

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 8672

112 SCOMM 9: HOUSE SPEC. COMM. ON PERMANENT FUND 1977-78

# Arthur D Little, Inc

Candidate Industry: PETROCHEMICAL INTERMEDIATES

Description: An ethylene complex with associated derivatives (polyethylene, ethylene glycol, styrene monomer, ammonia and urea.

Estimated Capital Costs: \$775 - \$825 million. A world scale petrochemical complex requires an estimated capacity of one billion pounds per year. A similar facility in the U. S. Gulf Coast would cost \$520 - \$550 million.

Assumptions:

- Plant Location: Kenai, or off pipeline with port access.
- Associated derivatives: polyethylene (low and high-density), ethylene glycol, styrene monomer, ammonia and urea.
- Investment includes 50,000 barrel/day natural gas liquids separation plant.
- Investment includes normal "offsites" at 40% of battery limits investment.
- Investment does not include additional infrastructure requirements.
- Complex requires about 3000 barrels/day benzene for styrene production.

Infrastructure Requirements:

- Rail and/or water links to important markets.
- Skilled and semi-skilled labor with associated infrastructure.
- Specialized fabrication, maintenance and repair industries.
- Interconnection of product and material flows with associated industries.
- Power and water.

Employment:

Employment requirements vary in terms of numbers and skill levels with degree of downstream processing. The industry is not labor intensive. According to recent estimates, a hypothetical one billion pound ethylene plant has some 300 associated employees. At the intermediate petrochemical level, associated employment increases dramatically to about 5500 per billion pounds of ethylene capacity.

# Arthur D Little, Inc.

Candidate Industry: POTATO PROCESSING

Description: Farm production, storage, and processing of potatoes into frozen french fries.

Estimated Capital Costs: \$30-35 million. A potato processing plant with an annual output of 100 million pounds of french fries has been assumed. Approximately 9000 acres of land will be required to produce sufficient potatoes to support the facility. Capital costs are estimated to be:

<u>Facility</u>	<u>\$ Millions</u>
Plant Processing Facility	9 - 11
Field Storage Facility	17 - 19
Farm Land Development	4 - 5
	<hr/>
	30 35

Assumptions:

- The land yields are based on lower 48 statistics.
- 270 million pounds of potatoes will be required to support a 100 million pound production facility.
- Capital costs do not include land.

Infrastructure Requirements:

- Roads
- Power and water
- Labor

Employment:

Typical employment requirements include:

Processing plant	250
Field Storage	30
Farm Production	<u>27</u>
TOTAL	307

90% unskilled, 10% skilled

# Arthur D Little Inc.

Candidate Industry: PULP AND PAPER INDUSTRY

Description: Production of newsprint from pulp wood and chips.

Estimated Capital Costs: \$225-275 million. To build an economically sized newsprint mill which uses thermo mechanical pulping process for converting solid wood into fiber for paper making requires a productive facility with a capacity of approximately 500 tons per day or 175,000 tons per year.

Assumptions:

- An adequate wood supply of softwood pulp wood and sawmill residues existing to meet the annual demand of about 200,000 cunits of wood.
- Access to deep water is available to allow shipments to the West Coast and Japanese markets.
- Does not include costs of acquisition of timber and/or timberlands.

Infrastructure Requirements:

- Port, deep water
- Energy/Power
- Rail service and roads
- Forestry support services

Employment:

Total employment is 200 to 250 people; 20% to 25% unskilled; 75% to 80%, skilled. This does not include seasonal labor needed in the forests to supply pulp wood.

# Arthur D Little, Inc

Candidate Industry: PULP AND PAPER INDUSTRY

Description: Manufacture of bleached paper grade kraft market pulp for sale to the paper industry.

Estimated Capital Costs: \$450-500 million. New bleached kraft market pulp mills are being built with an annual capacity of approximately 350,000 tons or 1000 tons per day average. Typical construction takes 30 to 40 months.

Assumptions:

- An adequate softwood supply is available within an economic hauling distance to a deep water port.
- A good supply of process water is available, and water and air environmental regulations for waste disposal can be met.
- Capital estimates do not include costs of buying timberlands.

Infrastructure Requirements:

- Deep water port
- Forestry support services
- Roads and rail service

Employment:

Work force of permanent nature would be about 350 to 400, of these, 70% to 80% would be skilled. This does not include seasonal forest workers needed to ensure wood supply.

# Arthur D Little, Inc.

Candidate Industry: SAWMILLING

Description: Cutting of dimension lumber and boards.

Estimated Capital Costs: \$26-33 million. The cost associated with the construction of a dimension mill having an annual capacity of 90,000 MBF is \$26-33 million in Alaska. The appropriate economic size of a sawmill is very flexible and dependent on location, timber, and market factors.

Assumptions:

- Timber is available in sufficient quantity and quality to support the mill.
- The mill has access to in-place shipping facilities.
- Dimension lumber and boards are appropriate products (rather than studs) given the timber and markets available.

Infrastructure Requirements:

- Roads
- Rail and/or water shipping facilities at the site.
- Power

Employment:

Work force of 200 - 225, approximately 70% skilled, 30% unskilled. This estimate is for a mill of average efficiency and automation levels.

Additional Comments:

- Current sawmill construction projects in the United States range from a \$6 million stud mill in the Southeast to a \$48 million state-of-the-art dimension mill in Longview, Washington. Several high volume small log sawmills are also under construction. The point is an "economic size" unit for a sawmill is site specific and would be for different locations within a given region of Alaska too.
- Working capital requirements are estimated to be 20% of fixed capital expenses.
- Operating expenses are estimated to be \$75.00 per MBF in the Northwest and would most likely be considerably higher in Alaska.

# Arthur D Little, Inc.

## Alaskan Study - II

### Candidate Industry: STEELMAKING

Description: Production of steel light section rods, merchant bars and structural shapes for local market consumption by electric furnace steelmaking from local and imported scrap or sponge iron raw materials.

Estimated Capital Costs: \$120 - \$240 million. Current designs of small steel plants, so-called minimills, are based on electric furnace steelmaking from scrap or sponge iron raw materials, continuous casting of the molten steel to extended billet lengths, and hot rolling the billets with a merchant bar mill to product shapes of rods, bars and light structural sections. The capacities of minimills range from 100,000 tons per year to approximately 600,000 tons per year. At the lower range, plants have a limited product mix but at the higher range, the product mix is broadened to include more sophisticated and higher valued products. The unit capital cost of a minimill could range from \$300 - \$600 per ton, for the plant facilities. The capital costs indicated above represent a 400,000 ton per year facility.

### Assumptions:

- A minimill consumes about 1000 kwh/ton with intensive short time peak power demands.
- The economic viability of the minimills has depended on their having access to low-cost melting stock for raw materials, coupled with a local market for their limited product mix located away from major steel producing plants. These same elements will govern the viability of a minimill in Alaska.

### Infrastructure Requirements:

- Power
- Fuel
- Scrap or Sponge Iron Raw Material
- Local Labor Force
- Highway System Throughout Market Area
- Railroad

### Employment:

Work force would range from about 200 - 300 for the smaller minimill up to 800 - 1200 for the larger minimill, with managerial and skilled personnel about 30 - 35% and the balance operators, workers and helpers.

# Arthur D Little, Inc

Candidate Industry: STEELMAKING (Continued)

Additional Comments:

One of the most recent minimills in the U. S. has a capacity of 600,000 tons per year with a raw material mix of scrap and sponge iron, a cost of \$150 - \$200 million and full employment of 1200 personnel.

# Arthur D Little, Inc.

## Candidate Industry: TOURISM

Description: The attraction of 600,000 to 1,000,000 non-Alaskans to the state for business or vacation.

Estimated Capital Costs: Could be in excess of \$500 million. The development of tourism in Alaska is dependent upon hotels and accommodations in gateway cities, infrastructure outside major cities, and lower cost Alaskan vacations.

- Anchorage will need approximately 5,000 more hotel rooms to handle the increased flow. Current construction costs are \$60,000-\$65,000 per room.
- The development of a major self-contained tourist facility at Tokichitna Glacier could cost in excess of \$50 million.
- 100-site campground parks cost in excess of \$4,000
- A convention center depending upon size and multiplicity of use, \$25-50 million.

## Assumptions:

- The primary tourist attractions currently exist in Alaska in the form of national parks, pristine environment, and hunting or fishing.
- The land cost portion of an Alaskan trip or vacation will remain high relative to other vacation opportunities.
- Awareness and demand levels are sufficiently high or will be raised to attract 600,000 to 1 million visitors.

## Infrastructure Requirements:

The requirements are extensive in the form of:

- Transportation networks to outlying attraction centers
- Visitor and information centers
- Food and accommodations
- Visitor and information centers

## Employment:

A current work force of 8,000 people are employed in tourist-related industries for an estimated 300,000 visitors. An anticipated work force of 15,000 semiskilled workers might be needed to support a 1 million visitor population.

## Additional Comments

Tourism, unlike the other candidate industries, does not produce a product and will not be established with the construction of a single facility.

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED  
AS A UNIT IN THE ORIGINAL DOCUMENT.

