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TIMBER SUPPLY AND DEMAND 1996

■ *Alaska National Interest Lands Conservation Act
Section 706(a) Report to Congress
USDA Forest Service, Alaska Region*

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Preface

This is the sixteenth report prepared in accordance with Section 706(a) of the Alaska National Interest Lands Conservation Act (ANILCA), which requires the Secretary of Agriculture to monitor and report annually on timber supply and demand in Southeast Alaska. The following pages provide a summary of timber sale activity in the region and a review of the primary factors affecting timber markets in fiscal year 1996.

As required by Section 706(a) of ANILCA, this report was prepared in consultation with representatives from the State of Alaska, the affected Native Corporations, the Southeast Alaska timber industry, the Southeast Alaska Conservation Council, and the Southeast Alaska commercial fishing industry.

Copies of this report have been submitted to the Committee on Energy and Natural Resources of the U.S. Senate and the Committee on Natural Resources of the U.S. House of Representatives. Additional copies may be obtained by writing to:

Director of Ecosystem Planning and Budgeting
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Executive Summary

- *Tongass Timber Availability*

Timber sale purchasers in Southeast Alaska harvested 120.2 million board feet (MMBF) of timber from the Tongass National Forest in FY 1996. This was the lowest rate of timber removal on the Tongass since 1954. The volume of timber harvested under the KPC long-term contract (93.4 MMBF) dropped 57 percent relative to the FY 1995 harvest level while timber harvest under the independent sale program (26.8 MMBF) dropped 55 percent.

The Forest Service offered a total of 281 MMBF of timber for sale in FY 1996.¹ Of this, 89 MMBF was offered under the short-term, or independent sale program and 192 MMBF was fully prepared for offer under the KPC long-term timber contract. Relative to FY 1995 activity, independent sale offerings were down 19 percent and long-term contract offerings were down 11 percent. Approximately 11.3 MMBF (13 percent) of the available independent volume was offered during the last month of FY 1996. As part of the settlement agreement in *AWRTA v. Morrison*, the industry was allowed to access 50.6 MMBF of timber that had already been offered and, in some cases awarded, in FY 1994 and FY 1995.²

- *Timber Industry Employment Continues to Decline*

The permanent closure of some wood processing facilities in Southeast Alaska and temporary layoffs in other small mills have reduced timber industry employment in Southeast Alaska to a decade low. Sawmill employment averaged 230 in FY 1996, a drop of 62 percent from peak employment levels in 1991 and a drop of 24 percent from last fiscal year. The pulp mill in Ketchikan continued to operate throughout FY 1996, maintaining stability in this sector. Logging employment appears to have stabilized, as the average of 1,157 jobs was only slightly less than last year's employment level. In comparison with the decade average (1987-1996) of 2,791, total employment in the region's timber industry is down by 32 percent.

¹ Includes reoffered volume.

² Settlement Agreement and Request for Court Order, *AWRTA v. Morrison*, May 16, 1996, pp. 5-6.

- *Stumpage Prices Remain High*

Stumpage prices (the value of standing timber) for Tongass timber remained high in FY 1996, with bid averages for independent sales running 15 percent over appraised rates.³ Final bid values for independent sales ranged from \$39 per thousand board foot (MBF) to \$352/MBF, averaging \$198/MBF. Excluding purchaser road credits, final bids averaged \$128/MBF. Prices paid for timber harvested under the KPC long-term contract averaged \$202/MBF. Excluding purchaser road credits, prices paid by KPC averaged \$122/MBF.

- *Solid Wood Products Show Rising Value*

Export prices for sawnwood products (dimension lumber, cants, flitches, etc.) continued to climb throughout FY 1996, reflecting tight wood supplies and the relative strength of the Japanese yen relative to U.S. currency. The average price paid for Alaska's sawnwood exports was \$810 per thousand board feet, an increase of 15 percent over FY 1996. Price averages in the domestic market were up 20 percent. An estimated 30 percent of Alaska's sawnwood products are exported, with the remainder destined for ports in the Pacific Northwest. Japan continues to be Alaska's primary export market for sawnwood products and was the destination for nearly 100 percent of lumber exports in FY 1996.

- *Pulp Market Hits Bottom*

The dramatic upswing in 1995 and consequent collapse in the wood pulp market this year exceeded anything seen in the last 20 years. World spot markets for rayon-grade dissolving pulp dropped as low as \$500-\$600/metric ton compared with 1995 prices as high as \$1300-\$1400.³ Market-related shutdowns were frequent. Louisiana-Pacific, parent company of the Ketchikan Pulp mill, reported a record operating loss of \$30.5 million for their pulp operations during the first quarter of 1996.⁴ Shortly after the close of the 1996 fiscal year, Louisiana-Pacific announced the March 24, 1997 closure of the Ketchikan Pulp Company (KPC) pulp mill.⁵ With a production capacity of 190,000 metric tons per year, the KPC pulp mill was the largest remaining wood-consuming entity in the region. The mill was a major component of the Ketchikan economy, accounting for 6 percent of the wage and salary employment and 10 percent of the community's total payroll.

³ "September Demand Continues Slow for Pulp Market; Canadian Shipments Good", *Pulp and Paper Week*, September 23, 1996, pg. 4.

⁴ "Louisiana Pacific Earnings Reinforce Concerns About Pulp Segment Future", *Pulp and Paper Week*, July 22, 1996, pg. 5.

⁵ "L-P to close Ketchikan Pulp next March...", *Pulp and Paper Week*, October 14, 1996, pg. 2.

Introduction

Section 706(a) of the Alaska National Interest Lands Conservation Act (ANILCA) directs the Secretary of Agriculture to monitor and report annually on timber supply and demand in southeastern Alaska. Accordingly, this report describes the status of the timber market in Southeast Alaska during the 1996 federal fiscal year (October 1, 1995 - September 30, 1996).

For purposes of this report, timber supply is defined as the timber most readily available for processing or export in Southeast Alaska. This includes the sum of: 1) timber advertised and timber purchased competitively under the Forest Service short-term sale program; 2) timber made available from State and private ownerships; and 3) timber fully prepared for release (and timber released) under the long-term timber contract between the Forest Service and Ketchikan Pulp Company (KPC). The amount of federal timber in various stages of sale preparation is referred to as the "timber pipeline" and is discussed in this report with regard to timber availability in future years.

The demand for timber in Southeast Alaska is determined by the number, capacity, and efficiency of wood processors in the region, the market value of products manufactured, the technology employed in manufacturing those products, the cost of available wood supplies, and the extent to which government policies enhance or restrict market opportunities. Ultimately, the interaction of all these factors will result in the harvest and import of timber by processors and exporters in the region. This report monitors the volume of timber purchased, harvested, consumed and exported each year, all of which are indicators of the demand for timber in Southeast Alaska. Some of these measures necessarily include timber supplied from non-federal ownerships in the region and timber imported from foreign or domestic sources. In addition, the rate at which timber is purchased and harvested ultimately depends on the demand for wood products. Thus, changes in the wood products industry in Southeast Alaska and trends in key wood product markets are also reviewed in this report.

Timber Supply

Tongass Timber Program Overview - FY 1996

The Forest Service prepared and offered 281 million board feet (MMBF) of timber in FY 1996. Of this amount, 89 MMBF was offered under the independent sale program and 192 MMBF was fully prepared for release to the Ketchikan Pulp Company (KPC) (Table A-2).

Short-term sales totaled 69 MMBF in FY 1996, 32 percent below last year's sale volume. The volume sold included approximately 52 MMBF of timber that had been offered at the end of FY 1995. A total of 158 MMBF of timber was released under the KPC long-term contract in FY 1996, approximately the same amount released last fiscal year (Table A-2).

Timber sale operators harvested 97 MMBF of sawtimber and 23 MMBF of utility grade logs for a total harvest volume of 120 MMBF in FY 1996. Of this, an estimated 60 percent was sawn, 25 percent was pulped, and the remaining 15 percent was exported. The amount of timber harvested under the KPC long-term contract (93 MMBF) dropped 57 percent from FY 1995 harvest levels. Timber harvest under the independent sale program (27 MMBF) declined by 55 percent.

Purchasers of National Forest timber started the fiscal year with approximately 372.6 MMBF of volume under contract, i.e., sold but not yet harvested. Of this, 100.4 MMBF was under contract to independent purchasers and 272.2 MMBF was available under the KPC long-term contract (Table A-17). By the end of the fiscal year, the volume under contract had increased to 144.7 MMBF in independent sales and 320.2 MMBF in long-term contract volume.

Factors Influencing Timber Supply from the Tongass in FY 1996

As reported in the FY 1995 Timber Supply and Demand Report, plaintiffs in *Alaska Wilderness Recreation and Tourism Association et. al. v. Morrison* (hereinafter referred to as "AWRTA") challenged the decision by the Forest Service to offer, as independent sales or as KPC long-term contract offerings, timber sale projects that were originally prepared to satisfy the volume requirements of the Alaska Pulp Corporation (APC) fifty-year timber sale contract.

A settlement in the AWRTA case was approved by the federal district court in Alaska on May 22, 1996. The settlement released 97.6 MMBF (42%) of the 234.6 MMBF of timber under injunction. The remaining timber enjoined by the lawsuit (approximately 137 MMBF) will be subject to further environmental review before it is made available for offer to industry. Approximately 90 MMBF of the timber released in the settlement was allocated to the independent sale program with the remainder (7.6 MMBF) made available to KPC under the long-term contract. Of the timber destined for the independent program, approximately 43 MMBF was already under contract and will be available for harvest after required contract modifications. The remainder will be offered as new independent sales.

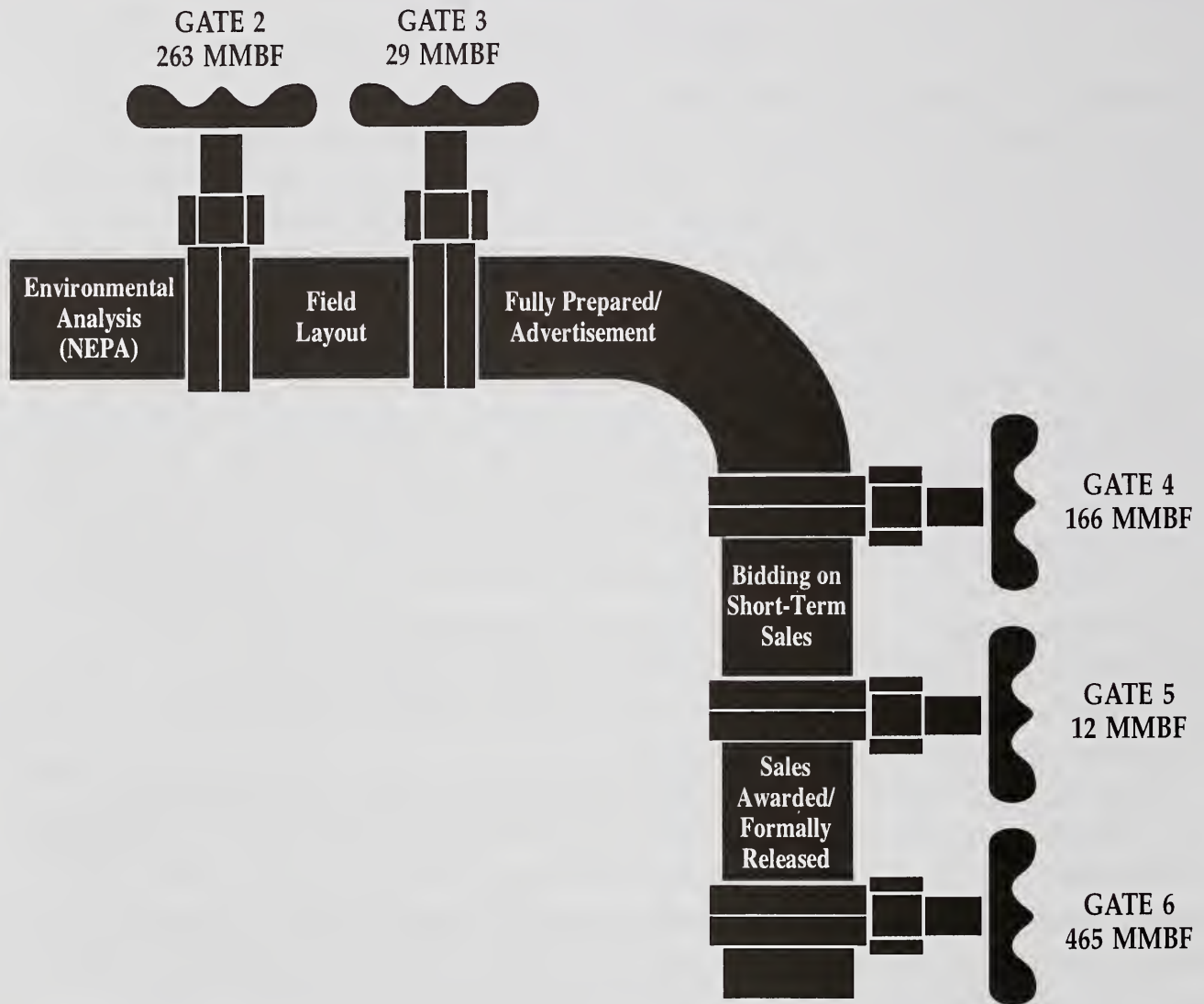
Status of the Tongass Timber Pipeline

At any point in time, varying amounts of timber from the Tongass National Forest are in different stages of readiness for harvest. Each stage is referred to as a "gate," and is defined by specific activities to be completed by the Forest Service before the associated timber volume can pass on to the next gate. Completion of six different gates is required. The sequence of gates numbered two through six is commonly referred to as the timber "pipeline" which serves as a link between timber inventory and timber available for harvest. Although it usually takes three to five years to move a timber sale through the pipeline, administrative appeals and litigation can delay sale preparation and require adjustments to out-year planning schedules.

