

Mining and Timber

Alaska's economy has always relied upon its rich natural resources. From the days of the Treadwell mine and the later Klondike gold rush to the development of the Prudhoe Bay oil fields, many Alaskans have earned their living by extracting Alaska's mineral wealth. Many others have been employed cutting timber and harvesting seafood.

Alaska Economic Trends reports wage and salary employment for mining and logging, the subjects of this article, under Natural Resources & Mining, Oil & Gas, a subcategory of mining, was profiled in the September 2003 issue of *Trends*. While seafood harvesting is based on natural resources, most fishermen are self-employed, and are therefore not included in wage and salary data. (The Global Salmon Industry is covered in the October 2003 *Trends*.) Other employment in industries related to natural resources, such as sawmills and seafood processing, is recorded in the Manufacturing sector.

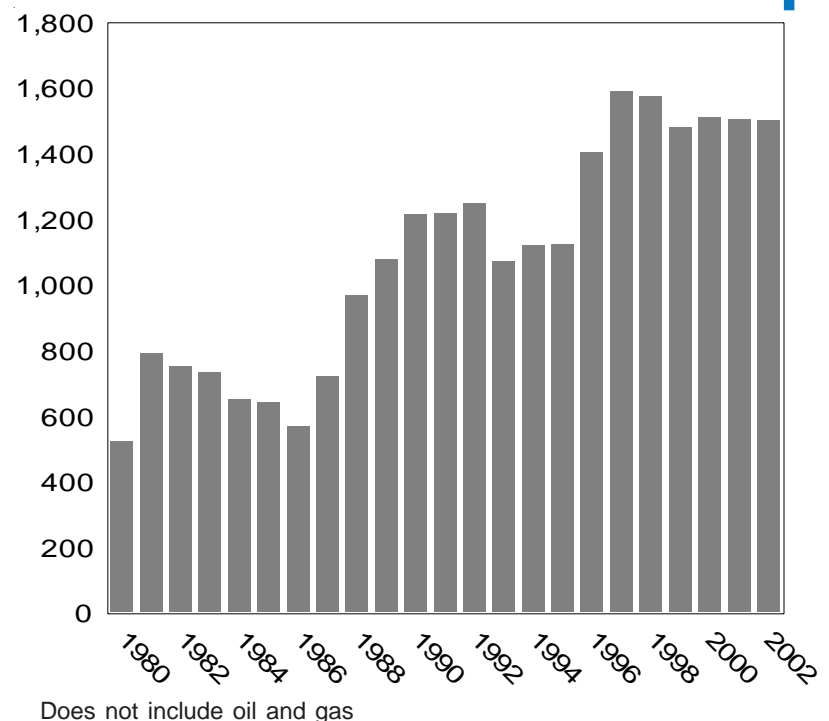
Mining employment has grown

The mining industry (excluding oil and gas) has nearly tripled in wage and salary employment since 1980. (See Exhibit 1.) The numbers in Exhibit 1 as well as those regularly published in *Alaska Economic Trends* exclude self-employed workers. In some industries, such as logging, few workers are self-employed; in others, such as

placer gold mining, there may be a significant number.

Mining provided 1,503 jobs in 2002, with gold mining and zinc-lead extraction each accounting for 444 positions. Together, these two types of mining accounted for 59 percent of all mining employment. (See Exhibit 2.) Silver mining was

Mining Employment 1980–2002



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

the next largest with 17.6 percent of the industry's workforce. Sand and gravel, coal, and a miscellaneous category contributed the balance.

Salaries are high

Alaska's mining employees are some of the highest paid in the state. (See Exhibit 3.) In 2002 they earned an average of \$63,763 a year. Though less than the earnings of oil workers, that amount is substantially more than the statewide average of \$37,101. Earnings in the mining industry are not only high, they have also risen faster than inflation (Anchorage CPI) in the period from 1980 to 2002. In constant 2002 dollars, earnings have increased from \$57,450 in 1980 to \$63,763 in 2002.

Mining occupations

Based on 2000 survey data, the largest share of mining workers, 31 percent, was in construction and extraction occupations. An additional 21 percent worked in installation, maintenance, and repair occupations, and 15 percent worked in production occupations.

The training for nearly all of these occupations occurs on the job, although several require work experience in a related occupation or post-secondary vocational training. Substantially more formal education is required for the 11 percent of mining workers employed in professional occupations (technicians, engineers, surveyors) and the 5 percent employed in management, business, and financial occupations.

Zinc more valuable than gold?

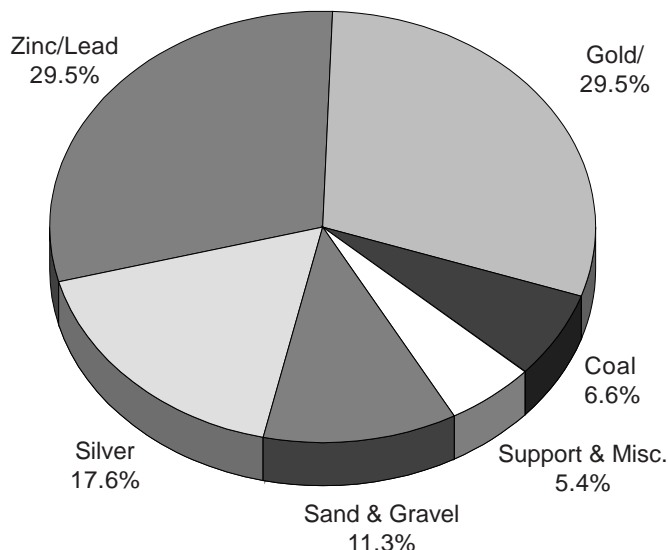
Gold prospecting and mining play a prominent role in Alaska's history and mythology. The Juneau area boomed with the discovery of gold in 1880. A few years later the Treadwell mining complex, across the narrow Gastineau Channel from Juneau, was one of the largest gold mining operations in the world. Prospector George Carmack came to Juneau in 1885 looking for riches, then moved on to the Yukon and was responsible for starting the Klondike Gold Rush of 1897. Smaller gold rushes at Nome and Fairbanks played a major role in the settlement and growth of those cities.

