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Timber

THE TIMBER INDUSTRY IN INTERIOR ALASKA

Prices, Products, Markets and the Economics of Production

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House Research Agency
Alaska State Legislature
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INTRODUCTION

The purpose of this project is to present a coherent picture of the competitive position of Interior timber operators in current and future forest product markets. Chapter 1 discusses the Interior timber resource base in some detail with respect to other sources of supply in the coastal regions of Alaska and interior British Columbia. Stumpage rates on Alaska Division of Forestry, U.S. Forest Service and British Columbia Ministry of Forestry timber sales are compared for their effect on the price of raw materials. The stumpage appraisal methodologies used in Alaska and British Columbia are examined and the philosophical differences in the government-industry relationship between the two countries is summarized in Chapter 2.

Chapter 3 presents an analysis of the structure of the Interior timber industry in contrast to the timber industries of Southeast Alaska and British Columbia. The economics of production for Interior operators are compared with their competitors in domestic markets and the outlook for Pacific Rim forest products markets is discussed in terms of anticipated supply and demand over the next fifteen years. In Chapter 4, a detailed analysis of potential Interior timber products, prices and markets is undertaken.

We hope that the reader will gain a sense of perspective from this study and an understanding of where the Interior Alaska timber industry stands in the overall context of Pacific Rim forest products markets. State policies which affect the competitive position of Interior operators are discussed at some length and areas where further research is needed are noted.

SUMMARY OF CONCLUSIONS

Chapter 1

There are approximately 22.5 million acres of commercial forest land in Interior Alaska. The Tanana State Forest contains about one million acres of commercial forest, while Native corporations control another five million acres of commercial timber. The State controls about 80 percent of the available commercial forest in the Interior. The annual allowable cut in the Tanana State Forest at present is 4.1 million board feet (MMBF) of spruce sawtimber and 20,000 cords of hardwood for fuel (page 7).

Seven tree species occur naturally in the Interior forest. These are: tamarack or larch; white spruce; black spruce; paper birch; quaking aspen; balsam poplar; and Western black cottonwood. Most of these species grow as pole sized and small sawtimber of intermediate to low quality and value in timber markets. A comparison of the productivity and quality of Alaska's coastal and interior forests reveals that coastal softwood timber is superior. Prime quality, old growth Sitka spruce logs from the coastal regions of the state command high prices on world markets and are Alaska's most valuable timber resource (pages 8-13).

The State timber sale program in the Interior has sold virtually all the timber that has been offered, mostly from the Tanana Basin area. Bid prices for State sales have shown little correlation to generally depressed forest products markets. The annual allowable cut in the Tanana State Forest is expected to double within the next two years, which will be defined in the forest plan being prepared by the State Division of Forestry (pages 13-15).

Chapter 2

The three stumpage appraisal systems examined in this report, which are currently used by the U.S. Forest Service, British Columbia Ministry of Forests, and Alaska Division of Forestry, all yield about the same appraised price for a given stand of timber under similar market conditions if all costs are considered. The appraised stumpage price is merely a reflection of the current market value of the products to be produced from a particular timber sale (page 28).

There are major philosophical differences in forest management practices between the U.S. model which emphasizes long-term biological considerations and the Canadian system which emphasizes economic stability and growth. The government-industry relationship in British Columbia is

very different from the relationship in Alaska where multiple-use considerations play an important role in timber sale policy. These differences play a significant role in setting the price of raw materials for the respective timber industries (page 28).

The competitive bidding process used for timber sales by the Forest Service and State Division of Forestry drives up stumpage rates for Alaska operators compared to competing British Columbia operators who generally pay for their timber at appraised rates. Emergency rate redeterminations available for operators holding Forest Service timber sale contracts in the Tongass and Chugach National Forests are much lower than stumpage rates for State sales in the Interior. The British Columbia Ministry of Forests offers special, low, flat rates for stumpage sold to small-scale operators and those in remote regions of interior British Columbia in recognition of their fledgling status (page 29).

Stumpage prices comprise only a small percentage of total production costs in the mature integrated timber products industries of Southeast Alaska and Interior British Columbia. Stumpage rates make up a significantly larger portion of total production costs for Interior Alaska operators who produce mostly roughcut and unfinished products (page 29).

State timber sale policy in the Interior has been to offer small to medium volume sales of relatively short duration. Interior timber operators have complained that constraints on the available timber supply have driven up stumpage rates (page 18).

Chapter 3

The present structure of the Interior timber industry is marginal in nature, with many small operators making a living off of the resource. The profitability of products produced by Interior sawmill operators tends to decline in direct proportion to the amount of manufacturing they put into it. Thus, sawmill operators attempt to minimize their manufacturing inputs and produce mostly semi-finished or roughcut, green and air-dried products and do not compete directly with British Columbia lumber imports. Import substitution is seen by most analysts to be the most economically feasible use of the Interior forest resource at the present time (page 32).

As a marginal supplier of forest products to the Japanese market, Alaska occupies a "last in first out" position on the overall timber market cycle. Alaska's competitive position as a supplier to the Pacific Rim log trade depends on the desirability and price of the species it offers for sale. Native corporations in Southeast and Southcentral control the best quality and most accessible spruce and hemlock sawtimber and have been willing to sell timber in large volume even during declining markets. Increased roundlog sales by Native corporations do

not represent an increase in Alaska's market share, rather they represent a displacement of cant and other value added product exports. (page 36).

Interior spruce sawtimber can be classified as construction grade and competes in Pacific Rim softwood markets with: low quality hemlock and second growth fir from the West Coast; British Columbia lodgpole pine-balsam-spruce-hemlock; Soviet larch; and radiata pine from Chile and New Zealand. The Pacific Rim softwood log trade is forecast to increase substantially in the next 15 years, but Interior operators will probably remain in the position of being marginal suppliers to markets dominated by second growth timber from other West Coast producers with lower operating costs (pages 32-36).

Hardwoods from the Interior remain something of an unknown at this time. There has been very little research done on potential export markets for Alaska hardwood. We do not know what the future demand for hardwood chips and logs is likely to be among Pacific Rim buyers. There appears to be a trend among traditional hardwood log suppliers such as Malaysia and Indonesia to require primary manufacture of exports. The consequences of these political factors are unknown at present (page 36).

The competitive position of Interior operators in domestic markets is constrained by a lack of infrastructure. Lack of access to markets for Interior operators may be more important than access to the resource itself. A comparison of the marketing infrastructure enjoyed by a Northern Interior British Columbia sawmill with a typical Fairbanks operation reveals why the B.C. mill is able to sell finished lumber in Fairbanks for less than local producers (pages 37-38).

Much of the literature on the Interior Alaska timber industry is promotional in nature and ignores the question of access to markets. Expectations of how rapidly the Interior industry can grow and how much the State can do to encourage development need to be tempered by a serious economic analysis of the prospects for specific products (page 39).

Chapter 4

At current market prices, it is uneconomical to export spruce logs and cants from the Interior. Building products markets for Interior timber operators are essentially restricted to internal Alaska markets or Pacific Rim exports. The two most promising areas for Interior timber operators at the present time appear to be producing building materials and woodchips. As larger amounts of timber are offered for sale by the State, import substitution of Interior dimension lumber for British Columbia lumber is expected to increase (pages 40-43).

Interior timber operators are likely to continue to make most of their profits on roughcut lumber, timbers and houselogs because they cannot compete on an equal basis with British Columbia lumber mills. Other options for sawmill operators--such as exporting cants or baby squares--do not appear to be viable at the present time. Export markets in general for any type of Interior forest product do not appear to be much of an option in the current market situation (pages 41-44).

The University of Alaska-Fairbanks, Agricultural Experiment Station is attempting to run a pilot project for using a 10 percent mixture of woodchips for fuel in coal-fired powerplants. The University would like to let out a contract and monitor the actual cost of producing chips, but the project is being held up for lack of adequate funding (pages 52-55).

A chipping industry appears to be economically feasible and the investment in equipment for an existing logging company would be reasonable. A healthy chipping industry would open up several forestry management options such as commercial thinning and removal of undesirable species for reforestation. It would also provide a market for agricultural land clearing residue (page 55).

Another energy product which can be produced from wood waste and agricultural land clearing residue is wood pellets These can be used in special woodstoves and powerplants for electrical production. Consumer acceptance of wood pellets as an alternative to cordwood is unproven. The proposals which have been put forward for building pellet mills and a powerplant are highly speculative at the present time. A pellet mill would use massive amounts of wood and may provide an alternative market for sawmill waste and logging residue. Power and timber sales agreements need to be concluded before firm financing can be obtained. There are serious reservations among industry analysts over the ultimate economic feasibility of wood pellets (pages 57-58).

Other potential Interior forest products which have been researched but do not appear to be viable at the present time include panel products (plywood, particleboard, and waferboard), pulp, charcoal, and densified fuel logs (pages 48-59).

CHAPTER 1

INTERIOR ALASKA'S FOREST RESOURCES

There are approximately 22.5 million acres of commercial forest land in Interior Alaska containing 14.25 billion cubic feet of harvestable timber volume.[1,2] Presently, the State of Alaska controls about 80 percent of the available Interior timber supply. About one million acres of commercial forest are included in the Tanana State Forest (out of 1.8 million acres total) at present with an annual allowable cut of 3.42 million cubic feet (4.1 million board feet) of spruce sawtimber and 20,000 cords of hardwood for fuel.

The Department of Natural Resources has conceptualized plans for three more State forests in the Interior. These could add about 1.3 million acres of commercial forest land, 42 million cubic feet of annual allowable cut of spruce sawtimber and 70,000 cords of hardwood for fuel to present timber inventories within the next ten years.[3]

Thirty-two Native corporations (regional and village) control about 16 million acres of Interior land estimated to contain about five million acres of commercial forest. Because only fourteen of these corporations have completed forest inventories to date, the total Interior land base which may be dedicated to timber production and the potential annual allowable cut for the next decade will remain unknown for some time. There are certain facts we do know about the potential products and markets for the Interior timber inventory, however, and we will concentrate on these "givens" as we speculate about the future.

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[1]Commercial forest land is officially defined by the U.S. Forest Service as being capable of producing 20 cubic feet of usable wood per acre per year. The average volume produced by Interior forests at present is about 14.4 cubic feet per year due to natural understocking. An alternative definition of commercial forest land as being composed of trees greater than 5 inches in diameter at breast height is generally used when describing Interior forest inventories.

[2]Richard C. Smith, Potential Economic Development of Forest Resources in Interior Alaska, Pacific Northwest Forest and Range Experiment Station, U.S. Forest Service, November 1980.

[3]These planned State forests are: Copper River (60,000 acres of commercial forest land and an estimated 3-5 MMBF annual allowable cut), Upper Yukon (400,000 acres and 18-27 MMBF), and Kuskokwim (800,000 acres and 29-50 MMBF).

INVENTORY CONSIDERATIONS

Only seven tree species occur naturally in the Interior forest. These are: tamarack or larch; white spruce; black spruce; paper birch; quaking aspen; balsam poplar; and Western black cottonwood.[4] Most of these trees are pole sized and small sawtimber. Table 1 lists all of the currently recognized uses (with the exception of log exports) for Interior timber species. We will attempt to assess the economic potential of several of the products listed in Table 1 in the final chapter of this report. Many of the products listed in the table have not been studied at all. We will confine our efforts to those where data exist.

[4]Edmond C. Packee, "Forest Management for Interior Alaska, Can Products Justify Costs?", Agroborealis, July 1984.

Table 1
Potential Uses of Native Interior Alaska Tree Species

USE	Species						
	Paper Birch	Quaking Aspen	Balsam Poplar	Black Cottonwood	Larch	Black Spruce	White Spruce
Building Material							
House logs					X	X	X
Const. lumber					X	X	X
Siding					X	X	X
Waferboard	X	X	X	X	X		
Particleboard	X	X	X	X	X	X	X
Finishing Materials							
Boards	X	X		X	X	X	X
Paneling	X	X	X	X	X	X	X
Flooring	X				X		
Molding	X	X					
Veneer	X	X	X	X	X	X	X
Cabinets	X	X			X		X
Furniture components	X	X					
Pulp and Paper							
Chips	X	X	X	X	X	X	X
Kraft pulp	X	X	X	X	X	X	X
Thermomechanical pulp	X	X	X	X		X	X
Newsprint	X	X	X	X		X	X
Agriculture							
Posts					X	X	X
Bedding	X	X	X	X			
Feed		X					
Energy							
Firewood	X	X	X	X	X	X	X
Hog fuel*	X	X	X	X	X	X	X
Pressed-wood logs					X	X	X
Miscellaneous							
Transmission poles					X	X	
Railroad ties					X	X	X
Export cants	X	X			X	X	X
Caskets	X						
Novelties	X						
Specialty items	X	X	X				
Christmas trees						X	X
Birch syrup	X						
Perfume/oils	X					X	X

*Hog fuel is sawmill waste not otherwise used; e.g. slabs, edgings, trimmings, defective boards and miscuts which is chipped into small roughly sized pieces for fuel.

Source: Agroborealis, July 1984, page 57.

DEVELOPMENT POTENTIAL

Some general observations about the Interior timber inventory are necessary in order to define its development potential in relation to the inventories of the coastal forests of Southeast and Southcentral Alaska and other suppliers to Pacific Rim forest products markets. White spruce is the most valuable commercial tree in the Interior and the dominant species on commercial forest land, comprising about 57 percent of total volume. Aspen (11 percent), birch (23 percent), and cottonwood (9 percent) make up the remaining commercial volume.[5], [6]

Black spruce and larch are generally regarded as noncommercial species because they are usually found in stands of small diameter trees. A major problem faced by Interior logging operators and forest managers is the disposal of logging waste and large amounts of small diameter hardwood trees which are uneconomical to handle. On a typical State timber sale, about 10 percent of the spruce logs harvested are suitable for houselogs--which are the most valuable Interior timber product--and the rest are sawn into lumber products. Most loggers find it uneconomical to handle logs of less than 8 inches in diameter, even for firewood, and would prefer to simply remove the spruce sawlogs and houselogs from a sale area and leave the other species in the woods.

The Division of Forestry attempts to encourage responsible logging practices by specifying in its timber sale contracts that all species are to be removed from a sale area. (State law requires that all material greater than 6 inches small end diameter be removed.) The cost of disposing of uneconomical species and special requirements such as ground scarification for future replanting are figured into the advertised stumpage price for a particular sale or given as credits to the operator against his stumpage fees.

Compared to Alaska's coastal forests, Interior forests are much less productive, especially in terms of large diameter, old growth sawtimber, which enjoys the greatest demand in export markets and commands the highest prices. Table 2 gives a comparison of the productivity of Alaska's coastal and Interior forests.

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[5]Balsam poplar and black cottonwood are commonly lumped together as cottonwood since the species are very similar and have identical applications.

[6]Forest Resource Development for Interior Alaska, Reid, Collins, Inc., April 1982.

Table 2
Net Volume of Sawtimber on Commercial Forest Land in Alaska
by Species, Diameter Class and Region

Region and Species	Diameter Class (inches)				Total
	11-20	21-30	31-40	41+	
		(MMBF)			
Coastal:					
Sitka Spruce	13,709	18,723	15,174	19,942	67,548
Western Hemlock	33,179	42,020	23,182	7,859	106,240
Other Softwoods	3,929	3,507	1,495	703	9,634
Hardwoods	780	412	83	0	1,275
Total Coastal	51,597	64,662	39,934	28,504	184,697
Percent	28	35	22	15	
Interior:					
White Spruce and Other Softwoods	23,281	1,668	0	0	24,949
Paper Birch	2,422	0	0	0	2,422
Balsam Poplar	2,228	414	0	0	2,642
Quaking Aspen	804	0	0	0	804
Total Interior	28,735	2,082	0	0	30,817
Percent	93	7			
Total Alaska	80,332	66,744	39,934	28,504	215,514

Source: "Forestry in Alaska", Alaska's Agriculture and Forestry, Chapter 13, U.S. Forest Service, University of Alaska, and State of Alaska.