Standing timber purchased from the Forest Service is referred to as "volume under contract." Timber processors generally have some volume under contract that is carried over from one year to the next. This gives them a "pool" of wood to use to bridge the gap between the time a sale is purchased and the time harvest activities can begin. For instance, it can take an operator one or more years to complete the road construction needed to gain access to a new sale area. While this work is underway, the purchaser can be harvesting timber purchased in prior years. The Forest Service strives to provide an opportunity for the industry to maintain a timber supply equal to approximately three years of mill production. At the close of FY 1996, 145 MMBF of timber was under contract to independent operators and 320 MMBF of timber had been released and remained unharvested under the KPC long-term contract.

Figure one illustrates the timber pipeline at the end of FY 1996. In its entirety, the timber sale program includes a much greater volume of timber than the amount offered for sale each year. For example, in FY 1996, the environmental analysis required under NEPA had been completed for project areas including some 908 MMBF of timber. This figure represents about three times the annual amount of timber that has been offered for sale in recent years. However, only part of the timber in the pipeline can readily be made available to purchasers. Sale preparation and the site-specific layout of cutting units must still be completed before 292 MMBF of the total "NEPA-cleared" timber sales can be advertised. In addition, part of the timber volume offered this year (i.e., cleared through gates 4 or 5) has not been awarded or released yet (178 MMBF). The remaining 465 MMBF of timber in the pipeline has been awarded or released to purchasers (i.e., cleared through gate 6) and usually represents the most readily accessible supply for the industry. Timber sold in prior years and not yet harvested is included as part of this supply.

**FIGURE 1. Tongass National Forest Timber Pipeline
September 30, 1996**



Note: See FSH 2409.18 for more information about the steps in timber sale preparation.

Other Sources of Timber

The bulk of the wood processed in Southeast Alaska comes from the Tongass National Forest. This is the result of two primary factors. First, except for Alaska Yellow Cedar and portions of the Western Red Cedar species, federal sawlogs are prohibited by law from being exported without local processing. Second, in comparison to the prices local processors are willing to pay, most species and grades of unprocessed logs bring higher prices in international markets. Consequently, non-federal suppliers export as many logs as possible, leaving primarily Tongass timber to supply local mills.

Timber Supply and Demand

Southeast Alaska Native Corporations. The 1971 Alaska Native Claims Settlement Act established thirteen Native Corporations in Southeast Alaska and entitled them to select some 600,000 acres of land from the Tongass National Forest. Approximately 10 percent of the non-reserved standing timber volume in the region was conveyed to these corporations. Since 1983, timber removals from Native Corporation lands have exceeded the level of harvest on the Tongass National Forest. Therefore, in purely physical terms, there has been an ample timber supply for local manufacturers. However, as a result of the higher prices paid for round logs in the export market, most timber from Native land is shipped "in the round" (i.e., without processing) to foreign destinations.

The contribution of Native timber to the supply available for local manufacture is also a function of the relative strength of pulp and lumber markets and the price and availability of timber from other sources. In the mid-1980s, for example, most pulp logs were left in the woods as a consequence of the soft pulp market. At the same time, imports of lower-cost logs from Canada further displaced pulp logs from private land in local markets. By the end of the decade, pulp production had increased in response to improved market conditions, and the demand for lower grade timber from all suppliers was renewed.

State Timberlands. The Forestry Division of the Alaska Department of Natural Resources (DNR) manages the state's commercial forest lands. The 49,000 acres of commercial forest land in the Haines State Forest can sustain an annual allowable cut of 6.96 MMBF. While only general information is available on the rest of the state's timber resources in Southeast, the commercial acreage has been estimated at 17,500 acres. It should be noted that the state lands in Southeast were selected with an eye towards community expansion and typically take the form of small parcels in the vicinity of populated areas. The aggregate allowable cut for these areas has been approximated at 4 MMBF per year. The most recent five-year timber sale schedule issued by DNR indicates that the state will offer an average of 12 MMBF of timber annually in Southeast Alaska through the year 2000.

Log and Chip Imports. In the early eighties, Canada's efforts to maintain logging employment (in spite of poor timber markets) generated a surplus of pulp logs in British Columbia (B.C.). Consequently, Canadian pulp logs could be imported for about half the price of similar raw material available in Southeast Alaska. The coincident strengthening of the U.S. dollar against Canadian currency provided an added incentive for mills in Southeast to turn to Canada for raw material. In recent years, only minor log import activity has occurred in Southeast, in part due to the considerable rise in log values. Also, in response to growing land use conflicts, the need for watershed protection, and increased resistance to clearcutting, the Canadian government has prohibited round-log export and encouraged the manufacture and sale of more finished wood products.

Timber Demand

As a general concept, a demand curve illustrates the quantity of a particular product that will be purchased at different price levels. At least four variations of this relationship are relevant to this discussion, including: 1) an individual's demand for a commodity or service; 2) the collective, or aggregate demand of all consumers for the output of the industry; 3) the "derived demand" for intermediate goods which will enter into future production; and 4) the demand for the output of a particular firm in the industry.

The following pages provide summary statistics on the volume of timber purchased, harvested, consumed, and exported from within Southeast Alaska, all of which are indicators of timber demand. Some of these measures necessarily include timber supplied from non-federal ownerships in the region and timber imported from foreign or domestic sources. In addition, the rate at which timber is purchased and harvested ultimately depends on the demand for the wood products manufactured. Thus, changes in the wood products industry in Southeast Alaska and trends in key wood product markets are also reviewed here. This report is intended to monitor timber markets and makes no attempt to speculate on what may have transpired if the numerous factors influencing timber and wood product demand had somehow been altered. As a result, it is technically a report on the *quantity* of timber demanded in FY 1996, given the cost of alternative supplies and the prevailing market conditions.

Quantity of Timber Consumed and Exported in FY 1996

Table 2 includes estimates of the installed operable mill capacity in Southeast Alaska and total log consumption in FY 1996. Log export volumes are also reported to provide a complete accounting of raw material flows in the region. It is important to note that mill capacity alone does not constitute market demand. However, it does set an upper limit on roundwood consumption in the short run. As shown below, total round log consumption in FY 1996 is estimated at 200 MMBF. Including chip by-products, the round log equivalent of timber consumed in Southeast Alaska is estimated at 252 MMBF. Log exports accounted for an additional 313 MMBF.

Although some Western Red Cedar and Alaska Yellow Cedar is sawn locally, these species have not traditionally been processed in the region and most unprocessed logs are shipped to markets outside of Alaska under special export exemption (Table A-3). Therefore, to the extent cedar volume is included in estimates of timber supply, the volume available for local processing under historical use patterns will be overstated. For example, if cedar accounted for 12 percent of the available timber volume, roughly 227 MMBF of timber would have been harvested to obtain the quantity of spruce and hemlock logs consumed this year. Given the closure of the remaining pulping facility in the region and

the declining availability of timber from all ownerships, the Forest Service is in the process of reviewing its log export policy and the role of the cedar species in development of the region's wood products industry.

**TABLE 2. ESTIMATED TIMBER CONSUMPTION AND EXPORT
SOUTHEAST ALASKA FY 1996**

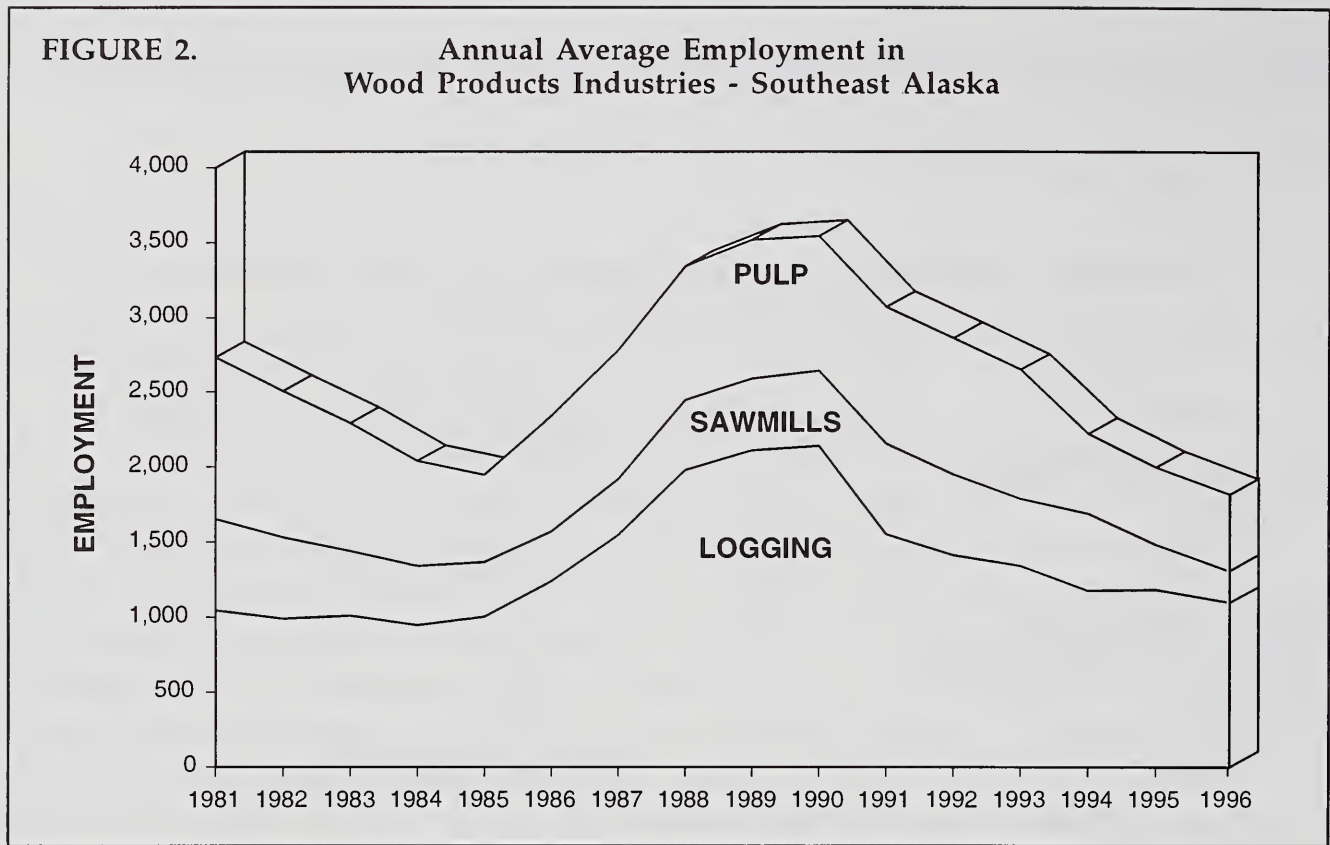
	Installed Capacity (MMBF equiv.)	Wood Fiber Consumed FY 1996 (MMBF equiv.)	Percent Capacity Utilized FY 1996
KPC Long-Term Contract:			
Sawmills	110	80	73%
Pulp Mill	190	92 + 52 MMBF in chips	76%
Independent Sawmills¹	73	28	38%
Subtotal Log Consumption		200	
Log Exports		313	
TOTAL		513 + 52 MMBF in chips	
/1 Capacity as reported by mill owners. Consumption estimated.			

The Wood Products Industry in Southeast Alaska

Since 1928, when the Forest Service established requirements to process National Forest timber within Alaska, the Tongass timber program has been part of an ongoing effort to provide for economic diversity and year-round employment in Southeast Alaska. However, as indicated by periodic declines in the timber-related sectors of the Southeast Alaska economy (Figure 2 and Table A-1), timber supply alone cannot ensure employment stability. Other important factors include economic conditions in Alaska's primary markets, the strength of other competitors for those markets, and the development and acceptance of wood-product substitutes. Employment may also be reduced when equipment is upgraded for increased efficiency.

Industry Update

Throughout FY 1996, Ketchikan Pulp Company (KPC) held the remaining long-term Forest Service contract for Tongass timber. As specified in contract number A10FS-1042 (dated July, 1951), KPC secured cutting rights for up to 8.25 BBF of National Forest timber, within a sale area designated on the northern half of Prince of Wales Island and the northwest portion of Revillagigedo Island. In 1954, KPC built a dissolving pulp mill in the community of Ketchikan, near the southern end of the Tongass National Forest. At full



capacity, the mill reportedly required 190 MMBF of pulpwood and chips annually to produce 190,000 metric tons (210,000 tons) of dissolving pulp. According to KPC, pulp production in FY 1996 totaled nearly 128,000 metric tons (140,800 tons). The company reports that the mill was shut down for 71 days in FY 1996.⁶

Two sawmills located at Ketchikan and Metlakatla are also operated by KPC. They reportedly have a combined log processing capacity of 110 MMBF. The Ketchikan sawmill was re-opened in 1989 and is designed primarily for the manufacture of finished lumber from small-diameter logs (7-18 inches). According to KPC, the mill ran at 60 percent of capacity during FY 1996 and processed 30 MMBF of sawlogs.⁷ The Annette Island Hemlock sawmill and its associated chip mill are also operated by KPC under a lease agreement with the Metlakatla Indian Community. The Metlakatla-based mill is set up to process large-diameter logs (18-65 inches) which are becoming increasingly difficult to obtain at competitive prices. This sawmill typifies early timber operations in Southeast Alaska, as it produces only rough lumber, primarily cants. KPC reduced operations at its Metlakatla mill to a single shift in FY 1996 and reports that the mill ran at 83 percent of capacity throughout the year, processing approximately 50 MMBF of sawlogs.⁸

In addition to supplying timber under the long-term contracts, the Forest Service participates in a Small Business sale program in conjunction with the Small Business

⁶ DeLynn Mitchell, KPC, FAX transmittal, December 1996.