All told, Alaska produced more than a million ounces of gold from 1880 to 1899, worth nearly \$24 million. Since then, the total value of gold produced in Alaska has ballooned to well over \$3 billion. (See Exhibit 4.) It may come as a surprise then that zinc, a relative upstart on the Alaska mining scene, has already far outpaced gold's production value.

Since 1989 Alaska has produced nearly five and a half billion dollars worth of zinc, nearly all of it from Teck Cominco's Red Dog Mine. The Red Dog is located in the DeLong Mountains, approximately 90 miles north of Kotzebue and 100 miles above the Arctic Circle. The huge zinc deposit was first discovered in 1953. The U.S. Geological Survey began documenting the minerals in the area in 1970 and named the local creek "Red Dog" after the rust-colored dog that frequently flew with a local pilot and miner.

The Red Dog is the largest zinc mine in the world. It produced about 85 percent of all U.S. zinc in

2 Mining Employment 2002



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

2002. In recent years the Red Dog has employed between 400 and 500 workers in the sparsely populated Northwest Arctic Borough.

Zinc prices fell to their lowest levels in 15 years in 2002, however, and the Red Dog has lost money in recent quarters, causing it to lay off a small percentage of its workers. As an industrial metal (zinc is used primarily to galvanize steel), the demand for zinc generally follows national and international economic cycles. Consequently zinc demand has been relatively low during the 2001-2003 recession.

A more direct reason for the low prices, though, is the strong worldwide investment in mines that took place in the late 1990s, leading to excess supply and downward pressure on prices. Although the quantity of zinc produced in Alaska increased from 2000 to 2002, the total value declined by 19 percent over that period. (See Exhibit 5.)

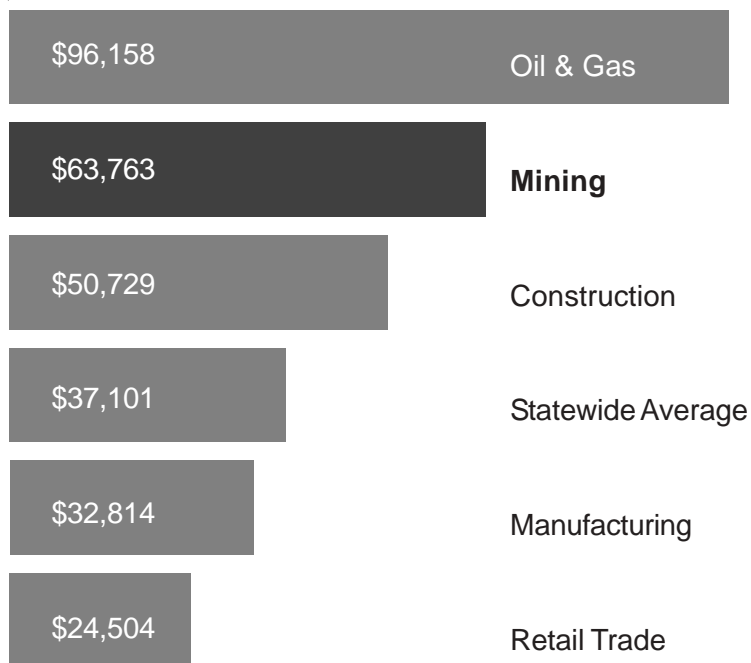
Some small companies and small mines operating outside of Alaska could not absorb the temporary losses and either suspended operations or closed mines altogether. But Teck Cominco is not a small company and the Red Dog is most certainly not a small mine, so any employment losses there are likely to be short-term and of limited numbers.

Golden opportunities

Although gold has taken a back seat to zinc in terms of total value, the future for gold mining in Alaska is bright. Extensive exploration activity in the late 1980s and again in the late 1990s resulted in substantial new discoveries of gold. The biggest prospect is NovaGold Resources' Donlin Creek project in Southwest Alaska, where it is believed 23 million ounces of gold await mining. Significant new discoveries were also made 25 miles northwest of Fairbanks at Kinross Gold's Fort Knox-True North mine, which has grown into Alaska's largest gold mine, employing as many as 400 workers in recent months.

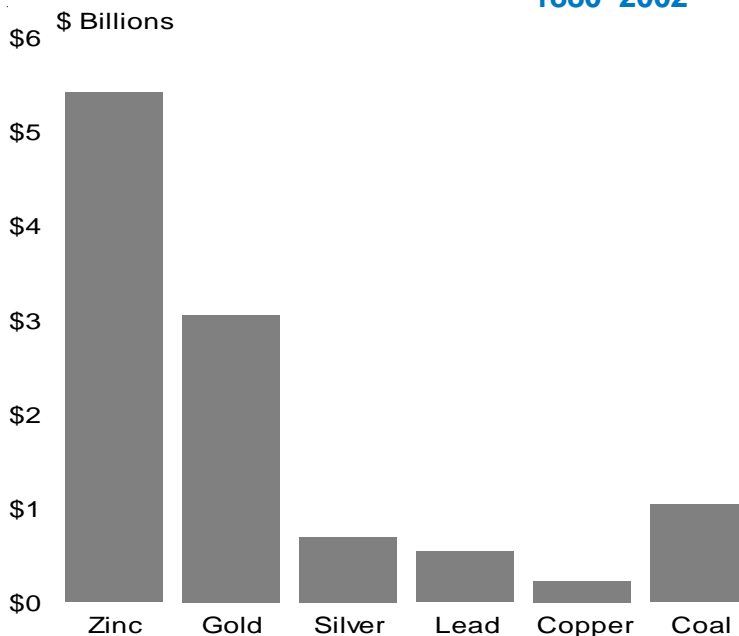
Joint venture partners Sumitomo Metal Mining and Teck Cominco are moving nearer to

