90 MMBM in 1968, again reflecting the increased economies of scale and resulting lower costs of transportation along the railbelt. The Interior region, however, increased in-state sales by about 60 per cent, going from 1.06 MMBM in 1961 to 1.70 MMBM in 1968, and the Southwest region also registered an increase, though slight, going from 0.42 MMBM in 1961 to 0.55 MMBM in 1968. Shipments from the Interior to the North Slope, in conjunction with exploratory activity of the petroleum industry, which began in 1968 (and intensified in 1969), accounted for much of the increase in Interior sales.

ALASKA MILL CHARACTERISTICS

In 1968, there were 93 lumber mills in Alaska, exclusive of those producing only house logs or shingles (see Table 3). Of these, 44 were active and 49 were inactive. Many of the inactive mills exist only to provide lumber for the owner's (or for village) con-

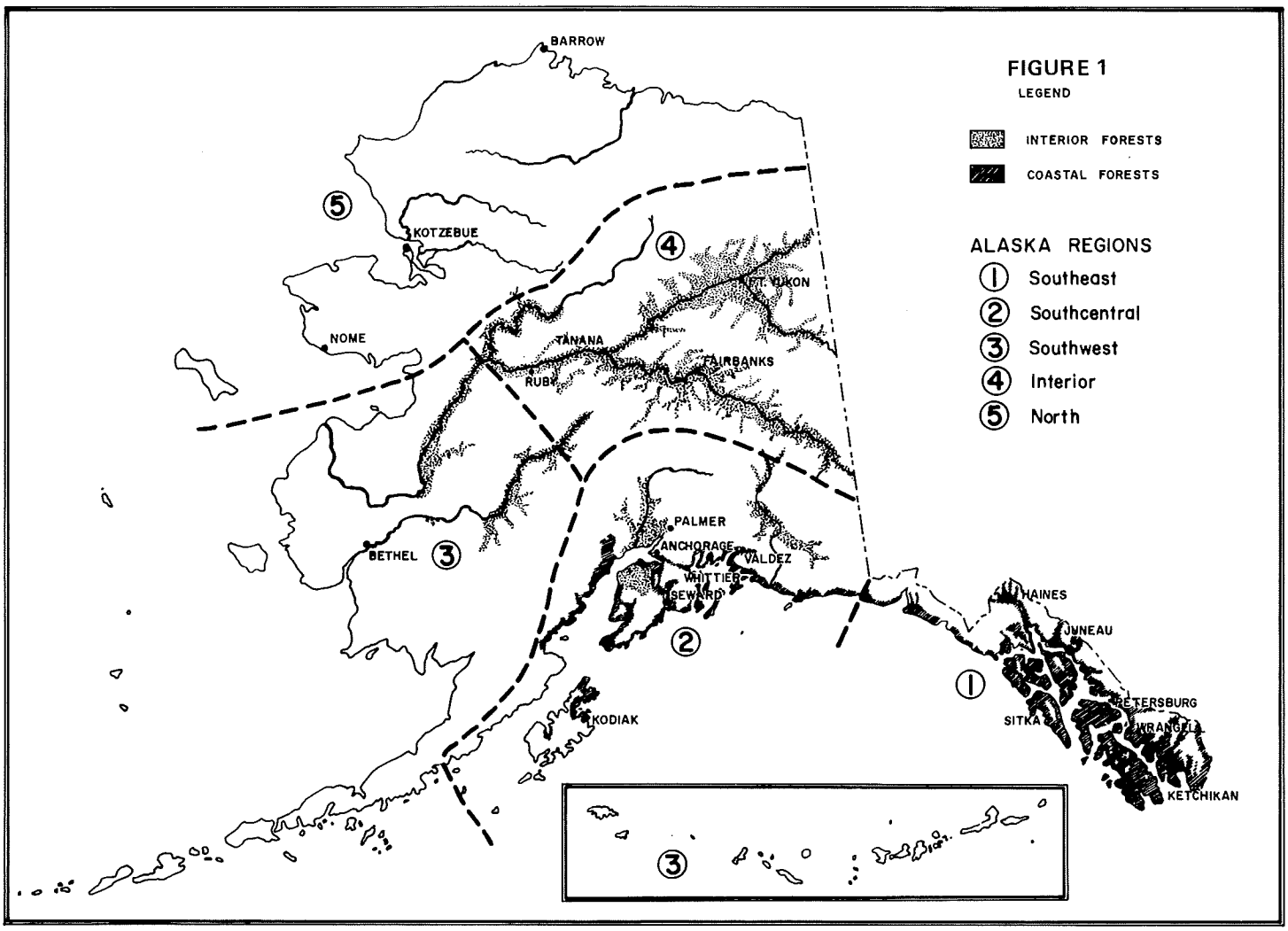
sumption and are operated only sporadically. To a large degree, the inactive mills are not potential entrants into the state's lumber markets.

Only six of the active mills, five in Southeast and one in Southcentral, had sales of over four MMBM per year. These six mills were engaged chiefly in the foreign export trade, but four of them reported sales to the state of Washington. Because lumber exports are of semi-processed materials ranging from rough-sawn timbers (squares) to cants (slabbed logs) and differ markedly from the locally demanded product, only two of the six large mills made significant local sales in 1968.

The next layer of mill size, with annual sales of from one-to-four MMBM, of which there also are six, probably represents the margin of successful commercial operations for Alaska. Although some owners of the remaining 32 smaller mills may derive a major portion of their income from sawmilling, most operate their mills only on a part-time basis, and engage in construction, storekeeping, farming, or other activities for a livelihood. Eight mills in the two largest class sizes sold approximately 79 per cent of the locally produced lumber used in Alaska during 1968.

USER EVALUATION OF ALASKA LUMBER

In an effort to determine the prevailing sentiment of Alaska wood users and dealers regarding the utility of locally produced lumber, questionnaires were sent in December 1970 to building contractors and building supply dealers in Anchorage, Kenai, Palmer, Fairbanks, Juneau, Ketchikan, and Sitka. (Usable returns were obtained from 19 of 48 dealers and from 22 of 46 builders to whom the questionnaires had been sent, a response rate of 40 and 48 per cent,



respectively.) Follow-up interviews were subsequently arranged in selected instances in order to fully assess the overall impression of local spruce as a construction material.

Disadvantages:

Alaska building contractors and building materials dealers were asked: "In your view, what are the relative disadvantages of local spruce compared to competing species which are provided from outside?" Their answers are summarized in Table 4.

Lack of seasoning (and/or seasoning defects, i.e., warp and twist) was mentioned by 84 per cent of the contractors and 75 per cent of the dealers as a major factor limiting the wider use of local lumber. (A respondent who said both that native lumber was poorly dried and was subject to warpage was only counted once in calculating these proportions to avoid double-counting.) Comments regarding this problem include:

> Will twist and warp after installation. Most work is to government specifications. Cannot afford the chance of warp after installation (Anchorage contractor).
>
> Is not stable when drying (Fairbanks dealer).
>
> You cannot use lumber with a moisture content of 19 per cent or more in any FHA housing (Anchorage building component manufacturer).
>
> Apt to twist and shrink when dry; at present it is not even available in Kenai except on special order (Kenai builder).

Warping is apparently less of a problem with Southeastern region lumber than with that found in Interior and Southcentral Alaska. Some railbelt builders thought that the Southeastern spruce lumber they formerly used was as good as what they now receive from the Pacific Northwest. Some Southeastern users thought that green spruce was satisfactory if properly handled (i.e., if structures framed with green lumber are allowed to dry before the application of siding). On the other hand, many complaints about Sitka spruce are similar to those expressed by the users of white spruce in the Interior area.