⁷ Mitchell, December 1996.

⁸ Mitchell, December 1996.

Timber Supply and Demand

Administration (SBA). Under this program, a target offer volume of 100 MMBF each year is to be offered to qualified small businesses in Southeast Alaska. In FY 1996, all of the independent sales offered (89 MMBF) were offered under the SBA program. At least 50 percent of the wood offered for sale under SBA set-aside sales must be manufactured by a firm of 500 employees or less. The largest small-business firms currently bidding on Tongass timber sales include Seaborne Lumber, Metlatkatla Forest Products, Pacific Rim Cedar, Silver Bay Logging, and Viking Lumber Company. Timber buyers who do not have their own processing facilities sell their logs on the open market or contract with area sawmills to manufacture green lumber.

District Rangers are given the authority to offer and award timber sales of up to 5 MMBF. Ranger sales of less than 200 MBF are occurring more frequently in the southern portion of Southeast Alaska. Because a large tree may contain as much as 5 MBF, smaller sales sometimes only include two or three trees. The increasing number of requests for such sales on the Ketchikan Area of the Tongass National Forest prompted both the Thorne Bay and Craig Ranger Districts to designate specific staff with the primary responsibility of preparing very small timber offerings.

The Special Salvage Timber Sale (SSTS) program is another cooperative effort between the SBA and the Forest Service, established under the National Forest Management Act (NFMA). Salvage sales are those intended primarily to remove trees that are damaged, dead, or down due to insects, disease, fire, or wind throw, and to remove associated trees for stand improvement. When salvage sales are offered under this special program, bidding is limited to firms with 25 employees or less.

Many smaller-scale manufacturers of wood products are located on Prince of Wales Island. Although individual operations may vary, they generally fall into one of three categories: 1) very small sawmills with a total capacity of less than one million board feet annually, including portable mills with special-use permits for on-site processing; 2) cedar salvage, shake, and shingle producers; and 3) manufacturers of specialty products, including high-quality components for musical instruments. The Forest Service "personal use" permit system also keeps a number of small sawmill operators busy breaking down logs into lumber for individual permit holders. A 1994 survey identified 31 separate entities in Southeast Alaska that process less than one million board feet of wood each year. A total of 58 people were reportedly employed by these small operations.⁹ Despite the high level of activity, the combined wood processing capacity for these mills is reported to be less than 3.5 MMBF.

⁹ Alaska Lumbermen's Association, Memorandum on the Capacity of the Southeast Alaska SBA Mill Operations, June 14, 1994.

Markets for Wood Product from Southeast Alaska

The combined value of Alaskan wood product exports exceeded \$516 million for the 1996 fiscal year (Table A-4). At \$390 million in export sales, shipments of whole logs accounted for 76 percent of the total dollar value of Alaska’s wood product exports. Log export values in FY 1996 increased 10 percent relative to last year’s prices, averaging \$708 per MBF. After hitting a decade low in 1985, Alaska’s lumber export values have followed a generally upward trend (Figure 3). At \$810/MBF, prices for Alaska’s lumber exports in FY 1996 surpassed last year’s record high. Lumber export volumes in FY 1996, however, declined by 65 percent relative to FY 1995. The 25.9 MMBF of lumber exported in FY 1996 was roughly one-tenth the volume shipped during the peak production year of 1990.

Because of the small volumes involved and our inability to differentiate grades within the available data set, it is difficult to fully explain the continued increase in valuation for sawnwood products exported from Alaska. Caution should be exercised in interpreting the data as being indicative of market trends in a more general context. The price increases reflected in this data set may simply be a function of an increasingly selective sort for the Japanese market rather than a steady upward shift in demand for the same product mix.

The domestic lumber market strengthened in FY 1996 with prices averaging 20 percent

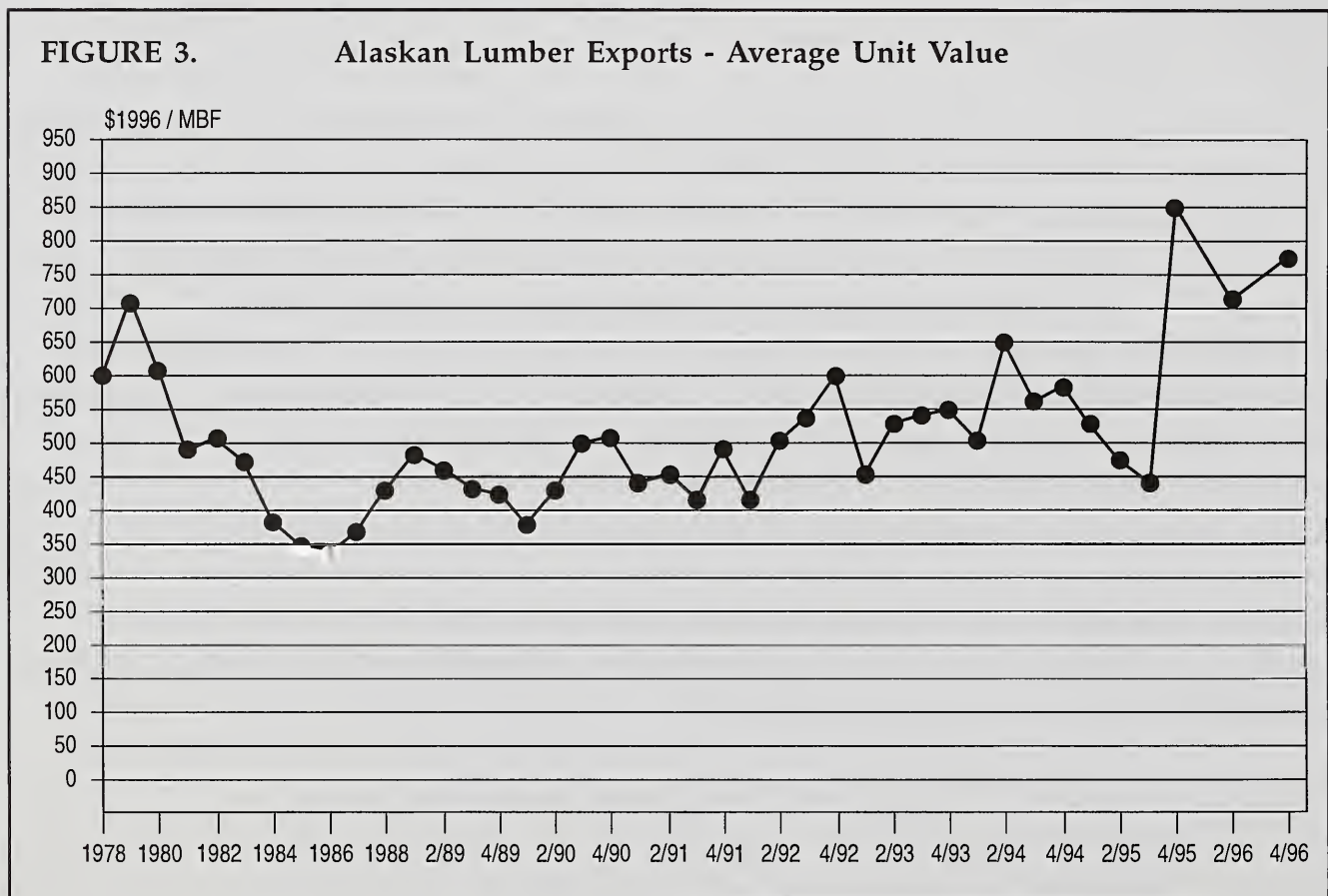
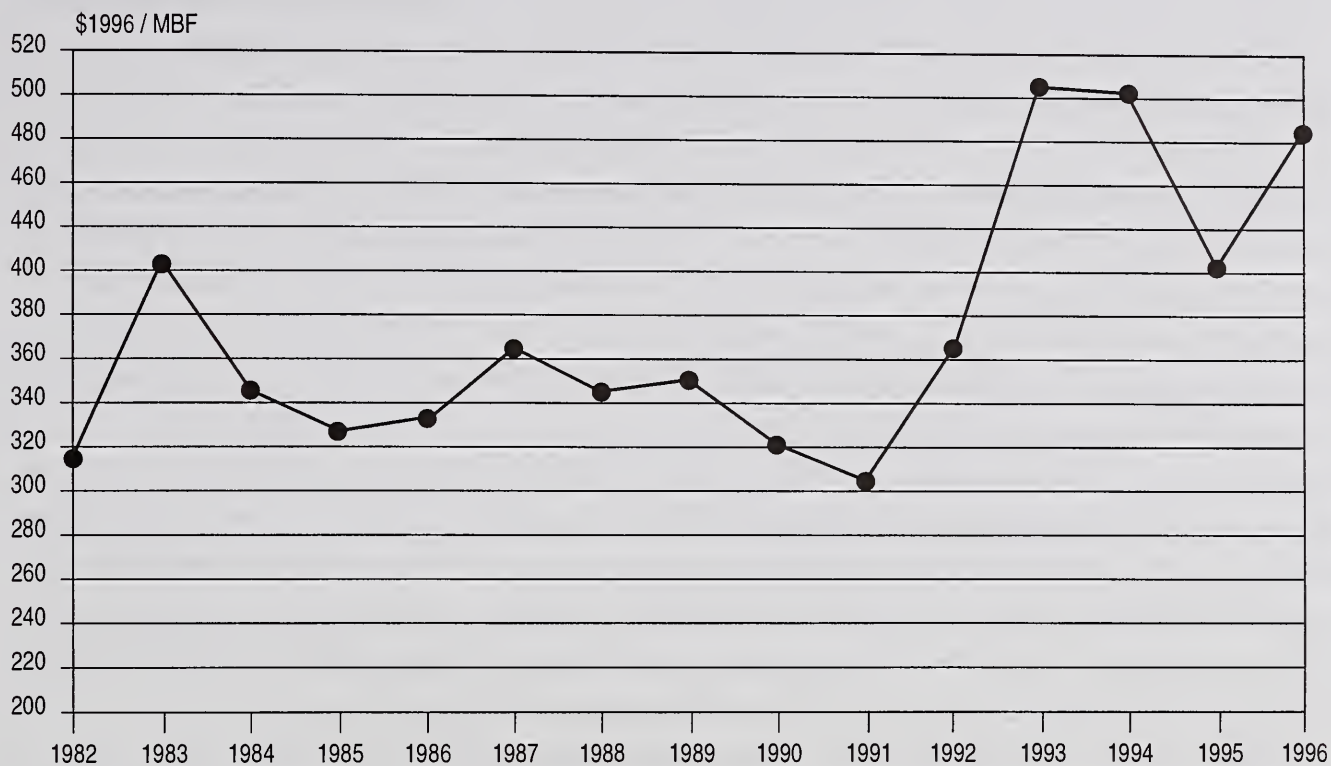


FIGURE 4. Price Averages for Framing Lumber in U.S. Markets



above FY 1995 (Figure 4). In response to recent shifts in wood products markets, Alaska's lumber manufacturers have steadily increased shipments to states in the Pacific Northwest. Although these trade flows are not captured in export statistics, information provided by the mill owners suggests that around 30-40 percent of Alaska's lumber output is shipped to domestic markets. In addition to rough-cut studs for framing, U.S. manufacturers are purchasing lumber from Alaska that fails to meet Japanese housing standards as well as lower grade material with a high percentage of knots and defect. These characteristics are removed during manufacture as the wood is cut into smaller size pieces, dried, and finger-jointed. A wide range of products are manufactured from the finger-jointed material including door and window framing, furniture, garage door pieces, doors for homes, paneling, window casing, and molding. The fine grain of Alaskan timber makes it especially well-suited for machining, and the process of finger-jointing increases the value of otherwise marginal timber.

Pulp exported from Alaska represents about 13 percent of the dissolving pulp imported by major consuming nations, including the United States. Alaska's FY 1996 exports of dissolving pulp dropped 30 percent relative to FY 1995. Unit prices averaged \$867 per metric ton, 10 percent below inflation-adjusted unit prices during the 1989 market peak.

Japan remains the primary market for Alaska's wood product exports, receiving approximately 63 percent of the total dollar value. In FY 1996, Japan received virtually all of Alaska's lumber exports (Table A-6). Japan also received most of Alaska's log exports,

accounting for 75 percent of the total dollar value in FY 1996. South Korea (18 percent) and Canada (3 percent) were other primary destinations (Table A-9). Taiwan was the primary destination for Alaska's pulp exports, receiving 52 percent of the total dollar value in FY 1996. Other sizable markets, in terms of total dollar value, include West Germany (13 percent), Japan (12 percent), China (10 percent), and Indonesia (9 percent).

Japan - Market Update. Although the Japanese market is vital to Alaska's wood products industry, Alaska supplies less than one percent of Japan's total softwood lumber imports. Japan has dominated world markets for softwood and tropical hardwood log imports for many years and is rapidly becoming one of the world's largest importers of softwood lumber. In addition, Japan's reliance on imported wood has steadily increased over the years to account for 80 percent of total wood consumption in 1995.¹⁰ Japan imported a total of 4,190 MMBF of softwood lumber during calendar year (CY) 1995, the bulk of which was purchased from Canada (59%). Together, Canada and the United States supply over 76 percent of Japan's softwood lumber imports. Since Europe mandated kiln-drying of all lumber imports, Canadian manufacturers have increased shipment to the U.S. and Japan.¹¹ At the same time, U.S. lumber exports to Japan have continued to decline from 35 percent of total trade volume in 1989 to 18 percent in 1995 (Table A-13).