# Alaska State Legislature

Representative  
CLARK GRUENING  
940 Tyonek Drive  
Anchorage, Alaska  
99501  
907-274-2446



Chairman  
SPECIAL COMMITTEE ON  
THE ALASKA PERMANENT FUND  
Chairman  
WAYS and MEANS SUBCOMMITTEE  
Member  
FINANCE COMMITTEE  
LEGISLATIVE COUNCIL

## House of Representatives

PCUCH V JUNEAU 99811

### M E M O R A N D U M

RE: ADL Study  
TO: Reps. Malone & Gardiner  
FROM: Rep. Gruening  
DATE: May 5, 1978

Attached is a copy of a March 22, 1978 letter from Mr. Hurley of ADL stating that the addendum to the main ADL study "Economic Development in Alaska" was done in lieu of task 5 of the original proposal. Task 5 was not done - "...we will not be completing the development of investment criteria for the fund since our earlier work and our report suggest this step will not be necessary." To the contrary, the report and addendum (\$7.4 billion in capital needs for candidate industries) show that investment criteria are absolutely necessary. I did not approve redefinition of task 5 nor approve the addendum study as required by free conference intent.

At Hugh's urging, I wrote ADL asking for a response to the unanswered questions (letter attached). According to Peter Bushre of Revenue, who has taken Edenso's former position, the bottomfish industry feasibility study is part of the redefined task 5 which will not exceed \$14,500.

Attached is a draft copy of the proposal which will have some of the same deficiencies the original ADL study has. Edenso is now in San Francisco talking to ADL and the final ADL proposal for bottom fishing is being developed. I suggest we contact ADL and Edenso (Hyatt House 415 398-1234) and get a meaningful study done.

Arthur D. Little, Inc. ONE MARITIME PLAZA · SAN FRANCISCO, CALIFORNIA 94111 · (415) 981-2500

REVISION I

March 22, 1978

Mr. Jim Edenso  
Deputy Commissioner, Treasury  
State of Alaska  
Department of Revenue, Treasury Division  
State Office Building  
Eleventh Floor  
Pouch SB  
Juneau, Alaska 99811

Dear Jim:

81102

We appreciate the time which you spent with us on Monday and Tuesday and believe the presentations went well. We are looking forward to completing the bottomfishing feasibility study and the capital cost estimates. It is the purpose of this letter to confirm our conversations of yesterday which in effect alter our existing contract.

The changes in the contract involve substituting the task of estimating the capital requirements for the several industries which we recommended that the State of Alaska evaluate in lieu of Task 5 of our existing contract. In other words, we will not be completing the development of investment criteria for the fund since our earlier work and our reports suggest this step will not be necessary. On page 13 of the existing contract it is indicated that Task 5 would be deferred and would not be commenced without your prior written approval and that the amount paid for Task 5 would not exceed \$14,500. We have agreed now to substitute the capital requirements estimate report and that our charges for both professional services and expenses will not exceed the \$14,500.

All other terms and conditions of our existing contract will remain in force and we will continue to operate under Arthur D. Little, Inc., case number 81102.

Per your direction we have already started on the capital cost estimating requirements and the work will be conducted under the direction of Cy Herrmann; working with Cy will be Mr. Stephen Race and Ms.

CAMBRIDGE, MASSACHUSETTS

ATHENS BRUSSELS CARACAS LONDON PARIS RIO DE JANEIRO SAN FRANCISCO TORONTO WASHINGTON WIESBADEN

Arthur D Little, Inc.

March 22, 1978

-2-

Mr. Jim Edenso  
Deputy Commissioner, Treasury

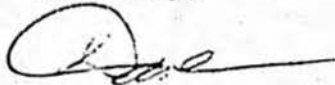
81102

Kathleen Blackmer plus those industry experts who participated in the base study. We expect to be able to phone you by no later than Monday, April 3 with the cost data and we will then submit written materials which will document our assumptions and cost estimates relative to the industry groups. This letter should arrive in your office no later than April 7.

Please sign and return this copy so that our records will indicate our mutual understanding of this contract task substitution.

In addition, we are submitting a full proposal for the bottomfishing industry feasibility study. This proposal will be sent to you no later than March 27.

Sincerely,



David G. Hurley

DGH/ck

cc: Contracting

Approved for  
ARTHUR D. LITTLE, INC.

By Fred P. DeBunder  
Authorized Contracting Officer

Accepted for  
THE DEPARTMENT OF REVENUE  
STATE OF ALASKA

By Jim Edenso  
Title Deputy Commissioner  
Date March 28, 1978

APPROVED:

\_\_\_\_\_  
Department of Administration

\_\_\_\_\_  
Date

**ECONOMIC DEVELOPMENT IN ALASKA**

**A Sectoral Analysis**

*report to*

**STATE OF ALASKA  
DEPARTMENT OF REVENUE**

ECONOMIC DEVELOPMENT IN ALASKA

A Sectoral Analysis

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STATE OF ALASKA  
DEPARTMENT OF REVENUE

March 1978

81102

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## I. INTRODUCTION AND SUMMARY

### A. PURPOSE AND SCOPE

On November 7, 1976, the voters of Alaska approved a constitutional amendment providing for the establishment of a "Permanent Fund" the purpose of which is to "preserve a legacy for future generations of Alaskans and still provide immediate benefits to present Alaskans . . . . the Permanent Fund will give the State the opportunity to invest revenue received from non-renewable resources into renewable resources."\* It is expected that the Permanent Fund will provide a sound basis for ongoing economic development beyond the period of non-renewable resource extraction.

Among the goals expressed for the Fund in proposed legislation are:

- To facilitate the diversification of the economy of Alaska by making sound investments in Alaska's renewable and non-renewable resources,
- To seek to smooth the cyclical pattern of growth in the Alaskan economy, and
- To encourage and assist the participation of private capital from both within and outside Alaska in private enterprises of benefit to Alaskans.

The concept of the Permanent Fund is well established, and the principal debate in the legislature and by various citizen groups has been over the allocation of the funds and the determination of their ultimate use -- whether they should be used for economic development purposes such as the stimulation of specific industries, or the development of infrastructure to support private capital investment; whether they should be placed in "investment grade securities" and the income used to defray debt within the state; or whether the funds should be used for public works and community development projects.

Given the many opportunities for use of the funds for the benefit of Alaskans, and given the various legislative and administrative prospects for investments, the Director of the Department of Revenue intends to establish criteria for investment based on analysis of economic sectors, industries, or portions of economic activities that appear to have the greatest payoff in the long run for Alaska in terms of diversification, income distribution, and various other economic goals the state might develop.

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\*Governor Jay S. Hammond as quoted in "The Alaskan Economy," published by the State Department of Commerce and Economic Development, June 1977.

In October 1977, the Director of the Department of Revenue entered into a contract with Arthur D. Little, Inc., to provide a sectoral analysis which would provide an overview of the Alaskan economy linking both the existing and potential economic sectors to the overall markets within the United States and foreign economies, particularly those of Pacific Rim nations. The economic analyses conducted under this contract were intended to provide a background and framework against which projects seeking assistance from the Permanent Fund could be evaluated.

In preparing this report we utilized information gathered at meetings and discussions with various state government agency representatives and citizen groups; examined previous and current studies, focusing on the compilation of data; and drew on our own knowledge of economic development, both domestic and international, to analyze economic activity and industrial development in Alaska and to consider the major projects which may enhance or detract from the state's economy. The latter include outer continental shelf (OCS) development, the possible move of the state capital, and development of the ALCAN gas pipeline.

We surveyed and analyzed statistical data on Japan and the lower 48 to identify those industries or industry expansions which could enhance the state's economy or otherwise provide opportunities for Alaskans or investment opportunities for the Permanent Fund. We examined selected industry markets in order to determine the priorities for possible participation by the Fund.

The sectoral analyses consisted of a screening process in which we identified the resources of Alaska, both labor and material; industries which could be supported by these resources; and markets for the industries: domestic Alaskan markets, lower 48 markets, and international markets. We identified candidate industries with potential for Alaska, and analyzed them in terms of the short- and long-term potential and in terms of their ability to meet the state economic development goals.

More specifically, the study, which encompassed a period of six months, included:

- A sectoral analysis of the economy of Alaska,
- A sectoral analysis of the economy of the United States as a whole,
- An analysis of the Japanese economy, particularly as related to demand for Alaskan resources/products,
- An analysis of the interrelationships among the three economies,
- The determination of the industrial development opportunities in Japanese and U.S. economies which could be exploited through investment by the Permanent Fund,

- Rationalization of economic development opportunities in Alaska vis-a-vis the stated and perceived economic development goals of the state,
- A review of the conclusions developed from the above analyses with the representatives of the Department of Revenue and the various state agencies concerned with the direction and use of the Permanent Fund, and
- The preparation of this report.

## B. CONCLUSIONS

Opportunities for industrial development in the State of Alaska exist within industries characterized as agriculture, fishing, tourism, oil and gas exploration and refining, coal development, development of hardrock minerals, forest products, hydroelectric power, pulp and paper, cyclic intermediates and chemicals, aluminum, and iron ore mining and direct reduction.