Average Annual Earnings 2002 3



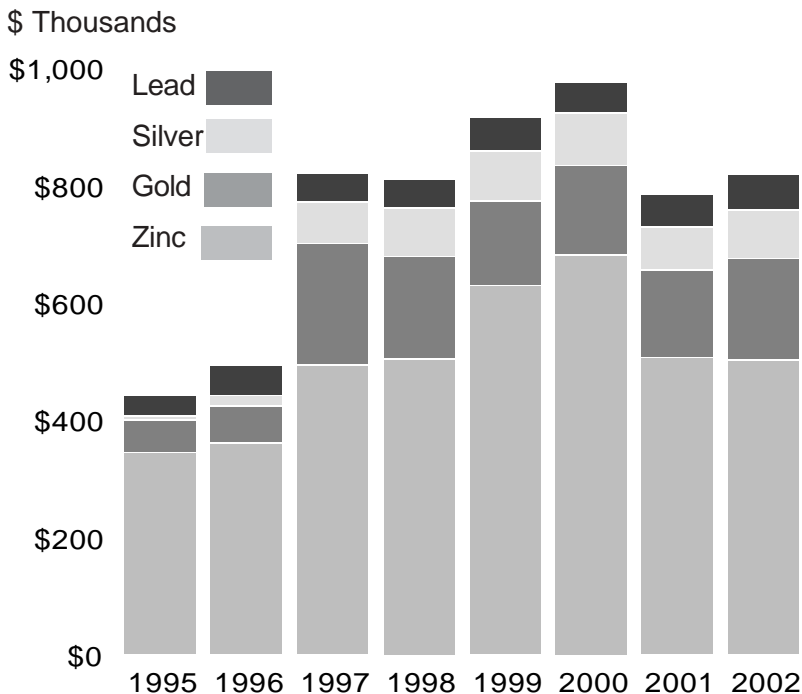
Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

Value of Mining Production 1880-2002 4



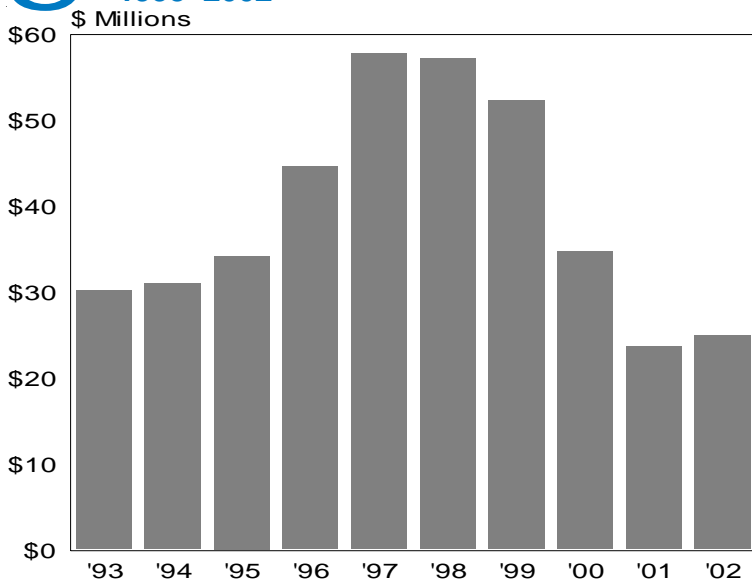
Source: Alaska Miners' Association 2005 Handbook and Services Directory and Alaska Department of Natural Resources

5 Alaska Mineral Production 1995–2002



Source: Alaska Miners' Association 2005 Handbook and Services Directory and Alaska Department of Natural Resources

6 Exploration Expenditures 1993–2002



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

construction on the Pogo gold project 85 miles southeast of Fairbanks in Interior Alaska. During construction of the mine and access road, employment is expected to reach as high as 700. Production operations will require a workforce of about 300. In Southeast, Coeur Alaska is moving toward final permitting of its Kensington gold mine north of Juneau, which contains an estimated 1.8 million ounces of proven and probable gold reserves.

Near Nome, partners NovaGold Resources Inc. and TNR Resources Ltd. continue exploration at their Rock Creek property. At least 550,000 ounces have been located at the site and another 303,000 are believed to exist. Production is scheduled to begin in 2005. Exploration at Northern Dynasty Minerals' Pebble project near Lake Iliamna is producing news of significant high grade gold-copper mineralization. The deposit will likely be accessible for low cost, open pit mining. A number of other projects are being explored or developed.

Although exploration has fallen in the last three years, exploration expenditures still amounted to \$25 million in 2002, more than \$17 million of which was for gold and associated precious metal projects. (See Exhibit 6.)

Gold prices have risen in recent months, (to almost \$400 an ounce in mid-November) largely due to economic and political uncertainty and volatile currency markets. Gold is often seen as a safe haven for investors although it has seen dramatic fluctuations in prices over the last few decades. In 1980 gold was worth \$835 dollars an ounce; by 1998 it had fallen below \$300 an ounce. In the short term, the higher prices are expected to stimulate gold production and if the prices remain high exploration activity is also likely to increase.

In 2002, jewelry made up approximately 80 percent of total demand; retail investment, 10 percent; industrial use, 8 percent; and dental products, 2 percent. Over any extended period of time, the world demand for gold has been

remarkably consistent, which bodes well for Alaska's growing gold mining industry.

Other mineral wealth

Alaska is rich in other minerals besides zinc and gold. Kennecott's Green's Creek Mine near Juneau employs more than 250 workers and is the largest silver mine in North America. It also produces gold, lead, and zinc. Alaska also produces significant amounts of lead, copper, and coal. Exploration for platinum is underway in southeast Alaska near Ketchikan, and what is believed to be the first ever lode diamond discovery in Alaska is being explored at Shulin Lake near Talkeetna.

Industrial minerals used for buildings, roads, railroads, airports, and docks are also abundant in Alaska. Marble quarried on Prince of Wales Island was used for the four columns of Juneau's state capitol building and in many buildings constructed on the west coast during the early 1900s.

The state's glacial history has produced, and continues to produce, a high grade of sand and gravel, most of it near coasts, facilitating transportation. The mining of construction sand and gravel provided 170 jobs in 2002.

In all, 77 million hectares of mineral-rich land in Alaska is available for exploration and development. This is an area about twice the size of Nevada. Alaska contains more land open to mineral development than the other 49 states combined.