Another major source of prejudice against the local product can be traced to manufacturing practices within the mill. The chief item in this category is lack of quality control (i.e., inaccurate sawing, which produces boards too thick, too thin, and overly long or short), resulting in a product that is more costly to build with. A related complaint expressed by almost one-third of both the contractor and dealer groups is that the unavailability of graded lumber (in some cases, stress graded lumber), or inconsistent grading, limited their acceptance of local lumber. Some comments falling in this category are:

> Unreliable—poor milling, drying, and grading (Fairbanks builder).
>
> Often produced oversize (Anchorage distributor).
>
> Not kiln-dried is only problem if grade stamped; if not grade stamped, not accepted by FHA (Juneau building supply dealer).
>
> I once used a greater portion of local spruce so got to know it quite well. I *would* like to use this local product more but yet I have to keep our quality of building up. In the manufacture of the lumber, it must be produced to the same exacting standards that we expect from stateside lumber (Kenai builder).
>
> Grading is very lax (Homer building supply dealer).
>
> Spruce we are able to purchase on today's market is very poor. That coming out of . . . (Southcentral coastal producer) is poorly manufactured and is not dried to any established moisture content. Sizing makes use for

TABLE 4.

Disadvantages of Local Spruce Lumber As Perceived by Building Contractors and Building Supply Dealers

	Percentage Response	
	Dealers	Contractors
Not kiln dried or poorly dried	62	53
General availability	50	26
Lumber not graded or inadequately graded	31	32
Quality control in manufacture	31	26
Price not competitive	25	--
Lumber warps and twists	19	37
FHA or architect specify fir	13	5
Strength or hardness	13	21
More costly to build with	6	11
Overly knotty	--	11
Decay resistance	--	5
Treated lumber not available	--	5
No disadvantage cited	--	5

primary framing impossible (Anchorage building contractor).

I figure the price differential wasn't great enough ($20-to-$40 per M) to warrant the extra trouble (Kenai builder).

The lack of reliable availability is perceived as a limiting factor by one-half of the dealers and one-quarter of the builders. The concept of availability is closely related to the quality considerations already discussed—that is, the *type* of lumber that was desired was not locally available. In some cases, the respondents indicated that local lumber of any type was unavailable.

Have not been able to secure a source of Alaska spruce or hemlock. Most of what is produced in S.E. Alaska is for export markets only (Juneau building supply dealer).

The problems associated with white spruce and Sitka spruce lumber develop simply because we are unable to get it. From our experience we know there are very few mills that are running framing lumber of the type we need (Fairbanks building supply dealer).

Limited production capabilities of local sources (Anchorage building supply dealer).

Normally only available in rough and green condition (Kenai builder).

Not always available (Homer contractor).

Of the dealers, 25 per cent stated that the local product was not competitive pricewise with outside lumber; contractors did not directly mention price, although some felt that the price differential was not adequate to make up for the higher cost of building with the locally available product. Also, it is apparently more difficult for dealers to sell native lumber. One Anchorage dealer stated that "surfaced spruce is too close to Douglas-fir in price to have to convince each customer that a grade stamp is not needed, or that local lumber, grade-stamped, does meet Federal Housing Administration (FHA) standards."

FHA or architect specification of Douglas-fir lumber limited the use of spruce, according to 13 per cent of the dealers and 5 per cent of the contractors. A number of others noted that the FHA regulations preclude use of local lumber because it is not graded by a certified grader.

Only a small minority of the respondents specifically mentioned the physical characteristics of the spruce wood itself (aside from a tendency to warp—a seasoning defect) as being a limitation of its use. Low strength and softness of spruce, compared to Douglas-fir, was thought to be a disadvantage by 13 per cent of the dealers and 21 per cent of the builders. Softness limits the use of spruce in applications where it is subject to crushing. Softness also adversely affects nail-holding ability. Some of the problem of nail loosening can be avoided if the lumber is properly dried before it is nailed. In addition, the strength of any wood increases when it is dry.

As a structural material, spruce is somewhat weaker than Douglas-fir. Some spans can be achieved only by using larger dimension spruce than would be the case if Douglas-fir were used. For example, 2 x 10 construction grade, Douglas-fir floor joists can span a 17-foot reach; to do the same job with spruce requires use of 2 x 12 lumber—a requirement of 20 per cent more wood (Table 5). In many applications, however, the strength differential between spruce and Douglas-fir will not be a limiting factor.

Of the contractors, 11 per cent stated that the spruce lumber available was overly knotty. This is characteristic of the species, especially in the case of white spruce, but the problem is also related to the deficiencies in grading and drying practices. For example, consider the following two statements, both by Anchorage contractors:

So many knots that pieces will twist and curl badly.

The knots (are the major disadvantage); one knot in a stud will create a bump in the wall, sometimes after sheetrock is installed.

In each of these cases, the characteristic expressed (knots) was given as the limiting factor, whereas the probable (or at least a contributing) cause of dissatisfaction was inadequate seasoning.

Advantages:

The building contractors were asked to enumerate the advantages of using the available local spruce (Table 6). In assessing the virtues of native lumber, it is apparent that an element of contradiction was introduced, which presumably depended upon the value judgments of the respondents.

TABLE 5.

Span Tables for Floor Joists and Rafters by Species and Grades[a]

Species (grading agency)	Floor Joists			Rafters		
Grade	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10
Coast Douglas-Fir (WCLIB)						
Construction	14' 0"	17' 0"	19' 8"	14' 0"	18' 4"	21'10"
Standard	14' 0"	17' 0"	19' 3"	12'10"	17' 6"	21'10"
Utility	10' 8"	14' 8"	17' 0"	8' 4"	12' 4"	16'10"
Rocky Mountain Douglas-Fir (WPA)						
Structural	11'10"	15' 0"	17' 4"	12' 4"	16' 8"	20' 4"
Standard Structural	11' 8"	14'10"	17' 4"	11' 2"	15' 2"	19' 2"
No. 1 Dimension	11' 4"	15' 0"	17' 4"	10' 6"	14' 8"	19' 8"
No. 2 Dimension	8' 8"	12' 2"	15' 4"	8' 4"	11' 4"	15' 8"
Western Hemlock (WCLIB)						
Construction	12' 6"	15' 8"	18' 0"	13' 8"	17' 8"	21' 2"
Standard	12' 6"	15' 8"	18' 0"	12' 6"	17' 2"	21' 2"
Utility	9' 6"	13' 0"	15' 4"	8' 4"	12' 4"	16'10"
Engelman Spruce (WPA)						
No. 1 Dimension	9' 6"	12' 8"	16' 4"	8' 8"	12' 4"	16' 4"
No. 2 Dimension	7' 4"	9'10"	12' 8"	6'10"	9' 6"	12'10"
Eastern Spruce (NELMA)						
Select	11'10"	15' 0"	17' 4"	13' 0"	17' 0"	20' 4"
No. 1 Dimension	11'10"	15' 0"	17' 4"	11' 2"	16' 4"	20' 4"
Sitka Spruce (WCLIB)						
Construction	11'10"	15' 0"	17' 4"	11' 2"	16' 4"	20' 4"
Standard	10' 0"	13' 0"	17' 0"	8' 8"	12'10"	16'10"
Utility	7'10"	11' 0"	12' 8"	6'10"	10' 0"	14' 4"
White Fir (WCLA)						
Construction	11' 6"	14' 8"	17' 0"	11' 2"	16' 4"	19'10"
Standard	10' 0"	13' 0"	17' 0"	8' 8"	12'10"	16'10"
Utility	7'10"	11' 0"	12' 8"	6'10"	10' 0"	14' 4"
Western Pine (WPA)						
No. 1 Dimension	10' 4"	14' 0"	16' 6"	9' 6"	13' 4"	18' 0"
No. 2 Dimension	7'10"	11' 0"	14' 0"	7' 4"	10' 0"	14' 4"

[a]Spans relate to a spacing of joists and rafters of 16 inches. Floor joists are for 40 pounds live load per square foot; rafter spans are for roofs with slope greater than three inches per 12 inches of run and using heavy roofing weighing more than four pounds per square foot.