The role of the Permanent Fund in the development of these industries will depend largely on the resources of the licensees or developers, the strategic plans of the native corporations which are evaluating entry into some of these specific industries, and the timing and growth of these industries in the lower 48 and Japan. We have concluded in general, however, that the Permanent Fund may best be used for development of infrastructure leading to the investment by operators in the private sector both in Alaska and Japan and from the lower 48, and/or the development of feasibility studies which will clarify the economic role of operators and investors and the timing of investment. Our overall conclusions, which are more thoroughly developed in Chapter VI of this report, are as follows:

1. Over the short term, it is unlikely that there will be significant development of new industries -- i.e., industries not currently present in Alaska. Because of the long lead time necessary for the development of industrial projects, particularly in Alaska, there is a role for the Permanent Fund in developing the preliminary feasibility plans for participation in new industries and the determination of the role of other state agencies and native corporations.
2. Short-term industrial growth will be concentrated in fish processing, lumber and pulp, and petroleum-related industries.
3. Growth in the forest products and the petroleum based industries could be seriously constrained by environmental or other institutional factors.

4. Growth in industries dependent on the construction sector (asphalt and cement) will depend on the execution and timing of major projects planned in the state (OCS development, capital move, ALCAN pipeline, etc.).
5. The major long-term industrial development opportunities will depend on factors outside the state's control -- world demand and prices for minerals and other resources. That is, Alaska, despite the wealth represented by the Permanent Fund and the resources of the Alaskan native corporations, will not be in a position to dictate its future development.
6. The federal d-2 land proposal is the most important economic development issue currently facing Alaska. After specific land designations have been made, it may not be economical to develop resources on the residual lands if the most efficient transportation corridors cannot be used because of the wilderness classifications.
7. While vertical integration of resource-based industries could proceed to the intermediate product stage, final processing of consumer goods depends on proximity to large markets and therefore is not a likely development possibility in Alaska.
8. Alaska's tourism industry will continue to grow as a result of promotion and development efforts currently underway. Tourism is in an early stage of development and has considerable potential to mesh with the goals of the Permanent Fund.
9. Most of the industry candidates which were the subject of the sectoral analyses and which fit Alaska's resources and meet the state's economic development goals, conflict with state and/or federal regulatory and environmental goals.
10. There is a need to review, coordinate, and organize state policies on economic development, environmental protection, land use, energy, employment, and taxes in order to improve the business climate and to provide a rational framework for industrial development.
11. The long-term payback potential of investment in infrastructure may be the major in-state investment opportunity for the Permanent Fund. Some infrastructure -- e.g., an industrial port -- may be eventually paid for by the user fees. Other infrastructure development -- e.g., railroads -- may generate large amounts of employment and tax revenue which can indirectly reimburse the Fund.

### C. RECOMMENDATIONS

Based on our findings and conclusions, we recommend that:

1. Those managers of the Permanent Fund concerned with economic development should conduct feasibility studies on specific industries which the sectoral analysis suggests are growth opportunities for the state. These feasibility studies should be focused on the role of the Fund in infrastructure development plus possible participation in financing feasible new industries and expansion of existing industries.
2. The staff of the Permanent Fund should not ignore the investment potential of the combined assets of the native corporations and the Fund: that is, working together on industrial development the two, having complementary goals for natives and the state in general, will obviously have a greater impact than each working alone or competing for investment opportunities.
3. In addition to infrastructure development, the Fund staff should investigate the costs and benefits of public works projects such as hydroelectric plants, or fisheries improvements such as hatcheries, which can have secondary and tertiary benefits in terms of creating employment and renewing resources. These investments and operating entities as such should be able to return interest or dividends on the equity invested by the Permanent Fund and thus not necessarily comprise a sunk cost.

### D. THE ROLE OF THE PERMANENT FUND

The Permanent Fund clearly has the potential to play a major role in Alaska's economic development. Although there are many outside forces which will shape the direction of Alaska's economy, the state will be able to foster industrial development by decision on such matters as provision of transportation infrastructure, and taxes, and will be able to mitigate the adverse impacts of growth by providing public services, housing, and the like: the Fund can stimulate development by providing equity capital, long-term loans, or debt guarantees for new business.

However, based on the economic research reported here, we believe that the majority of the funds available for economic development should be held while long-term opportunities are studied in detail. More immediate capital needs can be identified and met, such as mortgage financing of additions to the fishing fleet. Equity investments and loans for larger projects will more prudently follow detailed study of specific proposals or possible developments, including financial plans, markets available, and non-financial impacts.

The Permanent Fund's goals can effectively be used as the basis for investment decisions. That is, given two or more equally attractive projects (in terms of standard financial criteria such as rate of return and cash flow) the goals of employment, income, and reliance on renewable resources can be used to choose among these projects.

The Fund's mandate is to make investments which will diversify the economy, helping to reduce cyclicalities and provide new opportunities for the state's residents. As discussed above, market forces and overall economic development trends beyond the state's control will to some extent perpetuate cyclicalities and other negative economic fluctuations in Alaska. Further, the availability of capital will not, of itself, be a significant attractor of new industry, particularly large national or international firms. It is more likely that Permanent Fund financing for new business will go to smaller, local firms or entrepreneurs who are unable to raise money from out-of-state institutions and whose requirements exceed the lending ability of local banks (in amount or term).

Nonetheless, there are opportunities for the Permanent Fund in almost all industries likely to exist in Alaska, as the sectoral analysis that follows will indicate. Some of these investments will help to stimulate new business or help residents participate in existing or new industries. Others could be equity investments in larger projects, made to return a part of a major venture's profits to the state and its people. Areas for Permanent Fund consideration, and other state actions which could stimulate development, are outlined below.

#### Specific Areas for Consideration

State and federal agencies are already involved in the fishing industry in resource management and research, identification of new markets, salmon hatchery programs, and investigation of bottomfishing. As the markets and requirements for bottomfishing are identified, the Permanent Fund could make or guarantee loans to finance fishing boats or processing facilities, the latter possibly in cooperation with native corporations. Other local businesses which might be loan candidates are fishing industry support facilities (e.g., boat repair yards).

The state's role in the lumber and pulp industry will probably be in leasing timberland. Existing demand in Japan will be the stimulus for growth, and Japanese companies should continue to be principal investors. Over the long-term, there may be an opportunity for equity investment in an integrated pulp and paper mill. Local market-oriented wood products firms may be candidates for loans.

The state is already involved in the oil and gas industry and related refining and chemicals production. Because of its ability to determine the state lands available for leasing and the timing of such leases, the state will have some control over oil and gas exploration and production. However, the state will not be able to control oil and gas development on native corporation and federal lands.

The state's decision to accept North Slope royalty oil in kind for sale to an in-state processor is another example of the state's role in creating jobs and income. The success of this initial petrochemical venture will influence future decisions on use of royalties and the economies of Alaskan production. (That is, a successful petrochemical plant could lead to additional sales of royalty oil, gas, and possibly hardrock minerals to in-state processors.)

Possible opportunities for local business (and thus Permanent Fund investments or loans) in oil and gas and related industries include oil industry support. (Native corporations have already invested in companies to perform construction, pipeline camp support, and similar functions.) While Alaska is not a likely location for the manufacture of oilfield machinery and equipment, possible services would include camp construction, food services for oilfield workers, etc. Similar businesses would be required to support OCS drilling activity (home building, construction of warehouses, etc.). The Permanent Fund could also provide short-term loans to local governments impacted by oil (or other) developments to cover the gap between increased service demands and realization of additional property tax revenues.

The state has become involved in promoting tourism in the lower 48 and Japan and financing local tourism promotion programs. The opportunities for increasing tourism will involve development of destination attractions (ski lodges, fishing camps, etc.) outside the principal cities and providing transportation facilities to reach these destinations. Since the tourism industry is not likely to be able to finance its own transportation development, tourism may follow other industrial development. The state should be alert to investment opportunities in tourism facilities located to take advantage of existing or new transportation routes.

The Delta project currently being carried out by the Department of Commerce and Economic Development will help determine agricultural investment opportunities by providing information on the economics of larger-scale farming in Alaska. Over the short-term, opportunities will exist in expanding agricultural production for the local market (development of a middleman system linking small farmers with suppliers and consumers). As agriculture expands, there will be opportunities (and needs) for processing facilities for meat, vegetables, and grains, including such applications as producing alcohol from potatoes. Agricultural infrastructure (land clearing and drainage, irrigation, transportation, and distribution) is a possible area for cooperative state-native corporation investment or loan programs.

Longer term, large-scale agricultural development, if feasible, would provide opportunities for investment in processing, storage, and transportation facilities. The dedication of some two million acres of land to export grain farming would require substantial capital to acquire the land and prepare it for planting. Other necessary facilities would include rail or road transportation from farms to ports, grain elevators, and special grain handling facilities to load ships.

Other agricultural-related investments could be in the use of chemicals made in Alaskan plants for Alaskan agriculture. For example, urea, currently produced in Alaska, is a major input to fertilizer production. Agricultural limestone could also be processed in-state.

The initial requirements for coal and other mining operations will be transportation infrastructure -- access roads to mines and rail or port facilities for product shipment. If a study of mining lease holders indicated sufficient demand, an industrial port would be a good investment opportunity because of the long-term payback and income derived from port revenues. Alternatively, the Permanent Fund could guarantee the revenue bonds of a local port authority.

The possibility of Permanent Fund investment in roads will be limited because such infrastructure will not produce income. However, the indirect payback potential -- in jobs, access to tourist destinations, and improved transportation facilities for state residents -- might justify general fund investment. Similar arguments could be made for investment in the trans-Canada rail extension.

In summary, Permanent Fund investments could take the form of loan capital to finance local business, equity in large development projects, or financing or guaranteeing infrastructure development. The local businesses are likely to occur over the short term, while equity investments are a longer-term development. Investments in infrastructure will depend on policy decisions and the perceived benefits in terms of social as well as economic criteria.