Of the four key lumber markets in Japan (packaging and pallets, traditional housing, prefab housing, and industrial uses), the housing market is by far the largest and most difficult to break into.¹² Quality control is extremely important to Japanese home builders and meeting grade specifications is the number one issue for suppliers. Modern mills in urban areas need supplies of high value log imports to effectively compete, on a quality basis, with the skilled, labor-intensive production of the smaller rural mills. The combination of extraordinarily high logging costs in Japan, a growing shortage of young workers willing to live in rural locations, and log export restrictions in major supply regions, suggests a high potential for continued growth in Japanese lumber imports. The strength of the Japanese yen and rising labor costs, further support the expansion of finished product imports over the next few years. Both Canada and the United States have spent considerable time and money teaching Japanese contractors to build homes of 2x4 construction while exploring the prospects for trade in kiln-dried metric lumber, should these building techniques become more widely accepted.¹³

As the Japanese economy slowly creeps out of a prolonged recession, the nation's housing market also shows signs of a sustained recovery. Perhaps more importantly, wood-based houses account for a growing share of new construction. Although 1996 housing

¹⁰ Wood Industries in Japan, Japan Wood-Products Information and Research Center, 1996.

¹¹ "Canada Forced Out of European Market", Pulp and Paper Week, December 13, 1993, pg. 7.

¹² Bob Lewis, "Radiata Pine Products for Japan-The 21st Century", Pacific Rim Market Report, July 1992, pg. 4.

¹³ Japan Wood-Products Information and Research Center, 1996.

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starts were down 4 percent from the high of 1.7 million recorded in 1990, the number of wood-based homes increased by 4 percent (Table A-16). Moreover, because the average size of wood homes built in Japan has increased by 17 percent since 1990, in terms of actual floor space, the amount of wood used in home construction has actually increased over the last five years. Although traditional post and beam construction still dominates the market, home buyers in Japan are becoming increasingly cost conscious and more accepting of North American 2x4 construction methods. The latter technique now accounts for about 11 percent of Japan's wood-based housing starts.¹⁴

A number of government initiatives promise further gains to the housing sector. The average home size in Japan is about 900 square feet which compares to the U.S. average of 1300 square feet. The Government Housing Loan Corporations (GHLC) of Japan, which finances over 54 percent of all single-family homes and 33 percent of all new construction loans, has set up a preferential loan system to create larger, safer, and more durable homes. These "Top Quality Housing Guidelines" increase floor area for single family homes to 1,292 square feet. In addition, Japan's Ministry of Construction (MOC) has set goals for reducing housing costs by one-third before the year 2000 by reducing construction costs, increasing the supply of land for construction, and cutting government regulations. Measures in the MOC action program are aimed at increasing competition and streamlining distribution channels, encouraging more three-story multifamily projects, standardizing materials and construction methods, and increasing imports of lumber and housing materials.¹⁵

Environmental restrictions in the Pacific Northwest and Canada have prompted Japanese buyers to consider alternative markets and products as well as new construction techniques. In Oregon, Washington and California, the threatened species listing of the northern spotted owl has reduced the timber supply available from federal lands by about 5 billion board feet (BBF). British Columbia appears to be following a similar path by reducing the amount of government-owned land available for commercial timber production. However, the actual effect of changes in B.C. timber policies and regulations is a subject of debate. Although some analysts are of the opinion that both the allowable cut and timber harvest levels in B.C. will decline (perhaps by as much as 20 percent), other studies suggest that more moderate declines (10 percent or less) are likely. Yet another study suggests that the allowable cut may actually increase following the review and revision of site productivity data.

In its search for alternative fiber supplies, Japan has turned to the Nordic countries of Sweden and Finland. Both countries have high timber export potential, as only 60-65 percent of their annual growth is harvested each year. Finnish lumber producers began their cooperation with Japan in 1993 and consider this one of the most important export markets for their industry. Some producers have already invested in the Japanese market

¹⁴ Japan Wood-Products Information and Research Center, 1996.

¹⁵ Lisa Cohn, "Wood Producers Search the Globe for New Timber Supplies, *Forest Perspectives*, Winter 1994, pg. 8.

by adjusting their products to meet Japanese dimensions and standards. Sweden has since surpassed Finland in terms of volume of wood traded. Both countries work through the Nordic Timber Council, an organization dedicated to expanding the export of Swedish, Finnish, and Norwegian timber overseas. With regard to Japan, the Council is most concerned with the issues of high freight costs, Japan's strict specifications, and developing a market for substantial stocks of redwood.¹⁶ Difficulties notwithstanding, the Scandinavian countries exported a total of 98 MMBF of softwood logs and 257 MMBF of softwood lumber to Japan in 1995.¹⁷ All indications are that Scandinavia will continue to expand its presence in the Japanese market for wood products.

New Zealand and Chile - Competition for Alaska's Domestic Sales. Facing ever-increasing wood prices in the Pacific Northwest, secondary manufacturers have intensified their search for reasonably-priced substitutes for domestic timber. As previously discussed, Alaskan producers have been able to meet some of this demand. However, an increasing amount of finished and semi-finished wood products from New Zealand and Chile are moving into U.S. markets. Both countries are well-positioned to become significant timber exporters due to relatively low production costs and a supply of timber that substantially exceeds domestic demand.

New Zealand and Chile possess considerable acreages of radiata pine plantations; approximately two-thirds of the world's total. Radiata pine plantations, with a 25 to 30 year rotation period, produce timber much faster than many other forest types.¹⁸ Together, the two countries have an estimated sustained yield of 6.2 BBF annually which is projected to increase to 10.6 BBF by the year 2010.¹⁹ Although this species has had a reputation of being a low-quality resource, the focus on selective thinning and pruning of young stands in recent years is producing a large volume of clear, higher quality wood. In 1994, after prices for ponderosa pine molding stock jumped to \$2,615 per MBF, U.S. buyers were especially eager to test the acceptability of radiata pine as a substitute. The challenge for radiata pine producers is to convince buyers of the long-range acceptability of the species as a *permanent* source of wood for molding, mill work, and preservative treated timbers.

Dissolving Pulp - Market Update. Dissolving pulp, also known as "chemical cellulose," refers to a group of highly purified wood pulps, each with a different cellulose content and reactivity. A magnesium-based sulfite process is used by the Ketchikan Pulp mill to manufacture pulp with a cellulose content of around 91 percent for the manufacture of

¹⁶ "Nordic Timber Council Members Visit Japan for Market Investigation," *Japan Lumber Journal*, March 20, 1994, pg. 11.

¹⁷ Japan Wood-Products Information and Research Center, 1996.

¹⁸ *Marketing of Lumber, Chips, and Other Manufactured Forest Products of the Pacific Rim*, Conference Proceedings (Seattle: Jay Gruenfeld and Associates, Inc., 1992), pg. 13.

¹⁹ Ivan L. Eastin, "Radiata Pine: A Competitive Force in Pacific Rim Markets", *Cintrafor News*, April 1993, pg. 3.

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rayon and cellophane.²⁰ Rayon is further manufactured into woven and nonwoven fabrics for apparel, draperies, and upholstery. Other nonwoven items include disposable diapers, and disposable medical supplies as masks, gowns, drapes and caps. Rayon is used extensively in industrial products such as tire cord, rope, twine, industrial belting, hoses, braids, bristles, insulation and other products. There are also applications for rayon fibers in the plastics, rubber, paper, paint, electrical, chemical, and other non-textile industries. Cellophane has found widespread use as a clear packaging material for a multitude of consumer products. Another derivative of Alaska's dissolving pulp has been used in diet foods, pharmaceutical and cosmetic products.²¹

The productive capacity of dissolving pulp producers in the U.S., Japan, and Europe has declined over the years as rising wood costs, environmental regulation, and, in some cases, outdated technology, have put older mills into a severe cost/price squeeze. In particular, significant environmental concerns have developed in the United States and Europe with regard to the dioxin released during chlorinated pulp bleaching processes.²² The Environmental Protection Agency (EPA) continues to assess the potential health hazards and modify regulations accordingly. Louisiana-Pacific Corporation, parent company of Ketchikan Pulp, responded to these concerns by announcing plans for the nationwide conversion of all its plants to chlorine-free processing. In 1995, the company announced plans to convert the Ketchikan mill to the production of totally chlorine-free pulp by 1998.²³

Although dissolving pulp prices remained strong during the last quarter of 1995, as the fiscal year progressed, domestic and European paper markets weakened, buyers began to accumulate large inventories, and prices for all grades of market pulp fell dramatically. By January of 1996, the market was reportedly "swimming in pulp" and prices were dropping at an unprecedented rate, reportedly \$25/metric ton per week. In part due to slack demand from Chinese buyers, first quarter 1996 prices for rayon grade dissolving pulp in Asia were down to \$900-\$950 per metric ton compared to mid-1995 prices as high as \$1400/metric ton in Asian markets. Rayon-grade dissolving pulp prices in the U.S., generally more stable, were off \$50-\$100 per metric ton from the \$950-\$1,100 per metric ton range reported at the end of 1995.²⁴ Facing pressure from paper pulp prices and the depressed rayon staple market, rayon-grade dissolving pulp prices in overseas markets also began to fall by mid-year.

The dramatic upswing in 1995 and consequent collapse in the wood pulp market this year exceeded anything seen in the last 20 years. World spot markets for rayon-grade

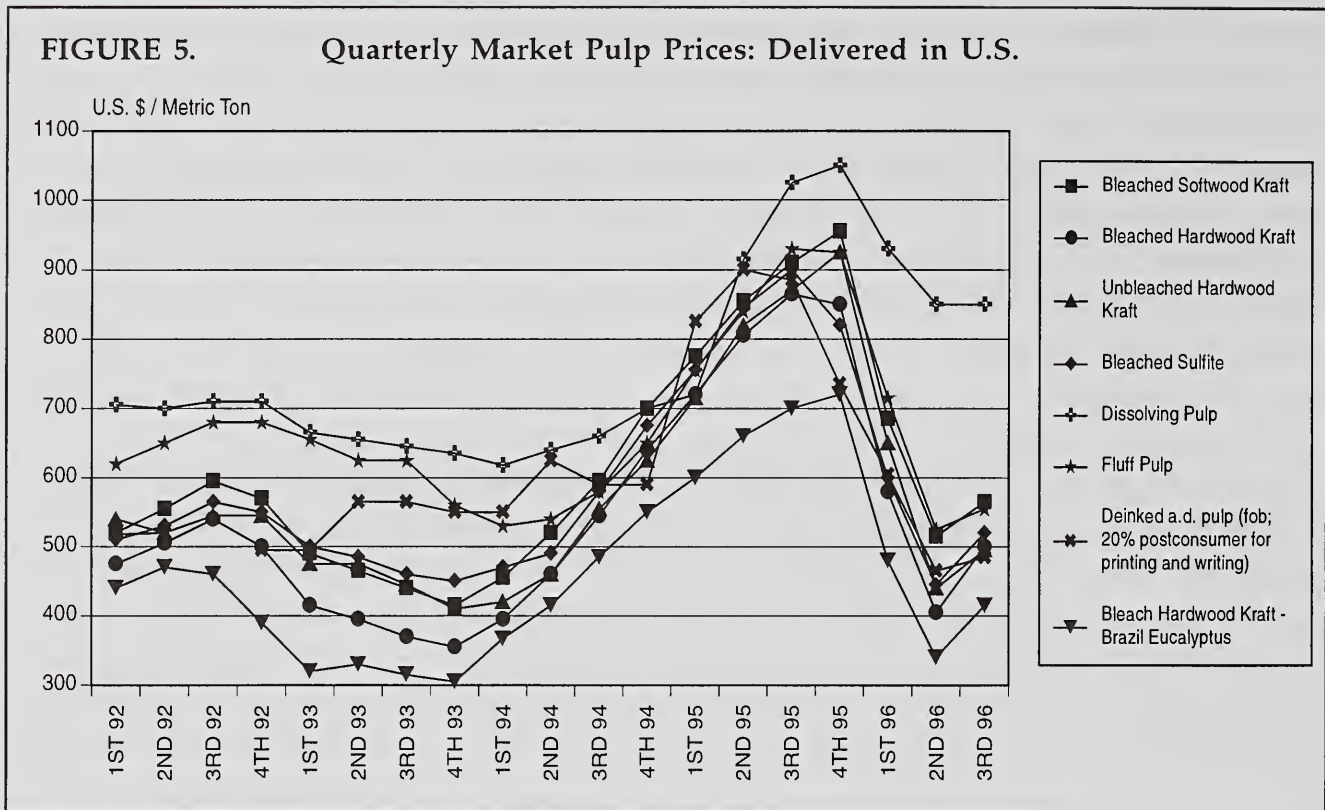
²⁰ Irene Durbak, "Pulp Industry Market Trends," Gen. Tech. Rpt. FPL-GTR-77, (Madison, WI: USDA Forest Service, Forest Products Lab), 1993, pg. 1.

²¹ Ketchikan Pulp Company, *Our First 20 Years*, 1974, pg. 17.

²² Gail Dutton, "Chlorine Fading from the Paper Scene?" *Chemical Business*, July/August 1992, pp. 30-32.

²³ Carl Espe, "Capital Spending Plans: 1994-96 and Beyond," *Pulp and Paper*, January 1995, pg. 73.