Environmental issues

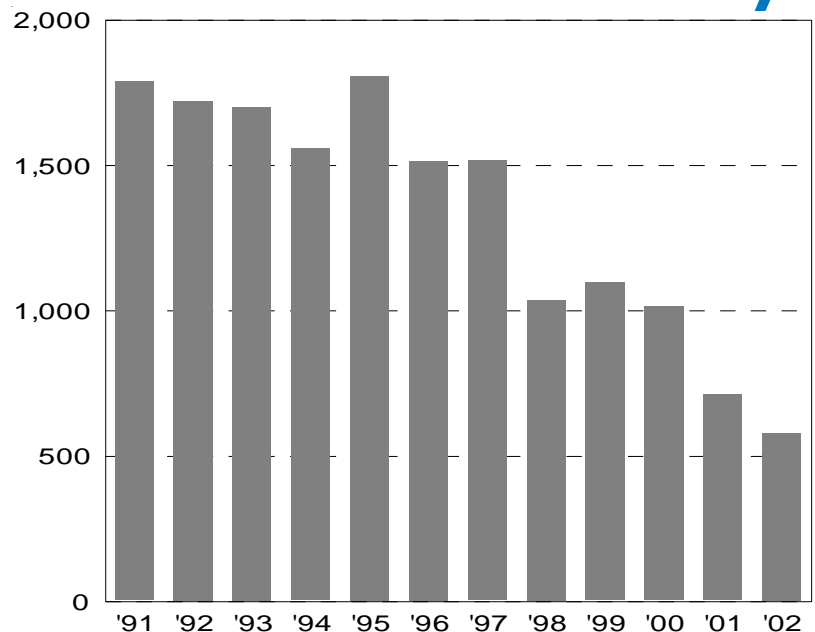
The availability of land for development does not necessarily mean known mineral reserves will be developed. If mining operations will affect the environment, the National Environmental Policy Act requires an environmental impact statement analyzing the effects and what steps the company must take to minimize or eliminate environmental harm. This can be a long and controversial process.

The Alaska Departments of Natural Resources (ADNR) and Environmental Conservation (ADEC), play roles before mining construction or development can begin. Individuals are given the opportunity to weigh in on proposed projects through public comments. As is often the case in Alaska when environmental issues are involved, there can be heated debate between those who favor specific projects and those who oppose them.

Timber

In 1991, nearly 1,800 were employed in logging operations in Alaska's forests. By 2002, only 32 percent, (581) of these jobs still existed. (See Exhibit 7.) In the Pacific Northwest, the Endangered Species Act and the spotted owl controversy played a role in limiting access to federally managed forestlands, while pollution issues resulted in some mill closures. In Alaska, cutting restrictions unilaterally imposed by the U.S. Forest Service in the early 1990s effectively

Logging Employment In Alaska 7



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

ended the long-term harvest contracts upon which the mills depended. In British Columbia, other political factors involving First Nations and environmental concerns contributed to a growing debate over the best use of forestlands. While each of the areas faced unique political situations, a global economic trend was increasingly impacting the entire region.

The economic reasons are complicated, but the underlying essence is the fact that the growing worldwide production of timber has exceeded demand for most of the past decade. Within the wood products industry, a series of mergers and consolidations have seen the emergence of several dominant corporations whose business perspective is global in scope. In seeking efficiencies, these companies have closed or consolidated plants in high cost areas and shifted investments to lower cost areas, often to nations in the developing world as well as to the American south.

Regional trend

In the 1990s, Alaska Pulp Corporation and Ketchikan Pulp Company closed pulp mills and associated sawmills in Southeast Alaska. These closures largely eliminated the local processing capacity and dramatically reduced the local demand for timber.

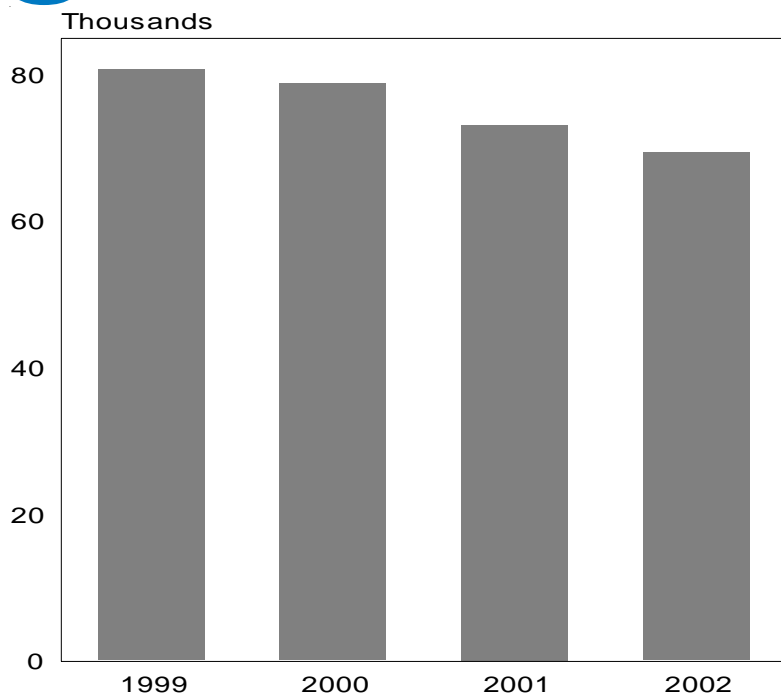
The Alaska mill closures were part of a regional trend that included the Pacific Northwest and British Columbia. Large timber companies were attempting to attain economies of scale with mergers and plant closings throughout the region. In Washington state, pulp mills in Port Angeles, Bellingham, Longview, and elsewhere were closed. Of the 673 sawmills that operated in the Pacific Northwest in 1988, only 349 remained by 1996. Similarly, of the 66 plywood mills that had operated in the coastal Pacific Northwest in 1988, only 27 remained by 1997.

A hundred or so miles to the south of Ketchikan in Prince Rupert, British Columbia, Skeena Cellulose Inc. declared bankruptcy in 1997. Because the company was so important to the area, accounting for up to 10,000 direct and indirect jobs according to an October 2003 *Vancouver Sun* article, the provincial government attempted a rescue. This attempt ultimately failed, and the company went into receivership in 2001, leaving taxpayers on the hook for C\$412 million. While there have been recent efforts to reopen the plant, as of this writing it remains closed.

This process is continuing. Since 1997, 11 of B.C.'s 47 forest product mills have closed. Following Weyerhaeuser's hostile takeover of Willamette Industries in 2001, the company has shuttered 28 plants across the United States and Canada, and eliminated 2,287 jobs. Acquisitions and consolidations by other major corporations have resulted in similar reductions. (See Exhibit 8.)