* * * *

As Table 2 clearly shows, there is a great disparity between the overall productivity of coastal and Interior timber stands. Large diameter, clear, close-grained, old growth Sitka spruce logs are Alaska's most

valuable forest product.[7] Native corporations in Southeast and Southcentral Alaska control the highest quality and most accessible stands of old growth Western hemlock and spruce sawtimber.

Another inventory consideration is overall log quality. In general, Alaska's coastal forests are overmature and contain about half-prime quality sawtimber and half pulp grade logs. Native corporation timber holdings in Southeast and Southcentral are of much higher than average quality, however. Most of the Interior forest can be described as understocked and mature but not overmature due to periodic forest fires which, in most areas, have not allowed the growing stock to age more than 150 - 200 years. Forest fires are virtually unknown in Alaska's coastal areas.

Log quality is judged according to small-end diameter, amount of crook or sweep in the log, frequency, distribution and size of limbs (knots) or other defects on the log faces and amount of decay estimated to be in the wood. These factors affect the proportion of log volume recoverable as lumber and the quality of the lumber itself.[8] In order to qualify as Grade 1 or 2 logs, the following specifications for white spruce have to be met:

> Grade 1 logs: At least 16 inches small-end diameter and 75 percent clear of limbs on three sides of the log.
>
> Grade 2 logs: At least 12 inches in small end diameter and 50 percent clear on three sides or 75 percent clear on two sides.
>
> Grade 3 and 4 logs are smaller in small-end diameter and have a higher incidence of knots and other defects.

The proportions of log grades making up the sawtimber volume on commercial forest land in the Interior are shown in Table 3.

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[7]There are three species or subspecies of spruce referred to in this section as spruce sawtimber: Sitka spruce from Southeastern coastal forests; white spruce from the Interior; and a hybrid cross of Sitka and white spruce which grows in coastal regions of Southcentral Alaska. All have similar properties and are assumed to be used for the same application for similar log grades.

[8]Op. cit. Reid, Collins, Inc.

Table 3
Grade of Sawtimber on Commercial Forest Land in Interior Alaska*

Species	Percent Distribution by Log Grade				
	1	2	3	4	Total
Spruce	1.3	2.1	72.9	23.7	100.0
Birch	5.2	8.9	84.5	1.4	100.0
Cottonwood and Balsam Poplar	13.7	25.0	56.8	4.5	100.0
Aspen	35.7	17.9	46.0	0.4	100.0

*Note that the inventory data presented in the preceding tables (2 and 3) are quite dated and some of the land base may have been withdrawn to nonforestry designations, e.g., wilderness. More current inventories exist for portions of the Interior region, but updated inventory statistics for the entire region are not presently available.

Source: Hutchinson, "Alaska's Forest Resource", U.S. Forest Service, 1967.

* * * *

As the preceding tables show, most Interior spruce logs are Grade 3, i.e., they are small and have many limbs. Interior birch generally has a large number of pin-knots which reduces its value considerably under current grading rules. At least some degree of disease or decay is present in the following proportions of merchantable stems: white spruce (37 percent); birch (47 percent); cottonwood and balsam poplar (78 percent); and aspen (82 percent).[9] This decay is often the result of fire scars which mainly affect the base of the tree, which is the prime potential log.

STATE POLICY

In general, State of Alaska Division of Forestry policies are modeled after U.S. Forest Service practices. The federal timber sale philosophy emphasizes biological rather than economic standards. Since 1973, the Forest Service has been managing sales of timber according to a principle called nondeclining even flow. Under this concept, principal harvests are based on the productive capacity of the forest rather than on economic conditions. Current harvests are managed to assure that

[9]Merchantable stem is defined as any type of product which can be sold from a particular timber stand and includes sawlogs, firewood, and pulpwood.

future harvests will be no smaller. These principles are embodied in the State Forest Practices Act which created the Division of Forestry. This philosophy tends to limit the supply of timber during periods of high demand and puts upward pressure on stumpage prices.

The State timber sale program in Interior Alaska in recent years has sold virtually all the timber that has been offered, mostly from the Tanana Basin area. At the present time, the annual allowable cut (the amount of timber that can be cut per year in perpetuity) is 4 million board feet (MMBF) of spruce for sawtimber and 20,000 cords of hardwoods for fuelwood. In 1982 and 1984, 7-8 MMBF of spruce sawtimber was sold because of agricultural land disposal programs and fire salvage.

State timber sales in the Interior during the past several years have yielded bid prices for stumpage which show very little correlation to generally depressed forest products markets nationwide. Supply and demand conditions facing individual operators appear to change rapidly without regard to overall economic conditions. This is probably due to the marginal structure of the Interior sawmill sector which is characterized by many small operators, mainly sole proprietorships, partnerships, or family businesses. These operations tend to go in and out of production as orders are received and timber supplies become available.

There appears to be some ambivalence on the part of policymakers over how the State should proceed with the development of the Interior timber resource. The State of Alaska has spent considerable time and effort in recent years promoting the Interior timber resource to potential Pacific Rim buyers, while offering small to medium-sized timber sales of relatively short duration to local operators. The promotional efforts have resulted in repeated expressions of interest by Pacific Rim wood products buyers but have yet to materialize into concrete proposals. This means there is a large range of possibilities for policymakers to consider. To date, the Division of Forestry has not offered any large-volume, long-term timber sales in the Interior.

The annual allowable cut in the Tanana State Forest is expected to double in the next two years (as explained in Chapter 2). Within the next decade, the Division of Forestry expects to be approached by an industry operator or joint venture willing to make a major investment in some type of wood products facility in exchange for a long-term supply of timber at negotiated stumpage rates.

The Tanana State Forest Plan--currently being prepared by the Division of Forestry--uses several different scenarios of future Interior timber development to decide which areas should be offered for sale and where stumpage fees received from a timber sale can justify the cost of building logging roads. These scenarios vary from the status quo--where the amount of spruce which is put up for sale is limited by the available supply and hardwood limited by demand--to an unlimited demand for both spruce and hardwood sawtimber. From a public policy point of view, the underlying economics of production for the range of possible Interior timber products and world market conditions indirectly affect decisions on which areas of the region are to be logged and which will be dedicated to other uses.

CHAPTER 2

COMPARISON OF STUMPAGE APPRAISAL SYSTEMS: STATE OF ALASKA, FOREST SERVICE AND BRITISH COLUMBIA

The price charged by the State for timber operators to harvest standing timber on State land (stumpage rate) seems to be the appropriate place to start an analysis of the economics of Interior timber as the competitive status of the industry begins with the availability and price of raw materials.

During the past several years, Canadian white spruce (SPF) lumber has become the standard framing material used by Alaska contractors while Douglas fir from the Pacific Northwest has remained the standard material used for high-strength applications.[10] This trend is apparent for the rest of the U.S. as well. British Columbia SPF exports to the U.S. more than doubled from 1970-1980. American timber operators have complained bitterly that the Canadian government unfairly subsidizes their timber industry by offering timber for sale at artificially low stumpage rates.

Our discussion of the various stumpage appraisal systems begins with recommendations made by the Alaska Timber Task Force.[11] The Alaska Timber Task force was formed in October 1984 by Governor Sheffield. Members of the task force included State officials and timber industry representatives. The governor directed the task force to determine how to improve the economic outlook for the timber industry in four areas: 1) marketing; 2) rules and regulations; 3) infrastructure; and 4) finance.

In its report to the governor, the Timber Task Force identified the high stumpage fees charged by the Division of Forestry on State lands in Southcentral and the Interior as a critical factor preventing the domestic industry from competing in local markets with imported lumber products from Puget Sound and British Columbia. According to the task force report, the domestic industry believes that the current stumpage appraisal system is not reflective of the market value of the end

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[10] Canadian framing lumber marketed in the Railbelt is generally labeled as spruce, pine, fir or SPF in lumberyards. White spruce, lodgepole pine and balsam fir are the species comprising this designation. All three species are graded identically and used for the same applications.

[11] "Report of the Alaska Timber Task Force to Governor Bill Sheffield and Regional Forester Michael Barton, Alaska Region Forest Service," December 13, 1984, p. 29.

products produced from the timber, and represents a State policy favoring revenues over incentives for development.

The task force recommended that the Division of Forestry compare its internal stumpage appraisal system to the methods used by the Forest Service and interior British Columbia with an objective of "creating a flexible system which provides an economic incentive for the industry to compete." In addition, the division was directed to examine the impact of constraints on the available supply of accessible timber on stumpage rates.

In the course of studying the stumpage rate issue, we contacted several individuals in the Alaska Department of Natural Resources Division of Forestry, the U.S. Forest Service, and Ministry of Forestry in British Columbia who are responsible for setting stumpage appraisals under the various regimes. In addition, we obtained a copy of the 1982 U.S. International Trade Commission investigation of Canadian softwood lumber exports to U.S. markets.[12]

STUMPAGE RATES

The U.S. Forest Service and British Columbia Ministry of Forests stumpage appraisal processes are extremely complex and are based on mathematical models involving several variable factors which may change according to the species to be harvested, geography of the sale tract, logging methods employed, road construction cost, and market expectations for the products to be produced. The Alaska Division of Forestry stumpage appraisal methodology is not nearly so complex.

The standard means by which forest managers determine whether the stumpage price set for a particular sale is reasonable is by the bidders response. If a proposed timber sale receives little or no attention from potential bidders, then the manager should be concerned that the appraisal price is too high for the perceived market conditions over the period of the sale contract. According to the managers we contacted, a certain amount of complaint from industry operators over the stumpage rate is standard even for very profitable (to the operator) sales.

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[12]"Conditions Relating to the Importation of Softwood Lumber into the United States," U.S. International Trade Commission, April 1982. This investigation analyzed the Canadian and American stumpage appraisal systems to see if Canadian lumber exports were being unfairly subsidized. The trade commission report concluded that although the structure of the Canadian and U.S. industries are very different and difficult to compare, there did not appear to be any direct government subsidy of stumpage rates or forest product exports to the U.S. and thus a countervailing tariff was not warranted.

We will present a brief outline of the appraisal methods used by the State Division of Forestry, U.S. Forest Service, and the British Columbia Ministry of Forests with a discussion of how each system affects stumpage prices. Then we will attempt to place the stumpage appraisal process within the larger context of the competitive position of the Interior timber industry.

The Transactional Evidence Appraisal System

The State of Alaska Division of Forestry employs the Transactional Evidence Appraisal System to set advertised prices for State timber sales. This method is the simplest of the three appraisal systems and attempts to let market forces determine the stumpage rate through the competitive bidding process. There are three basic steps to the Transactional Evidence methodology:[13]

1. A weighted average is determined for the last five sales under similar quality and market conditions. Effects of special stipulations such as road costs or scarification requirements are backed out of these figures. These costs are reintroduced at step three as computed for the new sale.

2. The average price determined is then reduced to account for speculative bidding. This reduction is normally 25 percent but can be varied if the appraiser has cause to believe that it is inappropriate. For example, several years ago there were a number of high stumpage bids on several small diameter sales in anticipation of piling needs for the North Slope. This demand did not materialize.

3. The reduced average is then lowered to allow for specific development costs or special treatment costs. This resulting figure is set as the minimum bid price for the material.

The average length of Interior timber sales contracts is from two to three years. Bids can be taken in an open auction type format or through sealed bid. One of the major difficulties with this system as pointed out in the Timber Task Force Report, is that because the Division of Forestry controls the bulk of the available timber supply, it may drive up bid prices to artificially high levels through the volume and timing of the sales it offers. The methodology of using average bid prices from previous sales to set the minimum bid price, even though it is discounted, can have a ratchet effect on bids as long as the annual allowable cut remains at 4 MMBF.

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[13]Les Fortune, Northern Region Forester, Alaska Department of Natural Resources, Division of Forestry.

Table 4
Volume and Average Stumpage Price of Commercial Timber Sales in the Tanana Valley 1980-1984

Species/ Product	Year	Total Volume (MBF)	Average Stumpage Price $/MBF	Ratio of Actual to Minimum Bid Price
Spruce	1980	1,856	$24.98	NA
Sawlogs	1981	4,250	39.51	1.01:1
	1982	7,858	27.91	1.33:1
	1983	4,113	46.40	1.62:1
	1984	7,019	18.91	1.04:1
		(CCF)	$/CCF	
Mixed	1980	4,185	$6.86	NA
Species	1981	6,709	9.90	1.44:1
Fuelwood	1982	8,233	11.29	1.80:1
	1983	9,001	9.61	1.16:1
	1984	5,397	4.73	1.87:1

MBF = thousand board feet
CCF = hundred cubic feet

Source: Department of Natural Resources, Division of Forestry.

* * * *

At the present time, the Division of Forestry does not have access to the multitude of data on product prices and production costs required for the Residual Value approach used by the U.S. Forest Service (explained on the next page). The Division of Forestry management plan for the Tanana State Forest will include the results of a timber inventory contracted to the U.S. Soil Conservation Service.[14]

The inventory data will be fed into the Forest Service FORPLAN computer model which will help the Division of Forestry personnel arrive at an annual allowable cut figure. This level will then serve as the basis for future timber sales in the area.

The amount of annual biological growth of white spruce in the Tanana State Forest is about 16.9 MMBF, which will yield an annual allowable cut of perhaps 8-10 MMBF after accessibility and other multiple-use

[14]This inventory is currently over a year behind schedule and is the major factor delaying increased timber sales from the Tanana State Forest. One of the recommendations of the Timber Task Force to the Division of Forestry was an accelerated forest inventory program.

constraints are taken into account through the FORPLAN modeling procedure.[15] As increasing amounts of timber from the Tanana State Forest become available, stumpage rates should begin to decline. The Division of Forestry estimates that it will take about two years before additional sales of timber can be offered over the current 4 MMBF allowable cut level.

The annual allowable cut level in the State of Alaska and U.S. Forest Service systems is the final expression of a very complex process of balancing the multiple uses of our public forest lands. A great deal of public input on alternative uses is incorporated into the final designation of logging areas which, of course, affects the ultimate economic value of the timber. This type of multiple use consideration is almost comp etely absent in the British Columbia system.

The Residual Value Appraisal Method

The U.S. Fores Service uses the Residual Value Appraisal Method to set a base rate or minimum bid price for a particular timber sale. The appraisal process measures the current market value of products which will be produced from the sale minus production costs and an allowance for profit and risk. The remaining amount or residual value is the base rate. From a forest manager's perspective, the formula is:

(selling price) - (logging cost) - (manufacturing costs) - (road cost) - (transportation cost) - (allowance for profit and risk) = base rate

The Residual Value Method is the standard appraisal system used by the Forest Service for timber sales in the Tongass and Chugach National Forests. The selling price and manufacturing cost variables are based on an annual survey of cant, lumber, and pulp producers. Logging costs are computed by applying a complex set of site-specific factors to the sale area. Road costs are computed by the Forest Service. If the operator does the roading, he is given a credit for these costs on his stumpage fee. Transport costs are also computed by the Forest Service as they apply to a particular sale. The allowance for profit and risk varies according to expected market conditions over the life of the sale contract. Generally, the allowances are about 18 percent for pulp, 12 percent for lumber, and 10 percent for round logs. The allowance for profit and risk increases as the amount of manufacturing investment increases.

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[15] White spruce from Interior Alaska and British Columbia are identical species. Potentially, Alaska lumber could replace British Columbia products in internal markets. For purposes of this analysis, white spruce is the appropriate species for comparison.