²⁴ "Market Pulp Prices Still Plunging as Producers Scramble for Orders", *Pulp and Paper Week*, January 15, 1996, pp. 1,5.



dissolving pulp dropped as low as \$500-\$600/metric ton compared with 1995 prices as high as \$1300-\$1400.²⁵ Market-related shutdowns were frequent. The adverse market reportedly caused Western Pulp LP to shut down its Port Alice, B.C. dissolving pulp mill from May 9-June 17, 1996 and from August 1-September 3, 1996. Rayonier, Inc. also reportedly shut its Port Angelas dissolving pulp mill from May 30-July 10, 1996 for similar reasons.²⁶

The downward slide in pulp markets immediately impacted the bottom line of key producers. Louisiana-Pacific, parent company of the Ketchikan Pulp mill, reported continued weakness in the company's pulp segment, especially from the Ketchikan Pulp Company subsidiary, was at the root of the company's poor financial performance in 1996. The pulp segment reportedly incurred record operating losses of \$30.5 million in the first quarter of 1996 compared to operating profit of \$23.5 million in the second quarter of 1995. It was reported that more than half the loss was generated by the Ketchikan pulp mill.²⁷

Shortly after the close of the 1996 fiscal year, three companies announced the pending closures of dissolving pulp mills with a combined capacity of 540,000 metric tons per year. On October 7, 1996, Louisiana-Pacific announced the March 24, 1997 closure of the

²⁵ "September Demand Continues Slow for Pulp Market; Canadian Shipments Good", *Pulp and Paper Week*, September 23, 1996, pg. 4.

²⁶ "Market Pulp Price Increase Strengthened by Norscan Inventory Loss of 250,000 Tons", *Pulp and Paper Week*, July 15, 1996, pg. 4.

²⁷ "Louisiana-Pacific Earnings Reinforce Concerns About Pulp Segment Future", *Pulp and Paper Week*, July 22, 1996, pg. 5.

Ketchikan Pulp Company pulp mill (capacity 190,000 metric tons per year). The week of October 21, 1996, Rayonier, Inc. announced a mid-1997 closure of its dissolving pulp mill in Port Angelas. The nearly 70-year old mill has a reported capacity of 150,000 metric tons per year and processes Western Hemlock into rayon-grade dissolving pulp. In Sweden, Mo Occh Domsjo AB announced closure of its 200,000 metric ton per year capacity dissolving pulp mill by 1998.²⁸

World capacity of dissolving pulp is approximately 4 million metric tons. Most of the capacity lost in the pending closures will probably be filled from the Southern hemisphere. At least one industry source reports that "none of the low-end cellulose grades such as those used for rayon production will be able to compete in the long-term with Indonesia and South African companies."²⁹ Indeed, at the same time mill closures are being announced in some regions, mill expansions are targeted for others. For example, in the spring of 1996, Lenzing (a U.S. manufacturer of rayon staple) and Klabin (of Brazil) reportedly started a 180,000 metric ton per day totally chlorine free dissolving pulp mill in Brazil. Lenzing also is reported to be completing an expansion of its Indonesian joint venture, South Pacific Viscose (SPV), which would increase its dissolving pulp capacity by 25,000 metric tons per year. Asia Pacific Resources International (APRIL) is reportedly planning the conversion of a kraft pulp mill at Porsea, Indonesia to a 180,000 metric ton per year dissolving pulp mill by the end of 1997. Finally, Formosa Chemicals and Fiber Corporation (FCFC) is reportedly considering building a dissolving pulp mill and rayon plant in Louisiana with a capacity of 635,000 metric tons per year. If it is built, the mill would rank with Sappi Ltds Sappi Saiccor mill in South Africa which has a reported capacity of 600,000 metric tons per year. The Saiccor mill is the world's largest single producer of dissolving pulp for the manufacture of viscose materials.³⁰

The market for dissolving pulp is indirectly influenced by the market for paper pulp because conversion between the two processes is economically feasible for some producers. Lower levels of economic activity during recessionary periods reduce the demand for paper, causing the price of paper-grade pulp to fall. This prompts the conversion of some mills from paper-grade to dissolving pulp leading which then leads to overcapacity and lower prices in the dissolving pulp market as well. The process is reversed during periods of economic recovery. Consequently, market cycles for dissolving pulp tend to lag two to three years behind turning points in the general economy.

²⁸ "Rayonier to Shut Port Angelas Mill", Pulp and Paper Week, October 28, 1996, pg. 2.

²⁹ Pulp and Paper Week, October 28, 1996.

³⁰ "Formosa May Resurrect Louisiana Dissolving Pulp Project; Fibers Markets Still Struggling", Pulp and Paper Week, July 22, 1996, pp. 5-6.

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At the end of 1995, weak demand in European markets, left pulp producers with record inventories of chemical grade market pulp. Mill closures and extended downtime throughout 1996 finally appeared to be pulling inventories back in line with demand but not until inflation-adjusted prices for most grades had dropped to their lowest point since the 1930s. Although a soft textile market has kept dissolving pulp prices low, they are relatively stable when compared with the price fluctuation in other grades of market pulp (Figure 5).

Appendix A. Reference Tables

TABLE A-1.
Employment in the Wood Products Industry¹
Southeast Alaska, Fiscal Years 1981 - 1996

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 ⁵	1994	1995	1996
Logging ²	1,047	991	1,010	946	1,004	1,239	1,545	1,981	2,113	2,144	1,554	1,415	1,344	1,177	1,185	1,157
Sawmill	605	540	429	395	363	331	375	468	478	500	604	538	447	515	301	230
Pulpmill	1,081	975	854	700	580	772	861	892	925	899	911	910	859	533	516	524
Total Direct Employment ³	2,733	2,506	2,293	2,041	1,947	2,342	2,790	3,341	3,516	3,543	3,069	2,863	2,650	2,225	2,002	1,911
Indirect Employment ⁴	2,125	1,950	1,800	1,600	1,500	1,825	1,950	2,350	2,550	2,570	2,226	2,077	1,935	1,624	1,461	1,395
TOTAL	4,858	4,456	4,093	3,641	3,447	4,167	4,740	5,691	6,066	6,113	5,295	4,940	4,585	3,849	3,463	3,306

¹ Figures report here include employment related to the harvest and processing of timber from all ownerships in Southeast Alaska.

² Job related to logging operations, such as road constructions, are counted as indirect employment.

³ Source: Alaska Department of Labor and USDA Forest Service Region 10, Ecosystem Planning and Budget.

⁴ Two computer simulation models (IPASS and IMPLAN) were used to estimate indirect employment. The distinction between direct and indirect employment is a function of the Standard Industrial Classification (SIC) System used nationally for the collection and grouping of economic statistics. For purposes of this report, the wood products "industry" is defined as logging, sawmills, and pulp mills. Persons employed in these occupations are reported here as "direct" employment. "Indirect" employment refers to the persons employed in all businesses supporting operation of the wood products industry. For example, the owners of a sawmill may purchase goods and services (such as power or repair services) from local merchants thereby contributing to their sales volume and employment. Other indirect jobs are supported where employees of the wood products industry spend their take-home pay in local communities.

⁵ Figures have been revised based on March 1994 benchmark.

TABLE A-2.
Volume of Timber Offered, Sold, and Harvested
Tongass National Forest, Fiscal Years 1988 - 1996
(million board feet, net sawlog + utility)

	Short-Term			Long-term Contracts			Program Total				
	Offer	Sold	Harvest	Prepared	Released	Harvest	Offer/ Prepared	Re-Offer	Total Offer	Sold/ Released	Harvest
1988	92	70	100	365	266	296	387	30	417	336	396
1989	93	92	142	276	198	303	369	2	371	290	445
1990	54	26	173	331	287	298	385	22	407	313	471
1991	79	52	90	318	354	273	397	35	432	405	363
1992	40	81	72	449	357	298	489	27	516	429	370
1993	61	45	55	257	303	270	318	32	350	348	325
1994	100 ¹	52	48	207 ²	217 ²	228	307	30	337	269	276
1995	110 ³	102 ¹	59	217 ⁴	159	162	327	0	327	261	221
1996	58	69	27	192	158	93	250	31	281	227	120

Note: The activities related to the long-term contracts are somewhat different than those of the short-term sale program. The following clarifications are provided in reference to the figures reported above.

Volume Offered: Under the short-term sale program, this refers to advertised volume. The volume fully prepared and available is reported here as a comparable measure for the long-term contracts.

Volume Sold: Under the short-term sale program, this refers to the volume awarded to purchasers. The volume formally released to contract holders is reported here as a comparable measure for the long-term contracts. Timber is counted as being released under the long-term contract when a timber offering has been accepted by the purchaser.

¹ 53.8 MMBF enjoined by court decision in *AWRTA v. Morrison*

² 40.9 MMBF enjoined by court decision in *AWRTA v. Morrison*

³ 67.7 MMBF enjoined by court decision in *AWRTA v. Morrison*

⁴ 57.8 MMBF enjoined by court decision in *AWRTA v. Morrison*

TABLE A-3.
Tongass National Forest, Log Exports
CY 1977 - 1996
(MMBF)

YEAR		YEAR	
1977	14.7	1987	39.8
1978	27.9	1988	54.4
1979	20.1	1989	48.9
1980	27.9	1990	61.2
1981	17.5	1991	35.3
1982	16.8	1992	43.7
1983	16.3	1993	39.6
1984	25.4	1994	38.8
1985	44.9	1995	77.1
1986	37.4	1996	34.8

TABLE A-4.
International Exports of Alaskan Wood Products
Fiscal Years 1981 - 1996

Product/Unit ¹	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
SOFTWOOD LOGS																
Volume (MMBF)	130.1	197.5	292.6	237.6	258.6	340.3	436.1	482.2	629.6	606.6	516.9	537.4	500.2	518.9	542.7	550.9
Value (\$MM)	68.4	95.4	128.3	97.1	99.6	137.9	179.6	261.6	310.3	350.9	293.9	327.4	362.6	391.7	347.7	390.0
Unit Value (\$/MBF)	526	483	439	408	385	405	412	543	493	578	569	609	725	755	641	708
Inflation Adjusted (\$93/MBF)	829	710	619	554	507	519	515	655	572	644	610	627	725	736	608	653
LUMBER AND CANTS																
Volume (MMBF)	202.5	178.6	136.0	113.3	122.0	93.5	121.0	152.5	182.3	225.5	180.7	120.8	145.2	122.7	73.3	25.9
Value (\$MM)	60.3	62.5	45.5	32.2	32.5	24.7	33.9	52.1	71.0	85.3	74.8	50.3	74.4	67.7	51.5	20.9
Unit Value (\$/MBF)	298	350	334	284	266	264	280	342	389	378	414	416	512	552	502	810
Inflation Adjusted (\$93/MBF)	307	361	344	293	274	272	288	352	401	389	426	428	512	538	666	747
WOODCHIPS																
Volume (Mtons)	60.5	84.8	19.0	10.5	4.5	0	0	10.4	77.9	18.2	87.8	19.49	41.3	69.1	102.1	166.8
Value (\$MM)	5.5	6.4	1.3	.3	.4	0	0	.6	3.6	1.4	7.3	1.5	4.3	8.2	15.2	17.4
Unit Value (\$/ton)	90	75	66	32	.98	0	0	54	46	78	83	79	105	119	149	105
Inflation Adjusted (\$93/ton)	142	110	93	43	129	0	0	65	54	82	89	81	105	116	141	97
WOODPULP																
Volume (Mtons)	252.9	211.0	188.5	249.2	166.5	203.8	232.0	260.4	296.9	289.3	263.8	299.2	209.5	156.8	146.5	101.6
Value (\$MM)	135.7	113.3	94.8	127.3	72.0	85.4	113.9	160.4	227.7	203.4	162.2	175.0	123.3	90.1	134.0	88.1
Unit Value (\$/ton)	537	601	503	510	433	419	492	616	767	703	615	585	588	575	915	867
Inflation Adjusted (\$93/ton)	847	883	710	692	571	538	615	744	890	784	659	603	588	561	868	800
TOTAL VALUE (\$ MM)	269.9	277.6	269.9	256.9	204.5	248.0	327.4	474.7	612.7	641.0	538.2	554.2	564.6	557.7	548.4	516.4

¹ Export volumes are reported as millions of board feet (MMBF) or thousands of metric ton (Mtons). Values are free along ship (FAS) in millions of dollars.

² Source: Compiled from official statistics of the U.S. Department of Commerce (1996).

TABLE A-5.
Timber Harvest and Imports for Southeast and Southcentral Alaska
Fiscal Years 1985 - 1996

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
(In million board feet, log scale)											
Southeast											
Public											
Tongass N.F.											
Sawtimber	251.4	282.0	331.5	377.0	399.0	299.6	303.1	268.3	221.8	181.3	97.4
Utility ^{2/}	39.1	54.2	64.7	67.6	72.0	64.6	66.6	56.7	54.0	39.8	22.8
State of Alaska											
Sawtimber	12.2	19.5	16.8	11.4	11.1	4.0	14.9	5.0	18.1	3.6	4.5
Utility	0.2	0.3	0.1	0.1	1.0	0.0	.1	0.0	2.7	2.2	2.5
BIA	0.0	0.0	0.0	3.5	0.0	7.5	4.5	0.0	0.0	0.0	0.0
Private^{3/}											
Export Sawlogs	294.1	282.5	277.0	419.8	433.7	307.2	348.7	328.2	275.0	233.9	292.4
Pulplogs	32.9	121.5	118.1	112.1	72.4	147.4	97.0	82.2	12.3	81.1	37.7
SE AK Sawlog Harvest	557.7	584.0	625.3	811.2	843.8	618.3	671.2	601.5	514.9	448.8	394.3
SE AK Total Harvest	630.0	760.0	808.2	991.0	989.2	830.3	834.9	740.4	584.6	481.3	450.6
Imports											
Sawlogs	24.4	5.7	0.1	1.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Pulpwood logs	22.1	5.1	6.8	1.9	0.0	0.0	3.0	3.0	3.0	11.5	34.1
Wood chips ^{4/}	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
SE AK TOTAL	676.5	770.8	815.1	994.7	990.4	831.5	839.4	743.4	587.6	517.3	484.7
Southcentral											
Public											
Chugach N.F.											
Sawtimber	0.8	0.7	1.0	1.1	1.1	1.1	0.5	1.7	0.0	1.1	1.3
Utility	0.0	0.0	0.0	0.4	0.4	0.4	0.0	0.0	6.5	0.8	2.0
State of Alaska											
Sawtimber	1.0	1.1	0.5	0.5	0.4	1.7	0.8	0.0	0.0	2.6	8.1
Utility	0.8	0.8	1.6	1.6	0.6	0.8	0.2	0.0	0.0	0.0	0.0
Private											
Export Sawlogs	ne	44.2	79.2	120.0	105.1	134.5	123.5	127.2	186.0	210.6	199.6
Pulplogs	ne	0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	19.5	8.0
Southeast and Southcentral Alaska											
Harvest Sawtimber	392.4	559.5	630.0	706.0	932.8	950.4	755.6	796.0	730.4	700.9	633.1
Harvest Total	535.2	632.6	806.8	896.9	1114.6	1096.8	968.8	959.9	869.3	777.1	715.9
Harvest + Imports	544.9	679.1	817.6	903.8	1118.3	1098.0	970.0	964.4	872.3	780.1	751.9

^{1/} The federal fiscal year extends from October 1st to September 30th of the following year.