Within its regional context, Alaska suffered far fewer mill closures than British Columbia or the Pacific Northwest. Unfortunately, these mills

8 U.S. Logging Employment 1999–2002



Source: U.S. Bureau of Labor Statistics

represented a far higher percentage of the local processing capacity. While loggers in Oregon, Washington, and British Columbia continued to send timber to fewer but more efficient local mills, Alaska loggers increasingly relied on the harvest and export of raw logs and rough cut lumber from private lands to Asian markets. (See Exhibit 9.) Before long, openings to these Asian markets for Alaska timber began to narrow.

Export markets

The Asian economies suffered a series of shocks during the 1990s. The Japanese recession resulted in fewer housing starts and lessened demand for wood products. The broader Asian economic downturn of 1997-1998 also impacted financial conditions. As the dollar gained strength against most Asian currencies, Alaska exports became more expensive. Moreover, inexpensive raw logs and rough cut timber from Russia's vast forests were capturing an ever larger share of the Northern Asia (China, Japan, Korea) market, growing from 17 percent in 1991 to an estimated 60 percent in 2002. Finally, wood from New Zealand plantations made up an ever-greater share of Asian imports.

China's economic growth during this period, which some thought would lead to increased demand for North American wood products, proved a disappointment. In fact China, relying on plantation trees as well as the vast and accessible Russian forests, has become a competitor, and now supplies a significant amount of Japanese needs. This emerging Sino-Russian forest products relationship has altered the dynamics of the Asian timber market.

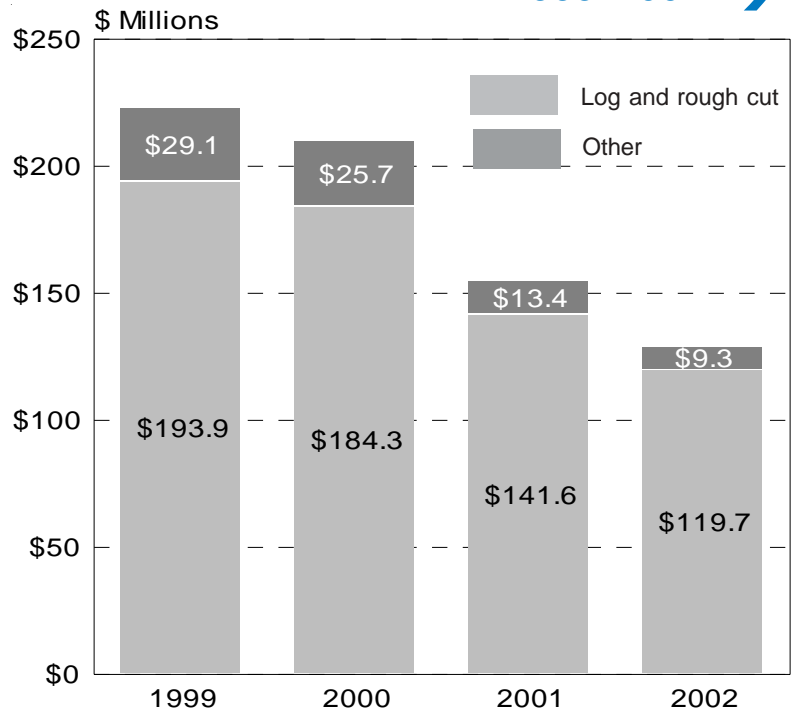
In 1995, Russia replaced the United States as the world's largest exporter of logs, and in 2001, China replaced Japan as the largest importer. The Chinese imports of raw logs support a growing processing industry, with China exporting finished wood products and supplying Japan with goods it once produced itself with timber obtained from North America. By 2002, China had more than 2,000 plywood mills, and was the fourth largest supplier of softwood plywood to the United States.

Plywood production is expected to grow from two billion square feet a decade ago to more than thirteen billion square feet by 2005.

In general, raw softwood logs and rough cut timber are at the low end of the scale in terms of wholesale value and profitability. U.S. log exports have declined 40 percent since 1989, while European exports, increasingly based on Scandinavian tree farms and the newly accessible Russian forests, have grown 81 percent, and Oceania's export of logs, mostly from New Zealand, has increased more than 200 percent. Since the mid-1990s, Alaska's exports of softwood logs and rough cut lumber has followed the U.S. decline. (See Exhibit 9.)

Not only is Alaska facing increased competition in the raw material market, but the opportunities for U.S. manufactured wood products are clearly under assault. In 1997, for example, U.S. plywood exports totaled a record 1.7 billion square feet. By 2002, shipments had fallen by 74 percent to only

Value of Alaska Wood Exports 1999-2002



Source: U.S. Census

443 million square feet. U.S. exports to Europe during this period declined by 99 percent, while the combined total of U.S. and Canadian plywood exports to Asia fell on the order of 60 percent. (See Exhibit 11.)

Rising imports from South America, especially Brazil, and increased local production of both plywood and oriented strand board, (OSB) largely explain the loss of European markets, while increased Chinese production of plywood has undermined U.S. exports to Asia.

Farmed trees

In August 1996 *The Economist* magazine carried an article entitled The Forest Industry Uprooted. The article argued that the timber industry was abandoning its traditional production locations and setting up new facilities in the Southern Hemisphere based on fast growing plantation trees. It predicted that Latin America would

overtake North America as the major exporter of forest products to the Pacific Rim by 2010.

While only five percent of the world's forest area is currently in plantations, these tree farms produce approximately 35 percent of the world's industrial round wood supply. This is expected to increase to 44 percent by 2020. In the past two decades, the area devoted to tree plantations has increased tenfold.

In 2002, for example, New Zealand's tree farm harvest amounted to 8.5 billion board feet valued at \$2 billion. Most of this was exported to Asian markets. Alaska's total wood exports by contrast, were valued at only \$129.1 million. New Zealand's production, which has more than doubled since the 1980s is expected to expand by up to six times by 2025. Multinational firms such as International Paper, Weyerhaeuser, Rayonier, Inc. as well as Japanese based companies have increased their holdings in New Zealand's "wall of wood," and many are developing plantation systems in other Southern Hemisphere countries including Chile, Uruguay, and Brazil.