Appraisals are based on cost and price indices computed from historical information for the participating operators' last fiscal years and are updated quarterly. The Forest Service maintains fairly accurate inventory information for each sale area. Allowances are made for undesirable stumpage which must be removed from clearcut areas at a net logging loss. Stumpage payments are made for scaled timber.

All of the variable factors listed above are based on an average operator efficiency basis. If a bidder feels he can get a higher product price or harvest and/or process for less cost, he will have an incentive to bid over the base price to maintain the same or possibly higher profit margin than that factored into the stumpage appraisal and published in the sale prospectus. In practice, competitive bidding usually erodes about half of the anticipated profit allowance. For mature, integrated pulp and lumber type operations in Southeast, stumpage amounts to between .5 and 4 percent of total cost.

From the operator's perspective, the simplified stumpage formula is:

(final selling value) - (logging cost) - (manufacturing cost) = conversion (profit and risk + stumpage)

A deficit sale occurs when the bid price is less than the minimum conversion factor (profit and risk allowance + base rate) estimated by the Forest Service with respect to current market conditions. A deficit sale does not necessarily mean that the Forest Service is losing money on the contract, it simply means the purchaser will not get the full profit and risk allowance figured into the appraised price due to market conditions. During the past several years of depressed timber markets, the Forest Service has been severely criticised for offering timber sales in spite of minimal bidder interest and for accepting deficit bids. Over the long term however, Forest Service timber sales have generated bid premiums.[16]

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[16]A deficit sale should not be confused with a "below cost sale." A below cost sale is where the stumpage fees received from a particular timber sale are less than the investment made by the Forest Service in sale preparation and administration. Presently, the regional Forest Service timber management offices do not keep track of how much they invest in a particular timber sale, though an accounting system is being developed at the national level. The major area of controversy concerns logging roads and whether the entire investment in roading for a sale should be charged to sale preparation and administration as many environmental groups argue, or whether some of the cost of building roads should be considered as an investment in access for multiple use as the Forest Service contends. This issue is very important to discussions of the amount of federal subsidy to the timber industry in the Tongass and Chugach National Forests.

During the 1970s, inflation, a booming housing construction market, and speculation on the increasing value of timber, caused intense bidding competition on Forest Service timber sales all over the U.S. Region 6 westside advertised prices (appraised value plus road credits) increased 16 percent from 1977-1979, but then dropped 26 percent from 1979-1981 reflecting decreased end product value.[17] Bid prices (including road costs) increased 93 percent from 1977-1980 before dropping 21 percent in 1981. For the entire 1977-1981 period, the average advertised price dropped 14 percent while average bid prices increased 51 percent.

Table 5
U.S. Forest Service Timber Sales for Region 6 (Westside)*

Year	Advertised Price/MBF	Bid Price/MBF	Bid Ratio
1977	$112.78	$181.76	1.6:1
1978	120.13	214.95	1.8:1
1979	131.24	335.00	2.6:1
1980	99.42	350.46	3.5:1
1981	97.50	275.14	2.8:1

*Unweighted year averages for all species including road credits.

Source: U.S. Forest Service, Region 6.

* * * *

Many timber buyers who purchased long-term (up to 8-year) sales during this period with expectations of increasing end-product prices found themselves saddled with uneconomical harvest contracts. The 1979-1981 period was a watershed for the timber industry as inflation eased and high interest rates depressed housing construction. Deflation in end-product prices, as reflected in the decline in the advertised prices shown above, resulted in large numbers of defaults and requests for extensions on timber sales contracts.

As a result of this situation, Congress passed the Federal Timber Contract Modification Act of 1984. The act allowed timber operators to buy out their Forest Service contracts at a fraction of the agreed upon stumpage rate. In effect, timber operators were allowed to give back their timber sales contracts by paying a penalty. The Forest Service could then reoffer the sales. The act also places a cap on the amount of timber the Forest Service has out in contracts at any given time.

[17]Region 6 includes national forests in Washington, Oregon, and a saml portion of northern California.

Alaska operators were treated as a separate case under this legislation. This is because the two major wood products manufacturers in the state, Louisiana Pacific Ketchikan (LPK) and Alaska Pulp Company (APC), Sitka have 50-year, long-term harvesting agreements with the Forest Service at average stumpage rates of $2.12/MBF and $1.48/MBF, respectively. When these contracts were signed in the 1950s, they were designed to assure these two companies of a reliable source of raw materials. In return, the companies provided economic stability for the region and were an important factor in the effort to gain statehood. Because of the existence of these long-term contracts at low rates, APC and LPK had an unfair advantage over other timber operators in the region who had bid premium prices for their timber sales on the rising market. Congress directed the Forest Service to make emergency rate redeterminations for timber sales on National Forest land in Alaska bid after January 1, 1974 and before July 31, 1985. These rate redeterminations were for companies other than LPK and APC and were designed to restore competitive balance among users of National Forest timber.

The redetermined stumpage rates under this legislation are: spruce sawlogs--$3/MBF; hemlock sawlogs--$1/MBF; spruce and hemlock utility logs--$1/MBF; Alaska cedar logs--$3/MBF; and red cedar and other species logs--$1/MBF. Operators who purchased Forest Service timber sales during the appropriate period can apply for refunds of excess stumpage payments. The new rates will apply for timber cut and scaled before October 15, 1989. The State receives 25 percent of stumpage fees paid for timber harvested on National Forest land in Alaska. The Forest Service has not yet made a firm policy decision on how to handle the State's portion of stumpage receipts.

As can be seen from Table 6, these rate redeterminations with an average price about $2/MBF will substantially reduce stumpage costs for operators who purchased Forest Service timber sales during the past five years (<u>average</u> annual redetermined rates for <u>all</u> species have not been computed as of this writing).

Table 6
Advertised Stumpage Rate, Bid Price, and Harvest in the Tongass and Chugach National Forests, 1981-1985*

Year	Advertised Rate/MBF		Bid Price/MBF		Harvest (MBF)	
	Tongass	Chugach	Tongass	Chugach	Tongass	Chugach
1981	$16.65	$27.32	$91.49	$29.54	338,472	1,816
1982	27.19	72.24	18.07	72.24	304,349	679
1983	7.30	18.35	37.07	30.53	219,135	39
1984	9.60	32.06	9.12	64.25	220,359	396
1985	2.62		10.52		NA	

*Annual averages for all species. Average annual redetermined rate data for all species is unavailable at this time.

Source: U.S. Forest Service.

* * * *

All sales of greater than five years duration now have a rate redetermination clause which allows the Forest Service to adjust the stumpage price. This clause in timber sales contracts acts as a hedge for buyer and seller against the extreme cyclical fluctuations in forest product markets. Under current rules, the Forest Service is allowed to increase the bid premium portion of the stumpage rate by up to 50 percent on a rising market and to decrease stumpage to the base rate during declining markets. The purpose of periodic rate redeterminations and of offering timber sales during periods of depressed markets is to assure the timber industry of a consistent supply from public lands at an annual allowable cut level and to dampen fluctuations in the business cycle through adjustments to the price of raw materials.

Forest Service contracts now require an up-front deposit of 20 percent of the estimated total stumpage to encourage timber operators to harvest their sales as soon as possible and to discourage speculation on rising product prices.

The British Columbia Stumpage Appraisal System

The stumpage appraisal system used for interior British Columbia timber sales is ostensibly set up along the same lines as the residual value method employed by the Forest Service. Comparisons between the two systems are very difficult to make, however, since the government-industry relationship is different in each country. In the American system, the Forest Service is responsible for conducting inventories, preparing

management and operational plans, holding timber sales, constructing logging roads, reforestation, and silvicultural treatment on federal lands.

In the Canadian system, publicly owned (Crown) timber is sold under seven or eight different types of licenses which grant stumpage rights to individual companies. These licenses or tenures give a company control of a large area of forest for a specified length of time, depending on the type of license issued by the provincial government. Annual license fees are charged on a per cubic meter of annual allowable cut basis and must be paid whether timber is harvested or not. Some British Columbia timber sales involve competitive bidding, but the vast majority of the annual harvest is sold at appraised stumpage rates. This is mainly due to the fact that the productive forest land in Canada is almost entirely Provincial Crown land. The British Columbia licensing system goes back to the turn of the century and the timber industry grew around it.

In contrast, public lands in the U.S. account for only 57 percent of the total softwood timber supply while the remainder is privately owned. The structure of the American timber industry grew around substantial private ownership of the resource. Public timber lands in the U.S. are managed for multiple uses which include recreation, grazing, etc. as well as timber production. Thus, while the two countries have comparable timber inventories, there tends to be considerably more competition for publicly owned timber in the U.S. when it is offered for sale, especially during rising markets.

In addition to harvesting, manufacturing, and marketing the resource, the licensee in British Columbia is responsible for most management activities under Ministry of Forests supervision. In all, about 85 percent of management costs are born by the licensee, and although he recovers most of the expenses for approved work either through appraisal allowances or credits against stumpage, he is not always fully reimbursed.

The structure of the Canadian timber industry is more concentrated than the American timber industry and tends to greater vertical integration. Manufacturing and labor costs are very similar. On average, Canadian lumber mills have a slight edge in technology and productivity over American mills. Canadian timber companies tend to earn a larger return on their investment even though effective tax rates are somewhat higher than in the U.S.

British Columbia logging costs are generally lower than in the United States (comparing first entry costs) primarily due to larger clearcuts allowed under Canadian regulations. There is no provision for rate adjustments for undesirable species in the British Columbia system. Road construction regulations are similar. British Columbia access

roads are operator built while Forest Service roads are often constructed via public works contracts. Transportation costs are lower for rail and waterborne shipments in British Columbia.[18] Manufacturing costs and end-product prices are collected from the industry on a monthly basis. The allowance for profit and risk ranges between 10 and 30 percent.

Stumpage rates are calculated for all Crown land on an annual basis and adjusted monthly according to a three-month rolling average of final product selling prices. The trigger mechanism for stumpage rate adjustment is a $5/MBF change in the selling price of products from a particular rate zone. Special stumpage rates of $.40/cubic meter for minor volume sales to smaller operators are designed to encourage development. Operators in the relatively undeveloped and remote Cassier District have also received this special rate for the past five years, though stumpage in this area will be reappraised as of April 1, 1986 (the new Canadian fiscal year) to a higher rate.

Table 7
British Columbia Interior White Spruce Stumpage Rates and Volume Cut*

Year	Prince Rupert Interior		Prince George		Special Rate**
	US $MBF	MBF	US $MBF	MBF	US $MBF
1979 CY	$211.11	38,831.3	$218.12	297,845.6	$9.68
1980-81 FY	60.26	49,829	73.82	229,086.5	9.68
1981-82	29.99	45,202.8	34.48	225,484.4	9.45
1982-83	23.65	37,892.7	24.57	250,240	9.19
1983-84	25.60	74,372.8	27.35	297,314.5	8.75

*Conversion factors for U.S./Canadian dollars and cubic meters/thousand board feet are on file with House Research.

**Volume cut in the special rate category is included in the volume figures shown.

CY = Calendar Year
FY = Fiscal Year

Source: British Columbia Ministry of Forests.

[18]The Canadian timber industry is much more export-oriented than the U.S. industry. The national railroad, C.P. Rail, has special rates for bulk shipments of lumber across Canada and has negotiated similar rates with connecting U.S. lines. Canada does not have any Jones Act type law which artificially raises the waterborne transport cost of U.S. timber products.

The goal of the British Columbia stumpage appraisal system is to maintain stumpage rates at about three percent of the total finished product price. The consensus view of the foresters we contacted who are involved with stumpage appraisals and are familiar with all three appraisal systems is that when all factors are considered, appraised stumpage prices are quite comparable between the systems. The major difference between the British Columbia system and the two methods used in Alaska is the relative absence of a competitive bidding process which drives up stumpage rates.

Another very important factor--which is not easily quantified--is the relationship between the provincial government and their timber industry. Timber operators in remote regions and smaller scale operations are encouraged with reduced stumpage rates in recognition of their fledgling status. The timber licensing system sets aside large areas of commercially harvestable timber for exclusive use by the industry. This precludes many of the multiple use conflicts which characterize the debate over State and National Forest policy in Alaska.

There is a basic philosophical difference between the Canadian and American approaches to forest management. Canada emphasizes economic considerations while the American approach places greater emphasis on long-term biological factors. The Forest Service has been comparatively cautious in its management strategy in Alaska. This is because there is no empirical regeneration data to refer to for the old growth forests in the state. There has not been a large-scale timber industry in existence for long enough to complete a rotational cycle. There is some controversy among foresters over the long-term effects of the more aggressive industry-dominated management strategy in British Columbia and its impact on the viability of their timber industry in 10-15 years when nearly all of their accessible old growth forest will have been harvested. These considerations should be kept in mind during any comparison of the various stumpage systems and their place in the overall structure of the timber industry.

The British Columbia licensing system allows operators to be more flexible in their management expenditures with respect to market conditions, i.e., nonessential expenses can be delayed during unfavorable markets. Operators can also highgrade their timber harvest to maximize returns during market lows. The Canadian government requires primary manufacture of timber but allows companies to export logs when there is excess supply for domestic mills. These exports are closely controlled by the Provincial government and act as a financial safety valve for timber companies during depressed markets.

The British Columbia stumpage appraisal system is more responsive to market fluctuations than the Residual Value Method used by the Forest Service since data is collected from industry on a monthly, as opposed to an annual, basis. Speculation on the market value of products to be produced from a particular sale over the life of the contract is largely absent from the British Columbia system. This prevents operators from making large profits during rising markets but also protects them as markets fall.

In summary, the British Columbia stumpage appraisal system, combined with an industry structure built around a Provincial licensing or tenure system, provides flexibility with respect to market fluctuations and economic stability for the B.C. timber industry.

EFFECTS ON INTERIOR TIMBER OPERATORS

As we have shown, purchasers of State timber sales in Interior Alaska pay considerably more for their stumpage than purchasers of Forest Service or British Columbia timber (Canadian operators also enjoy a 29 percent exchange rate advantage). Thus, the Interior timber operator starts out at a competitive disadvantage because of the cost he must pay for raw material. On the other hand, the Division of Forestry has had no trouble selling all of the timber it has offered for sale in the Interior region, which gives it very little incentive to change its timber sale methodology. It is the local timber operators themselves who have bid the stumpage rates up.

Part of this problem is due to the limited amount of timber that has been offered for sale by the Division of Forestry. Stumpage rates should begin to decline in the near future as larger volumes of timber are offered for sale in the Tanana State Forest within the next two years. As we have shown, stumpage rates comprise only a small portion of total production costs for mature timber operations in Southeast Alaska and British Columbia which produce finished products.

The State Division of Forestry does not maintain the extensive database used by the Forest Service and British Columbia Ministry of Forestry to set stumpage prices. Therefore, no data exist on what proportion of total costs for Interior operators stumpage rates comprise. However, since Interior operators find it most profitable to produce unfinished products and minimize their manufacturing inputs, stumpage rates almost certainly make up a larger fraction of total production costs. As we discuss in Chapters 3 and 4, the competitive position of Interior timber operators only begins with the price they pay for stumpage. There are many other factors which affect the Interior operator's ability to compete, even in local markets.

CHAPTER 3

INDUSTRY STRUCTURE/COMPETITIVE POSITION

Much of the literature which has been written on the Interior timber industry is of the promotional variety which tends to stress the volume of the resource and potential for development. We attempt a realistic assessment of the prospects for development by combining our knowledge of the resource base, summarized in Chapter 1, with an examination of the Interior operator's position in relation to other producers and possible markets. In Chapter 4 we examine the feasibility of specific products, their production costs, and expected prices.