SOURCE: Federal Housing Administration, *Minimum Property Standards for One and Two Living Units*, May 1963.

Cost and availability were given as the primary advantage of the local product. In some cases, the respondents "hedged" concerning availability, stating that the product was "usually available" or "sometimes available." The local availability of large dimensions also was considered an advantage by some contractors. "Toughness," determined to mean that spruce does not split as easily when nailed as competing species, was cited by 16 per cent of the builders. Ease of nailing was mentioned as an advantage by 11 per cent of the building contractors, as was the light weight of spruce.

It is noteworthy that contractors were more prone to enumerate the disadvantages rather than the advantages of the available local product. In addition, one-fifth of the contractors stated explicitly that there was *no advantage* associated with the use of local lumber, while another one-tenth did not mention any advantage.

TABLE 6.

Advantages of Local Spruce As Stated by Building Contractors

	Per Cent
Cost	37
Availability	21
Does not split as readily as fir	16
Lightweight	11
Ease of nailing	11
Availability of large dimension timbers	11
Durability (for septic tank cribbing)	5
No advantages	21
No advantage cited	11

PROSPECTS FOR THE FUTURE

It is apparent that the Alaska lumber producer must improve his manufacturing practices if he is to compete with suppliers from other regions. The shoddy practices of the past will aggravate the problems faced by the local lumberman who is trying to recapture a substantial portion of the market; in short, the previous unsatisfactory performance of the local lumber will make the marketing of even a well-manufactured product difficult.

Foremost among the requirements that the local producer must meet is that the lumber produced must be accurately manufactured and consistently dried and graded. In order for new construction to qualify for funding under the FHA, the lumber used must be dried to a moisture content below 19 per cent. This standard can be met through either air or kiln drying, but in the consumer's view, the kiln-dried product is superior. Drying must be coupled with general quality control in manufacture. To achieve this goal the lumberman must consciously strive for accuracy, and he must have equipment that is capable of producing accurately dimensioned lumber.

The major deficiencies of the lumber locally available are rectifiable. The comment of a major Anchorage area builder illustrates both the current situation and the potential:

> We have (in the past) purchased a first-class spruce product from Canada which was utilized for joists, studs, all primary framing and bevel siding . . . Alaska spruce probably could never catch up with the demand if its quality came anywhere comparable to that of the Canadian product. I feel that a primary industry is being bypassed due to lack of technology, or poor management and sale conditions.

An Anchorage dealer similarly noted:

> As I presently would diagnose this situation, it is not a fault of the product but more the lack of capital and facilities in the mills attempting to promote spruce lumber. For example, it is impossible for us to merchandise spruce lumber unless it is grade stamped. Neither FHA nor commercial jobs being supervised by an architectural firm will accept non-graded materials. I know of no mill presently cutting spruce lumber which employs a certified grader. Perhaps this is a matter of economy as well as the availability of such an individual.

White spruce is the primary lumber species of eastern Canada, and it has made inroads into the markets of the eastern U.S. In the Boston to Baltimore market area, spruce (both eastern and western) has captured about 25 per cent of the market. Spruce, along with white fir and west coast hemlock, accounts for 48 per cent of lumber use in this metropolitan area; only 22 per cent of the consumption is Douglas-fir.

Building supply dealers who were contacted in our survey indicated that well-manufactured spruce could capture about 60 per cent of the Alaska lumber market if priced competitively (see Table 7). (One dealer thought that Alaska lumber could capture no more than 30 per cent of the market because he understood that "FHA-financed building calls for

[Douglas] fir dimension lumber." This is a common misconception. At the other extreme another dealer said that "if Sitka spruce can carry a premium price on the West Coast, we should be able to do *all* our building here with native lumber.") The average price differential necessary to market spruce was stated to be about $22.00 per MBM below that for Douglas-fir. Builders, on the other hand, felt that the price differential would have to be about $32.00 per MBM. Too much, however, should not be inferred from these stated differentials, because in their answer the respondents were required to evaluate a product currently available (well-manufactured, kiln-dried Douglas-fir) with one only potentially available (comparable grades of spruce lumber). The necessary transition was apparently difficult to make and is hinted at by some of the statements made in the completed questionnaires. The following two replies illustrate this difficulty:

> Comparable grades of spruce are not always obtainable.
>
> An appropriate differential (would be) $50.00; actually I can handle fir for less because of loss due to grading and warpage in the spruce.

The proper price differential can only be guessed at; however, the existing prices for random width standard and better grades of white fir (a species with much the same properties as spruce) has averaged $9.83 per MBM less than those for comparable Douglas-fir grades over the 1965-to-1970 period. An average differential of about $10.00 per MBM thus appears to be an appropriate expectation for spruce. This differential probably will vary according to the dimensions of the product. Items such as boards and 2 x 4's may command a price only slightly less than Douglas-fir, but wider widths of dimension lumber will probably require enough of a price differential to compensate for the differences in strength between the two species.

The major advantage possessed by the Alaska lumber producer is the freight charge on incoming lumber. These charges add about $40.00 per MBM to the Seattle lumber price for shipments to Anchorage and upward of $50.00 for Fairbanks shipments. Ocean freight charges for one carrier serving various Alaska ports averaged $41.43 per ton (about $46.60 per MBM) for Seattle to Juneau shipments, $39.79 per ton ($44.75 per MBM) for Ketchikan shipments, and $79.51 per ton ($89.45 per MBM) for shipments to Bethel.

The question remains of why the relatively high transport cost umbrella has not encouraged the types of investment that would make the local lumber more competitive with imported lumber. A number of answers to this question can be advanced, but the foremost constraining factors appear to be the limited size of the market available to an individual producer and uncertainty regarding potential sales to this market.

TABLE 7.

Proportion of Alaska Market that Well-Manufactured Spruce Lumber Might Command and Appropriate Price Differential Required (Replies of Lumber Dealers)

Proportion of Market (by class)	Responses	Price Differential — $ Per MBM: Individual Responses	Price Differential — $ Per MBM: Class Average
10%	1	($17.50)	$17.50
25-40%	2	($25.00, $50.00)	37.50
40-50%	4	($7.50, $20.00, $30.00, $42.50)	25.00
65%	1	($50.00)	50.00
80-85%	4	($7.50, $20.00, $25.00, $30.00)	20.63
90-100%	5	($0, $0, $0, $10.00, $50.00)	12.00
	17	TOTAL AVERAGE PRICE DIFFERENTIAL —	$22.25

TABLE 8.