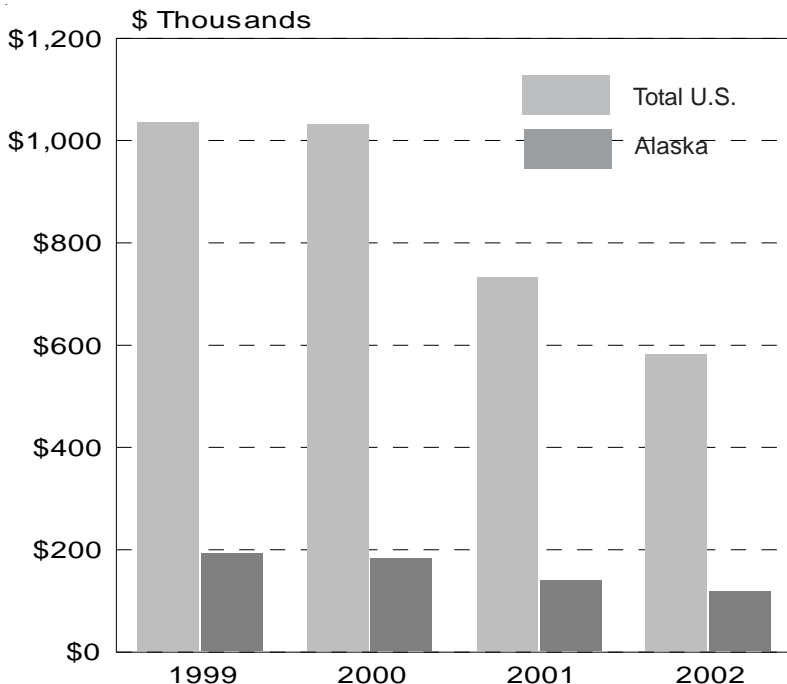
Currently Brazil has 300 plywood mills, 40 percent of which draw fiber from softwood plantations. Production is expected to exceed three billion square feet by 2005. Two thirds of the country's production is exported.

At the same time Russian forest products are displacing North American logs on the Asian market, tree plantations across the Southern Hemisphere are gaining an increasing share of the market, as well as supplying a source of raw materials for manufactured wood exports. This growing competition from low wage areas cannot be ignored.

Alaska is a high cost area

Alaska is a high cost area within the United States and the U.S. is a high cost area within the emerging world economy. Major firms like International Paper, Weyerhaeuser, Stora Enso

10 Log/Lumber Exports to Japan Total U.S. and Alaska



Source: U.S. Census

and others are increasingly locating production facilities in low wage areas that have ready access to fiber. Scandinavian multi-nationals have come to rely on the newly available low-cost Russian timber as well as domestic tree farms to produce high-end engineered wood. American based multi-nationals have pursued a strategy of mergers and the closure of inefficient plants, relocation of U.S. production to the American south, and growing investments in developing nations.

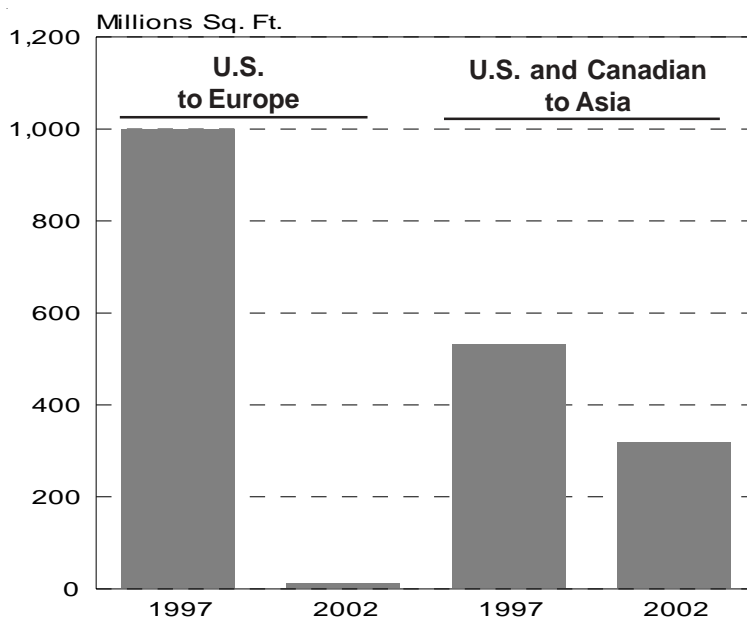
In many ways, the softwood timber dispute between Canada and the United States, which has led to WTO and NAFTA hearings, is irrelevant to the investment strategies of multinational firms. For example, Weyerhaeuser has long operated in Canada and in 1999 added to its holdings by acquiring MacMillan Bloedel. Following this acquisition, Weyerhaeuser closed plants in both Canada and the Pacific Northwest while expanding its operations in New Zealand and Uruguay. As major producers transfer operations to lower cost areas offshore, smaller domestic firms are displaced from export markets and face growing competition from low priced imports.

In a 2001 report prepared for the Canadian Ministry of Forests entitled Industry in Crisis, Peter Pearse, a former forestry professor at the University of British Columbia, presented a limited cross-national comparison of timber costs. Pearse found that Chile had the study's lowest cost softwood lumber production. (All values are expressed in 2000 Canadian dollars.) Chile's loggers and millworkers produced a thousand board feet of dimensional lumber for \$202 including labor costs of only \$49. Brazil was a close competitor at \$267 per thousand board feet of which \$82 was labor costs. Coastal British Columbia, by contrast, was the most expensive area with total costs running \$559 per thousand board feet and \$228 in labor costs. Pearse's study, which did not include Alaska, also showed the Pacific Northwest as a high cost area at \$437 per thousand board feet with \$124 going to labor. It should be noted that the study did not include China, where according to the *Marine Digest and Cargo Business News*, the average Chinese

worker earns just 2.1 percent of the average U.S. income.