THE STRUCTURE OF THE INTERIOR TIMBER INDUSTRY

The State Division of Forestry estimates there are between 20 and 30 small Interior sawmills that each produce 200 MBF of lumber and houselogs per year or less. The largest Interior producer has an annual output of about 2.4 MMBF per year, with a potential capacity of about 5 MMBF per year. The total 1982 (most recently published data) estimated production volume of sawmills in the Tanana Basin was 5,245 MMBF.[19]

As we stated in Chapter 1, the Interior timber industry is somewhat marginal in nature, with many small operators making a living off of the resource. Nearly every logging and sawmill operation in the Interior uses older equipment purchased outside Alaska. In general, Interior sawmill operators attempt to minimize their manufacturing inputs and produce mostly semi-finished or roughcut, green and air-dried products. The profitability of the products they produce tends to decline in proportion to the amount of manufacturing they put into it. Houselogs are the most profitable product, followed by timbers, roughcut lumber and finished lumber.

Most Interior operators have found it difficult to compete with Canadian imports of kiln-dried, finished and graded spruce-pine-fir (SPF) dimension lumber, which is produced in enormous quantities by state-of-the-art mills in British Columbia and dominates internal Alaska markets for framing lumber. This situation is discussed in greater detail in Chapter 4. There is no research to date on the exact composition of the local market demand for lumber. Thus, there is no way of predicting just how much displacement of British Columbia lumber will occur as greater supplies of timber become available to Interior operators.

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[19]Susan Todd, "Interior Transportation Study", Louis Berger and Associates, Alaska Transportation Consultants, Inc., 1982.

None of the Interior sawmills currently in operation produce lumber graded to nationally recognized standards. Residents have long used air-dried spruce lumber and houselogs for home construction, but standard design practices for multifamily, commercial, and public buildings preclude its use. The State statutes clearly encourage the use of locally produced lumber "wherever practicable" on State-funded construction projects, but very little has been used because of design requirements for lumber graded to Construction Specification Institute (CSI) standards.[20] Thus the potential market displacement of British Columbia lumber by Interior producers is limited by the lack of kiln-dried, planed, and graded products.

Import substitution is seen by most analysts to be the most economically feasible use of the Interior forest resource at the present time. The Cooperative Extension Service, University of Alaska-Fairbanks, Agricultural Experiment Station, the Institute of Northern Forestry and the Tanana Chiefs Conference are all working with local communities and timber operators to improve logging and sawmill efficiency. Virtually every Interior village has a sawmill or access to one. Over time, as the regional population increases and larger areas of State and private timber are brought into the forestry-dedicated land base and access to the timber improves, these small local mills can potentially develop into larger, more sophisticated operations.

INTERIOR TIMBER OPERATORS' POSITION IN PACIFIC RIM MARKETS

Pacific Rim Log Trade

As we have shown previously, Interior white spruce logs on average are graded lower than spruce logs from the coastal forests of Southeast and Southcentral Alaska. For the most part, Interior spruce logs can be classified as "construction grade" (as opposed to number 1 and 2 "structural grade) and compete in Pacific Rim softwood log markets with: Soviet lower-valued species, mainly larch; West Coast Number 3 hemlock and fir sawlogs; British Columbia lodgepole pine-balsam-spruce-hemlock if offered at tidewater as roundwood; and radiata pine from Chile and New Zealand.[21] The principal importing countries are Japan, Korea, Taiwan, and China.

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[20]Alaska Statute 36.15.010.

[21]Donald F. Flora and Richard P. Vlosky, Potential Pacific Rim Demand for Alaska's Construction-Grade Logs, U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, April 1985.

Exports of softwood logs from the Pacific Northwest, Alaska, and British Columbia have risen steadily over the past 25 years.[22] Japan has traditionally been the primary market (95 percent of Alaska forest products are shipped to Japan), but China has become the second largest purchaser of softwood logs within the past year and has increased its imports of West Coast logs from zero in 1979 to one billion board-feet in 1984.

Presently, Japan imports almost half of the softwood construction-grade logs that move across the Pacific Ocean, though its proportional share of the market has declined recently, primarily due to China's entry. In the aggregate, Pacific Rim demand for construction grade logs is expected to increase about 40 percent through 1995 while prices are projected to increase about 12 percent in real terms (inflation adjusted).[23]

Alaska's Market Position

Alaska supplies about two percent of Japan's total wood products imports, but 68 percent of spruce imports. Table 8 portrays Alaska's position in the Japanese timber products markets.

Japanese sawmill operators generally prefer logs to roughsawn lumber (cants and waneys) because logs can be held in inventory longer (lower perishability, one year versus three to six months) and have greater potential for lumber and chip recovery. Close-grained, clear spruce is used in Japanese housing construction for exposed surfaces such as window and door frames and for making musical instruments such as pianos. Western hemlock and lower grade spruce are used for enclosed construction applications. Overall, about 35 percent of imported logs used for lumber become products such as boards, boxes, packing, furniture, cabinets, etc. which do not depend on surface appearance or stress rating for their value.

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[22]Jay Gruenfeld and Associates, "Alaska Forest Market Report", Volume 11, June 1985.

[23]Op. cit., Flora and Vlosky, p. 10.

Table 8
Japan's Imports by Origin and Market Shares of Suppliers 1984

Origin of Import	LOGS Volume	LOGS Market Share	LUMBER Volume	LUMBER Market Share	WOODCHIPS Volume	WOODCHIPS Market Share
	Thousand Cubic Meters		Thousand Cubic Meters		Thousand Tons	
North America:						
Alaska	916	3.4%	277*	7.3%	15	0.5%
British Columbia	972	3.6%	2,173	57.0%	506	18.4%
Washington/Oregon	6,883	25.5%	610	16.0%	2,230	81.1%
Australia/New Zealand	290	1.1%	172	4.5%	NA	NA
Soviet Union	5,211	19.3%	139	3.6%	NA	NA
Other Pacific Rim**	12,683	47.1%	443	11.6%	NA	NA
Total	26,955	100.0%	3,814	100.0%	2,751	100.0%***

*Includes cants and waneys (logs that have been roughsawn on two sides to a maximum thickness of 8-3/4 inches) and baby squares (small roughsawn squared timbers with a specified thickness of 4-1/8 inches or 105 centimeters).

**Primarily hardwood species.

***North American share only.

Source: Joseph R. Mehrkens, "Timber Supply and Demand 1984," U.S. Forest Service, June 6, 1985.

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As a marginal supplier of forest products to the Japanese market, Alaska occupies a "last in first out" position on the overall timber market cycle. Japanese demand for high quality spruce logs is closely related to domestic housing starts while construction grade log demand for Alaska timber is also influenced by North American markets, i.e. when North American markets are rising, greater volumes of Alaska logs and lumber are sold in export markets. Timber demand for the Japanese housing construction market is expected to continue to decline (as it has for the past five years) into the immediate future as fewer new houses are being built, and new models contain less wood. Japan's domestic timber production is expected to increase substantially from current levels (7 MMBF) as forests which were decimated after World War II to rebuild bombed out cities become mature and are harvested. The Japanese government has placed great emphasis on becoming more self-sufficient in timber production. About 60 percent of their domestic

forests are softwoods and almost half of Japan's timber plantations are in the 16 to 35-year-old class and ready for commercial thinning.[24]

Chinese, Korean, and Taiwanese demand for logs appear to be more speculative and not closely related to any single economic variable such as housing starts.[25] Demand for logs in these countries appears to be very price sensitive and has typically focused on construction-grade logs. The late 1980s and early 1990s could hold great potential for exports of North American construction-grade logs to Pacific Rim markets due to political factors and to overall economic growth expected in the region.

Other Suppliers

During the past ten years, about 95 percent of plywood logs imported by Japan have been tropical hardwoods, mainly from Indonesia and Malaysia. As these countries have cut off their old growth forests, they have generally turned the land over to agriculture instead of reforesting. In 1980, Indonesia began to phase in a ban on log exports which became fully implemented on January 1, 1985. Malaysia has recently cut back its log exports by 85 percent.[26] There has been a definite trend over the past few years among Asian log suppliers to require primary manufacture of timber exports. Plywood manufacturers in Japan, Taiwan, and South Korea will require alternative sources of supply for domestic use and re-export of finished products.

The Soviet Union has recently completed a new railroad from Eastern Siberia which gives them further rail links to China as well as Pacific ports and should make them an even larger player in the Asian log trade. During the mid-1990s, large supplies of radiata pine from Chile and New Zealand timber plantations are expected to enter Pacific Rim log markets. Given all of the factors specified above, the Pacific Rim construction-grade log markets should be very dynamic and competitive during the next fifteen years.

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[24]Don Flora, "Alaska's Low-End Logs: Outbound or Stumpbound?", Trade Research Pacific Northwest Research Station, U.S. Forest Service, September 1985.

[25]There is a special grade of so-called "K Sort" logs which are often exported to Korea and China when there is a surplus of pulp grade logs. These logs are of very low quality and would ordinarily be chipped or made into pulp in the United States but are sold on the export market at low prices.

[26]Op. cit. Flora and Vlosky.

Alaska's Competitive Position

Alaska's competitive position as a supplier to the Pacific Rim log trade will, of course, depend on the desirability and price of the species it can offer. Native corporations in Southeast and Southcentral Alaska control the best quality and most accessible stands of old growth spruce and Western hemlock timber. Over the past five years, exports of logs from Native corporations in Southeast and Southcentral have increased dramatically from 70.3 MMBF in 1980 to a high of 232 MMBF in 1983 (202 MMBF in 1984). This increase has occurred even as timber markets have softened and prices have declined over the same period. Note that this increase in log exports does not represent an increase in Alaska's overall market share in Pacific Rim forest products markets. Rather it is a change in the composition of exports from value-added products such as cants to more profitable log exports.

Future Native timber harvests are expected to range from 225 MMBF to 350 MMBF per year if current management practices continue.[27] Native corporations have been willing to sell high quality spruce logs even during declining markets due to cash flow considerations and pressures from shareholders for jobs.

There is not likely to be any shortage of construction-grade softwood logs from Pacific Northwest and British Columbia producers in the forseeable future. Interior operators will probably remain in the position of being marginal suppliers to markets dominated by second-growth timber from other West Coast producers with lower operating costs. The only comparative advantages for Alaska timber producers to exploit in Pacific Rim softwood markets are large volumes of premium quality old-growth sawtimber and the geographical advantage of being one day closer to the Orient for shipping costs. Interior timber operators do not enjoy either of these advantages and are unlikely to gain any significant market share of log exports at current prices (log prices are discussed further in Chapter 4).

Interior Alaska does have an abundance of hardwood timber, albeit mostly of small diameter and low quality. Pacific Rim buyers have repeatedly expressed interest in this resource but have not yet approached either the Division of Forestry or private owners with specific proposals. Very little market research has been done in this area. A realistic assessment of the export demand for hardwood logs and chips would be very useful in light of the changing political climate in additional South Pacific hardowood suppliers.

27/Mehrkens, "Timber Supply and Demand 1984."

INTERIOR TIMBER OPERATORS' POSITION IN DOMESTIC MARKETS

Lack of Infrastructure

A very important aspect of the competitive situation for Interior (and other Alaska) timber operators is the relative lack of infrastructure. Discussions of infrastructure development in the Alaska timber industry tend to focus on who should pay for the construction of logging roads and ignore other aspects of access to markets which may be even more important than access to the resource itself. If we compare the infrastructure enjoyed by a Northern Interior British Columbia mill with a typical Fairbanks operation, the comparative advantages of a mature industry and well developed infrastructure become very clear.

Lumber Production in British Columbia

The British Columbia mill is able to buy small logs that are suitable only for dimension lumber from a log producer at a price that may be less than the average price of producing logs.[28] This is because the British Columbia logger sorts his logs and sells the larger, higher grade logs to another mill that produces high value clear boards with clear cuttings (shop grade). The Canadian mill then produces lumber and other products. One thousand pounds of logs run into the mill produces approximately five to six hundred pounds of of green lumber, three hundred pounds of chips and two hundred pounds of hog fuel. If the mill has an energy co-generation facility, it burns the hog fuel to produce electricity for sale and heat to power a drying kiln; if not, it sells hog fuel for a little more than the cost of handling it.

Most British Columbia mills are so efficient at producing large quantities of lumber with a handful of employees that the return it receives for the woodchips it produces and sells to pulp mills just about covers total labor costs. During times of high chip prices, marginal side boards are mostly chipped. At other times the side boards are sorted and the upper grades sold to specialty markets such as bed frames and fencing and the lower grades are sold to a pallet maker.

Dimension lumber from the British Columbia mill is sold by grade. The economy grade is often chipped, but is sometimes sold to pallet and fencing manufacturers. The utility grade goes to various manufacturers and the cash and carry market. The standard grade and better is kiln-dried and shipped to the homebuilding industry. When log quality dictates, a stud grade is pulled. Studs are sold green or dry, depending

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[28]Alaska Timber Task Force, Memorandum from Tom Boutin to Milt Barker, Deputy Commissioner of Revenue, December 31, 1984.

on the market. When the mill has an exceptionally good run of logs, the upper grades are pulled from the wider dimension sorts and sold to glu-lam and waterbed markets.

Very little of the British Columbia mill's product is sold directly by the mill itself. Many shipments will be traded by two or three wholesalers before reaching their ultimate destination. In addition to having a sophisticated wholesale sector in which to market his products, the British Columbia mill manager can buy and sell lumber futures on financial markets to lock in a price for future production.

Lumber Production in Interior Alaska

In contrast, the Fairbanks mill operator must pay his logger at least the average cost of producing logs in order for the logger to stay in business, since the mill is the only market (other than export). (As we discussed earlier, high stumpage rates on State timber sales raise the cost of raw material going into the mill.) The Fairbanks mill cannot reach many of the specialty markets enjoyed by the British Columbia producer, i.e., the waterbed, pulp, and pallet markets. Lumber which cannot be graded as standard and better and sold on the homebuilding market is sold at a deep discount for farm building and other miscellaneous uses.

In addition to having markets only for green or air-dried lumber, houselogs, timber and firewood, the Fairbanks producer has no support sector of wholesalers to assist in selling his products and no financial market to lock in a price. As we stated previously, the British Columbia operator currently enjoys a 29 percent exchange rate advantage. From the example given above, it is not difficult to see how a British Columbia lumber mill can make a profit selling its products in Fairbanks at a price that may be below the cost of production in Alaska. All of these disadvantages combine to increase entreprenurial risk for the Interior timber operator in a very competitive business. Indeed, there is some evidence that several British Columbia sawmills in the far North are having trouble surviving in the current market situation.[29]

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[29]Edmond C. Packee, "Forest Products Marketing Realities for Subarctic Alaska - Challenge for the Future", Paper presented to the 1985 Convention of the Society of American Foresters, Fort Collins, Colorado, July 30,1985.

Market Potential

There is considerable room for increasing the domestic share of internal Alaska building material markets, especially in dimension lumber. Expectations of how rapidly the domestic industry can develop and how much the State can do to encourage development need to be tempered with a healthy dose of economic reality, however. As one reviewer of the Alaska Timber Task Force Report put it, "there is nothing wrong with the Interior timber industry that a couple of million people in the region wouldn't cure".[30] This statement, while facetious, neatly captures the essence of what numerous feasibility studies for various wood products ventures proposed over the years for Interior timber have concluded. Internal Alaska markets are simply too small to support most types of major wood products facilities.

One theme that occurs frequently in the "potential of Alaska's Interior timber industry" literature is that because the forest is very similar in species and volume to Michigan and Minnesota, where the forest products industry directly employs 115,000 people in primary jobs and several hundred thousand in secondary employment, the same type of development is feasible in Alaska. The implication is that if Alaska only had adequate access to its forest resource base, this type of development could occur. Again, the problem is access to markets. The Lake states mill operator has an enormous midwest market right at his doorstep.