^{2/} The Forest Service requires the harvest and removal of utility volume which is in addition to the 450 MMBF Allowable Sale Quantity (ASQ) calculated in the Tongass Land management Plan (TLMP). The ASQ is based on net sawlog volume.

^{3/} Estimate. Sources were not found for certain years or ownerships and are not estimated (ne). Some of the private harvest reported in fiscal years 1983 - 86 for southeast Alaska originated from southcentral Alaska, but data were not available to separate the two regions from the estimated total.

^{4/} Compiled from official statistics of the U.S. Department of Commerce. Commerce reports pulpwood imports and wood chips imports in metric tons. Cords are converted to log scale at a ratio of 2 cords per thousand board feet (MBF). Wood chips are converted to log scale at a ratio of 2.7 short tons per MBF.

^{5/} FY 1994 estimates of private harvests have been revised in this report.

TABLE A-6.
Softwood Lumber and Cant Exports from Alaska
Volume and Value by Destination
Fiscal Years 1988 - 1996

VOLUME (MBF)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	15	0	0	0	0	0	0	0	0
Canada	2,064	88	16	0	657	4	0	0	69
Hong Kong	0	24	0	0	0	0	0	0	0
Iceland	245	0	0	0	0	0	0	0	0
Ireland	0	18	0	0	0	0	0	0	0
Italy	0	38	0	0	0	0	0	0	0
Japan	145,343	180,874	211,189	169,160	117,615	135,598	116,184	72,765	25,783
Korea, South	4,315	1,099	7,022	3,203	0	8,804	1,994	1,462	0
Morocco	0	0	2,379	0	0	0	0	0	0
Netherlands	298	0	0	0	0	0	0	0	0
Saudi Arabia	0	0	2,921	3,606	0	0	0	0	0
Taiwan	188	87	0	220	2,597	777	4,553	65	0
United Kingdom	36	94	0	0	0	0	0	0	0
World	152,504	182,322	223,527	176,189	120,869	145,249	122,731	73,291	25,853
VALUE (\$M)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	\$11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Canada	\$739	\$24	\$5	\$0	\$164	\$4	\$0	\$0	\$17
Hong Kong	\$0	\$4	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Iceland	\$45	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ireland	\$0	\$5	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Italy	\$0	\$31	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Japan	\$48,385	\$70,309	\$80,186	\$70,361	\$49,557	\$64,734	\$63,122	\$49,400	\$20,922
Korea, South	\$2,754	\$559	\$3,281	\$1,851	\$0	\$9,422	\$3,509	\$2,002	\$0
Morocco	\$0	\$0	\$770	\$0	\$0	\$0	\$0	\$0	\$0
Netherlands	\$89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Saudi Arabia	\$0	\$0	\$555	\$701	\$0	\$0	\$0	\$0	\$0
Taiwan	\$80	\$23	\$0	\$88	\$579	\$226	\$1,094	\$58	\$0
United Kingdom	\$14	\$29	\$0	\$0	\$0	\$0	\$0	\$0	\$0
World	\$52,117	\$70,984	\$84,797	\$73,001	\$50,300	\$74,399	\$67,725	\$51,461	\$20,939
UNIT VALUE (\$/MBF)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	\$742	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Canada	\$358	\$272	\$319	\$0	\$250	\$1,049	\$0	\$0	\$243
Hong Kong	\$0	\$169	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Iceland	\$184	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ireland	\$0	\$281	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Italy	\$0	\$813	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Japan	\$333	\$389	\$380	\$416	\$421	\$477	\$543	\$688	\$812
Korea, South	\$638	\$509	\$467	\$578	\$0	\$0	\$1,760	\$1,369	\$0
Morocco	\$0	\$0	\$324	\$0	\$0	\$0	\$0	\$0	\$0
Netherlands	\$299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Saudi Arabia	\$0	\$0	\$190	\$194	\$0	\$1,070	\$0	\$0	\$0
Taiwan	\$425	\$265	\$0	\$400	\$223	\$291	\$240	\$895	\$0
United Kingdom	\$389	\$308	\$0	\$0	\$0	\$0	\$0	\$0	\$0
World	\$342	\$389	\$379	\$414	\$416	\$512	\$552	\$702	\$747

Source: Compiled from official statistics from the U.S. Department of Commerce, 1996.

TABLE A-7.
Softwood Log Exports from Alaska
Volume and Value by Destination
Fiscal Years 1988 - 1996

VOLUME									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	18	11	0	0	0	0	0	0	0
Canada	70,117	38,029	12,595	15,393	4,477	2,978	1,049	78,256	29,223
China	11,647	12,259	1,326	19,132	26,049	24,528	17,329	3,775	8,488
Germany, West	11	0	0	0	0	0	0	0	0
Hong Kong	0	0	0	0	4,505	0	0	0	0
Jamaica	0	0	0	4,636	0	0	0	0	0
Japan	302,594	460,792	465,152	359,842	384,553	311,200	391,911	344,599	373,467
Korea, South	86,781	108,540	109,264	94,448	90,170	135,264	84,780	94,541	120,076
Taiwan	8,988	9,926	18,199	23,411	27,728	26,203	23,851	21,538	0
Turkey	1,822	0	0	0	0	0	0	0	0
World	481,978	629,557	606,535	516,862	537,483	500,173	518,920	542,710	550,901
VALUE (\$M)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	\$35	\$15	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Canada	\$9,313	\$8,625	\$3,924	\$4,218	\$2,049	\$697	\$597	\$24,478	\$10,768
China	\$3,229	\$3,735	\$548	\$11,072	\$16,562	\$15,482	\$10,269	\$1,530	\$4,389
Germany, West	\$17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hong Kong	\$0	\$0	\$0	\$0	\$3,528	\$0	\$0	\$0	\$0
Jamaica	\$0	\$0	\$0	\$3,397	\$0	\$0	\$0	\$0	\$0
Japan	\$211,450	\$252,323	\$289,217	\$231,217	\$256,811	\$256,032	\$318,520	\$255,998	\$290,999
Korea, South	\$33,833	\$41,315	\$47,518	\$33,456	\$33,927	\$71,055	\$47,703	\$51,963	\$71,141
Taiwan	\$3,778	\$4,335	\$9,628	\$10,553	\$14,782	\$19,321	\$14,599	\$13,721	\$0
Turkey	\$246	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
World	\$261,901	\$310,348	\$350,835	\$293,913	\$327,659	\$362,587	\$391,669	\$347,688	\$389,964
UNIT VALUE (\$/MBF)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Australia	\$1,934	\$1,416	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Canada	\$133	\$227	\$312	\$274	\$458	\$234	\$569	\$322	\$369
China	\$277	\$305	\$413	\$579	\$636	\$631	\$593	\$405	\$517
Germany, West	\$1,540	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hong Kong	\$0	\$0	\$0	\$0	\$783	\$0	\$0	\$0	\$0
Jamaica	\$0	\$0	\$0	\$733	\$0	\$0	\$0	\$0	\$0
Japan	\$699	\$548	\$622	\$643	\$668	\$823	\$813	\$743	\$779
Korea, South	\$390	\$381	\$435	\$354	\$376	\$525	\$563	\$550	\$593
Taiwan	\$420	\$437	\$529	\$451	\$533	\$737	\$612	\$637	\$0
Turkey	\$135	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
World	\$543	\$493	\$578	\$569	\$610	\$725	\$755	\$641	\$708

¹ Data for 1994 was revised subsequent to publication of 1994 706(a) Report.

Source: Compiled from official statistics from the U.S. Department of Commerce, 1996.

TABLE A-8.
Market Pulp Export from Alaska
Volume by Destination
Fiscal Years 1988 - 1996

VOLUME (METRIC TONS)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Argentina	2,222	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	1,144	0	0	0
Bangladesh	0	0	966	0	966	0	966	0	0
Belgium	2,400	5,597	3,302	2,842	6,430	3,448	2,896	940	1,926
Canada	749	0	98	0	0	0	0	0	0
China	28,833	43,843	28,670	35,213	20,828	17,931	27,076	21,067	11,098
Czechoslovakia	74	417	5,656	5,611	996	0	0	0	0
Egypt	8,363	8,716	15,000	6,770	9,965	7,746	5,792	4,644	1,930
Finland	0	0	0	0	485	2,912	0	0	0
France	0	592	727	0	4,408	0	0	0	0
Germany, West	3,475	4,301	4,040	5,670	27,331	17,025	17,036	19,421	13,070
Hungary	0	50	0	0	0	0	0	0	0
India	13,389	25,482	40,893	18,584	24,192	10,815	0	4,657	0
Indonesia	1,998	13,560	8,711	7,267	21,332	4,850	20,257	19,525	7,722
Japan	124,989	107,896	102,751	102,238	98,722	101,009	26,671	25,434	12,826
Korea, South	5,616	6,864	13,063	6,383	0	0	0	0	0
Malaysia	0	0	0	0	0	0	0	0	20
Poland	6,885	8,280	5,293	1,811	0	0	0	0	0
Soviet Union	7,999	12,648	8,723	6,773	0	0	0	0	0
Spain	1,999	967	1,671	0	0	0	483	0	0
Switzerland	0	24	0	0	0	0	0	0	0
Taiwan	47,070	50,916	46,544	59,932	75,324	36,888	48,520	46,904	53,029
Thailand	4,387	6,532	2,907	4,353	8,225	5,821	6,746	1,929	0
Turkey	0	0	140	0	0	0	0	0	0
United Kingdom	0	171	194	352	0	0	0	0	0
World	260,448	296,856	289,349	263,799	299,204	209,589	156,803	146,452	101,621

Source: Compiled from statistics from the U.S. Department of Commerce, 1996

TABLE A-9.
Market Pulp Export from Alaska
Total Value by Destination
Fiscal Years 1988 - 1996

VALUE (\$M)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Argentina	\$1,341	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Austria	\$0	\$0	\$0	\$0	\$0	\$719	\$0	\$0	\$0
Bangladesh	\$0	\$0	\$845	\$0	\$539	\$0	\$533	\$0	\$0
Belgium	\$1,198	\$4,307	\$2,478	\$1,913	\$3,894	\$2,079	\$1,567	\$683	\$1,433
Canada	\$354	\$0	\$68	\$0	\$0	\$0	\$0	\$0	\$0
China	\$16,842	\$33,929	\$18,928	\$19,440	\$11,420	\$9,499	\$15,714	\$18,286	\$9,165
Czechoslovakia	\$47	\$302	\$3,789	\$3,547	\$648	\$0	\$0	\$0	\$0
Egypt	\$5,621	\$7,563	\$11,214	\$3,593	\$5,562	\$4,159	\$2,886	\$4,412	\$1,431
Finland	\$0	\$0	\$0	\$0	\$249	\$1,542	\$0	\$0	\$0
France	\$0	\$377	\$200	\$0	\$1,709	\$0	\$0	\$0	\$0
Germany, West	\$2,171	\$3,276	\$3,123	\$3,531	\$16,867	\$10,301	\$9,994	\$16,906	\$11,239
Hungary	\$0	\$38	\$0	\$0	\$0	\$0	\$0	\$0	\$0
India	\$9,043	\$21,192	\$25,213	\$9,409	\$12,910	\$5,870	\$0	\$5,344	\$0
Indonesia	\$1,199	\$5,763	\$6,366	\$4,321	\$11,770	\$2,430	\$13,301	\$17,111	\$7,931
Japan	\$77,010	\$82,079	\$76,688	\$69,330	\$62,091	\$63,956	\$15,827	\$18,964	\$10,935
Korea, South	\$3,282	\$4,684	\$7,062	\$2,567	\$0	\$0	\$0	\$0	\$0
Malaysia	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12
Poland	\$4,294	\$6,780	\$4,279	\$903	\$0	\$0	\$0	\$0	\$0
Soviet Union	\$5,247	\$10,472	\$7,186	\$4,883	\$0	\$0	\$0	\$0	\$0
Spain	\$1,271	\$773	\$1,034	\$0	\$0	\$0	\$260	\$0	\$0
Switzerland	\$0	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Taiwan	\$28,880	\$40,237	\$32,440	\$35,961	\$42,928	\$19,859	\$25,127	\$50,148	\$45,923
Thailand	\$2,597	\$5,859	\$2,320	\$2,584	\$4,363	\$2,848	\$4,903	\$0	\$0
Turkey	\$0	\$0	\$25	\$0	\$0	\$0	\$0	\$0	\$0
United Kingdom	\$0	\$73	\$133	\$253	\$0	\$0	\$0	\$0	\$0
World	\$160,397	\$227,713	\$203,391	\$162,235	\$174,950	\$123,262	\$90,111	\$134,005	\$88,069

Source: Compiled from statistics from the U.S. Department of Commerce, 1996.