## II. CHARACTERISTICS OF THE ECONOMY

This chapter presents an overview of the current status of the Alaskan economy in terms of population trends, labor force and employment, relationships among the principal economic sectors, and interactions with the U.S. and foreign economies. It also includes a discussion of the principal institutional, legal, and regulatory issues which have affected economic development in the state and which will continue to determine the future level and direction of growth. The purpose of this baseline summary is to identify the specific problems of the economy which the state is seeking to solve through the development of new industry and to describe the conditions which will have to be considered in assessing the likelihood of Alaskan location for specific industries.

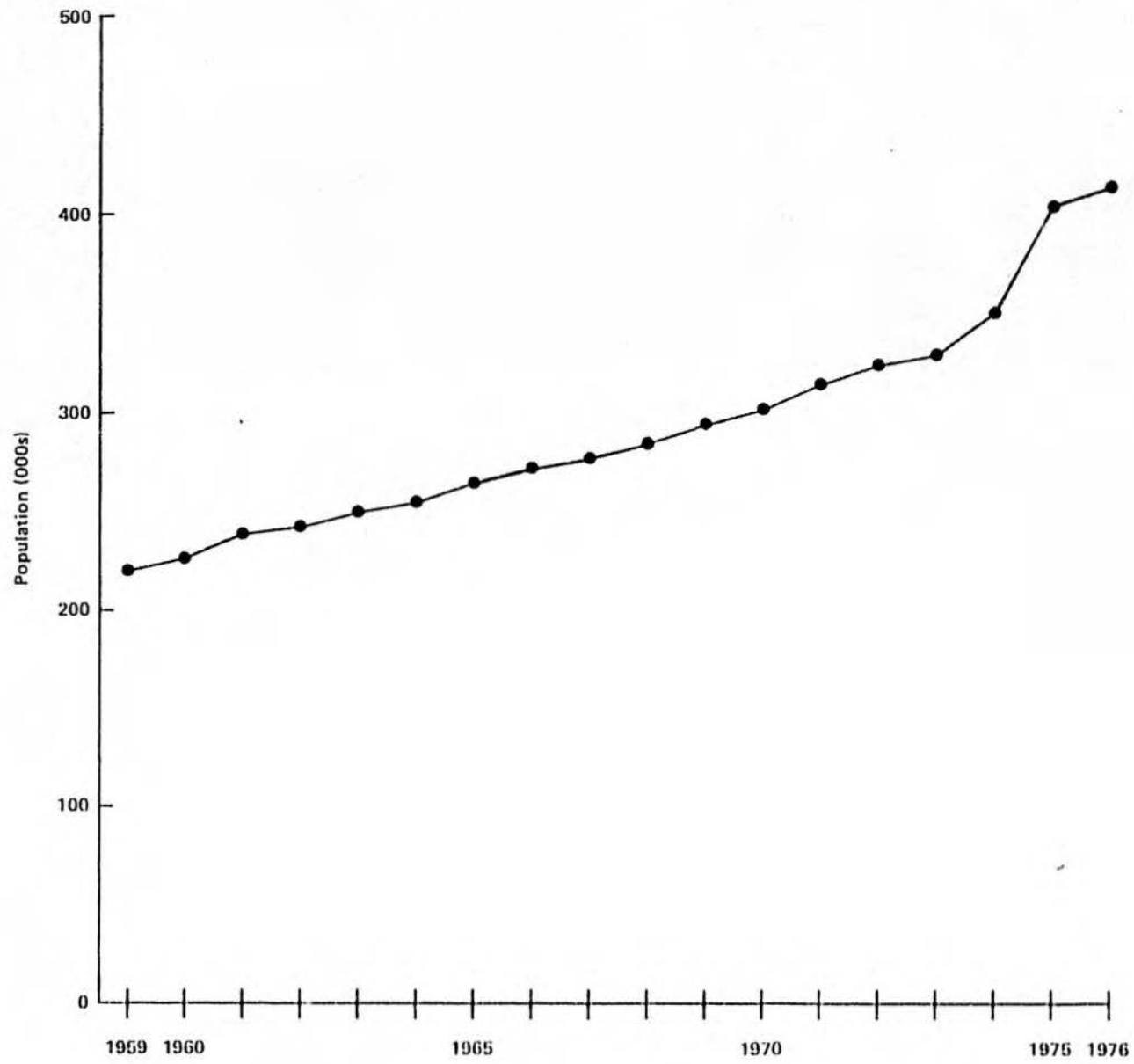
### A. POPULATION TRENDS

Population in the State of Alaska has almost doubled since statehood, from about 220,000 in 1959 to a current level of more than 400,000 (see Figure II-1). From 1959-73, total population grew at a rate of approximately 3% per year, with the majority of growth due to natural increase (births minus deaths). However, since 1973 the rate of population growth has increased substantially as a result of in-migration. During 1974 and 1975, Alaska experienced net in-migration of about 30,000 people per year, attracted primarily by trans-Alaskan pipeline-related employment opportunities.

From World War II through the late 1950s, members of the military made up a large share of the state's population. In 1943, about 65% of Alaska residents were members of the armed forces; during the Korean War military personnel accounted for about one-quarter of the state's population. Since statehood, the number of military personnel in Alaska has been declining gradually. The military share of population was about 14% in 1960, 10% in 1970, and is currently approximately 6%.

Alaska's native population has grown at a rate of 2% per year since 1960, and is currently about 60,000. The native share of total population has been declining slowly and is now about 15%. While average birth rates among the natives have been higher than those for the state's total population, natural increase has been offset to some extent by out-migration of natives for education and other purposes. (Approximately 20,000 persons enrolled under the Alaskan Native Claims Settlement Act live outside the state.) Furthermore, in-migration to the state in recent years has accelerated overall population growth far beyond the contribution of natural increase.

As the state's population has grown, it has become more concentrated in urban centers. In 1976, the Anchorage Census Division contained some 45% of the state's total population, compared to 37% in 1960. The state's



Source: Alaska Department of Commerce and Economic Development.

FIGURE II-1 ALASKA POPULATION - 1959-76

three largest cities -- Anchorage, Fairbanks, and Juneau -- contain nearly two-thirds of the total population. Moreover, because of the low level of population outside these cities, isolated events have significant effects on population levels and growth rates. For example, population in the Barrow-North Slope and Valdez Census Division has tripled since the startup of pipeline construction in 1974.

The age distribution of Alaska's population is significantly different from the national average. In 1976, more than 83% of the state's population was under 45 years of age -- the comparable national figure was 69%.\* Less than 3% of Alaska's population is older than 65. Factors contributing to the relatively low age of Alaska's population include a higher than average birth rate and the in-migration of young adults, particularly in the last few years.

Historical population growth trends in Alaska are likely to continue over the next several years. The state's rate of natural increase should remain above the national average, in large measure because of the age distribution of its population. While in-migration will fall off from recent levels of 30,000 per year, the average rate of the decade prior to pipeline construction (about 3500 people per year) is likely to continue given the state's image as the "last frontier" and continued national publicity about Alaska's resources and physical attractions. Anchorage should remain the state's principal population center.

As was the case with trans-Alaska pipeline development, future large-scale projects will have significant impacts on population growth rates and distribution. Major construction projects are likely to attract in-migrant workers who will become either temporary or permanent residents of the state. Oil and gas and mineral developments are likely to have a fairly small population impact in terms of total in-migrants to the state, but may have significant impacts on outlying communities.

## B. LABOR FORCE AND EMPLOYMENT

Alaska's labor force is characterized by high participation rates, seasonal and temporary in-migrant workers, and high unemployment. The seasonal and cyclical nature of the state's economy is the principal contributor to these trends.

### 1. Labor Force

Alaska's civilian labor force grew at an annual rate of about 4-5% between 1960 and 1973, compared to a population growth rate of some 3% per year during the same period. Construction of the trans-Alaska pipeline and related development attracted nearly 70,000 additional participants to the labor force between 1973 and 1976. Labor force growth over this

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\*U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, No. 646, February 1977.

three-year period was 15% per year, about twice the rate of population growth. The civilian labor force decreased substantially (by about 20,000 people) in 1977 as the pipeline was completed and unemployed workers began to leave the state.

Alaska has historically experienced high labor force participation rates. At the time of the 1970 census, Alaska's total labor force participation rate (including armed forces) was about 68% of the population 16 years and older, compared to a national average of 61%. Higher than average labor force participation is largely a function of the age distribution of the state's population -- very few of those people 16 years and older are over 65.

Labor force participation increased dramatically during pipeline construction -- to almost 75% of the 16 and older population. Increased employment opportunities in the state caused residents to enter the labor force in larger numbers. In addition, many of the people who came to the state to take pipeline-related jobs were single men and women who expected to be temporary residents. Among this group, labor force participation was effectively 100%.

The size of Alaska's civilian labor force exhibits a seasonal pattern, with the total August labor force about 10% larger than the annual average and the January labor force 10-15% smaller. In 1974-76, this amounted to a difference of about 40,000 between the high and low months. This pattern was much less evident in 1977 since many former pipeline workers had left the state by August. After this post-pipeline adjustment has been completed, labor force seasonality is likely to return to its former pattern.