Monthly Distribution of Lumber Shipments To and Within Alaska

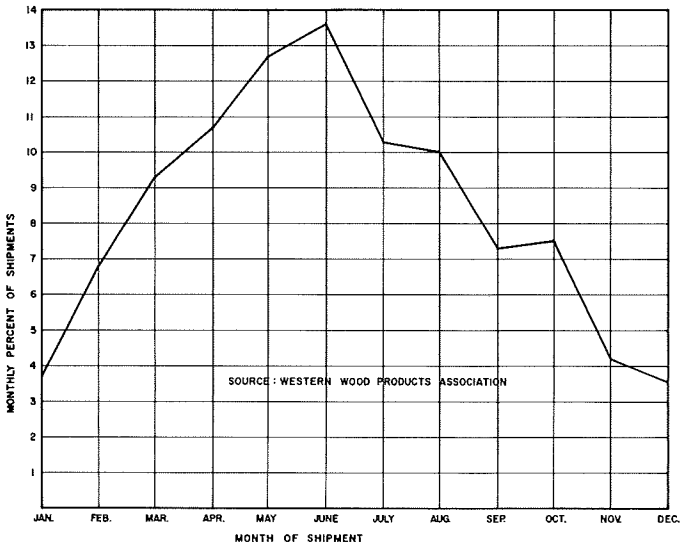
Month	Western U.S. Shipments		Alaska Railroad Shipments, 1968		
	1967-70	1968	Total	To Anchorage	To Fairbanks
January	3.7%	1.3%	2.1%	2.1%	2.4%
February	6.8	4.2	2.4	2.5	0.8
March	9.3	12.4	6.4	7.5	4.8
April	10.7	12.4	9.6	9.6	10.5
May	12.7	13.4	11.2	11.4	8.3
June	13.6	9.5	15.1	15.3	14.1
July	10.4	10.6	10.8	10.3	12.2
August	10.0	6.9	7.6	5.7	13.4
September	7.4	12.4	8.7	8.1	11.2
October	7.5	9.2	9.0	10.2	7.4
November	4.3	4.3	11.7	12.1	8.4
December	3.6	3.4	5.4	5.2	6.5
ALL SHIPMENTS	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: Western U.S. shipments from Western Wood Products Association. Alaska Railroad distribution based on data on file at Traffic Agents Office, Anchorage.

No single production site in Alaska can economically serve the entire area of the state because of weak transport linkages between, and within, regions (the only exception is the railbelt area of the Interior and Southcentral regions, which are connected by rail and highway). In addition, the present reputation of the locally produced lumber hinders the potential expansion of the industry, while the uncertainty regarding the acceptance of a well-manufactured local product inhibits investment in, and financing by lending agencies of, an optimum scale of operation (see box).

The seasonality of lumber demand is also a perverse element facing the Alaska lumber producer. Reflecting this variation, between 1967 and 1970, 67 per cent of the lumber shipped to Alaska from the western U.S. was shipped in the six-month, March-to-August period. Only 18 per cent was shipped in the four winter months of November, December, January, and February (see Figure 2 and Table 8). Faced with this demand variation, a mill will probably

FIGURE 2



MOBILE AND MODULAR HOUSING IN ALASKA

Most mobile homes are not designed for the severe climatic conditions found in the arctic and subarctic regions. Thus, they may be less than satisfactory for winter life in many parts of Alaska. David Schaefer (*The Northern Engineer*, "Mobile and Modular Homes for Cold Regions," Vol. 3, No. 1, Spring 1971, pp. 4-6.) notes several deficiencies of mobile homes under arctic conditions:

1. "The maximum insulating quality [of typical mobile home wall construction] is R=10,* with most mobile homes having an R=5 insulating factor. In Interior Alaska . . . it is almost mandatory that walls have at least an R factor of 15. Four inches of fibergalss insulation give an R=16 insulating factor."

   Furthermore, mobile homes generally do not have vapor barriers on the interior side of the walls, leading to condensation of moisture within the wall itself, further reducing the insulation value of the wall.

2. Design criteria for snow and wind loads in much of Alaska call for a 30 pound per square foot (p.s.f.) loading; the Mobile Home Manufacturers Association Code recommends a roof truss design of only 20 p.s.f.

3. The heating systems available for mobile homes are inadequate for comfort during the typical Interior Alaska winter (a deficiency exacerbated by insufficient insulation). Overworking of the furnace under these conditions increases the fire hazard, which is already high in the typical mobile home design.

In recognition of the special conditions found in Alaska, an act establishing official state mobile home standards was passed by the Alaska State Legislature in 1971. The act specifies that mobile homes sold in Alaska after September 1, 1971 must have roofs able to withstand a minimum 30 pound per square foot live load and have the following minimum insulation:

Wall—	R = 11.0
Ceiling—	R = 19.0
Floor—	R = 7.0

Modular units appear to be an attractive housing alternative in Alaska. This type of construction has been used extensively in North Slope oil operations, and at the present time, the University of Alaska is constructing 96 modular units near Fairbanks, which are to be used for faculty housing.

A plant for manufacturing modular and mobile housing has recently started in Palmer, Alaska. Successful operation of this plant in Alaska depends upon service and transport cost advantages to offset the higher operating costs in Alaska. A local plant may be able to maintain a closer relationship with customers than one located in the "lower 48," and since its market is largely limited to Alaska, it should be more responsive to the specific requirements of the Alaska consumer. For example, the Palmer plant now sells mobile units with four inches of insulation; these are advertised to be the only mobile homes manufactured in the U.S. with this feature.

The chief factor favoring a fabrication location closer to the Alaska market is that shipment of finished modular units is a more costly proposition than shipment of the raw materials used in assembling the unit. For example, the shipment of one 60-foot-long unit (containing approximately 720 square feet of floor area) from Seattle to Anchorage costs $1,703.70. About 43 MBM of lumber, enough to build more than four standard single family houses with an average of 1,392 square feet of floor area, could be shipped for the same cost.

If successful, the Palmer facility may eventually provide a substantial outlet for Alaska-produced lumber.

*The "R" factor is an index of thermal resistance defined as the reciprocal of overall thermal conductance (U), where U is the number of BTU's that will flow, air-to-air, through one square foot of a structure in one hour at a temperature difference of one degree F. For example, if there were 0.1 BTU flow per hour through a wall separating air of one degree F. temperature difference, then R = 1/U = 1/0.10 = 10.

operate fewer days and carry a larger inventory than would be the case if demand were less fluctuating.

For new construction to qualify for FHA underwriting, all softwood boards and framing lumber used should be graded by a recognized grading association and be identified with a grading mark. Moisture content of lumber shall not exceed 19 per cent at the time of installation, according to the FHA specifications. Within these provisions, "all species of softwood framing lumber may be used for floor, ceiling, and roof framing subject to the maximum allowable spans for the particular species, grade, and use." No specific species prohibition is contained in the FHA standards.

A more stringent restriction to the use of Alaska lumber in local construction is posed by the specification by architects of Douglas-fir lumber in their plans. This exclusion of all other species even extends to contracts let by the State of Alaska. The Alaska State Housing Authority (ASHA) recently purchased lumber for over 300 units of village housing; in seeking bids for the lumber to be used, ASHA specified that the product supplied must be Douglas-fir.

Regardless of the difficulties outlined here, a positive opportunity exists for the Alaska lumber industry to expand its share of the state's market. The primary requirement for market enlargement is a dependable source of acceptable lumber; the major defects of native lumber are rectifiable.

Conditions for expansion are most evident in the railbelt area. A first step in this direction has been taken by two firms that have recently installed dry kilns and remanufacturing facilities. The next phase will be to install a modern mill capable of realizing significant economies of scale (one with an annual production of about 10-to-20 MMBM per year). This investment will probably be delayed until the uncertainties of market acceptance are settled.

A POSSIBLE IMPROVEMENT

The chipper headrig is an example of the type of equipment that may have promise in Alaska. Originally designed to utilize small logs, some of the new models can process logs of up to 24 inches diameter. The chipper headrig is characterized by very high per man hour productivity; in one study, using logs from 6-to-14 inches small-end diameter, productivity was 3-to-7 times greater than band mills. The high rate of output is the major limitation to acceptance of this machinery in Alaska. In order to adequately amortize the investment in this machinery, a minimum yearly output upwards of 10 MMBM would probably be required. Only the Railbelt market can conceivably support this level of output, although some combination of local and export markets might make a location in the Southwestern region feasible.