A 1998 University of Washington study entitled An Assessment of Market Opportunities for Alaska's Forest Product Exports, found Alaska's production costs to be slightly higher than British Columbia's. Total costs of production (in 1995 dollars) over the 1987 to 1994 time period, averaged \$370 per thousand board feet for Alaska compared to \$345 for British Columbia and \$170 for the Pacific Northwest. Labor costs of producing one thousand board feet of aggregated sawn lumber in Alaska was \$153.52 compared to \$99.26 in the Pacific Northwest. (Adjusted to 2002 values, these amounts would be \$182.56 and \$117.18 respectively.) While Alaska stumpage fees were the lowest among the regions, manufacturing costs comprised 50 percent of Alaska's total lumber costs compared to 27 percent in BC and 21 percent in the Pacific Northwest. The authors stated that reasons underlying this disparity were unclear, but manufacturing inefficiencies may have included the scale of operations, higher

Plywood Exports 11 To Europe and Asia, 1997 and 2002



Source: APA Engineered Wood Association

energy and transportation costs, difficulty of terrain, lack of infrastructure and higher labor costs. (See Exhibit 12.)

Labor cost data from the U.S. Bureau of Labor Statistics tend to support these findings. While there are differences in logging techniques, equipment and productivity, annual salaries are indicative of overall labor costs. In 2001, timber fallers in Alaska earned an average annual wage of \$60,920. This compared to Oregon's \$46,740 and Georgia's \$21,870. These Alaska loggers earned nearly twice the national average of \$32,580. Alaska also had the highest average annual wage for sawyers (a manufacturing occupation) at \$29,780, which was roughly one third higher than the \$20,970 annual wage of sawyers in South Carolina and 20 percent higher than the national average of \$22,810. (See Exhibits 13 and 14.)

Alaska in a global perspective

Geographically, Alaska is by far the largest state in the union. Alaskans surrounded by largely undeveloped natural resources often wonder why these treasures cannot be readily translated into economic prosperity. Impressive as these resources are, they must be viewed within a global context.

While Alaska's timber stands seem extensive, they are relatively small in comparison with the rest of North America. The Tongass National Forest, for example, represents approximately one percent of U.S. forested lands and less than one tenth of a percent of the global total. Russian forests, which were largely unavailable until the 1991 collapse of the Soviet Union, represent 22 percent of the world's forest supply and contain over half the world's standing softwood. Proximity to both European and Asian markets and low cost labor are added Russian advantages. These factors have in recent years attracted growing multinational investment that has only begun to exploit the potential of Russian resources. (See Exhibit 15.)

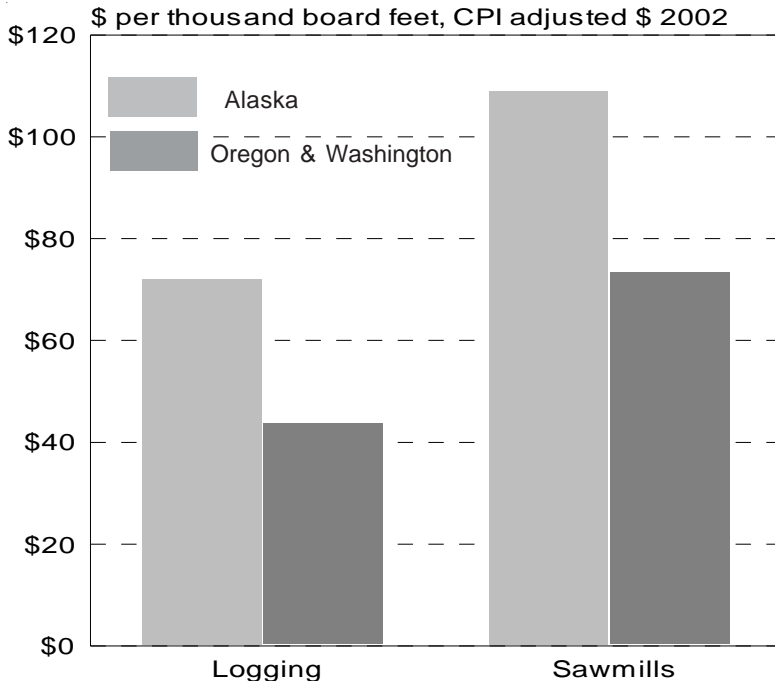
On a broader scale, multinational timber companies seem to be focusing attention on plantations based in emerging nations. Tree farms already contribute over a third of the world's round wood supply, and are expected to increase this figure to nearly half by 2020. Like the threat posed by salmon farms to Alaska's wild stock fisheries, tree farms located in low-cost developing nations are expected to capture an ever-greater share of world markets.

Bright spots

While most indicators fail to point towards a significant revival of the Alaska timber industry, there are some bright spots. The low mortgage rates of 2003 ushered in a building boom that increased domestic demand for softwood lumber and led to higher prices. The fact that much of British Columbia's production was curtailed due to forest fires contributed to this upward spiral. The decline in the dollar in relation to both the euro and yen has made Alaska exports more affordable on foreign

12 Labor Costs per 1,000 Bd. Ft. Alaska vs. Oregon and Washington

1987-1994



Source: University of Washington College of Forest Resources

markets, while the rise of the Canadian dollar has increased the cost of Canadian lumber on domestic markets. Another positive sign is that the sluggish Japanese economy has finally begun to show some signs of improvement.

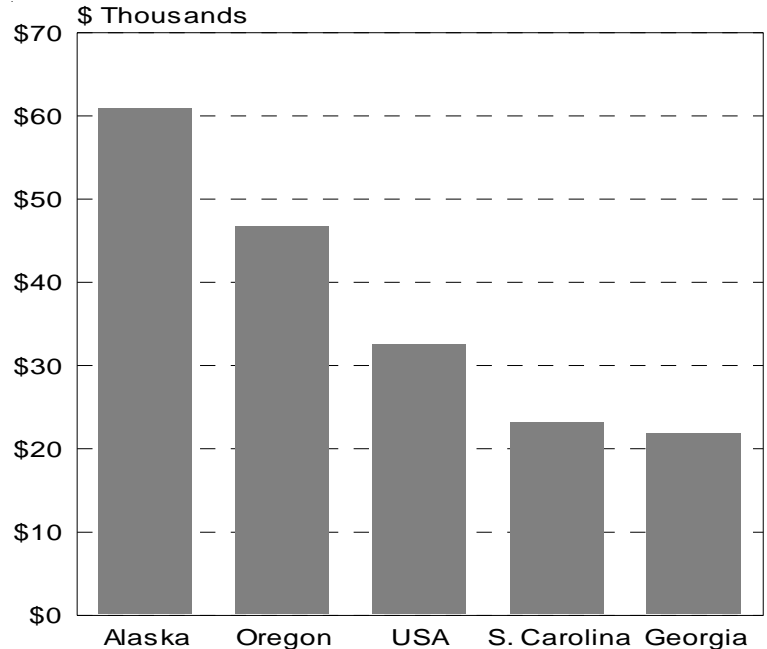
In addition, some Alaska mills may follow Pacific Log and Lumber's lead in installing dry kilns, a major step towards providing finished lumber for local markets. Not only will this save the costs of transporting green lumber south, it will provide further opportunities for Alaska builders and manufacturers who utilize finished lumber. While such measures should increase milling and manufacturing employment opportunities, it is doubtful they will create a demand for a substantial increase in timber harvests. They will, however, lead to a more profitable utilization of current levels of harvest. Opportunity appears to exist for specialty small business manufacturing utilizing Alaska woods; this would benefit the economy and manufacturing employment, but have negligible impact on the level of natural resource extraction.