The factors contributing to labor force seasonality are the same ones that have contributed to labor force growth in recent years. Alaskan residents are drawn into the labor force during the peak summer months by additional employment opportunities in seasonal industries -- fishing, fish processing, construction, etc. In addition, even before pipeline construction began, temporary in-migrants contributed to peak labor force numbers. It has been estimated that as many as one-third of the additional workers needed in the summer months are temporary workers who come from Seattle and other areas in the lower 48.

## 2. Employment

Total civilian employment in Alaska grew at an annual rate of 4.2% between 1960 and 1973, and at nearly 16% per year from 1973-76. Total employment decreased by about 30,000 jobs between August 1976 and August 1977, reflecting the effect of the trans-Alaska pipeline on job opportunities in the state.

The government sector has historically been, and continues to be, Alaska's largest employer. However, as other sectors of the state's economy have grown, particularly in the last several years, the government share of total employment has decreased. Government accounted for approximately 40% of non-agricultural wage and salary employment in 1960, 38%

in 1970, and had decreased to only 28% by 1976 (see Figure II-2). Data for the first eight months of 1977 indicate that the government share had increased to 30%, primarily the result of decreasing construction employment.

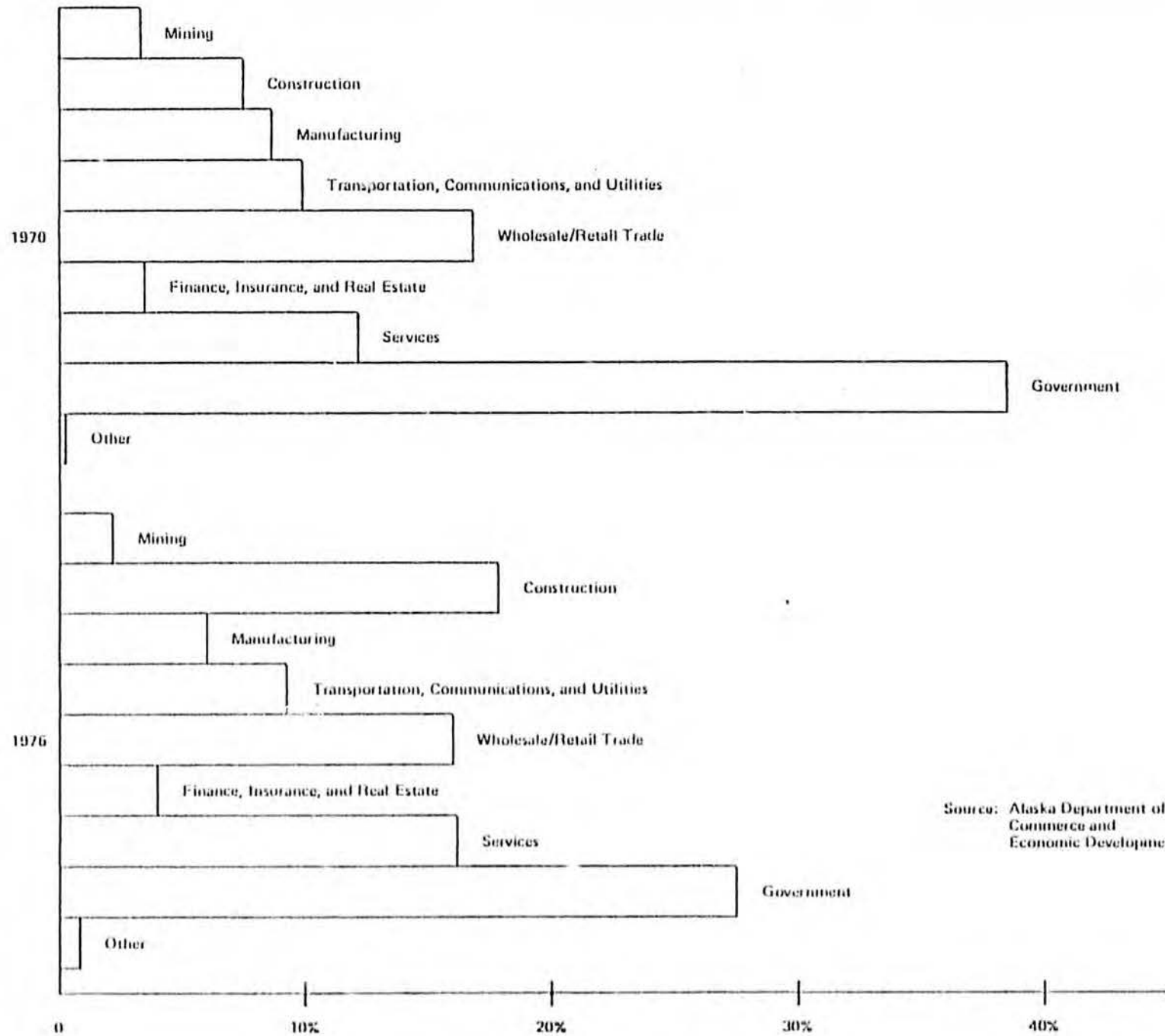
In the early 1970s, trade, services, and transportation, communications and utilities (TCU) were the next largest employers. These three sectors combined provided about as many jobs as the government sectors. Manufacturing accounted for less than 10% of employment. For the total United States, manufacturing contributed almost 30% of all jobs, with only 18% in government. In 1970, 7.5% of Alaska's workers were employed in the contract construction sector.

The trans-Alaska pipeline project began in 1974, increasing the construction share of total employment to 11%. In 1976, construction was the second largest employer in the state, followed by services and trade. In addition, pipeline construction was responsible for some of the employment increases in TCU, trade, and services; this is borne out by employment losses in these sectors in 1977.

As is the case for the state's labor force, employment in Alaska is subject to seasonal variations. Peak month (August) employment is approximately 12% higher than the annual average, while low month (January) employment is typically 15-20% below the average (Figure II-3). The principal contributors in this employment seasonality are the construction and manufacturing sectors (Figure II-4). Construction employment is heavily concentrated in the summer months because of weather constraints. Manufacturing employment is primarily in the food processing (mainly fish) and logging industries, which are highly seasonal activities. The government sector exhibits the least seasonal variation, and as the state's largest employer provides a moderating influence on overall employment seasonality.

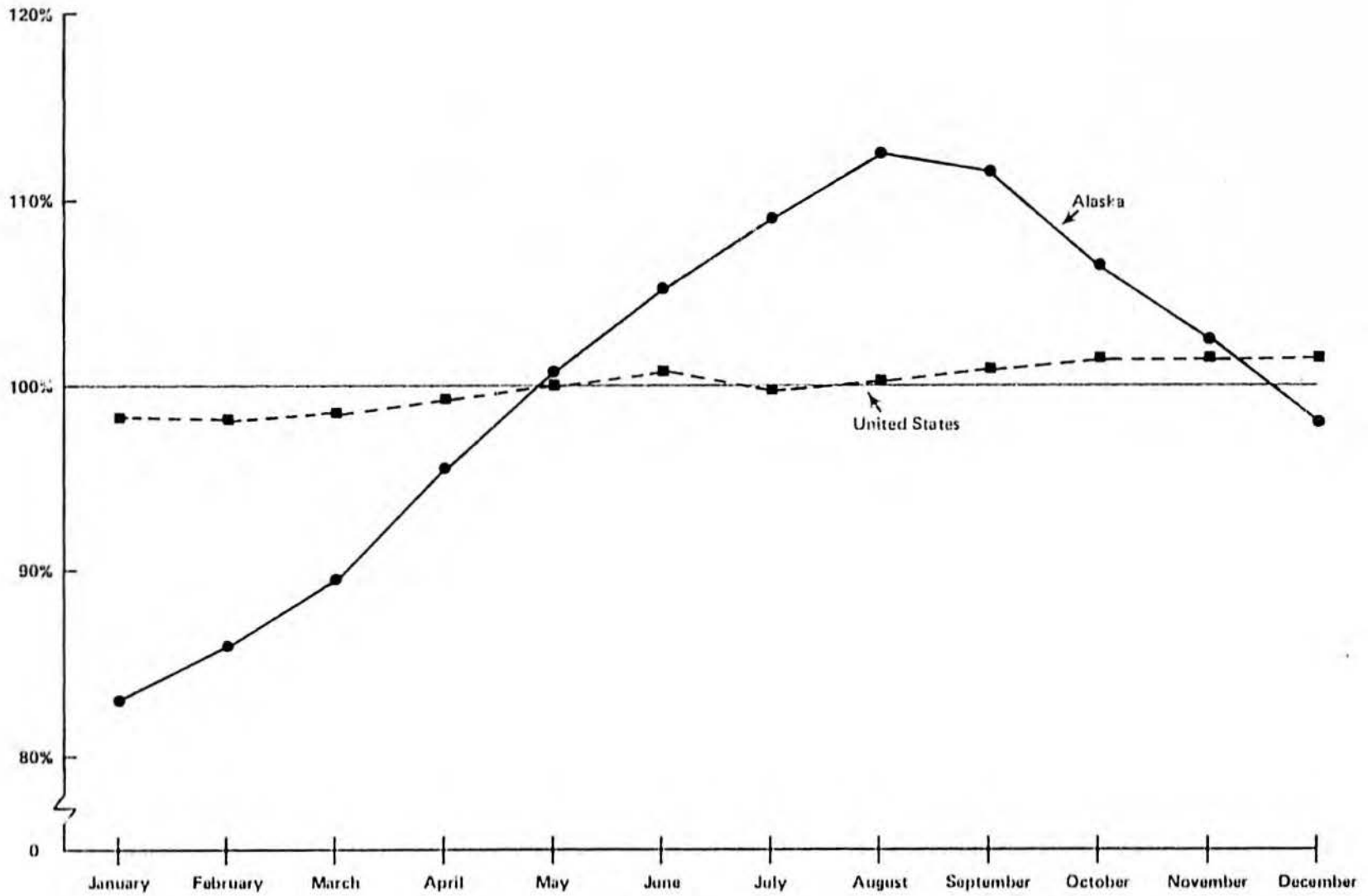
Seasonality of employment varies among areas of the state based on the distribution of industries. In 1976, government accounted for approximately 60% of non-agricultural wage and salary employment in the Juneau Census Division. Total employment varied from 95% of the annual average to 107%. The Kodiak Census Division derived about 40% of its employment from the manufacturing sector and experienced a seasonal variation of 90% to 139%. The greatest seasonal variation occurred in the Southeast Fairbanks Census Division. In this area, about two-thirds of the workers were employed in the construction sector and monthly employment varied from 52% to 146% of the annual average. In general, those areas with the greatest amount of employment in the less seasonal government and support sectors experienced the least dislocation during the winter months.