APPENDIX

A NOTE ON METHODOLOGY

The total size of the Alaska market for lumber is somewhat difficult to determine. A report by Arthur D. Little, Inc.[1] indicates that in 1957 "an estimated 100 MMBM of lumber products were used in the state; 60 million produced locally and 40 million imported." Bones accepted this estimate of total consumption (even though his data indicated that 1961 use of Alaska lumber was less than one-half of the Little estimate) and further stated, "Undoubtedly, this consumption (100 MMBM) increased in the period 1957 to 1961."[2] By contrast, in the *Alaska Highway Study* it was estimated that in 1961 approximately 44 MMBM of lumber was supplied Alaska from the conterminous states and 4 MMBM were imported from Canada.[3] Addition of Alaska production gives an estimated 1961 Alaska lumber consumption of about 74 MMBM. Even this lesser figure apparently over-estimates lumber consumption.

The compilers of the *Alaska Highway Study* arrived at their lumber consumption estimates in the following manner (*Highway Study*, p. 41.):

> In 1961, about 55,000 tons of posts, lumber, plywood, ties, and miscellaneous manufactured lumber products were received at Alaskan ports. Assuming an average of 2,500 pounds per 1,000 board feet, wood products imported into Alaska from the conterminous United States totaled approximately 44 million board feet.

[1] Arthur D. Little, Inc., *Alaska's Forest Resources as a Base for Industrial Development*, report to the State of Alaska, C-62998, 1961.

[2] Bones, James T., "Wood Processing in Alaska—1961," p. 6. U.S. Forest Service Resource Bulletin NOR-1, 14 pp., Juneau, Alaska, 1963.

[3] U.S. Department of Commerce, Bureau of Public Roads, *Alaska Highway Study*, 1965 (prepared by Transportation Consultants, Inc. and Wilbur Smith and Associates).

TABLE A-1.

Lumber Shipments at Alaska Ports 1961
(Short Tons)

Ports by Region	Total	FOREIGN		DOMESTIC				
				Coastwise		Internal		
		Imports	Exports	Receipt	Ship.	Receipt.	Ship.	Local
Southeast								
Ketchikan	9,306	--	--	828	8,468	--	10	--
Wrangell	53,134	--	52,925	36	165	--	8	--
Petersburg	2,042	--	--	331	1,707	--	4	--
Sitka	1,047	--	--	1,047	--	--	--	--
Juneau	9,566	--	123	1,303	8,132	8	--	--
Skagway	135	100	--	27	--	--	--	--
Southcentral								
Anchorage	10,580	--	--	10,580	--	--	--	--
Cordova	453	--	--	453	--	--	--	--
Valdez	1,233	--	--	1,233	--	--	--	--
Seward	14,699	--	--	14,663	36	--	--	--
Homer	71	--	--	71	--	--	--	--
Whittier	900	--	--	900	--	--	--	--
Kodiak	78	--	--	78	--	--	--	--
Southwest								
Naknek River	1,418	--	--	1,418	--	--	--	--
Northwest								
Nome	1,210	--	--	605	--	--	--	605
Total		100	53,048	33,573	18,508	8	22	605
Other Ports[a]								
Metlakatla	69							
Other S.E.	2,813							
Seldovia	141							
Prince Wm. Sound	13							
Alaska Peninsula	2,275							
Dillingham	23							
Aleutian Is.	91							
Pribilof Is.	71							
Bering Sea	2,035							
Yukon River	654							

[a]Types of shipment not specified.

SOURCE: U.S. Army, Corps of Engineers, *1961 Waterborne Commerce of the United States.*

It is evident that the *Highway Study* estimate of wood products shipments includes nonlumber commodities, such as posts and plywood. In addition, some portion of the receipts in Alaska ports was shipped from Alaska and not imported from the conterminous states.

The 1961 edition of *Waterborne Commerce of the United States*, published by the U.S. Army Corps of Engineers, indicates that 33,573 tons of lumber and shingles were recorded as received in coastwise shipments at Alaska ports[4] (see Table A-1). Lumber and shingle traffic at ports where a classification into receipts and shipments was not made totaled 8,185 tons, of which 2,813 tons were for "other southeast Alaska ports," 654 tons were shipped on the Yukon River, and 4,718 tons were either shipped or received at other Alaska ports primarily in the North and Southwest regions. As an approximation of the 1961 Alaska receipts of lumber, we can make the following calculations:[5]

	33,573	tons	Alaska coastwise receipts
plus	8,185	tons	unclassified transactions
	41,758	tons	
less	2,813	tons	unclassified Southeast Alaska
less	654	tons	unclassified Yukon River
	38,291	tons	received coastwise in Alaska

The problem of accounting for intra-Alaska shipments remains. Coastwise 1961 shipments for Ketchikan, Wrangell, Petersburg, and Juneau amount to 18,472 tons. Using the production data from the 1961 survey of lumber producers, it was possible to determine that about 53 per cent or 9,790 tons of total coastwise shipments from these four Southeast Alaska ports represents intrastate transactions.[6] Reducing the total estimated Alaska lumber receipts by this figure yields an estimate of the 1961 shipment of lumber from the "Lower 48" of 28,501 tons or about 25.3 MMBM. (The factor used to convert tons into board feet was 1 MBM = 2,250 pounds = 1.125 tons. See Table A-2 for some representative weights of lumber.)

Our estimate is, therefore, that 1961 Alaska lumber consumption was about 55 MMBM.[7] Alaska producers supplied approximately 46 per cent of this market.

By 1968, the bulk of the lumber used in Alaska was produced outside of the state and shipped in by water. It might be presumed that the Corps of Engineers' *Waterborne Commerce of the United States* should have adequately recorded this movement[8] (see Table A-3). Unfortunately, this is not the case.

[4]Coastwise shipments are defined as domestic traffic receiving carriage over the ocean or the Gulf of Mexico and internal shipments refer to traffic between ports wherein the entire movement takes place on inland waterways. Shipments between points on the Inland Passage in Southeast Alaska are considered to be internal; those between Southeast Alaska and the rest of Alaska, coastwise.

[5]Unclassified Southeast Alaska tonnage was subtracted because it was assumed that this tonnage largely represents shipment of cants from Haines to Japan; Yukon River tonnage will have already been counted as either landed at some other port or produced in Alaska. The residual sum was assumed to represent receipts because the remainder of unclassified traffic involved ports where lumber probably did not originate.

[6]It is assumed that Southeast Alaska shipments of less than 100 miles are shown as internal shipments and that shipments from Haines to Alaska markets were by overland means.

[7]This estimate may be shocking to some readers in view of the higher estimates made by other writers. By comparison, 1961 U.S. per capita consumption of lumber was 193 board feet (U.S. Forest Service, *Timber Trends in the United States*, Forest Resource Report No. 17, Washington, D.C., 1965). Based on an estimated 1961 Alaska population of 235,000 persons, Alaska's proportionate share of national lumber consumption would have amounted to about 45 MMBM. The Highway Study estimate pegged per capita Alaska lumber consumption at about 164 per cent of the national average, while that of A.D. Little assumes that the Alaska rate of consumption is more than twice the national average.

[8]*Waterborne Commerce* data were accepted as suitable measures of lumber shipments to Hawaii (Harpole, George B., "Wood Products in Hawaii—Consumption, Production and Trade," Forest Service Research Note, PSW-198, 5 pp., 1969).

TABLE A-2.