Several analysts have stated that Interior timber products will become more economical in fifteen years or so when Native corporations in Southeast and British Columbia producers will have depleted their accessible old growth stocks. This argument ignores the fact that Interior timber does not compete directly with old-growth stock (although there can be some substitution between grades), it competes with second-growth timber from other areas. As we discussed previously, there will not be any shortage of second growth timber in the world marketplace in the forseeable future.

There are comparatively few states that are not self-sufficient in dimension lumber and pulp and paper production from their own second-growth forests. Major forest products companies are moving from the Pacific Northwest as their supplies of old-growth timber become depleted and are relocating in the Southeast states where labor and production costs are cheaper, private timber land is available for purchase (which solves the problem of having to rely on expensive government timber sales), tree rotations are shorter, and population centers are closer.

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[30]Alaska Timber Task Force, Memorandum from Tom Boutin to Milt Barker, Deputy Commissioner of Revenue, December 31, 1984.

Canadian exports of building products tend to dominate areas of the U.S. which aren't self sufficient. Lumber mills in Southeast Alaska--with relatively cheap timber of high quality (compared to the Interior) as well as the advantage of direct access to waterborne transportation at backhaul rates--enter lower 48 markets only at the very peak of the housing construction business cycle. Building products markets for Interior timber operators are essentially restricted to internal Alaska markets or Pacific Rim exports.

CHAPTER 4

PRODUCTION COSTS, PRICES, PRODUCTS AND MARKETS

In this chapter we propose to examine costs of production, prices and markets for as many of the previously identified timber products (Table 1) which can be produced from Interior forests as the existing data allow.

Most experts on Alaska forest products markets would agree that the timber industry is currently in the trough of the business cycle although internal forest products markets in the contiguous states have picked up somewhat in the past year. As analysts, we tend to view the future in terms of the present, which may make the outlook for future Interior timber development appear to be bleaker than it really is. However, one theme runs through all of our analysis of the Interior timber industry and through all of the contacts we have had with those who study the timber industry in general: investors should be very cautious about investing in development which requires stronger markets than currently exist.

PACIFIC RIM MARKETS

Log Export Efforts

There has only been one major joint venture log export operation in the Interior to date. The Toghotthele Native Corporation in partnership with Fibrex, Inc., exported about 16 MMBF of spruce sawlogs to Japan between 1975 and 1981. This venture ended with mixed results when the log market softened and the Japanese company canceled its contract.[31]

The final contract settlement has yet to be decided in the courts. The Native corporation was left with a seriously depleted timber resource as most of their best quality and most easily accessible timber supply was taken. The logging contractor also highgraded the corporation's timber stands which seriously degrades the genetic stock for future reforestation. The Toghotthele experience has definitely soured other Interior Native corporations on the idea of exporting roundlogs. If the roundlog market improves and prices increase, there will be renewed interest. Currently the emphasis for Native corporation timber is on import substitution and producing building materials for village and local use.

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[31]Rob Leach, Forester, Taghotthele Corporation.

Table 9 gives a breakdown of costs to export Interior spruce roundlogs via the Alaska Railroad through the port of Seward:

Table 9
Costs of Producing Spruce Sawlogs for Export FOB Seward

Interior logging costs:*			
Falling	$11.65		
Ground Skidding to Landing	$35.62		
Hauling (35 miles one way)	$38.90		
Subtotal	$86.17/MBF		
Stumpage:			
Average 1980-1984 Stumpage Price for Spruce Sawtimber	$30.17		
Subtotal	$116.34/MBF		
Freight:			
Alaska Railroad (Fairbanks to Seward)**	$121.29	Nenana to Seward	$107.10
Stevadoring (Railroad to to ship)	$ 15.86		
FOB Seward Total	$253.49/MBF		

*Assumes 1978 fuel prices. Note that these costs reflect existing operator efficiency and would be lower for an operator using new equipment and the latest logging techniques.

**Does not include any charge for lease of a staging area or sorting yard near the railroad.

Source: Computed by the House Research Agency from information supplied by Alan Richmond, University of Alaska-Fairbanks, Division of Forestry and the Alaska Railroad.

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As was discussed in Chapter 1, about 97 percent of Interior spruce sawlogs are graded as Number 3 and below. For the past year, prices for spruce logs in these grades have run $230-$270/MBF when markets could be found, which makes exporting them uneconomical at present.[32]

[32]Jay Gruenfeld, A.C.F. (Associates), "Alaska Forest Market Report", Volumes 9-12, December 1984-September 1985.

We should note that prices for individual contracts can vary widely.[33] If we compare the prices given above with those received for logs from the coastal regions of the state, the marginal nature of log exports from the Interior becomes even more apparent. The average price for log exports in 1984 sold by Sealaska Timber Company from its holdings in Southeast was $373/MBF which returned $89/MBF to the company in profit.[34] The threshold price at which Interior spruce sawlogs become economical to export appears to be about $300/MBF delivered to the ship at Seward.

Export Cants

Cants are logs that have been roughsawn on at least two sides (usually with a maximum thickness of 8-3/4 inches). In Southeast Alaska, timber taken from Forest Service land must meet primary manufacture requirements and thus a sawmill sector oriented to producing cants (which meet minimum primary manufacture requirements) has developed. Since 1978 when Native corporations began exporting significant volumes of roundlogs, there has been a major displacement of cant exports by roundlog exports. Most of the displacement has occurred in hemlock cants. While most Japanese sawmills prefer roundlogs to cants, some smaller "mom and pop" operations are not set up to deal with roundlogs and prefer spruce cants for custom sawing.[35], [36] These operators have been willing to pay premium prices for spruce cants.

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[33]Frontier Resources, Inc., has a contract to sell up to 5 MMBF of spruce logs to a Korean buyer at a delivered price to Seward of $370/MBF. A certain amount of the smaller diameter logs are to be processed local 2.3 MMBF of spruce sawlogs but has yet to harvest.

[34]Speech by Sealaska President Byron Mallot to the 12th annual meeting of Sealaska shareholders.

[35]An additional advantage to roundlogs is that the best vertical grained clear boards from the outside wood of the log are usually ruined in the process of sawing the log into cants.

[36]"Markets for Alaskan Timber Products in Pacific Rim Countries", Development Planning and Research Associates, Inc., May 1983.

There is some evidence that this situation may be changing. The sawmill sector in Japan appears to be retooling to take advantage of large supplies of more profitable roundlogs.[37] In any case, the market for spruce cants appears to be declining. Table 10 gives a recent history of the Alaska-Japan cant trade.

Table 10
Exports of Spruce Cants from Alaska to Japan 1978-1984

	1978	1979	1980	1981	1982	1983	1984
MBF	111,207	94,527	91,245	78,868	83,966	53,814	41,181
$1,000	36,784	45,143	42,872	32,886	32,320	21,913	17,470
$/MBF	331	478	470	417	385	407	424

Source: "Alaska Forest Market Report", March 1985.

* * * *

Cant exports from the Interior would seem to be more economical than logs (depending on sawmilling costs) because a higher value product could be shipped for the same freight cost. We spoke with two Interior sawmill operators who were involved in producing cants for export during the peak market years (1979-1981) shown in the table above. These operators were unable to figure the cost of sawing cants, which in any case is liable to vary somewhat between mills, but both said it was uneconomical at today's prices. We inquired about the possibility of custom sawing baby squares for export to Japanese contractors. Neither of these operators has any access to foreign markets. Cant and log exports from the Interior to date have always been done on a contract basis through a timber broker where the local logger or mill operator does not deal directly with the foreign manufacturer or end user.

Given the facts of a structural change in Japanese sawmilling capabilities, continuing Native exports of high quality spruce logs, and idle capacity in Southeast Alaska cant mills, there doesn't appear to be much of a future for Interior cant exports. Custom sawmilling for foreign contractors does not appear to be a near-term possibility either, given the current level of marketing ability of Interior operators.

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[37]There is no recent research in this area. We base this statement on conversations with several individuals who watch the Japanese timber market closely.

BUILDING MATERIALS FOR INTERNAL ALASKA MARKETS

A considerable amount of research has been devoted to the potential of Alaska's internal markets. Most estimates place current Railbelt lumber consumption at about 100 MMBF annually, of which about 15 MMBF is produced internally.[38,39] As we noted in Chapter 4, about one-third of the domestically produced lumber for the Railbelt region comes from the Interior.

Local markets for building material are likely to remain the mainstay of the Interior timber industry with the North Slope and Yukon Delta becoming increasingly important markets over the next fifteen years. Annual demand for lumber and houselogs in 1985 for the Tanana Basin, North Slope, and Yukon Delta as estimated by the Division of Forestry is given in Table 11.

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[38]Craig J. Lindh, "Domestic Market for Alaska Wood Products", Department of Commerce and Economic Development (DCED), Division of Economic Enterprise, June 1979. Note that this estimate of Railbelt lumber consumption is somewhat suspect and is the sum of three sources: Waterborne Commerce statistics collected by the U.S. Army Corps of Engineers, customs checks at the United States-Canada border, and estimates of domestic per capita wood use. Waterborne Commerce statistics are actually crane operators' estimates of how much lumber was loaded on barges bound for Alaska. Estimates of United States-Canada lumber trade were compiled by Mr. Lindh from personal contacts and varied widely. Since Mr. Lindh's 1979 study, the 100 MMBF market size figure has taken on a life of its own and has been used repeatedly by other analysts in several feasibility studies. A definitive study of the size and composition of the Alaska wood products market using primary data would be very useful for State policymakers and economic analysts.

[39]John L. Sturgeon, State Forester, "Developing an Alaska Timber Market", Speech to the 1983 Alaska Logger's Convention.

Table 11
Forecast Demand for Lumber/House Logs in the Tanana Basin, North Slope and Yukon Delta*

	1985	1990	1995	2000
Lumber/Houselogs (MMBF)	30.1	34.0	38.0	42.1

*Note that these estimates were first developed by Susan Todd in the "Interior Transportation Study" and do not include the expected increase of 8,000 soldiers, civilians and dependents associated with a light infantry division which is scheduled to move to Ft. Wainwright over three years beginning in 1986. If we use her assumptions, this would add 3.2 MMBF to the forecast by 1990.

* * * *

Table 12 provides a snapshot view of Railbelt lumber prices from the results of a July 1985 survey of prices for various dimension lumber products at lumber yards in Anchorage and Fairbanks:

Table 12
July 1985 Dimension Lumber Prices in Anchorage and Fairbanks

Anchorage			Price/MBF
Hemlock-Fir (white)	Standard S4S (surfaced 4 sides) KD (kiln dried)	2"	$365-440
Alaska spruce	S1, S2E, green	1"	$335-455
	S4S, green	2"	$330-440
Fairbanks			
Spruce and hemlock mixed	Rough	2"	$320-420
		1"	$380-540
	Rough #2 and better		
	Standard planks, timbers, beams, stringers, and posts. Lengths through 20 feet.	3x12"	$600
		4x4"	$563
		10x10"	$552
Surface boards #3 and better		1"	$490-600

Source: "Alaska Forest Market Report", July 1985.

Northland Wood Products of Fairbanks (the largest Interior producer which supplied the data in the previous table) has its own grading system which does not conform to national standards. It sells surfaced and air-dried framing lumber for the same price as British Columbia lumber. In fact, both products are sold out of the same pile and customers rarely know the difference. According to the manager, they sell about 30 percent surfaced lumber, with the rest of their business in rough-cut lumber, timbers, houselogs and firewood.

Table 13 gives a recent history of average end product prices received by Interior timber operators. Lumber prices have fallen recently, probably due to price competition with British Columbia dimension lumber. There appears to be some consumer preference for finished, kiln-dried and graded lumber when it is available in appropriate sizes. Interior operators also suffer from a reputation for producing lumber of inconsistent quality.

Note that the price for houselogs, which are a specialty item, has increased in the face of a general decline in wood products prices over the past few years. The increasing price of firewood probably reflects a growing scarcity of available supplies near Fairbanks.

Table 13
1980-1984 Fairbanks Local Wood Products Price Summary

	Lumber $/MBF**	Houselogs* $/LF	Houselogs* $/MBF	Firewood $/Cord***
1980	NA	$2.55	$480	$86
1981	NA	2.55	480	85
1982	$380	2.55	480	92
1983	390	2.97	560	93
1984	340	3.20	600	104

*Northland Wood Products average of two and three-sided 8-inch houselogs.

**Northland Wood Products rough cut 2x6 inch not kiln-dried.

***Fairbanks North Star Borough, Community Research Department average of spruce and birch, seasoned, unsplit, less than two-foot lengths delivered.

Source: Alaska Division of Forestry.

PRODUCTION COSTS

In the standard framing material sizes of dimension lumber, British Columbia and Interior products are fairly close substitutes. Locally produced rough cut and green lumber sells for about 10-20 percent less than British Columbia lumber when compared on an equal basis, while surfaced and air-dried lumber sells for the same price. According to the lumber dealers with whom we spoke, prices for framing lumber are determined by the going rate for British Columbia SPF imports, while prices for other sizes of rough-cut lumber and timbers are determined by "whatever we think we can get."

In the real world of the local producer who handles the product from harvesting the log in the woods to retailing the lumber, there are too many variables to keep track of to have exact figures on production costs and returns for each product he produces and sells. He may figure very closely how much he needs to charge to cover costs and profit for a specialty item like timbers or houselogs, but prices for many of the other products he sells are determined by what other sellers charge.

None of the operators with whom we spoke felt it would be economical for them to build and operate a drying kiln as long as cheap Canadian lumber is available. They were also skeptical about the usefulness of a cooperative drying kiln (a recommendation for study by the Timber Task Force) at their present scale of production and with the wide geographical dispersion of sawmills in the region.

PANEL PRODUCTS

Production of panel products such as plywood in the Interior would be highly desirable in terms of stable employment and high value added in the manufacturing process. However, current and projected total demand in Alaska markets is insufficient to offset investment costs. Total statewide consumption of plywood and other panel products was approximately 50-60 million square feet (MMSF) in 1980.[40] A minimally viable plant size would produce 100 MMSF of 3/8-inch plywood annually. The investment necessary for a plant of minimum size would be approximately $25 million. Total costs on a per thousand square feet of production basis are given on the next page.

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[40]Joseph R. Mehrkens, "Staff Paper: Future Forest Products Development, Interior Alaska", U.S. Forest Service, January 6, 1984.

Fixed Costs (excluding interest)	$25.00/MSF
Operation and Maintenance	$90.00/MSF
Log Procurement	$65.00/MSF
Interest	$5-10.00/MSF
Total Cost	$185-190/MSF

In addition to panel products, such a mill could produce 35-40 thousand tons of wood chips and a million board feet of lumber as by-products.

The 5-year average (1978-1983) selling price for 3/8-inch plywood in Alaska markets was $160/MSF. If we assume the mill would have to produce competitively priced products, a plywood mill would be uneconomical even if the domestic market were able to absorb the entire production. Entry into other Pacific Rim markets is highly unlikely since Alaska producers would face the same tariffs (15 percent in Japan) and other trade barriers as other North American producers. Japan, Korea, Taiwan, and Indonesia have all raised protectionist barriers around their plywood industries.

Two other feasibility studies of panel products, one of a structural particleboard plant and the other of an oriented strand (waferboard) plant in the Railbelt region have been done in recent years.[41,42] These products have done well in regions of North America where shipping costs for imported plywood are significant. Both studies come to similar conclusions--the internal Alaska market is too small to support one of these type of facilities, other North American producers can manufacture these products and sell them in Alaska cheaper than they can be produced domestically, and our Pacific Rim trading partners jealously guard their value-added industries with tariffs and trade barriers. Another difficulty for this type of product is consumer acceptance. Consumers are in the habit of using plywood for panel applications and would not switch to other products readily unless they were considerably cheaper (which would not be possible with Alaska production costs). Particleboard and waferboard have become popular in Eastern Canada, but consumer acceptance took several years.