Conclusion

Alaska is enormously rich in natural resources, but in spite of their symbolic and mythic importance, they have not been a major source of employment in the modern era. In 1980, only one percent of the state's wage and salary workforce was employed in the mineral mining and timber industries. By 2002, the actual number of workers had increased slightly, but their percentage of the workforce had fallen to seven-tenths of one percent.

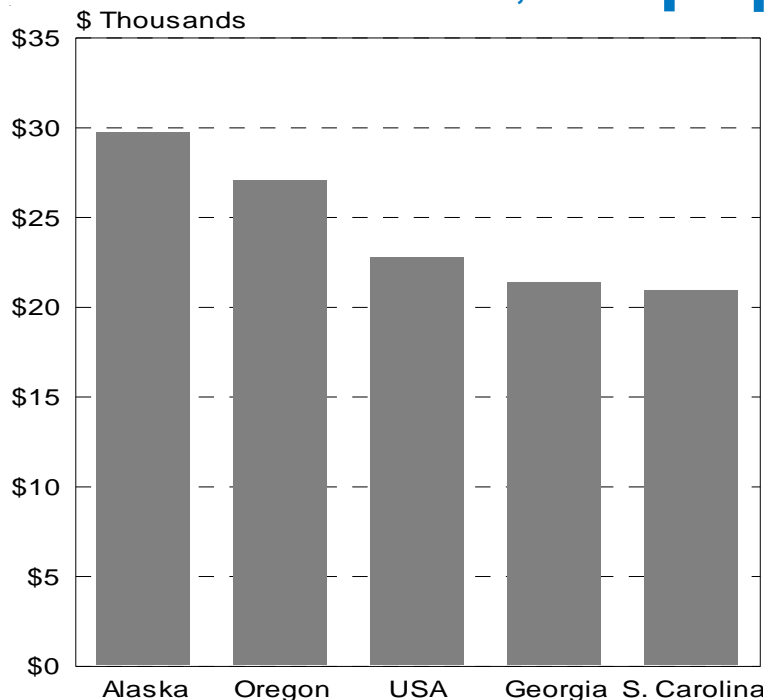
The mining and timber industries deal with the production of raw materials, and in this era of globalization such commodities must compete on a world market against new sources of supply. A distinction is to be drawn between biological resources such as timber and mineral resources like zinc and gold. Timber can be farmed, and vast forests exist in low wage countries. These abundant, alternative sources of supply have driven world prices of the commodity downward

Timber Fallers Avg. Annual Wage 13 Selected states, 2001



Source: U.S. Bureau of Labor Statistics

Sawyers Average Annual Wage 14 Selected states, 2001



Source: U.S. Bureau of Labor Statistics

and glutted the market. While Alaska timber will continue to find specialty markets and niche opportunities, the economic realities of the early twenty-first century point towards a world market dominated by less expensive sources.

Mineral resources, on the other hand, must be mined where they are found and production cannot be shifted to other locales. While the discovery and development of ore bodies in low wage areas affect prices, Alaska's supply of mineral resources is large enough to suggest a continuing ability to compete on the world market. For the foreseeable future, mineral wealth will provide economic benefit to the places where the minerals happen to be found, and Alaska is one of those places.

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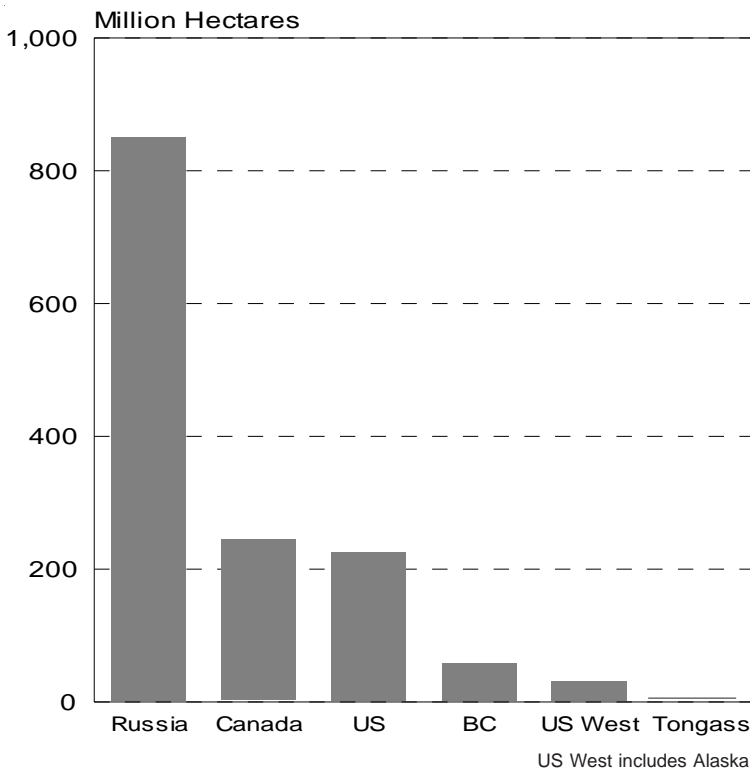
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Sources: FAO 2003, Statistics Canada, U.S. Forest Service, *Forest Resources of the U.S.*