Employment in Alaska is cyclical as well as seasonal. This is evident in the events of the last several years, during which construction of the oil pipeline increased total employment by about 60,000 over three years. The last year saw a substantial decrease in employment as the project was completed. It is almost inevitable that major development projects planned



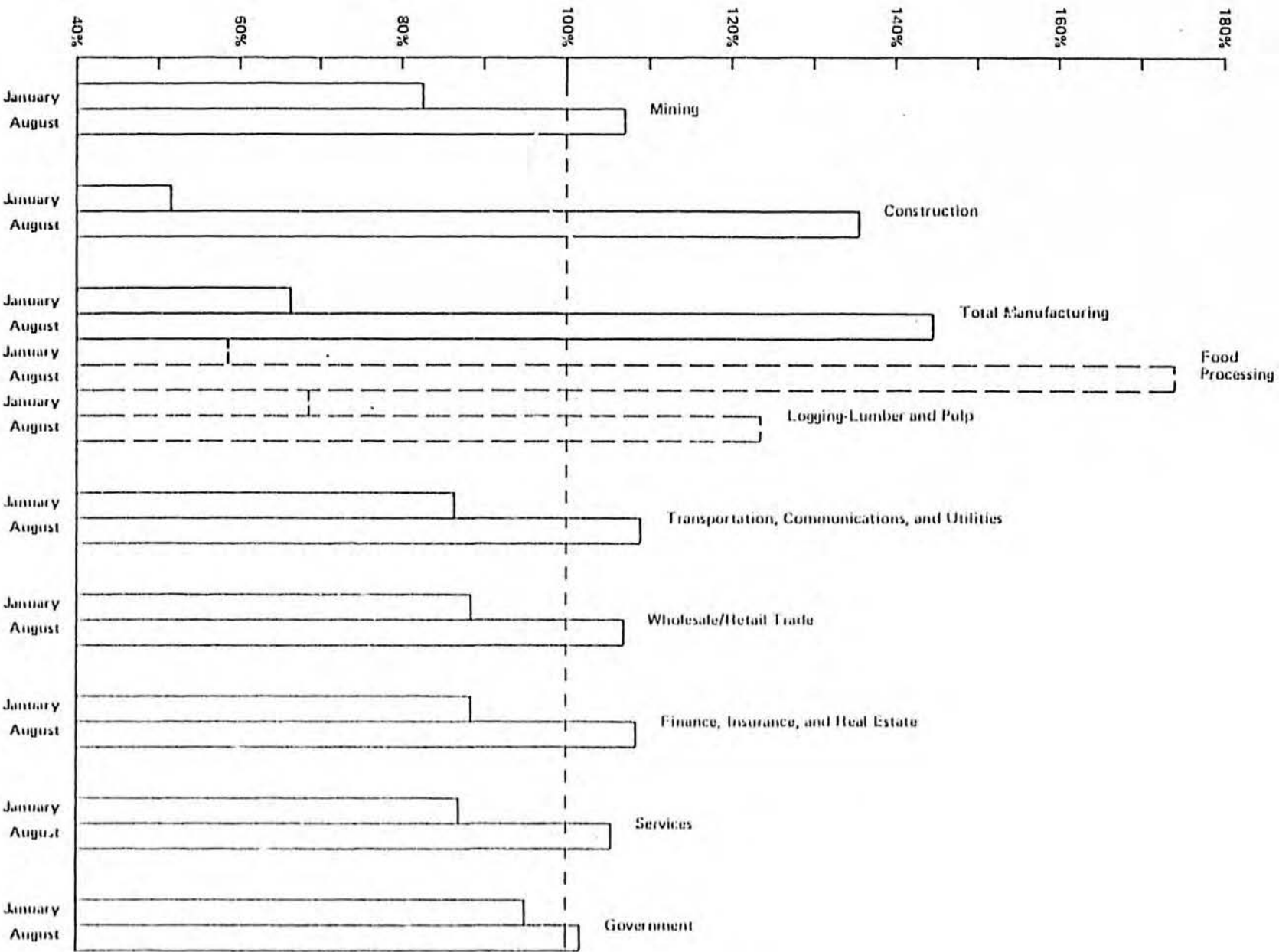
Source: Alaska Department of Commerce and Economic Development.

FIGURE II-2 PERCENT DISTRIBUTION OF NON AGRICULTURE WAGE AND SALARY EMPLOYMENT - 1970 AND 1976



Sources: Alaska Department of Labor, Alaska Labor Force Estimates by Area and Employment by Industry, 1974, 1975, 1976; U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, various issues.

FIGURE II-3 MONTHLY PERCENT OF AVERAGE ANNUAL EMPLOYMENT  
(Three-year Average for 1974-76)



Sources: Alaska Department of Labor, Alaska Labor Force Estimates by Area and Employment by Industry, 1974, 1975, 1976.

FIGURE II-4 JANUARY AND AUGUST PERCENT OF AVERAGE ANNUAL EMPLOYMENT BY SECTOR (Three-year Average for 1974-76)

for the future, particularly those with large construction components (gas pipeline, capital move) will produce similar dramatic swings in employment. However, because of the in-migration of temporary residents to take construction jobs, the employment decline after such projects should not assume the magnitude of a "bust."

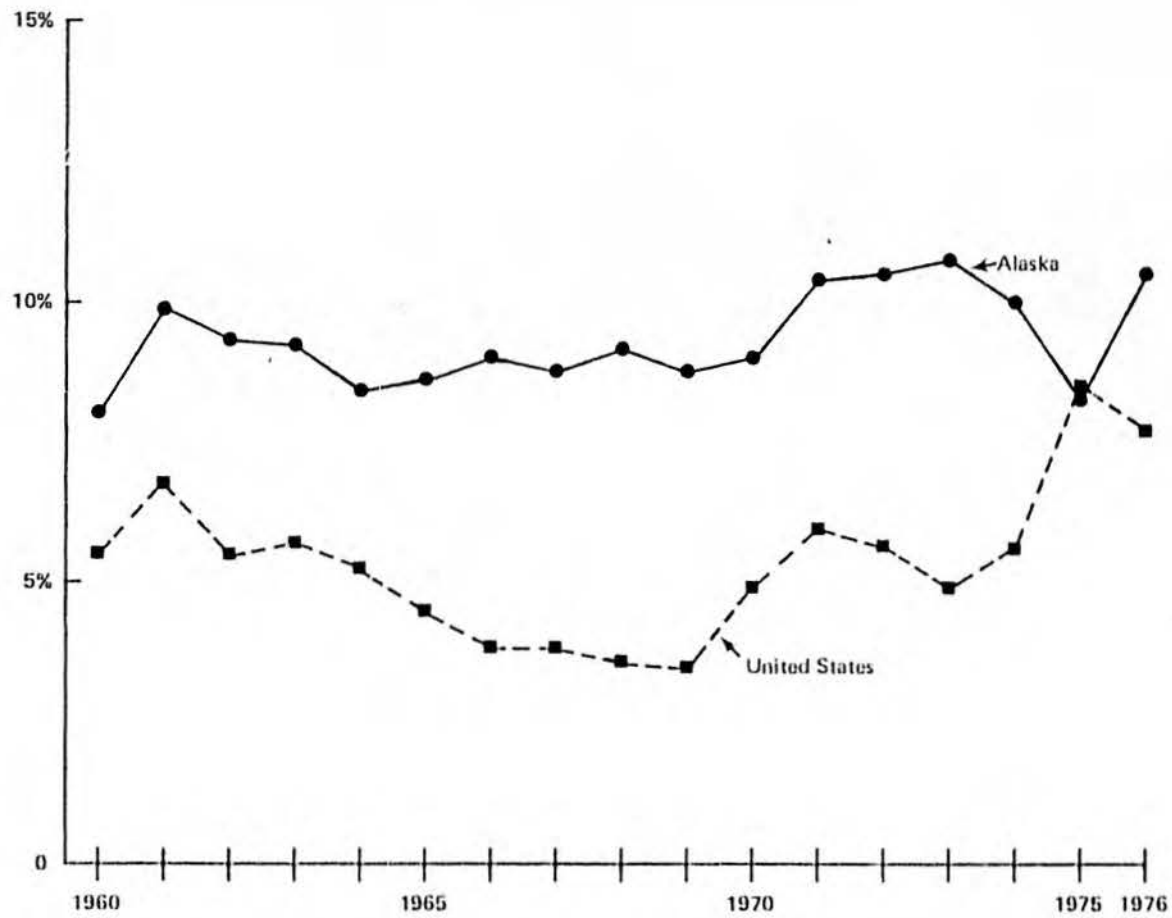
In addition to the wage and salary employment reported in published statistics, many Alaska residents, both native and non-native, rely at least in part on the traditional subsistence economy. A 1974 federal study estimated that some two-thirds of the state's natives rely on hunting and fishing to provide at least part of the food for their families. Many of these people are seasonal workers (e.g., in the fish processing industry) and engage in the traditional subsistence activities during the rest of the year. Even some city dwellers hunt and fish for part of their food.