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[41] Leonard Guss Associates, Inc., "Feasibility of Structural Particleboard Manufacture in Alaska", March 1977.

[42] "An Investigation into Land Clearing Methods and the Utilization of Salvaged Wood Fiber from the Nenana Agricultural Project", Columbia Engineering International, Inc., April 1982.

FINISHING MATERIALS

There has been little recent research on the feasibility of domestically produced finishing materials. This could be an area of opportunity in the future. There are two small hardwood mills in the Anchorage area which produce paneling, furniture blanks, flooring and cabinets, but there is very little data available on the size of Alaska and other U.S. markets for these products. In addition, export markets remain unproven. Value-added products such as veneer, door and window frames or cabinet kits are about the only type of items which could justify the cost of shipping to markets outside the Interior region at today's prices for forest products. This is another area where some primary data collection and basic research into the potential size and composition of markets for Alaska hardwoods would be useful.

PULP AND PAPER

Quite often in the promotional literature and speeches by State officials on the potential of the Interior timber resource, there are statements like: "If the entire 11 million acres of Fairbanks area State-owned land were made available to the timber industry, it would provide enough wood to run 10 large pulp mills".[43] This statement may be true, but the establishment of even one pulp mill in the Interior in the forseeable future appears to be highly unlikely. The two existing pulp mills in Southeast Alaska with their 50-year contracts for cheap timber are barely surviving in today's markets. The last serious examination of the economics of building a pulp mill in Alaska occurred in the late 1960s when Champion International (now merged with St. Regis) explored the possibility of constructing a third mill in Southeast. After prevailing over environmentalist's lawsuits in court, the company concluded that even with a long-term Forest Service contract for cheap timber, the investment was not justified by their expected return.

Alaska's share of worldwide dissolving pulp markets declined by about 8 percent in 1984, while Japanese imports of dissolving pulp (Alaska's major market) increased by 13 percent during the same period. Worldwide, dissolving pulp markets are expected to stagnate or decline into the intermediate future.[44] There is worldwide overcapacity in production facilities for dissolving pulp which is used in the manufacture of rayon and acetate. These products face stiff price competition from synthetic petroleum-based products which are cheaper and often of superior quality. In addition, Alaska producers face rapidly changing

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[43]Esther Wunnicke, Commissioner, Alaska Department of Natural Resources, quoted in the Anchorage Daily News, October 28, 1985.

[44]Mehrkens, "Timber Supply and Demand 1984".

technology in the industry (the two Alaska mills were built in the 1950s) and a strong dollar. Similar pulp is exported from Port Alice, British Columbia; Port Angeles, Washington; and a new large capacity mill (SAICCOR) in South Africa. The SAICCOR mill now accounts for 16 percent of worldwide production capacity as opposed to 13 percent for Alaska's mills.

Table 14 provides a recent history of Alaska's pulp trade:

Table 14
Export of All Types of Alaska Wood Pulp to All Destinations 1978-1984

Unit	1978	1979	1980	1981	1982	1983	1984
Tons	211,449	264,948	312,002	286,226	209,924	241,964	211,440
$1,000	76,750	115,128	153,248	140,493	98,470	117,783	61,950
$/Ton	363	435	491	491	469	487	193

Source: "Alaska Forest Market Report", December 1984 and September 1985.

* * * *

Other types of pulp and paper products mills require access to fairly large markets to be economical. Canadian and Pacific Northwest producers dominate domestic markets.[45] An average-sized, integrated pulp and paper mill like those in Canada or the Pacific Northwest could supply the total annual Alaska demand for newsprint and other paper products with about three week's production. Further penetration of export markets by Alaska producers of any type of pulp products is uncertain; we have already discussed protectionist trends for value-added forest products in Pacific Rim markets.

Currently, there is a large surplus of pulp grade logs in Southeast Alaska. The two pulp mills have found it cheaper to buy British Columbia pulp logs than to harvest pulpwood under their own timber contracts. Native corporations have been unable to market much of their pulpwood and have left large amounts of low-grade timber lying in the woods as they have highgraded their best quality logs for export. This practice is very detrimental to reforestation efforts.

Any new pulp production facility in Alaska would most likely be built in Southeast or Southcentral to take advantage of waterborne transportation rates and large supplies of surplus pulp logs. The economics of a thermomechanical type mill (which produces pulp for paper products)

[45] J. Alfred Hall, "Wood, Pulp and Paper, and People in the Northwest", Northwest Pulp and Paper Association.

type mills on the British Columbia coast has not been studied in any detail. Thermomechanical mills using a continuous digester (which recycles water) are relatively nonpolluting and apparently have a lower minimum economy of scale threshold for economic operation (100 tons/day or about half the size of either of the existing Alaska mills).

WOOD CHIPS

One of the most promising areas for the Interior timber industry is woodchips. The University of Alaska-Fairbanks, Agriculture Experiment Station is exploring the feasibility of using woodchips in coal-fired powerplants for electrical power generation. If it proves to be economical, this use of small diameter timber, logging residue, and wastewood from agricultural land clearing could open up new areas for intermediate forest management as well as provide additional markets for Interior timber operators.

There are four coal-fired power plants in the Fairbanks area which could burn a partial (10 percent initially) mixture of coal and woodchips. These are: Eielson Air Force Base; Fort Wainwright; Fairbanks Municipal Utility System; and the University of Alaska-Fairbanks. Allan Richmond, the research associate in charge of the woodchip study, estimates that if all four utilities burned a 10 percent mixture of woodchips nine months a year (during all but the coldest months of December, January, and February), they could use about 36,000 cords of wood annually.

Woodchips are cleaner to burn than Healy coal. They produce fewer particulate emissions and 40 percent less ash. The estimated cost of producing woodchips at $22.50/ton delivered to the utility is 19 percent cheaper than coal on a per million BTU basis.[46] Woodchips are comparable to coal from a safety standpoint (spontaneous combustion). The project is technically feasible and a test burn has already taken place. It may be possible to use a mixture of greater than 10 percent in the future.

The technology required for making woodchips involves a portable woodchipper which is transported directly to the logging site where it grinds up the material fed into it and blows the chips into vans. The $22.50/ton estimated production cost assumes a 35-45 mile, one-way haul from the logging site to the utility. Outside of Alaska where this technology is being used, the delivered price of chips to the utility is $17-$19/ton. This type of operation might be too expensive to start

[46]Healy coal delivered to Fort Wainwright costs $46.50/ton. On a per million BTU basis, the break-even price for woodchips is $28.50/green ton.

from scratch, but could be a very worthwhile investment for an existing logging operator and may allow him to realize greater cash flow and returns from each timber sale.

The minimum investment cost for an existing logging operator would be as follows:

Portable chipper 150 ton/day minimum size	$48,000 each
Self-dumping chip vans (used) 2 minimum	$16-20,000 each
Total investment for one small chipping machine and two self-dumping chip vans	$80-88,000 Total

* * * *

A 150 ton/day chipper charging $22.50/ton produces $3,375/day at a theoretical harvest cost of $19.50 to $20/ton (including labor and finance charges at 16 percent) and a $2.50-$3.00/ton profit. An efficient operation using two small chipping machines and three self-dumping vans would have an amortized payoff period of about five years.[47]

There do not appear to be alternative export market opportunities at present for an Interior woodchip producer. This situation could change in the long term, however, if prices returned to their 1980-1982 levels. If we assume the $22.50/ton harvest price for a woodchip producer is accurate, the cost to get woodchips from Fairbanks onto a ship at Seward is as follows:

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[47]All of the figures used in this section come from Allan Richmond at the University of Alaska-Fairbanks, Agricultural Experiment Station. We questioned Mr. Richmond closely about the assumptions he used to make his calculations but the House Research Agency has no way of independently confirming these figures. These calculations assume an existing logging operation would already have a faller-buncher, grapple skidder, logging truck tractors, and bulldozer for constructing roads and landing areas. Chippers range in size from the smallest model cited above, to a 400-ton/day model that costs $250,000. The calculations cited above were made two years ago, when interest rates were higher. Current interest rates would shorten the payback period.

Stumpage	$ 3.50/ton	
Harvest Cost	$22.50/ton	green weight
Load Railcars	$ 2.50/ton	
Fairbanks to Seward R.R. Freight	$15.10/ton	
Load onto Ship	$12.50/ton	
Total	$56.10/ton	

Sources: Alaska Bioenergy Supply, Wasilla, and the Alaska Railroad.

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Table 15 below gives a recent history of export volumes and prices for woodchips from Alaska to Japan:

Table 15
Woodchip Exports from Alaska to Japan 1978-1984

Unit	1978	1979	1980	1981	1982	1983	1984
Tons	31,967	81,906	151,328	67,115	74,164	6,645	16,525
$1,000	1,195	3,971	11,436	5,209	5,106	230	769
$/Ton	37	48	76	78	69	35	47

Source: "Alaska Forest Market Report", December 1984 and September 1985.

* * * *

As the preceding table shows, at current market prices, it costs more to load, haul, and unload Interior woodchips than the product itself is worth. Other uses and possible markets for woodchips include landscaping and insulation. (The Alyeska Pipeline Company is currently having a woodchip contractor lay down a thick layer of chips over the underground sections of the TAPS line to insulate it from temperature changes and protect it from heaving.)

The forest management possibilities this technology could open up in Interior Alaska are particularly interesting. Currently, timber operators are required to remove all material over 6 inches in diameter from clearcut areas on State timber sales. Loggers can generally sell everything over 4 inches in diameter as firewood, but this still leaves large amounts of wasted slash and residue in the logged area. The machinery that the Division of Forestry uses to prepare a clearcut for reforestation does a much better job if all logging residue is removed.

Another possibility would be to hire a chipping contractor to remove large areas of black spruce which could be replanted with more desirable species such as white spruce or tamarack. The Division of Forestry estimates that it would cost about $200 per acre for them to thin stands of spruce or remove birch and other undesirable species of trees from spruce stands on State forest land. If a viable woodchip industry were developed, thinning contracts could be sold and the State would have to pay only the cost of administering the contracts. The potential benefits of thinning are great. By thinning spruce stands at the proper time, the period of a rotation cycle can be reduced from 120 to about 80 years.

While the economics of producing woodchips in the Interior seem reasonable in theory, there are several obstacles in the way of development. The first is funding for a 1,000-ton demonstration burn at Fort Wainwright. The Agricultural Experiment Station would like to let out a chipping contract and then monitor the operation to find out exactly how much it costs to produce the chips and demonstrate the feasibility of the process. The Army is willing to conduct the experiment but has already contracted its coal purchases for the year and is unwilling to come up with an additional fuel purchase of $20-25,000 just to demonstrate the feasibility of burning woodchips. The University does not have the ability to fund the experiment either. The project is currently at a standstill until adequate funding can be obtained.

If the economics of using woodchips in powerplants prove to be feasible, the next hurdle would be to acquire a large enough supply of State or Native corporation timber to justify the investment. The current allowable cut of hardwood for fuel in the Tanana State Forest is 20,000 cords.

Another consideration would be financing the purchase of chipping equipment. Firm contracts with powerplant operators would be necessary before a chipping contractor could go to the bank for financing. A long-term (3-5-year) contract for exporting chips would be required before the Alaska Railroad would be willing to acquire the necessary equipment (chip cars and unloading facilities) to ship the product from Seward. If an agreement with a foreign buyer were made, the railroad would be willing to negotiate a hauling contract at a lower rate than is quoted above.

OTHER ENERGY PRODUCTS

The demand for fuelwood in the Interior for the next 15 years is estimated in Table 16 below:

Table 16
Forecast Demand for Fuelwood in the Tanana Basin, North Slope and Yukon Delta

	1985	1990	1995	2000
Fuelwood (MCF)*	41.0	46.0	51.5	57.1

*Thousand cubic feet (11.1 cords = 1 MCF).

Source: Alaska Division of Forestry

* * * *

We have already discussed the Division of Forestry forecast of lumber consumption in the Interior. The forecast of fuelwood consumption given above is based on the same original work done by Susan Todd.[48] This forecast is also somewhat dated and does not include the expected increase in military personnel in the area beginning in 1986. If we use the same assumptions adopted by Ms. Todd in making her original forecast, we should add approximately 8 MCF of fuelwood consumption by 1990.

The Division of Forestry identifies three key factors (among others) affecting fuelwood consumption: 1) the price of alternative fuels; 2) personal income and population; and 3) the availability of fuelwood.

We do not have good data on the price of alternative fuels. The price of fuelwood at the retail level increased 21 percent during the 1980-1984 period (portrayed in Table 13). Fairbanks personal income grew by three percent during 1981-1982 (the latest years for which data are available) and population increased by seven percent in the past year.

As Table 17 shows, fuelwood consumption in the Interior leveled off during 1982-1983 and began to decline in 1984. Most of the recent decline in firewood consumption is probably due to declining fuel oil prices. Another related factor is consumer expectations that the price of fuel oil is likely to continue to decline into the immediate future. Fuel oil price declines reduce the incentive to cut or buy firewood.

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[48]Susan Todd, "Interior Transportation Study."

Table 17
Interior Region Fuelwood Sale Statistics 1980-1984

Type/Species	1980	1981	1982	1983	1984
Commercial Mixed Species	4.2 MCF	6.7 MCF	8.2 MCF	9.0 MCF	5.4 MCF
Personal Use Fuelwood (all species)	6.3 MCF	10.8 MCF	9.0 MCF	8.8 MCF	6.7 MCF
Total	10.5 MCF	17.5 MCF	17.2 MCF	17.8 MCF	12.1 MCF

Source: Alaska Division of Forestry

* * * *

WOOD PELLETS

Hammermilled wood pellets are an alternative use of wood wastes and uneconomical timber for energy production that has received considerable attention in the press recently.[49] This product is made from woodchips which are dried and compressed into three-quarter-inch cylinders. Pellets are comparable to coal on a cost per million BTU basis. The pellets can be burned in special woodstoves for space heating or in power plants. Like woodchips, they are cleaner to burn than coal and produce less ash.

Currently, pellets are imported from other states and sell at the retail level for $200/ton, which makes them marginally cheaper than purchased firewood (one ton of pellets is roughly equivalent to two cords of birch firewood which sells for $90-$150/cord). With local production, the retail price could be reduced to $100/ton. A $2 million plant investment would allow production with an estimated manufacturing cost of $50/ton. The proposed hammermill could produce 300 tons of pellets per day, which is equivalent to about 150 MBF. This type of product is unproven in Alaska and would have to win consumer acceptance.

Consumers would have to be convinced that conversion costs to a special pellet stove (which are 10-20 percent more efficient than conventional woodstoves) would pay off in a reasonable length of time and that handling pellets is more convenient than logs. Another plan for wood pellets is to burn them in a specially designed power plant near Willo or in the coal-fired plants in the Interior.

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[49]"Alaskans Hope Pellets Will Replace Cordwood," Anchorage Daily News, November 11, 1985.

The proposal for Willow is for a 12-MW powerplant and pellet mill. The total investment required would be about $15 million ($12 million for the plant and $3 million for the pellet mill and finance charges). A site near a power substation and the timber resource has been selected. Tom Chaussee, the entrepreneur proposing this project, is in the process of negotiating a long-term (20-year) power sales agreement with the local utility, Matanuska Electrical System (MES). He figures the plant could deliver power at a wholesale rate of 5-5-1/2 cents per kilowatt hour in 1987. Currently MES receives power from Chugach Electric at an effective wholesale rate of 4.2 cents. Some of the natural gas sales contracts that Chugach Electric has with Cook Inlet gas companies will come up for renewal within the next five years, which will likely raise the cost of wholesale power to MES. Thus, it looks as if the utility could possibly benefit from such an agreement.