Representative Weights of Lumber Products

	Seasoned	Unseasoned
	(pounds per MBM)	
Coast Douglas-Fir, Hemlock, and White Fir		
2 x 4	2,200	2,500
2 x 10 and wider	2,300	2,600
1 x 8 (¾" thickness finished)	2,100	2,400
Coast Western Red Cedar		
rough 1" lumber	2,100	3,000
1" clears	1,650	
Inland Pine, Engelmann Spruce and White Fir		
1-5/8" dimension	2,000	
1-¾" dimension	2,200	
planks and timbers	2,200	
Inland Douglas Fir—Larch		
2 x 4 and 2 x 6	2,200	2,800
2 x 8	2,250	2,850
2 x 10 and 2 x 12	2,300	2,900
1" lumber	2,200	2,800

NOTE: Unless otherwise specified, all weights are for lumber that is surfaced four sides.

SOURCE: "Terms and Conditions of Quotation and Sale," Western Wood Products Association.

The Corps of Engineers statistics are, at best, subject to errors of omission; for example, fishing boats traveling to Alaska are known to have carried lumber, which probably is not recorded in the statistical compilations, and data is not always available for all ports. This problem pales, however, when compared to the difficulty posed by containerization. Shipments that have been containerized may not be fully recorded by commodity, but rather are sometimes put in a catchall category, "not elsewhere classified."

To illustrate the problem, consider the case of lumber receipts at Whittier. Whittier, a port on Prince William Sound, is unique inasmuch as the only land access to the port is via the Alaska Railroad. Except for minor local shipments not utilizing rail facilities, all shipments to Whittier must be moved on the railroad; therefore, the data from the Alaska Railroad and *Waterborne Commerce* should closely match. The 1968 *Waterborne Commerce* data indicate that the total volume of lumber receipts at Whittier was 269 tons. The Alaska Railroad, however, moved 29,396 tons of lumber interline from Whittier. Seward, serviced by both rail and highway, has *Waterborne Commerce* receipts of 2,851 tons and interline railroad shipments of 3,163 tons. Anchorage receipts, according to *Waterborne Commerce*, are 2,045 tons, but a single major carrier shipped in slightly more than this tonnage in 1968.

The figures in Table A-4 sum up recorded coastwise receipts of lumber in Alaska.

The figures for the Southcentral and Southwest regions are believed to be fairly accurate (within 10 per cent). The receipts data for the Southeast and Northern regions are, however, open to question.

TABLE A-3.

Lumber Shipments at Alaska Ports 1968
(Short Tons)

Port by Region	Total	Foreign		Domestic				
				Coastwise		Internal		
		Imports	Exports	Receipt	Ship.	Receipt	Ship.	Local
Southeast								
Ketchikan	62,082	50	60,942	74	963	--	53	--
Wrangell	218,070	--	216,208	148	1,714	--	--	--
Sitka	422	15	--	407	--	--	--	--
Juneau	1,969	--	626	1,135	52	156	--	--
Metlakatla	99	--	--	46	--	53	--	--
Petersburg	731	--	--	197	378	--	156	--
Skagway	144,016	160	143,734	122	--	--	--	--
Other	35,287	--	34,585	700	2	--	--	--
Total		225	456,095	2,829	3,109	209	209	--
Southcentral								
Anchorage	2,117	1	--	2,044	72	--	--	--
Cordova	270	--	--	270	--	--	--	--
Kodiak	417	--	--	417	--	--	--	--
Seward	2,851	--	--	2,851	--	--	--	--
Whittier	269	58	--	211	--	--	--	--
Other	638	--	--	496	--	--	--	142
Total		59	--	6,289	72	--	--	142
Southwest								
Dillingham	21	--	--	21	--	--	--	--
Naknek River	275	--	--	103	172	--	--	--
Alaska Pen.[a]	2,208	--	--	2,001	--	--	--	207
Aleutian Is.	1,354	--	--	1,353	1	--	--	--
Total		--	--	3,478	173	--	--	207
Northwest								
Nome	206	--	--	206	--	--	--	--
Other	556	--	--	456	--	--	--	100
Total		--	--	662	--	--	--	100
Interior								
Yukon River	104	--	--	--	--	--	--	104
TOTAL		284	456,095	13,258	3,354	209	209	553

[a]Including Kuskokwim River.

SOURCE: U.S. Army, Corps of Engineers, *1968 Waterborne Commerce of the United States* and author's correspondence with Seattle office of the Corps to determine the disposition of movements at ports where no breakdown is indicated in *Waterborne Commerce*.

TABLE A-4.

Recorded Coastwise Receipts of Lumber At Alaska Ports 1968

Region or Port	Tons	Data Source
Southeast Alaska	2,829	Waterborne Commerce
Southwest Alaska	3,478	Waterborne Commerce
Northwest Alaska	662	Waterborne Commerce
Southcentral Alaska:	40,684	
Whittier	29,338	Alaska Railroad
Seward	3,163	Alaska Railroad
Anchorage	7,000	Author's Estimate
Other Ports	1,183	Waterborne Commerce

TOTAL COASTWISE RECEIPTS: 47,653 tons or 42,400 MBM

Receipts in the Southeastern region appear to be unrealistically low, while data are not even collected for some ports (e.g., Barrow, Prudhoe Bay) in the Northern region.

Because of deficiencies in the available data, it is not possible to exactly determine the size of the 1968 Alaska lumber market, but the Western Wood Products Association (W.W.P.A.) has maintained destination of shipment data that include Alaska shipments since 1967. These data do not represent a complete accounting for western shipments; however, they reflect approximately 40 per cent of the shipments from western Washington and Oregon mills and about 55 per cent of those from the inland region. In Table A-5, these association data are presented and the imputed total shipments are shown.

The W.W.P.A. data indicate that about 18.5 MMBM of lumber was shipped from member mills to Alaska in 1968. The imputed totals from these data assume that shipment patterns of non-member mills are the same as those of members; however, the W.W.P.A. data does not lend itself to calculation of the between-mill variance in shipping pattern and therefore confidence limits cannot be established about the imputed total of 44 MMBM.

The imputed total of 44 MMBM of Alaska shipments derived from the W.W.P.A. data is 2 MMBM greater than the recorded coastwise receipts indicate but because of the deficiencies in the recorded data the W.W.P.A. total is accepted as the correct estimate of coastwise receipts. The estimated size of the 1968 Alaska market thus is:

Coastwise Receipts	44.3 MMBM
Imports	1.9
From Local Sources	13.9
TOTAL	60.1 MMBM

Additional tabular data pertaining to wood use, transportation, and the Alaska lumber market are presented for the information of the reader.

TABLE A-5.

Lumber Shipments From Western States to Alaska, 1967-70
(Actual shipments by Western Wood Products Association members and imputed total shipments)
(thousand board feet)

	W.W.P.A. Data			Imputed Totals		
Year	Coast Mills	Inland Mills	Total	Coast Mills	Inland Mills	Total
1967	10,408	5,464	15,872	24,814	9,935	34,749
1968	14,192	4,349	18,541	36,436	7,907	44,343
1969	12,946	7,064	20,010	35,236	12,844	48,080
1970	5,427	11,355	16,782	16,803	20,645	37,448

NOTE: Coast mills are those located in western Oregon and western Washington; inland mills are located in the remainder of the west except for the California redwood region.

SOURCE: Western Wood Products Association.

TABLE A-6.

Softwood Lumber Imports To Alaska From Canada: 1962-69
(Thousand Board Feet)

	Surfaced Lumber						
Year	Spruce	Douglas-Fir	Hemlock	Other	Rough Lumber	R.R. Ties	Total
1962	2,601	77	--	137	45	88	2,948
1963	3,847	7	--	223	711	90	4,878
1964	3,036	392	89	471	504	138	4,630
1965	2,745	198	--	527	325	101	3,896
1966	547	14	--	245	180	180	986
1967	965	217	45	309	217	--	1,753
1968	1,289	39	55	444	59	97	1,886
1969	1,803	4	140	284	625	98	2,856

Note: These figures exclude imports of remanufactured products such as siding. Lumber with surfacing not specified was considered to be surfaced.