### 3. Unemployment

High labor force participation, seasonal employment patterns, and the cyclical nature of the economy have resulted, until recently, in unemployment rates in Alaska about twice the national level (see Figure II-5). In 1975, the pipeline construction activity in the state and the second year of recession in the United States resulted in an unemployment rate slightly less than the national rate for the first time. As pipeline layoffs began in 1976, Alaska's unemployment rate increased by more than two points, while the national rate began to decline. Partial data for 1977 indicate monthly unemployment rates running about four points above 1976 levels, so that the annual average unemployment rate may well return to twice the national rate.

According to state Department of Labor statistics, about half the 1977 insured unemployed were workers in the construction industry, a direct result of pipeline layoffs. However, an annual unemployment rate of about 15% for 1977 represents a short-term problem. Many construction workers came to Alaska as temporary residents and many of the unemployed have left or will leave the state. The level of unemployment peaked in April of 1977 and had declined by about 12,000 (one-half) by August. Furthermore, currently planned projects, such as the gas pipelines, OCS developments, and the capital move, should provide jobs for many of the state's resident construction workers.

As might be expected from employment patterns in Alaska, unemployment rates exhibit high seasonal and regional variations. Unemployment is highest during the winter months and decreases dramatically in the summer, which is the peak season for construction, fishing, and other seasonal employment. Unemployment rates also vary throughout the state based on regional employment and industry distribution. Unemployment rates in Juneau and Anchorage in recent years have averaged two to three percentage points below the statewide average, while some areas in the southeast (Haines and Angoon) have had unemployment rates of 25-40%, in part because of extremely poor fishing seasons.



Source: Alaska Department of Labor, Alaska Labor Force Estimates by Area and Employment by Industry, 1960-76.

FIGURE II-5 AVERAGE ANNUAL UNEMPLOYMENT RATE - ALASKA AND UNITED STATES, 1960-76

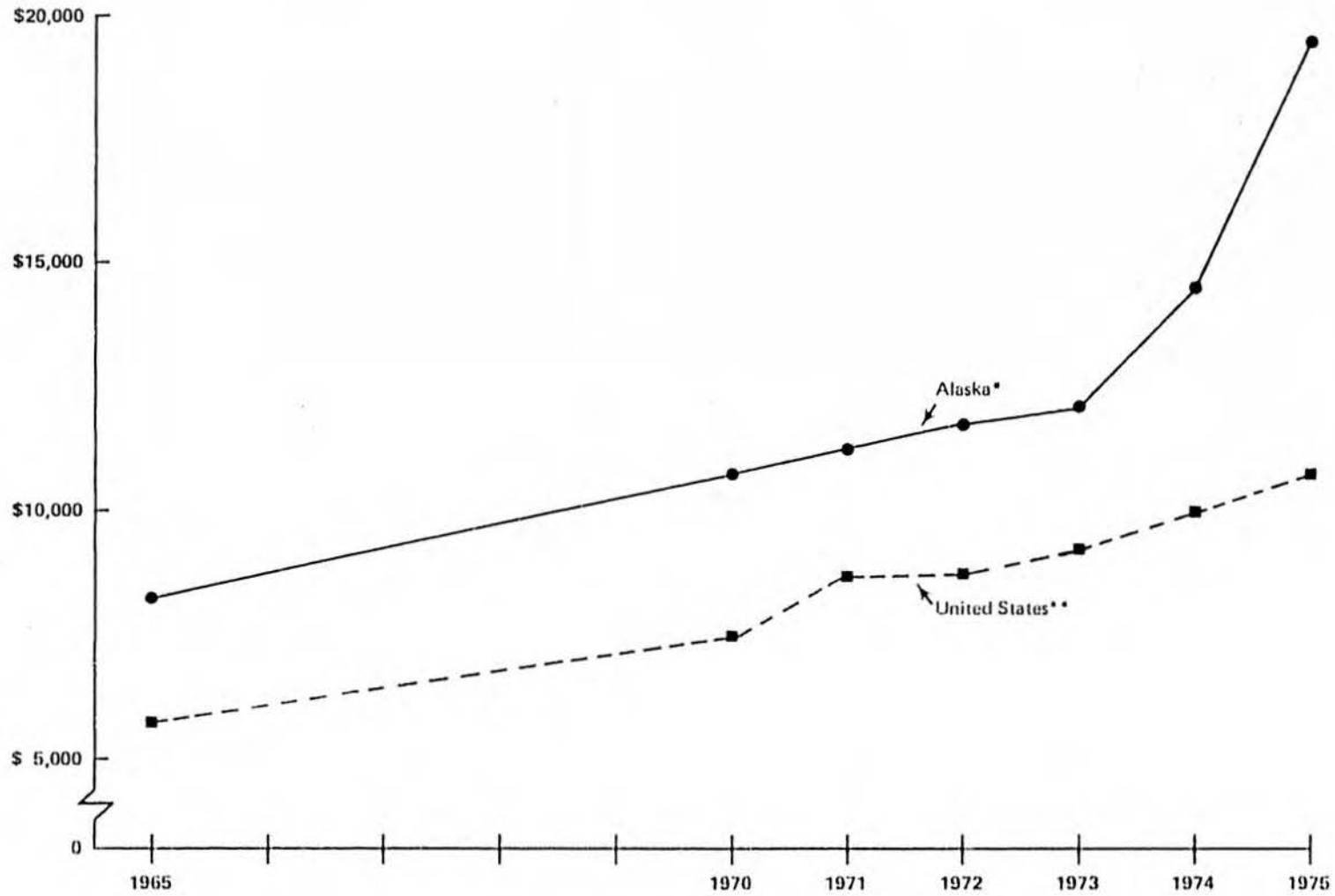
There are other points which should be noted about unemployment in Alaska. While the unemployment rate is typically very high, the level of unemployment is fairly low because of the small size of the state's population and labor force. Even in 1971-74, when the average annual unemployment rate was 10% or more, the number of persons unemployed was less than 15,000. Furthermore, unemployment rate statistics may overstate the severity of the problem to some extent because of prevailing wage rates in Alaska. For example, average weekly earnings for construction workers over the last few years have been about \$1,000. Even if these workers, who make up a large share of the unemployed, work only six months of the year and are considered unemployed for the other six, their annual earnings, excluding unemployment insurance benefits, would average more than \$25,000.

### C. WAGES

Wages and salaries paid to employees in Alaska are considerably higher than average wages for the United States as a whole (Figure II-6). Wage rates in the state are a function of the industrial distribution of employment, a short season for many industries which results in large amounts of overtime earnings, and the state's high cost of living which requires higher wages to attract workers.

From 1965-73, average earnings per employee in Alaska grew at an average annual rate of about 5%. At the beginning of this period, annual earnings were almost 45% above the U.S. average, but by 1973 a faster growth rate for average U.S. earnings had narrowed the gap to about 30%. However, with the beginning of pipeline construction and associated activity in 1974, average earnings per worker in Alaska increased 20% above the previous year, followed by a 35% increase in 1975.