TABLE A-10.
Market Pulp Export from Alaska
Unit Value by Destination
Fiscal Years 1988 - 1996

UNIT VALUE (\$/METRIC TON)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Argentina	\$604	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Austria	\$0	\$0	\$875	\$0	\$0	\$628	\$0	\$0	\$0
Bangladesh	\$0	\$0	\$875	\$0	\$558	\$0	\$552	\$0	\$0
Belgium	\$499	\$770	\$750	\$673	\$606	\$603	\$541	\$727	\$744
Canada	\$473	\$0	\$694	\$0	\$0	\$0	\$0	\$0	\$0
China	\$584	\$774	\$660	\$552	\$548	\$530	\$580	\$868	\$826
Czechoslovakia	\$635	\$724	\$670	\$632	\$651	\$0	\$0	\$0	\$0
Egypt	\$672	\$868	\$748	\$531	\$558	\$537	\$498	\$950	\$741
Finland	\$0	\$0	\$0	\$0	\$513	\$530	\$0	\$0	\$0
France	\$0	\$637	\$275	\$0	\$388	\$0	\$0	\$0	\$0
Germany, West	\$625	\$762	\$773	\$623	\$617	\$605	\$587	\$871	\$860
Hungary	\$0	\$760	\$0	\$0	\$0	\$0	\$0	\$0	\$0
India	\$675	\$832	\$617	\$506	\$534	\$543	\$0	\$1,145	\$0
Indonesia	\$600	\$425	\$731	\$595	\$552	\$501	\$657	\$876	\$1,027
Japan	\$616	\$761	\$746	\$678	\$629	\$633	\$593	\$746	\$853
Korea, South	\$584	\$682	\$541	\$402	\$0	\$0	\$0	\$0	\$0
Malaysia	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$600
Poland	\$624	\$819	\$808	\$499	\$0	\$0	\$0	\$0	\$0
Soviet Union	\$656	\$828	\$824	\$721	\$0	\$0	\$0	\$0	\$0
Spain	\$636	\$799	\$619	\$0	\$0	\$0	\$538	\$0	\$0
Switzerland	\$0	\$375	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Taiwan	\$614	\$790	\$697	\$600	\$570	\$538	\$518	\$1,069	\$866
Thailand	\$592	\$897	\$798	\$594	\$530	\$489	\$727	\$725	\$0
Turkey	\$0	\$0	\$179	\$0	\$0	\$0	\$0	\$0	\$0
United Kingdom	\$0	\$427	\$686	\$719	\$0	\$0	\$0	\$0	\$0
World	\$616	\$767	\$703	\$615	\$585	\$588	\$575	\$915	\$867

Source: Compiled from statistics from the U.S. Department of Commerce, 1996.

TABLE A-11.
Chip Exports from Alaska
Volume and Values
Fiscal Years 1988 - 1996

VOLUME (METRIC TONS)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Canada	0	0	3,810	0	7,790	6,277	0	0	0
Japan	10,437	77,918	14,355	87,767	11,700	35,054	69,067	102,084	166,819
World	10,437	77,918	18,165	87,767	19,490	41,331	69,067	102,084	166,819
VALUE (\$M)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Canada	\$0	\$0	\$134	\$0	\$203	\$134	\$0	\$0	\$0
Japan	\$559	\$3,620	\$1,285	\$7,279	\$1,343	\$4,199	\$8,216	\$15,189	\$17,488
World	\$559	\$3,620	\$1,419	\$7,279	\$1,546	\$4,333	\$8,216	\$15,189	\$17,488
UNIT VALUE (\$/METRIC TON)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996
Canada	\$0	\$0	\$35	\$0	\$26	\$21	\$0	\$0	\$0
Japan	\$54	\$46	\$90	\$83	\$115	\$120	\$119	\$149	\$105
World	\$54	\$46	\$78	\$83	\$79	\$105	\$119	\$149	\$105

Source: Compiled from statistics from the U.S. Department of Commerce, 1996.

TABLE A-12.
Annual Timber Harvest
Tongass National Forest 1909 - 1996

Year	Volume (MMBF)	Year	Volume (MMBF)	Year	Volume (MMBF)
1909 - 1916 ¹	234.5	1943	73.6	1970	493.0
1917	41.0	1944	86.8	1971	584.2
1918	43.1	1945	58.3	1972	532.4
1919	37.4	1946	48.6	1973	590.7
1920	45.6	1947	83.4	1974	559.6
1921	11.7	1948	81.0	1975	462.4
1922	20.6	1949	49.2	1976	450.0
1923	40.5	1950	54.4	1977	456.3
1924	48.6	1951	52.9	1978	414.0
1925	53.7	1952	58.0	1979	422.2
1926	51.0	1953	49.5	1980	480.1
1927	52.0	1954	66.8	1981	386.7
1928	33.8	1955	179.3	1982	370.7
1929	42.0	1956	215.8	1983	250.5
1930	38.5	1957	253.6	1984	261.0
1931	18.2	1958	195.7	1985	231.3
1932	14.7	1959	218.3	1986	290.5
1933	14.7	1960	314.8	1987	336.2
1934	28.2	1961	347.4	1988	392.2
1935	30.5	1962	339.2	1989	443.1
1936	40.0	1963	180.5	1990	471.0
1937	35.3	1964	415.7	1991	363.3
1938	25.6	1965	424.6	1992	369.7
1939	26.5	1966	439.6	1993	325.0
1940	30.9	1967	450.5	1994	275.8
1941	35.8	1968	541.3	1995	221.1
1942	38.5	1969	518.7	1996	120.2

Source: USDA Forest Service Region Ten, Timber Management

¹ Time period 1909 - 1951 reported in calendar years, net sawlog volume only.

² Time period 1952 - 1996 reported in fiscal years, net sawlog + utility volume.

³ This is the transition quarter for the year when Congress changed the fiscal year from July 1 - June 30 to October 1 - September 30.

TABLE A-13.
Japanese Imports of Softwood Logs and Lumber
Calendar Years 1983 - 1995

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SOFTWOOD LUMBER (MBF¹)													
United States	577,622	522,354	558,725	721,678	923,680	983,549	1,112,793	1,050,406	1,019,237	896,018	857,142	788,254	748,193
Canada	849,408	817,447	916,030	882,669	1,172,328	1,337,909	1,565,897	1,568,587	1,786,722	1,870,031	2,312,241	2,338,706	2,464,340
Russia	54,488	61,964	64,240	71,531	76,014	94,212	110,675	112,355	101,653	95,132	120,648	148,448	179,669
New Zealand	114,863	76,458	65,531	49,583	55,909	53,006	45,025	88,153	109,214	105,311	99,636	106,894	123,350
Chile ²	0	0	0	71,268	90,662	138,648	137,990	172,456	168,125	112,858	168,719	128,897	227,624
South Seas	20,776	14,987	31,202	45,407	46,626	50,115	49,961	33,061	45,343	41,262	57,259	56,006	55,371
Other	42,709	70,379	103,381	70,215	115,553	113,803	135,177	97,381	71,495	55,648	143,056	280,995	390,055
TOTAL	1,659,867	1,563,590	1,739,108	1,912,352	2,480,771	2,771,242	3,157,519	3,122,399	3,301,791	3,176,260	3,758,702	3,848,201	4,189,601

SOFTWOOD LOGS (MBF¹)													
United States	1,693,721	1,586,590	1,721,419	1,836,462	2,134,399	2,072,889	2,411,951	2,255,062	1,969,603	1,863,723	1,673,622	1,602,149	1,545,944
Canada	162,791	263,219	304,507	315,053	414,966	261,816	193,086	112,947	89,677	163,682	107,305	65,378	40,009
Russia	1,299,021	115,466	1,103,352	1,238,568	1,217,785	1,109,627	974,361	899,102	791,052	798,072	1,002,974	980,007	1,088,101
New Zealand	69,015	67,467	64,955	57,384	85,867	125,668	168,394	296,545	355,151	410,763	378,877	411,008	412,005
Chile ²	0	0	0	59,568	55,271	47,623	53,261	68,894	60,451	35,667	44,387	26,042	23,989
South Seas	37,845	46,002	39,568	28,244	28,800	26,171	33,919	38,957	27,257	18,833	15,951	21,392	14,714
Other	52,543	82,444	89,060	5,052	5,847	5,680	12,813	11,112	9,972	13,205	29,649	81,264	143,613
TOTAL	3,314,936	2,160,904	3,322,861	3,540,330	3,942,934	3,649,473	3,847,783	3,682,620	3,303,165	3,303,945	3,252,765	3,187,239	3,268,376

Source: Wood Supply and Demand Information Service. Published by Japan Wood Products Information and Research Center, various issues.

¹ Converted from cubic meters at a rate of 4.53 MBF log scale/m³ and 2.36 MBF lumber tally/m³.

² Prior to 1986, imports from Chile were included in the "Other" category.

TABLE A-14.
Economic Growth and Currency Exchange Rates
Alaska's Primary Trading Partners

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
ANNUAL PERCENTAGE CHANGE IN REAL GROSS DOMESTIC PRODUCT													
U.S.	3.2	2.9	3.1	3.9	2.5	1.2	-0.7	2.6	3.1	3.5	2.0	1.8	
Japan	5.0	2.6	4.1	6.2	4.7	4.8	4.3	1.1	-0.2	0.5	0.9	2.7	
Korea	6.9	12.4	11.8	11.5	6.3	9.2	8.4	4.8	5.3	8.4	9.0	7.5	
Taiwan	5.0	11.6	12.3	7.3	7.6	4.9	7.2	6.5	5.7	6.4	6.4	6.2	
China	13.4	9.7	11.0	11.1	3.4	3.8	7.7	13.0	13.1	11.8	10.2	10.0	
ANNUAL PERCENTAGE CHANGE IN CONSUMER PRICES													
U.S.	3.5	1.9	3.7	4.1	4.8	5.4	4.2	3.0	3.0	2.6	2.8	2.6	
Japan	2.0	0.6	0.1	0.7	2.3	3.1	3.3	1.7	1.3	0.7	-0.1	0.4	
Korea	2.5	2.8	3	7.1	5.7	8.6	9.3	6.2	4.8	6.3	4.5	4.5	
Taiwan	-0.2	0.7	0.5	1.3	4.4	4.2	3.6	4.5	2.9	4.1	3.7	3.7	
China	8.8	6.0	7.3	18.6	17.8	2.1	2.7	5.3	13.0	21.7	14.8	10.0	
U.S. EXCHANGE RATES-ANNUAL AVERAGES													
Canada (\$CA/\$US)	1.37	1.39	1.33	1.23	1.18	1.17	1.15	1.21	1.29	1.37	1.37	1.36	
Japan (Yen/\$US)	236.7	167.5	144.6	128.2	138.0	144.8	134.7	126.7	111.2	102.2	94.0	108.8	
Korea (Won/\$US)	----	---	822.6	731.5	671.5	707.8	733.4	780.7	802.7	803.4	771.3	804.5	
China (Yuan/\$US)	----	---	3.72	3.72	3.77	4.78	5.32	5.52	5.76	8.64	8.37	8.34	

Monthly U.S. Exchange Rates 1995		
	Canada (\$CA/\$US)	Japan (Yen/\$US)
January	1.413	99.8
February	1.401	98.2
March	1.408	90.8
April	1.376	83.7
May	1.361	85.1
June	1.378	84.5
July	1.361	87.2
August	1.355	94.7
September	1.350	100.5
October	1.346	100.7
November	1.353	101.9
December	1.369	101.9

Monthly U.S. Exchange Rates 1996		
	Canada (\$CA/\$US)	Japan (Yen/\$US)
January	1.367	105.75
February	1.375	106.79
March	1.366	105.94
April	1.359	107.20
May	1.369	106.34
June	1.366	108.96
July	1.367	109.19
August	1.372	107.87
September	1.369	109.93
October	1.351	112.41
November	1.338	112.30
December	1.362	113.98

Source: World Economic Outlook, International Monetary Fund, May 1996 and Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis, September 1996, and Federal Reserve Bulletin, Board of Governors of the Federal Reserve System, various issues.