SOURCE: *United States Imports of Merchandise for Consumption and General Imports of Merchandise*, Alaska District, U.S. Department of Commerce, Bureau of the Census (reports for specified years on file at Anchorage office).

TABLE A-7.

Lumber Shipments at Alaska Ports 1969
(Short Tons)

Ports by Region	Total	FOREIGN		DOMESTIC				
				Coastwise		Internal		
		Imports	Exports	Receipt	Ship.	Receipt	Ship.	Local
Southeast								
Ketchikan	139,454	215	129,228	1,015	8,995	--	1	--
Wrangell	225,073	--	225,073	--	--	--	--	--
Sitka	421	--	--	421	--	--	--	--
Skagway	69,012	221	68,395	396	--	--	--	--
Southcentral								
Anchorage	24,539	--	18,069	6,397	73	--	--	--
Valdez	432	--	--	432	--	--	--	--
Total		436	440,765	8,661	9,068	--	1	--
Other Ports[a]								
Juneau	8,637							
Metlakatla	4,434							
Petersburg	1,152							
Other S.E.	64,316							
Cordova	244							
Homer	1,275							
Kodiak	551							
Seward	322							
Whittier	6,060							
Dillingham	122							
Naknek River	123							
Alaska Peninsula	20,011							
Nome	431							

[a]Types of shipment not specified.

SOURCE: U.S. Army, Corps of Engineers, *1969 Waterborne Commerce of the United States.*

TABLE A–8.

Lumber Shipments on Alaska Railroad–Calendar Year 1968 (Tons)

Origin	Destination				
	Anchorage	Other Southcentral	Fairbanks	Other Interior	Total
Whittier*	19,174	1,890	8,026	306	29,396
Seward*	2,265	227	445	226	3,163
Anchorage	--	324	450	124	898
Other Southcentral	743	106	61	--	910
Fairbanks	--	--	--	72	72
Other Interior	6	--	--	--	6
Total	22,188	2,547	8,982	728	34,445

*Whittier and Seward shipments are for interline shipment (i.e., those originating on another carrier); shipment from local producers is included in other Southcentral origins.

TABLE A-9.

Rates For Shipment of Alaska-Produced Lumber Via Alaska Railroad

Origin	Min. Load/Car	Destination		
		Anchorage	Fairbanks	Seattle
		(dollars per MBM)		
Seward, Sunshine Talkeetna, Wasilla[a,b]	(23 MBM)			23.54
Seward, Whittier[c,e]	(40 Mlb.)	6.60	17.00	
Fairbanks[c,e,d]	(40 Mlb.)	12.60		
Talkeetna[b,c]	(16 MBM)	8.18		

[a]ARR, Freight Tariff 70-A, correction 737, effective June 21, 1971.

[b]Rates apply only to shipment of hardwood lumber and are published on a per MBM basis.

[c]ARR, Freight Tariff 16-H, correction 96, effective April 24, 1970.

[d]Shipment from Fairbanks area to Potter, a station approximately 14 miles south of Anchorage.

[e]Rates converted to dollar per MBM, calculated from per cwt. rates on the basis of seasoned spruce weighing approximately 2,000 lbs. per MBM. (Add 900-1,100 lb./MBM if unseasoned rough lumber.)

TABLE A-10.

Shipment of Lumber on the Alaska Railroad By Place of Origin and Destination, Fiscal Year 1964 to Fiscal Year 1969 (Amounts in Tons)

Origin	Destination				
	Anchorage	Other Southcentral	Fairbanks	Other Interior	Total
Fiscal Year 1964					
Whittier*	10,356	777	2,255	57	13,445
Seward*	6,043	504	2,029	159	8,735
Anchorage	--	175	1,600	217	1,992
Other Southcentral	1,480	1,403	369	335	3,587
Fairbanks	20	27	--	67	114
Other Interior	--	--	--	--	--
Total	17,899	2,886	6,253	835	27,873
Fiscal Year 1965					
Whittier*	21,333	1,922	3,336	486	27,077
Seward*	--	--	--	--	--
Anchorage	--	178	2,131	218	2,527
Other Southcentral	571	--	--	--	571
Fairbanks	50	--	--	88	138
Other Interior	--	--	--	--	--
Total	21,954	2,100	5,467	792	30,313
Fiscal Year 1966					
Whittier*	16,926	1,162	3,432	527	22,047
Seward*	--	18	183	--	201
Anchorage	--	9	1,364	211	1,584
Other Southcentral	575	44	138	87	844
Fairbanks	--	--	--	76	76
Other Interior	--	--	--	16	16
Total	17,501	1,233	5,117	917	24,768
Fiscal Year 1967					
Whittier*	15,726	2,031	3,667	157	21,581
Seward*	1,534	235	870	69	2,708
Anchorage	--	214	620	120	954
Other Southcentral	259	262	21	125	667
Fairbanks	10	12	--	91	113
Other Interior	--	--	69	--	69
Total	17,529	2,754	5,247	562	26,092

TABLE A-10 (Continued)

Shipments of Lumber on the Alaska Railroad by Place of Origin and Destimation, Fiscal Year 1964 to Fiscal Year 1969 (tons)

Origin	Destination				
	Anchorage	Other Southcentral	Fairbanks	Other Interior	Total
Fiscal Year 1968					
Whittier*	17,233	3,245	4,897	171	25,546
Seward*	2,641	455	718	110	3,924
Anchorage	--	83	468	139	690
Other Southcentral	251	82	33	--	366
Fairbanks	183	13	--	38	234
Other Interior	--	6	--	--	6
Total	20,308	3,884	6,116	458	30,766
Fiscal Year 1969					
Whittier*	19,771	1,659	8,401	216	30,047
Seward*	1,229	135	189	19	1,572
Anchorage	--	151	867	115	1,133
Other Southcentral	769	113	242	82	1,206
Fairbanks	--	--	--	76	76
Other Interior	11	--	5	--	16
Total	21,780	2,058	9,704	508	34,050
Fiscal Year 1970					
Whittier*	37,424	1,319	12,744	315	51,802
Seward*	20	--	15	--	35
Anchorage	--	153	485	349	987
Other Southcentral	805	1,633	83	56	2,577
Fairbanks	--	--	--	90	90
Other Interior	82	--	--	10	92
Total	38,331	3,105	13,327	820	55,583

NOTE: Whittier and Seward shipments are interline, i.e., they originated outside Alaska. Local shipments from sawmills in Whittier and Seward are shown as shipments from other Southcentral.

SOURCE: Traffic Department, Alaska Railroad, Anchorage, Alaska.

TABLE A-11.

Carload Rates for Rail Shipment of Lumber to Alaska Ports

Origin	Min. Wt.	Destination				
		Seward	Kenai	Anchorage	Fairbanks	Ft. Yukon
	(Mlb.)	(cents per cwt.)				
Seattle, Washington[a]	(30)	480	--	480	619	794
Seattle, Washington	(80)	187	227	186	255	423
Seattle, Washington	(100)	177	216	175	244	412
Eugene, Oregon[b]	(100)	210	250	209	262	--
Libby, Montana[b]	(100)	211	251	210	263	--
Centralia, Washington[b]	(100)	187	227	186	239	--
Prince Rupert, B.C.[c]	(40)	171	210	170	222	407
Prince Rupert, B.C.	(80)	150	190	149	202	386
Prince Rupert, B.C.	(100)	144	183	143	195	379
		(dollars per MBM)[d]				
Seattle, Washington	(30)	106.80	--	106.80	137.73	176.67
Seattle, Washington	(80)	42.08	51.08	41.85	53.78	95.18
Seattle, Washington	(100)	39.83	48.60	39.38	51.30	92.70
Eugene, Oregon	(100)	47.25	56.25	47.03	58.95	--
Libby, Montana	(100)	47.48	56.48	47.25	59.18	--
Centralia, Washington	(100)	42.08	51.08	41.85	53.78	--
Prince Rupert, B.C.	(40)	38.48	47.25	38.25	49.95	91.58
Prince Rupert, B.C.	(80)	33.75	42.75	33.53	45.45	86.85
Prince Rupert, B.C.	(100)	32.40	41.18	32.18	43.88	85.28

[a]ARR, Freight Tariff 70-A, correction 737, effective June 21, 1971.