Before investing in the plant, the owners must negotiate an agreement with the State or Native sources for an adequate timber supply. A 300-ton/day pellet plant like the one proposed would use massive amounts of wood fiber. Mr. Chaussee estimates he would need to sign a 15-year agreement for 5,000-6,000 acres of timber per year before he could obtain firm financing. It would be economical to haul chips within about a 70-mile radius of the mill and the plant could purchase chips from other sources for $15-$17 per green ton. (Note in the woodchip section we stated that the delivered price to a utility in other states was $17-$19.) The second pellet mill proposed by Mr. Chaussee, would be for the Fairbanks region and would sell pellets directly to the four coalfired plants in the area. He figures the plant could become economical if it displaced 25 percent of the coal presently burned by the plants. Wood pellets priced at $50/ton (8,500 BTU/lb.) are about seven percent cheaper on a per million BTU basis than Healy coal priced at $48/ton (7,600 BTU/lb.).

The Division of Forestry is attempting to accommodate the possibility of this type of development in its forest management plans. There is some concern within the division about allowing one individual or company to control such large amounts of timber land. We should note that these plans are speculative at present, although the technology has been proven in other states. If difficulties are overcome, a pellet mill could provide an alternative market for sawmill waste and chipping contractors. There is considerable skepticism on the part of industry analysts over the ultimate feasibility of taking a low-valued product, such as woodchips, through an expensive intermediate manufacturing process to produce fuel which competes with other low-valued products such as coal. There does not appear to be much room for price fluctutations in these proposals. Either of these pellet plant proposals might become more economically feasible if developed as an integrated facility or joint venture with a sawmill to produce some higher valued products from the timber supply.

OTHER PRODUCTS

Charcoal and densified fuel logs are alternative products which could be manufactured from Interior timber and have been studied in some detail recently.[50,51]

The charcoal study does not attempt to develop costs for producing charcoal in Alaska. It is assumed that Alaska operators would sell their products at or below the prices charged by existing producers. The Pacific Northwest and Japan are identified as possible markets for bagged briquette type charcoal while Korea is identified as a possible market for bulk or lump charcoal.

The densified fuel log study took four types of land clearing residue from agricultural land clearing projects in the Interior and had a fuel log manufacturer in Grants Pass, Oregon make it into presto logs. The fuel logs can be manufactured for a price that is marginally competitive with firewood. They tend to decompresss when stored in a covered but unheated place during the transition from winter and summer. An initial investment of about $750,000 would be required to establish a densified log operation. To make it a viable business, an entrepreneur would have to capture the equivalent of one-fourth to one-third of the firewood used in the Fairbanks North Star Borough annually for a market. The technical problems with the product as well as the requirement to capture such a large market share make it unlikely that this product can become economically feasible in the near future.

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[50]Schreuder, Waggener, and Clasby, "The Export Potential for Charcoal Made From Low Grade Alaska Hardwoods and Softwoods", University of Washington, College of Forest Resources, March 1985.

[51]George Sampson and Forrest Ruppert, "Potential for Economical Recovery of Fuel From Land Clearing Residue in Interior Alaska", U.S. Forest Service, September 1983.

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Alaska's Commercial Forest Resource

Department of Commerce and Economic Development
State of Alaska
March 1985

Bill Sheffield, Governor, State of Alaska
Loren H. Lounsbury, Commissioner, Department of Commerce and Economic Development
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OUTLINE

LIST OF EXHIBITS

I. INTRODUCTION

This report provides an introduction to Alaska's forest resource and timber industry. Its purpose is to provide potential purchasers of Alaskan wood products with information on how much timber volume is available, where it is located, who owns it, and who to contact to get more information.

Alaska has 28.2 million acres (11.4 million hectares) of commercial timberland with net volume of growing stock of 50 billion cubic feet (1.4 billion cubic meters). Net volume of sawtimber (trees greater than 11 inches in diameter) is an estimated 215 billion board feet (approximately 1 billion cubic meters).

Most of Alaska's timber is old-growth. Species range from the high volume hemlock/spruce forests in the southeast to the extensive hardwood/spruce forests of the interior. Although some of the forest resource has been withdrawn from production and other areas are inaccessible, there remains a vast commercial timber resource available for sale.

The principal owners of commercial timberland in Alaska are the U.S. Forest Service, Native corporations, and the State of Alaska. The U.S. Forest Service is the dominant owner of the old-growth hemlock/spruce/cedar forests in southeast Alaska where volumes range from 20,000 board feet/acre to 100,000 board feet/acre (approximately 240-1200 cubic meters per hectare). By law, the U.S. Forest Service has a goal of making 450 MMBF (2 million cubic meters) available for sale each year.

The majority of timber made available by the Forest Service is purchased by two companies which have long-term contracts: Louisiana Pacific, headquartered in Ketchikan and Alaska Pulp Corporation, headquartered in Sitka. Both companies operate sulphite pulp mills and operate or lease sawmills. In addition to these long-term contracts, the Forest Service offers significant volumes of timber through a competitive process. Independent loggers and sawmills have built their operations around these sales.

Because the U.S. Forest Service requires primary processing, the industry was built around pulp and cant products. Purchases of cants and pulp may be made through existing owners of timber sales or directly from processing facilities. Opportunities also exist to compete for timber sales, to purchase mills, or to participate in partnerships.

Native corporations are new entities and have only been in the timber industry for 10 years. In southeast Alaska, Native corporations own prime old growth hemlock/spruce/cedar stands of timberland. Native corporations also own substantial volumes of white spruce, birch, cottonwood, and balsam poplar in interior Alaska. Although volume per acre in the interior is less than found in the southeast, vast tracts of virgin timber are available for development. Unlike the Forest Service, Native corporations are not required to process logs before export and have developed a round log export program. As with most profit making companies, Native corporations are very responsive to demand and are receptive to expressions of purchases, investments, and partnerships. Business may be carried out directly with each Native corporation.

As with Native corporations, timberland has only recently been transferred to State ownership. The State offers timber sales ranging from small, short-term sales to occasional large, long-term sales. In addition, the State is establishing State forests as a means of providing the industry with a steady, reliable supply of timber. Purchases may be made from owners of existing timber sales or by directly bidding on a sale. The State Division of Forestry will also consider special requests for a new sale although in the end such a sale must be offered on a competitive bid basis.

Other sources of timber include local governments, individual land owners, and a variety of federal land owners. In addition to direct contact with timber owners, there are an increasing number of timber marketing agents, timber associations, and government agencies available to provide assistance.

This fact book was prepared by the Office of Forest Products, State of Alaska. For further assistance, please contact:

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II. ALASKA'S FOREST RESOURCE

A. OVERVIEW

Alaska has 119 million acres (48 million hectares) of forest land. This represents 16% of the forest land in the U.S. or as much timberland as is found in the states of Montana, Washington, Oregon, and California combined. Of this, 28.2 million acres (11.4 million hectares) is considered commercial (capable of producing at least 20 cubic feet of wood per acre per year). Interior Alaska, with 22 million acres of commercial timberland, contains most of the commercial timberland. Most of the timber volume and industry, however, is located in southeast Alaska where there are approximately 6 million acres of commercial forest.

Exhibit 1 provides a map of Alaska's forest resource. Alaska has two forest types: coastal and interior. Coastal forests consist primarily of old growth (virgin) Sitka spruce, western hemlock, and western red cedar. A maritime climate characterized by heavy rainfall, relatively warm winters, and cool summers supports these species. The net volume of growing stock (gross volume less deductions for defects) on commercial coastal forests is approximately 36 billion cubic feet (1 billion cubic meters).

The climate of the interior is characterized by warm summers, cold winters, and low precipitation. The predominant species in the interior are white spruce, birch, aspen, balsam poplar, and black cottonwood. Most of the interior's 14 billion cubic feet of net volume of growing stock (.4 billion cubic meters) is found along the major rivers.

Exhibit 2 provides estimates of the net volume of growing stock on commercial forest land in coastal and interior forests. About 70% of the net growing stock is found in coastal forests and 30% in interior forests. In coastal forests, 94% of the volume is found in trees greater than 11 inches in diameter. In contrast, 58% of the interior's growing stock is found in trees 5-10.9 inches in diameter.

Exhibit 3 provides estimates of the net volume of sawtimber on commercial forest land in Alaska. While most of the timberland in Alaska is found in the interior, most of the sawtimber is in the southeast. The reason for this is that coastal forests average more than 32,000 board feet of sawtimber per acre (approximately 400 cubic meters per hectare) of timberland while in contrast, the average sawtimber stand in interior forests averages only 1370 board feet per acre (17 cubic meters per hectare). More than 37% of the sawtimber volume in coastal forests occurs in trees greater than 30 inches d.b.h. Most of the interior sawtimber, on the other hand, is between 11 and 20 inches d.b.h. It should be clarified, however, that within the vast interior, there are numerous sawtimber stands with volumes greater than 10,000 board feet per acre (125 cubic meters per hectare).

EXHIBIT 1

Forests of Alaska

- Coastal Forest
- Interior Bottomland Spruce-Poplar
- Interior Upland Spruce-Hardwood
- Interior Lowland Spruce-Hardwoods

EXHIBIT 2 NET VOLUME OF GROWING STOCK ON COMMERCIAL FOREST LAND IN ALASKA, BY SPECIES, DIAMETER CLASS & REGION

Region & Species	Diameter Class					TOTAL
	5-10	11-20	20-30	31-40	41+	
	(Million Cubic Feet))					
Coastal:						
Sitka Spruce	512	2,401	3,112	2,480	3,055	11,560
Western Hemlock	1,348	6,366	7,908	4,479	1,469	21,570
Other Softwoods	192	851	789	316	128	2,276
Hardwoods	63	163	63	11	0	300
Total coastal	2,115	9,781	11,872	7,286	4,652	35,706
%	6%	27%	34%	20%	13%	
Interior:						
White spruce	4,782	3,988	394	0	0	9,164
Paper Birch	2,318	656	0	0	0	2,974
Quaking Aspen	733	162	0	0	0	895
Balsam Poplar	425	685	106	0	0	1,216
Total Interior	8,258	5,491	500	0	0	14,249
%	57%	39%	4%			
Total Alaska	10,373	15,272	12,372	7,286	4,652	49,955
%	21%	30%	25%	15%	9%	
Volume in cubic meters	294	432	350	206	132	1,415

Source: Alaska's Forest Resource, O Keith Hutchison, U.S Forest Service 1967, PNW Bulletin 19

EXHIBIT 3 NET VOLUME OF SAWTIMBER ON COMMERCIAL FOREST LAND IN ALASKA, BY SPECIES, DIAMETER CLASS & REGION

Region & Species	Diameter Class				TOTAL
	11-20	21-30	31-40	41+	
	(MMBF)				
Coastal:					
Sitka Spruce	13,709	18,723	15,174	19,942	67,548
Western Hemlock	33,179	42,020	23,182	7,859	106,240
Other Softwoods	3,929	3,507	1,495	703	9,634
Hardwoods	780	412	83	0	1,275
Total coastal	51,597	64,662	39,934	28,504	184,697
%	28%	35%	22%	15%	
Interior:					
White spruce & other softwoods	23,281	1,668	0	0	24,949
Paper Birch	2,422	0	0	0	2,422
Balsam Poplar	2,228	414	0	0	2,642
Quaking Aspen	804	0	0	0	804
Total Interior	28,735	2,082	0	0	30,817
%	93%	7%			
Total Alaska	80,332	66,744	39,934	28,504	215,514
%	37%	31%	19%	13%	

Source: Forestry in Alaska, Chapter 13 of Alaska's Agriculture and Forestry, U.S. Forest Service, University of Alaska, and State of Alaska.

Note: These data are derived from a 1967 inventory. Some of the sawtimber may be withdrawn from timber harvests.

B. MAJOR ALASKAN SPECIES

Alaska's forests are divided into two types: coastal and interior. Coastal forests are dominated by western hemlock (60%), Sitka spruce (32%), and other softwoods (6%). Interior Alaska is vast with extensive stands dominated by white spruce (64%), birch (21%), and poplars (15%). The important characteristics of the major species found in coastal and interior forests are summarized below:

Coastal Species:

Sitka Spruce (Picea sitchensis): This tree is the largest and most valuable species in Alaska. It typically reaches a height of 160 feet (49 m.) and a diameter of three to five feet (0.9-1.5 m.). The wood is moderately light, does not shatter easily, is easy to kiln dry, straight grained, and is easy to work. Uses include high-grade pulp, airplane parts, boats, pianos, and general construction.

Western Hemlock (Tsuga heterophylla): This species ranges from two to four feet (0.6-1.2 m.) in diameter and 150 feet (46m.) in height. The wood is light and is easy to work. Its most important uses include pulpwood, construction lumber, railway ties, and boxes.

Western Red Cedar (Thuja plicata): These trees can attain heights of 70-130 feet (21-40 m.) and diameters of 2 to 4 feet (0.6-1.2 m.). The wood is light, straight grained, easy to kiln dry, highly resistant to decay, but has a poor nail holding capacity. Uses include boats, shingles, shakes, poles, and fence posts.

Yellow Cedar (Chamaecyparis nootkatensis): This is a medium sized tree typically ranging in size from 40 to 80 feet (12-24 m.) high and 1 to 2 feet (30-60 cm) in diameter. The aromatic wood is easily worked and takes a beautiful finish. It is suitable for window frames, exterior doors, boats, poles, furniture, and cabinets.

Interior Species:

White Spruce (Picea glauca): This species extends over a vast acreage in the interior. On good sites, it attains a diameter of 6 to 18 inches (15-46 cm.) and heights of 40-70 feet (12-21 m.). On the best sites, it reaches heights of 80-115 feet (24-35 m.) and diameters of 30 inches (76 cm.). The wood has an exceptionally high strength-to-weight ratio, glues easily, has excellent dimensional stability, paints well and is also suitable for high quality pulp.

Paper Birch (Betula papyrifera): This species is small to medium sized, usually ranging from 4 to 12 inches (10-30 cm.) in diameter and 20-60 feet (6-18 m.) in height. On good sites birch can attain 24 inches in diameter (60 cm.) and 80 feet (24 m.) in height. It is used for furniture, cabinets, veneer, boxes, and pulp.

Balsam Poplar (Populus balsamifera): On good sites, this species grows to heights of 100 feet (30 m.) and diameters of greater than 24 inches (60 cm.). Its primary uses are for boxes, crates, and sometimes for house logs. Although the fibers are short, balsam poplar is also suitable for pulp.

Black Cottonwood (Populus trichocarpa): This large tree grows 80-100 feet (24-30 m.) tall and 3 feet (1 m.) in diameter. This tree is very similar except bigger than balsam poplar. The wood is used for boxes and crates, pulp, veneer, and lumber.

Quaking Aspen (Populus tremuloides): This tree typically grows 20-40 feet (6-12 m.) high and 3-12 inches (7.5-30 cm.) in diameter. It often occurs in dense pure stands. This wood is light, weak, soft, and has high shrinkage. Its ability to hold a nail is low and has a tendency to crack in nailing. Aspen is suitable for pulp, boxes, and waferboard.