TABLE A-15.
Housing Starts in Japan

	Total	Wood-Based	Percent Wood-Based	Average Floorspace (ft²) Wood-Based	Average Floorspace (ft²) Non-Wood
1965	842,596	646,536	77%		
1970	1,484,556	1,035,500	70%		
1972	1,807,581	1,111,846	62%		
1974	1,316,100	869,637	66%		
1979	1,492,926	909,582	61%		
1981	1,151,695	653,643	57%		
1982	1,146,144	666,960	58%		
1983	1,136,794	590,848	52%		
1985	1,236,072	591,911	48%	1,055	754
1986	1,364,609	633,858	46%	1,039	734
1987	1,674,300	741,552	44%	1,051	694
1988	1,684,644	697,267	41%	1,078	705
1989	1,662,612	719,870	43%	1,076	720
1990	1,707,109	727,770	43%	1,071	715
1991	1,370,126	624,003	46%	1,113	760
1992	1,402,590	671,130	48%	1,105	757
1993	1,485,684	697,496	47%	1,159	773
1994	1,570,252	721,431	46%	1,205	822
1995	1,470,330	666,124	45%	1,192	839
1996	1,643,266	754,296	46%	1,249	852

Source: Japan Wood-Products Information and Research Center, February 1997

TABLE A-16.
FY 1996 Tongass Timber Sale Offerings
(MBE, Sawlog + Utility Volume)

INDEPENDENT SALES	Type	Volume	Notes
STIKINE AREA			
Shamrock	SBA	24,280	status: unsold at end of FY 96
Kindergarten Salvage	SBA	262	status: awarded
Little Hamilton Salvage	SBA	331	status: awarded
Nemo Row Salvage	SBA	83	status: awarded
Shotgun Salvage	SBA	16	status: awarded
Subtotal Stikine Area		24,972	
CHATHAM AREA			
Poison Cove	SBA	19,114	status: unsold at end of FY 96
Blue Salvage (Reoffer)	SBA	52	status: sold not awarded
Furlow Fuelwood	SBA	161	status: sold not awarded
HICA Salvage	SBA	205	status: sold not awarded
Rod N' Apple	SBA	8,133	status: sold not awarded
Hanus ATC (Reoffer)	SBA	15,546	status: awarded
Eagle Salvage	SBA	71	status: awarded
Lucy Salvage	SBA	382	status: awarded
Spare Salvage	SBA	187	status: awarded
Stringer Fuelwood	SBA	159	status: awarded
Tributary (Reoffer)	SBA	113	status: awarded
Two Bears Salvage	SBA	27	status: awarded
Subtotal Chatham Area		44,150	
KETCHIKAN AREA			
Shield	SBA	1,096	status: unsold at end of FY 96
Point Salvage	SBA	216	status: sold not awarded
Roadside Salvage	SBA	118	status: sold not awarded
Whistle	SBA	579	status: sold not awarded
Cape Pole	SBA	1,438	status: awarded
Cutthroat Log	SBA	37	status: awarded
Dog Salmon Road	SBA	74	status: awarded
Edge Slavage	SBA	104	status: awarded
Election Creek Stringer	SBA	8	status: awarded
Goose Creek Log Salvage	SBA	20	status: awarded
Limes Point	SBA	2,220	status: awarded
More Boards	SBA	6	status: awarded
Old Franks Cedar	SBA	67	status: awarded
Peanut	SBA	37	status: awarded

TABLE A-16. *Continued*
FY 1996 Tongass Timber Sale Offerings
(MMBE, Sawlog + Utility Volume)

INDEPENDENT SALES	Type	Volume	Notes
South McKenzie	SBA	12,317	status: awarded
Timber Knob Pass	SBA	415	status: awarded
Toto	SBA	24	status: awarded
Triangle Salvage	SBA	348	status: awarded
Trumpeter Stringer	SBA?	18	status: awarded
Warren Channel	SBA	912	status: awarded
Wold Pup Log	SBA?	10	status: awarded
355 Salvage	SBA	28	status: awarded
49 Cedar	SBA	20	status: awarded
800 Contour	SBA	58	status: awarded
Subtotal Ketchikan Area		20,170	
Total FY 1996 Offer		89,292	

KPC CONTRACT	Type	Volume	Notes
KHS KPC Offer #1	LT	42,538	
North Thorne/Little Ratz	LT	22,420	
Big Dewey	LT	65,465	
West Polk	LT	27,976	
Total FY 1996 Offer		158,399	

TABLE A-17.
Tongass Volume Under Contract
(MBF, Sawlog + Utility Volume)

PURCHASER	SALE NAME	10/1/94	10/1/95	10/1/96	NOTES
Alaska Pacific Trading Co.	Granite	5,346.5	0.0	0.0	
Age, Frank	Zarembo Salvage	371.0	0.0	0.0	
	Cedar	0.0	0.0	105.0	
	Kindergarten Salvage	0.0	0.0	25.0	
Belk Logging	Shikat Plus A-Frame	161.0	105.0	0.0	
Big Salt Lumber	Upper Steel Salvage	72.1	0.0	0.0	
	Rockie Dog II	0.0	11.0	0.0	
	Rock Creek Slide II	0.0	71.0	71.0	
Cedarville Timber & Logging	Snowpup	3,048.0	0.0	0.0	
Chambers, Jack	Rynda Boomstick	4,546.0	1,937.3	0.0	
	8400 Line Salvage	696.0	0.0	0.0	
Cook, Mel	Peanut Sale	0.0	0.0	37.0	
D&L Logging	Turnout Salvage	318.0	0.0	0.0	
	Fogbank Salvage	0.0	180.0	0.0	
	Freshwater Salvage	0.0	36.0	0.0	
	Little Hamilton Salvage	0.0	0.0	331.0	
D&L Woodworks	Tributary Salvage TS	0.0	0.0	113.0	
Ensely, Jim	Twin	65.0	0.0	0.0	
Fox River Timber Corp.	Deep Bay South	2,904.1	0.0	0.0	
Furford, Ryan	Jubilee Cedar Salvage	15.0	0.0	0.0	
Graves, Timothy	Kitkun Bay	4,212.8	0.0	0.0	
H&L Salvage	E. Shaheen Cull Log	25.0	0.0	0.0	
	Sleepy Cedar Too	20.0	5.0	0.0	
	End of Road	0.0	30.0	5.0	
Icy Straits Lumber Co.	Wukuklook Salvage	0.0	72.2	0.0	
Jones, Jerry	Cutthroat Log Salvage	0.0	0.0	37.0	
	Goose Creek Cedar Salvage	0.0	0.0	20.0	
Jones, Warren	Polk Switchback Salvage	0.0	0.0	29.0	
Kohnke, John	Froot Lake Salvage	0.0	9.0	6.0	
L&L Logging	Two View	152.0	0.0	0.0	
L.B. Logging	Middle Steel Salvage	101.0	0.0	0.0	
	Split Pit Salvage	94.0	0.0	0.0	
Landers, Keith	Goose Bay Cedar II	0.0	10.0	2.0	
Last Chance Enterprises	Goose Bay Cedar	25.0	0.0	0.0	
	Rush Too/E. Rush Peak	23.0	0.0	0.0	

TABLE A-17. Continued
Tongass Volume Under Contract
(MBE, Sawlog + Utility Volume)

PURCHASER	SALE NAME	10/1/94	10/1/95	10/1/96	NOTES
	Roadside Hazard Removal	10.9	0.0	0.0	
	Wolf Pup log Salvage	0.0	0.0	10.0	
McGraw Gravel Sales, Inc.	False Island BlowDown	390.0	0.0	0.0	
Metlakatla Forest Products	Tuxecan North	1,989.9	0.0	0.0	
	Salt Lake	2,843.5	0.0	0.0	
	Midpoint	5,328.0	2,844.0	0.0	
	Deep Bay North	14,860.0	13,661.0	13,661.0	
	Timber Knob Pass Salvage	0.0	0.0	415.0	
	Triangle Salvage	0.0	0.0	348.0	
Monro, Mike	Spruce Flats Salvage	0.0	0.0	33.0	
Music, Jeff	Edge Salvage	0.0	0.0	104.0	
New Traditions	Sarkar Stringer	1.75	0.0	0.0	
	Buck Snort/Lab Bay	37.75	25.5	0.0	
	X-Mark Stringer	22.0	6.0	0.0	
	Staney Stringer	26.0	8.5	0.0	
	Salamander Log Salvage	0.0	8.0	0.0	
	Ratz Stringer	0.0	8.0	0.0	
	Sweetwater Log Salvage	0.0	6.0	0.0	
Rayonier, Inc.	Saginaw	0.0	24,041.0	24,041.0	
Richter, Wm. Skip	Kosciusko Stringer	37.0	0.0	0.0	
	Port Alice Cull Log	59.0	59.0	0.0	
Sealaska Timber Corp.	De Rumba Salvage	585.0	0.0	0.0	
	Twenty Mile/Indian Creek	11,865.0	91.0	0.0	
Seley Corp.	East Thorne Arm	193.5	0.0	0.0	
	North Ridge Sale	0.0	924.0	0.0	
	Red's Bridge	0.0	452.0	452.0	
	Top of the World	0.0	0.0	199.0	
Silver Bay Logging	Appleton Resale	0.0	23,348.0	10,684	
	Saook	29,833.0	29,833.0	29,833	
	Hanus ATC	0.0	0.0	15,546	
	South McKenzie	0.0	0.0	12,317	
The Mill, Inc.	Sumner Salvage	3,105.0	1,748.0	0.0	
	11-Mile Blowdown	0.0	47.0	0.0	
Thorne Bay Lumber Enterprises	Tiny Salvage	16.0	0.0	0.0	
	Fall/Six	35.0	31.0	0.0	

TABLE A-17. Continued
Tongass Volume Under Contract
(MBF, Sawlog + Utility Volume)

PURCHASER	SALE NAME	10/1/94	10/1/95	10/1/96	NOTES
	Bug Bite/RP Cull Log	36.0	6.2	0.0	
	Rio Beaver	33.0	4.0	0.0	
	North Thorne Stringer	0.0	14.0	0.0	
	Stress Salvage	0.0	10.0	0.0	
Vandervort, Lawrence	800 Contour Salvage	0.0	0.0	58.0	
Viking Lumber Company	Bohemia	0.0	0.0	33,710.0	
	Dog Salmon Raod Salvage	0.0	0.0	10.0	
	Cape Pole	0.0	0.0	1,438.0	
	Warren Channel	0.0	0.0	912.0	
Walker Wood Products	Bonanza Cull Log Salvage	119.0	119.0	0.0	
West, Robert	49 Cedar Sale	0.0	0.0	20.0	
	Old Franks Cedar	0.0	0.0	41.0	
Wilks Logging	East Polk Salvage	19.0	19.0	0.0	
Wood Marine	Cavern Stringer	6.0	0.0	0.0	
W.R. Tongard Logging	Eagle Salvage	0.0	0.0	71.0	
	Two Bears Salvage	0.0	0.0	27.0	
Subtotal Independent Sales		93,646.8	100,362.7	144,711.0	
Enjoined Sales		-29,833.0	-53,874.0	-0.0	
Available Unscaled Volume		63,813.8	46,488.7	144,711.0	

Ketchikan Pulp Company Contract	Offer 1 Lab/Whale Pass	51,343.0	51,343.0	52,802.0	
	Offer 2 Coffman/Winter	7,000.0	0.0	0.0	
	Offer 3 Thorne Bay	10,000.0	0.0	0.0	
	Offer 4 Polk Inlet	6,000.0	0.0	0.0	
	Offer 9 Shelter Cove	10,000.0	900.0	550.0	
	Offer 11 North Saddle	13,973.0	5,500.0	2,000.0	
	Offer 12 Sumex	23,921.0	5,250.0	0.0	
	Offer 13 Hume Island	5,808.0	5,000.0	541.0	
	Offer 14 Fire Cove	25,993.0	4,000.0	0.0	
	Offer 15 Upper Salt Creek	31,196.0	11,000.0	3,433.0	
	Offer 16 Slide/Lava	17,402.0	5,500.0	3,366.0	
	Offer 17 South Margaret	0.0	23,000.0	13,264.0	
	Offer 18 Traitors River	0.0	25,000.0	320.0	
	Offer 19 Campbell	12,540.0	4,000.0	0.0	
	Offer 20 Crab Bay (I)	30,986.0	30,986.0	9,000.0	Vol. Reduced
	Offer 21 Inbetween	9,917.0	9,917.0	4,400.0	Vol. Reduced

TABLE A-17. Continued
Tongass Volume Under Contract
(MBF, Sawlog + Utility Volume)

PURCHASER	SALE NAME	10/1/94	10/1/95	10/1/96	NOTES
	Offer 22 Trumpeter 6	0.0	500.0	2,037.0	
	Offer 23 Chin Pt./Bushy Pt.	0.0	41,500.0	40,872.0	
	Offer 24 Little Coal Bay	0.0	17,500.0	0.0	
	Offer 25 East Polk	0.0	17,000.0	14,865.0	
	Offer 26 Thorne Bay II	0.0	12,000.0	14,328.0	
	Offer 31 KSH	0.0	0.0	42,538.0	
	Offer 32 North Thorne/Ratz	0.0	0.0	22,420.0	
	Offer 33 Big Dewey	0.0	0.0	65,465.0	
	Offer 35 West Polk	0.0	0.0	27,976.0	
	Sink Blowdown	0.0	156.0	0.0	
	Swing	0.0	2,119.0	0.0	
Subtotal KPC		256,079.0	272,171.0	320,176.0	
Enjoined/Undercut Volume		-92,246.0	-92,246.0	0.0	
Available Unscaled Volume		163,833.0	179,925.0	320,176.0	

TABLE A-18.
Conversion Factors

PULP AND CHIPS:	
Air-dried tons (ADT) to pounds	= 2,000 lbs./ADT
Air-dried short tons (ADST) to pounds	= 2,000 lbs./ADST
Air-dried short tons (ADST) to metric tons	= .90718 metric tons/ADST
Bone-dry tons (BDT) to pounds	= 2,000 lbs./BDT
Bone-dry units (BDU) to pounds	= 2,400 lbs./BDU
Bone-units to metric tons	= 1.0886 metric tons/BDU
Short tons (T) to metric tons	= 1.10232 T/metric ton
Metric tons to short tons (T)	= .90718 metric tons/T
1 MBF round wood	= 1.09 short ton pulp
1 MBF round wood	= 2.7 short tons chips
.6515 ton chip by-product/MBF lumber tally produced	
LOGS AND LUMBER:	
1,000 board feet (MBF), Scribner (log scale) to cubic meters	= 4.53 m ³ /MBF, ls
1,000 board feet (MBF), Scribner (lumber tally) to cubic meters	= 2.36 m ³ /MBF, lt
Cubic meters to 1,000 board feet (MBF), Scribner (log scale)	= 0.2208 MBF/m ³
Cubic meters to 1,000 board feet (MBF), Scribner (lumber tally)	= 0.4237 MBF/m ³



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