[b]North Pacific Coast Freight Bureau, Freight Tariff 49-E, supplement 8, effective December 29, 1969.

[c]ARR, Freight Tariff 65-B, correction 245, effective March 20, 1970 (applies only to shipment originating in Canada).

[d]Based on assumed average conversion factor of one MBM = 2,250 pounds.

TABLE A–12.

Rates for Shipment of Lumber to Alaska from Seattle Via Sealand Freight Service (cents per cwt.)

	Minimum Weights Per Shipment—Mlb.				
	20	80	88	100	120
Anchorage	480	186	181	175	173
Fairbanks	638	255	249	244	---
Kodiak[a]	741	447	442	436	434

[a]Kodiak rate is the Anchorage rate plus a differential of $2.61/cwt. The 20 Mlb. rate will only apply for loads greater than 24 Mlb.

SOURCE: Rate clerk, Fairbanks office of Sealand Freight Service, June 16, 1971.

TABLE A-13

Relationship Between Freight Charges and Seattle Prices for Lumber When Delivered to Various Alaska Ports–1965[a]

Shipment Seattle To:	Ocean Freight	Total Landed Charge[c]	Per Cent Freight Charge is of F.O.B. Price Seattle
Juneau (LCL)	$32.68/MBM	$38.70/MBM	71.4%
Anchorage (LCL)[b]		71.60	132.1
Anchorage (CL)[b]		45.15	83.3
Kodiak (LCL)	40.21	46.64	86.0
Nome (LCL)	57.68	75.28	138.9

[a]Based on an assumed conversion factor of 1 MBM = 2,150 pounds with an F.O.B. cost of $54.21 at Seattle.

[b]Joint through rates filed by Alaska Railroad.

[c]Includes lightering, dock charges, and inland transportation when applicable.

SOURCE: Alaska Trade Study, Appendix B and C, Federal Maritime Commission, Bureau of Domestic Regulation, Washington, D.C., July 1967.

TABLE A-14.

Rates for Shipment of Fabricated Buildings and Mobile Homes on Alaska Railroad (units over 12 feet, but not exceeding 13 feet 6 inches)

	Length — Feet			Length — Feet		
	40	50	60	40	50	60
	(dollars per rail car)			(dollars per square foot)[d]		
Fabricated Buildings[a]						
Seattle to:						
Anchorage	1,224.00	1,346.40	1,703.70	2.55	2.24	2.37
Fairbanks	1,924.00	2,046.40	2,403.70	4.01	3.41	3.34
Mobile Homes[b]						
Seattle to:						
Anchorage	1,080.00	1,012.50	1,087.50	2.25	1.69	1.51
Fairbanks	1,450.00	1,750.00	1,850.00	3.02	2.92	2.57
Mobile Homes or Fabricated Buildings[c]						
Anchorage (or Palmer) to:						
Fairbanks	700.00	700.00	850.00	1.46	1.17	1.18
Seward to:						
Anchorage	325.00	325.00	400.00	0.68	0.54	0.56
Fairbanks	750.00	750.00	900.00	1.56	1.25	1.25

[a]ARR, Freight Tariff 76A, correction 802, effective March 25, 1971.

[b]ARR, Freight Tariff 67A, correction 819, effective April 13, 1971.

[c]ARR, Freight Tariff 16H, correction 129, effective October 22, 1970.

[d]Per square foot shipping cost is based upon the assumption that the living area is 12 feet wide and of the stated length. By comparison, Mr. Bill King of the University of Alaska Construction Department estimates that the shipping cost for the modular units used in the university housing project (shipped from Centralia, Washington to College by truck and barge via Valdez) was approximately $4.00 per square foot.

TABLE A-15.

Estimated Alaska Timber Cut by Product—1966-69
(Million Board Feet)

Product	National Forest Lands[a]							
	Quantity				Per Cent of Total			
	1966	1967	1968	1969	1966	1967	1968	1969
Pulp	379	363	379	302	80%	76%	71%	58%
Cants	71	100	147	203	15	21	28	39
Lumber	11	7	7	18	2	1	1	3
Logs and chips	14	7	--	--	3	2	--	--
Total	476	477	533	523	100%	100%	100%	100%

Product	State Lands[b]							
	Quantity				Per Cent of Total			
	1966	1967	1968	1969	1966	1967	1968	1969
Pulp	4	--	--	--	13%	--	--	--
Cants	27	45	44	44	87	100%	90%	90%
Lumber	--	1	4	4	--	--	9	9
Logs and chips	--	--	1	1	--	--	1	1
Total	31	46	49	49	100%	100%	100%	100%

Product	Other[c]							
	Quantity				Per Cent of Total			
	1966	1967	1968	1969	1966	1967	1968	1969
Pulp	1	--	--	--	10%	--	--	--
Cants	--	--	--	1	--	--	--	11%
Lumber	--	--	--	--	--	--	--	--
Logs and chips	8	12	9	8	90	100%	100%	89
Total	9	12	9	9	100%	100%	100%	100%

Product	Total[d]							
	Quantity				Per Cent of Total			
	1966	1967	1968	1969	1966	1967	1968	1969
Pulp	384	363	379	302	75%	68%	64%	56%
Cants	98	145	191	248	19	27	32	39
Lumber	11	7	10	22	2	1	2	3
Logs and chips	22	20	10	9	4	4	2	2
Total	515	535	590	581	100%	100%	100%	100%

[a]U.S. Forest Service.

[b]Alaska Department of Natural Resources.

[c]Alaska Department of Natural Resources. Some estimation was involved because of unavailable data. Other category includes BLM, BIA, and private timber lands.

[d]Some estimation is involved because of unavailable data; figures are approximately correct.

SOURCE: *Alaska Statistical Review—1970*, State of Alaska Department of Economic Development, December 1970.

TABLE A-16

Lumber and Plywood Use in Housing, By Type of Unit, 1969

Type of Unit	Use Per Unit	
	Lumber board feet	Plywood square feet (3/8" basis)
One- and two-family	11,850	5,430
Multifamily	4,260	1,910
Mobile homes	1,910	1,330
All Types	7,170	3,370

SOURCE: U.S. Department of Agriculture, Forest Service, "The Demand and Price Situation for Forest Products 1970-71."

TABLE A-17

Lumber and Plywood Use in Single-family Houses Inspected by the FHA, 1968 (selected regions)

Region	Use Per Unit		
	Lumber board feet	Plywood sq. ft. (3/8" basis)	House Size square feet
United States	10,271	4,158	1,392
North Atlantic	11,755	5,620	1,534
Lake States	9,295	4,363	1,115
Northwest	10,687	7,358	1,247

SOURCE: U.S. Department of Agriculture, Forest Service, "Wood Products Used in Single-family Houses Inspected by the Federal Housing Administration—1959, 1962, 1968," Statistical Bulletin 452, 1970.

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