C. REGIONAL CHARACTERISTICS

To further describe the forest resource, it is convenient to divide Alaska into six regions (See exhibit 4). A brief description of the forest resource within each region is provided:

The Southeast Region:

The southeast Region, the principal location of Alaska's forest product industry, contains 11 million acres of forest land of which 5 million are commercial quality and two million designated for commercial management. Most of the timber is old-growth found on islands or within three miles of tideland and at elevations of less than 2,000 feet. Timber stands in this area average 35,000 board feet per acre (approximately 450 cubic meters per hectare) but range from 8 MBF to over 100 MBF. Total net sawtimber volume is estimated to be 166 billion board feet (800 million cubic meters) and consists of 61% western hemlock and 31% spruce with the balance in cedar and other species. Areas designated for commercial management contain some of the highest volumes of old-growth softwood in the world and second growth forests display excellent growth and volume characteristics.

The Southcentral Region:

Forests within the region are scattered and vary greatly in terms of timber types, volume, growth potential, access, wood quality, and economic value. Species in the region include Sitka spruce, balsam poplar, cottonwood, birch, white spruce, and western hemlock.

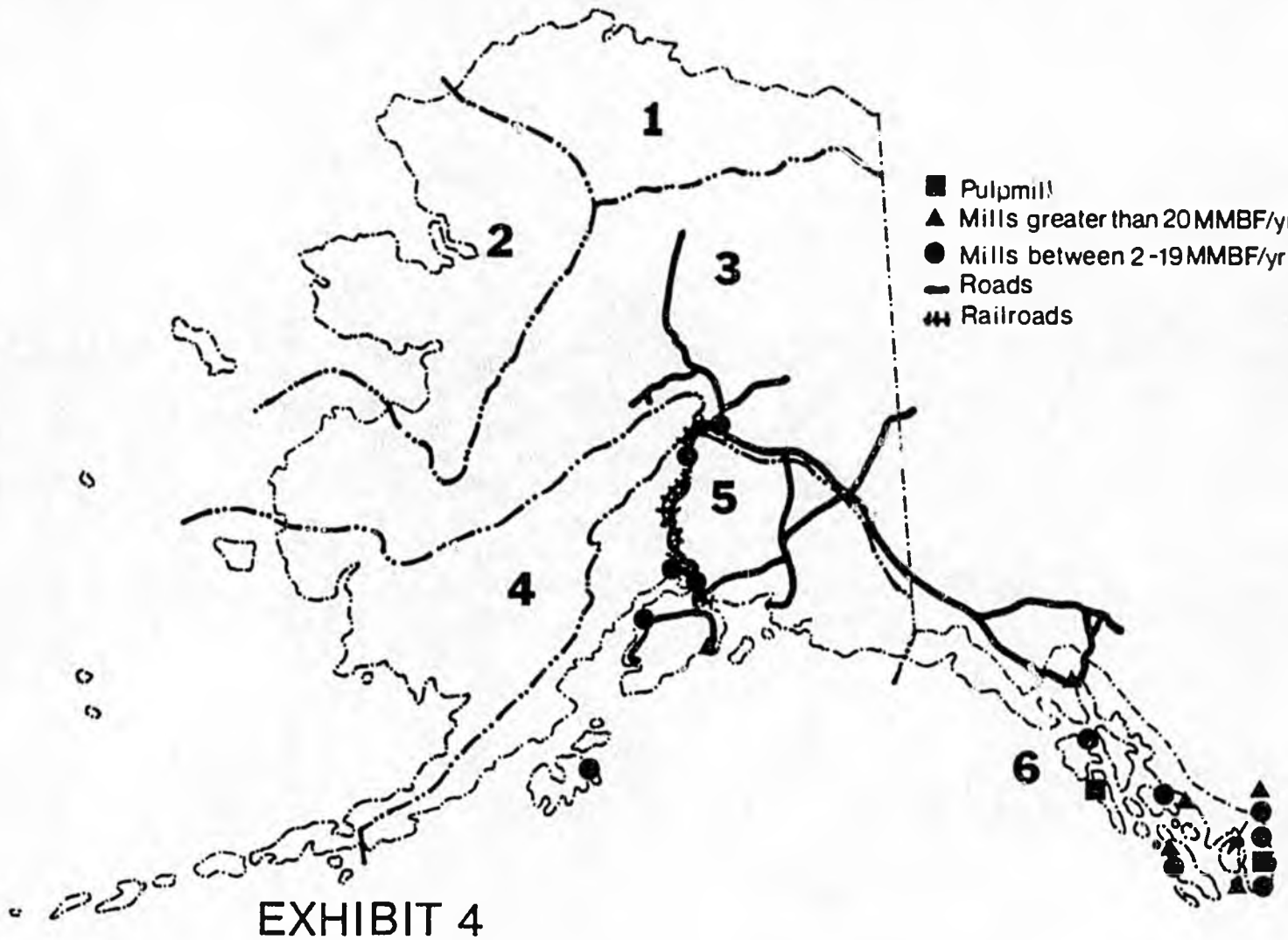


EXHIBIT 4

Pulpmills, Sawmills, Roads & Railroads within Six Biological Regions

1 NORTH SLOPE
2. NORTHWEST
3. YUKON
4. SOUTHWEST
5. SOUTHCENTRAL
6. SOUTHEAST

Reliable data on commercial forest land and sawtimber volume, while not available for the region as a whole, is available for some sub-regions: The 40,000 acres of commercial forest around Kodiak island, for example, are primarily Sitka spruce and average 11,400 board feet of sawtimber per acre; the white and Sitka spruce stands to the west of the Cook Inlet contain 534 MMBF and average nearly 12,000 board feet per acre; Afognak Island contains 5.6 billion board feet of sawtimber and averages over 25,000 board feet per acre of spruce; and the better stands of spruce-hemlock around Yakataga can support over 100 MBF per acre. In contrast, more than one-third of the commercial forest land in the Susitna valley is either without timber or occupied by rotten or poorly formed trees. Where there is timber, the most productive stands occur in well-drained flood plains and consist of black cottenwood, balsam poplar, or birch.

Accessibility in the region is varied and includes the sea, major highways, the Alaska railroad, and major river systems. More than 60% of the State's population resides within the region. There are numerous small sawmills but no major sawmills currently operating in the region and most of the wood consumed is imported from the Pacific Northwest.

The Southwest Region:

This region contains 29 million acres of total forest land and 4 million acres of commercial timberland. Sawtimber stands account for slightly more than 1 million acres of the commercial forest land. White spruce is the predominant species, followed by birch and balsam poplar. Net sawtimber volume on commercial forest land in the region is an estimated 5 billion board feet.

Most of the commercial forests are located along the river banks. Access to the forest resource is possible from the Kuskokwim and other rivers. Access is limited, however, from May to October. Logging may also restricted during the spring thaw in May and the cold winter months. Numerous small sawmills are found in the region that cut lumber and logs for homes, cabins, and other local uses.

The Yukon Region:

The Yukon region contains about 79 million acres of forest land, of which 17 million acres is classified as commercial. Total volume is estimated to be about 20 billion board feet or about 1,100 board feet per acre. Sawtimber stands in the region average about 3,300 board feet per acre. Good sites yield 15,000 board feet per acre. Most of the commercial forest is found along flood plains and low river terraces. Softwoods account for 87% of the sawtimber volume with white spruce the major commercial species. Although most of the forest in the region has never been harvested, large acreages of the forest resource are immature due to fires (on average, an estimated 1 million acres per year burned in Alaska from 1940-1969).

Access in the region includes the Yukon and Tanana rivers, the Alaska Railroad, and the road system around Fairbanks. Numerous small sawmills are scattered throughout the region. Flat terrain and large blocks of ownership provide two of the critical ingredients for large scale timber development.

The Northwest Region:

The commercial forests in the northwest region are found primarily at lower elevations in valley bottoms, along major streams, and occasionally on entire hillsides. Commercial forests occupy about 686,000 acres in this region with white spruce accounting for 87% of the commercial land area and birch about 10%. Sawtimber volume in the region is an estimated 487 million board feet. About 1% of the sawtimber volume is considered grade 1 (best, largest, and free of visible defects) and 27% grade 4 (poorest, but suitable for local use and fiber).

Although white spruce can attain diameters of 30 inches and heights of 115 feet, most of the commercial spruce in this region is less than 12 inches in diameter and less than 50 feet tall. Volume per acre ranges from 100 board feet per acre to 10,000 board feet per acre, but averages less than 2 MBF. Several small mills producing less than 1 MMBF per year exist in the region.

Most of the forest land in the northwest is accessible from the major rivers. Consequently, boat access and log removal by water is the most practical, albeit seasonal, means of transportation. Access by aircraft such as helicopters or use of all terrain vehicles over frozen surfaces is also possible. There is no extensive road or railroad access.

III. OWNERSHIP OF THE FOREST RESOURCE

When Alaska became a state in 1959, the federal government owned 99.8% of the land in Alaska. The Statehood Act, signed into law in 1959, began a dramatic shift of land ownership patterns. The act authorized the State to select 104 million acres (42 million hectares) of land (approximately 28% of Alaska's land area). As of January 1985, the State had applied for 110 million acres of land. Of this, 23 million acres has been patented and 57 million acres tentatively approved.

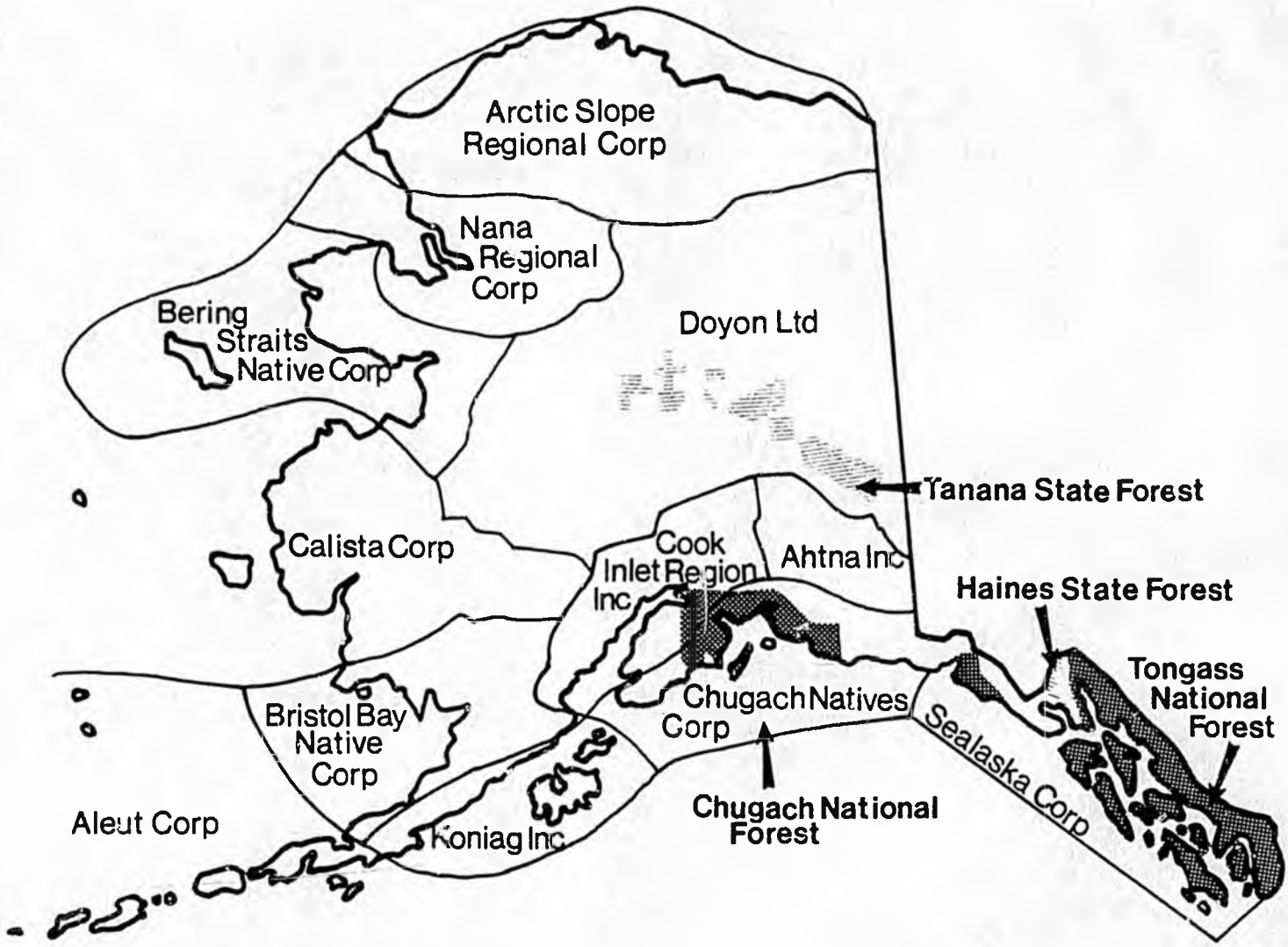
The passage of the Alaska Native Claims Settlement Act (ANSCA) in 1971 was the next legislative action to impact land ownership patterns in Alaska. This act granted thirteen Native corporations and smaller village corporations the right to receive title to approximately 44 million acres (17.8 million hectares) of land (12% of Alaska's land area). As much as eight million acres of this land may be timberland. Although the selection process is not complete (as of 1982 Native corporations had received title to approximately 20 million acres), an immediate result of the initial land transfers has been the entrance of Native corporations into the timber industry. Harvests from Native lands, for example, rose from almost nothing in 1979 to 232 MMBF in 1983. Since there is no prohibition on the export of round logs from Native lands, the importance of round logs in Alaska's timber industry has rapidly increased.

Another piece of federal legislation that is impacting the forest industry is the Alaska National Interest Lands Conservation Act (ANILCA) in 1980. This act added 104 acres (42 million hectares) to conservation systems (national parks, preserves, monuments, refuges, etc.) in Alaska. This act identifies lands available for harvest as well as nonharvestable acres. To compensate for the loss of timberland, the Congress mandated in ANILCA that 4.5 billion board feet of timber be made available each decade from the Tongass National Forest in southeast Alaska. In addition, the act authorized the expenditure of $40 million to maintain this yield. The pulp and cant industry in southeast Alaska uses the Tongass National Forest as its land base.

The result of the Statehood Act, ANCSA, and ANILCA is a unique Native/State/Federal land ownership pattern which is still undergoing change. As a result, ownership maps and inventories are limited. Exhibit 5 shows the national and State forests as well as the boundaries of the Native corporations.

EXHIBIT 5

National Forest, State Forest, and Native Corporation Boundaries



As of 1982, the federal government owned 302 million acres (81% of Alaska), the State 52 million acres (14%), and Native corporations 20 million acres (5%). Of the federal land, over half is in conservation areas. This means that commercial harvest of timber is not allowed on approximately 79 million acres of federal land. By 1990, federal land ownership is expected to decline to 225 million acres, the State's to increase to 104 million, and Native corporation's to 44 million.

In terms of ownership of commercial forest resources, one estimate identified 29 million acres (11.7 million hectares) of which the federal government owns 10.2 million acres (35%), Native corporations own 8.6 million acres (29%), and the State owns 10.6 million acres (36%). In terms of acreage, most of the Native and State-owned commercial forest land is in the interior while the bulk of federal commercial timberland is in coastal areas. However, Native corporations in southeast Alaska have selected prime timber acreage and currently produce over 40% of Alaska's timber harvest.

In terms of existing volumes, growth rates, land ownership, and species, the underutilized interior forests display considerable development potential. Lack of access and only recent private and state acquisition of land are among the historical constraints on development. Another stumbling block to the development of forest resources in the interior has been a lack of ongoing, consistent volumes of timber made available for sale. In an attempt to create a land base dedicated to forestry, the State of Alaska recently created the 229,000 acre Haines State forest and the 1.7 million acre Tanana State forest. These forests, made possible by the State Forest Bill in 1982, dedicate land to forestry and multiple use management. Additional State forests are under consideration.