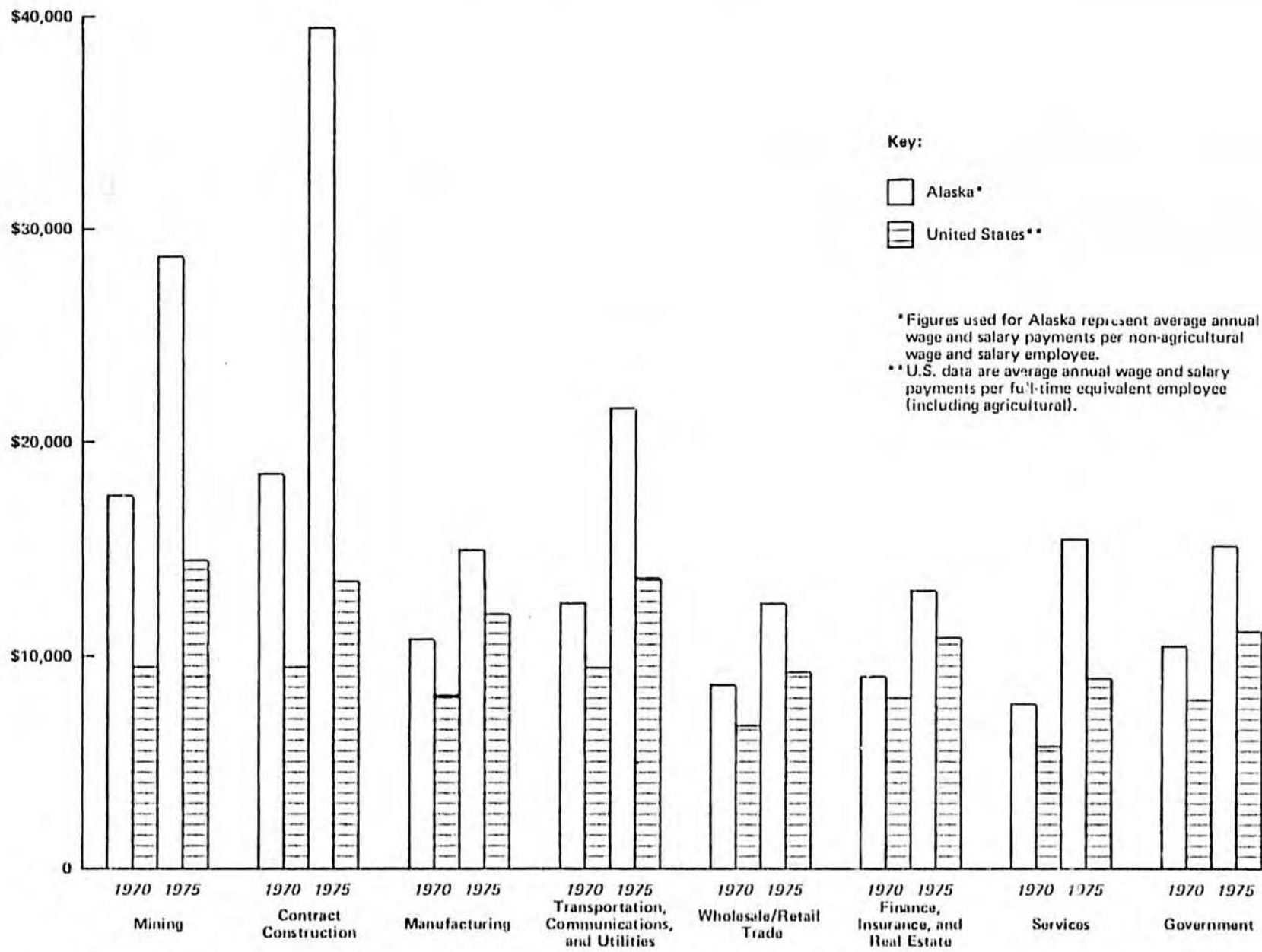
While, as might be expected, the largest increase in wages occurred in the construction sector, where average earnings per employee doubled between 1973 and 1975, earnings in almost all sectors of the state's economy were affected. To a large extent, this was a result of changes in the mix of employment within each sector. The mining sector was affected by an increase in the share of employment accounted for by the oil and gas industry and the especially high wages paid to North Slope workers. Similarly, the largest employment growth in the services sector was in the area of business services due to firms directly or indirectly related to the pipeline. Large numbers of employees in engineering, management, and related professional services contributed to the 60% increase in earnings in this sector over the two-year period. Earnings in transportation, communications, and utilities also rose sharply because of the pipeline-related demands on the state's transportation system. Wages per employee in each of these sectors -- construction, mining, services, and TCU -- were much higher relative to U.S. averages in 1975 than in 1970 (see Figure II-7).



\* Figures used for Alaska represent average annual wage and salary payments per non agricultural wage and salary employee.  
 \*\* U.S. data are average annual wage and salary payments per full-time equivalent employee (including agricultural).

Sources: Alaska Department of Commerce and Economic Development; U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*.

FIGURE II-6 AVERAGE ANNUAL EARNINGS PER EMPLOYEE — 1965 AND 1970-75



Sources: Alaska Department of Commerce and Economic Development, *The Alaska Economy, Mid-year Performance Reports 1977*; U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*.

FIGURE II-7 AVERAGE ANNUAL EARNINGS PER EMPLOYEE BY SECTOR - 1970 AND 1975

The seasonal nature of the state's economy leads to substantial overtime payments to workers in many industries. During most of the pipeline construction period, workers averaged 60 hours a week compared to less than 40 in the lower 48 because of the need to concentrate construction activity in the summer months. Thus, average weekly earnings for construction workers were approximately \$1,000. Similarly, the state's manufacturing sector, which is highly seasonal, had average weekly earnings approximately 50% higher than the national average, while annual earnings were only about 25% above the national level for 1975 (see Figure II-8).

#### D. COST OF LIVING

The cost of living in Alaska, measured by consumer prices, is considerably higher than in the lower 48. However, until pipeline construction and related activity generated rapid price increases in the state, the rate of inflation was generally lower than the national average.

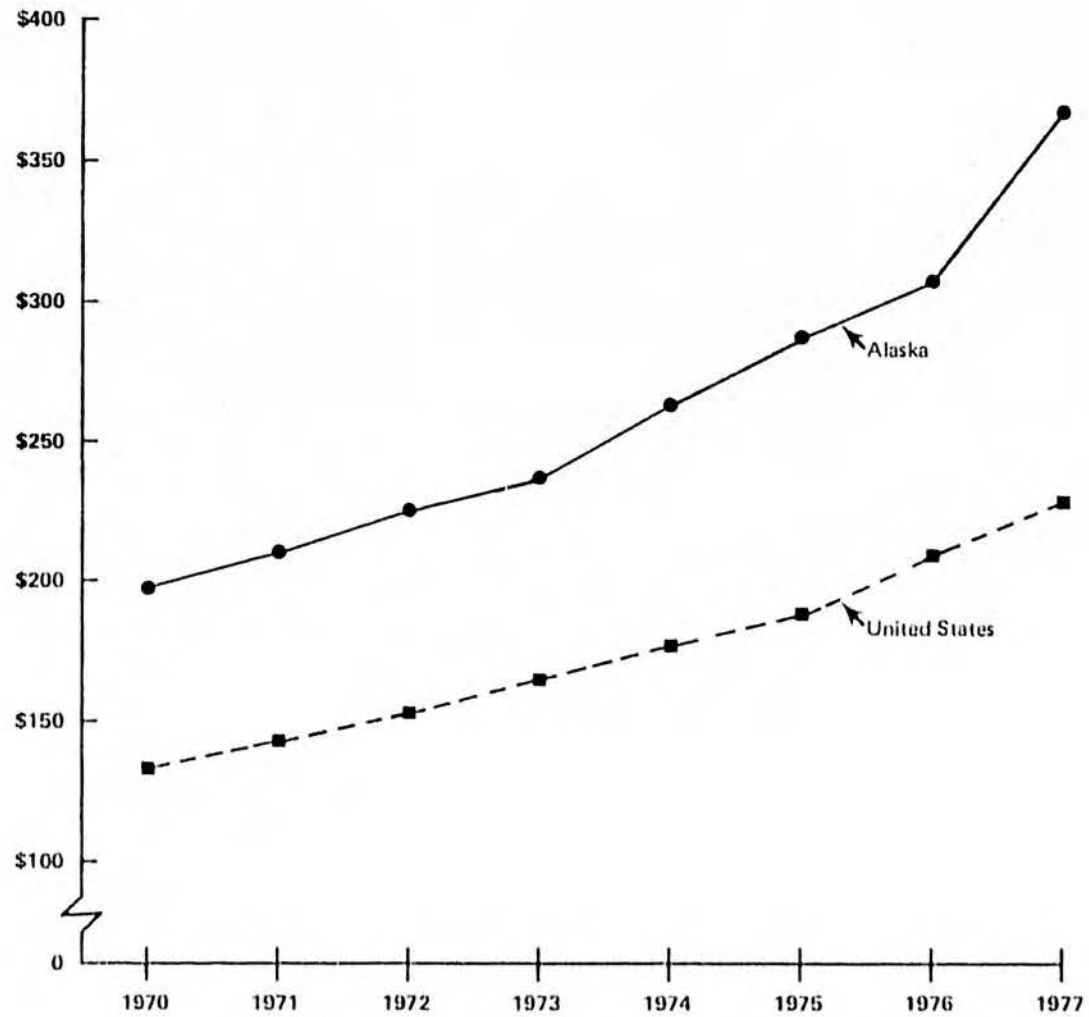
The Anchorage Consumer Price Index (CPI) increased at about 2.3% per year between 1961 and 1973, compared to an annual rate of 3.4% for the United States as a whole. Figure II-9 shows that while the cost of living in Anchorage was approximately 45% higher than the national average in 1961, by 1973 the difference was only 30%. However, between 1973 and 1976, the Anchorage CPI increased at an average annual rate of 10.8%, compared to a national average of 8.6%, so that by 1976 the Anchorage CPI was once again almost 40% above the U.S. average.

To a large extent, the rapid increase in the cost of living since 1973 can be attributed to pipeline construction. The influx of construction and other workers created pressures on the housing supply and thus on housing prices. The housing component of the Anchorage CPI increased at an average annual rate of 11.5% over the three-year period. Food prices increased almost 12% per year, with the greatest increases in the "food away from home" component, reflecting sharply increased business travel and related activity. The other principal components of the CPI experienced annual rates of increase somewhat lower than the overall rate of inflation.

It should be noted that Anchorage is the only area in Alaska for which the Bureau of Labor Statistics prepares a consumer price index. However, available data indicate that prices in other parts of the state are higher than those in Anchorage, largely the result of higher transportation and distribution costs for all consumer goods.

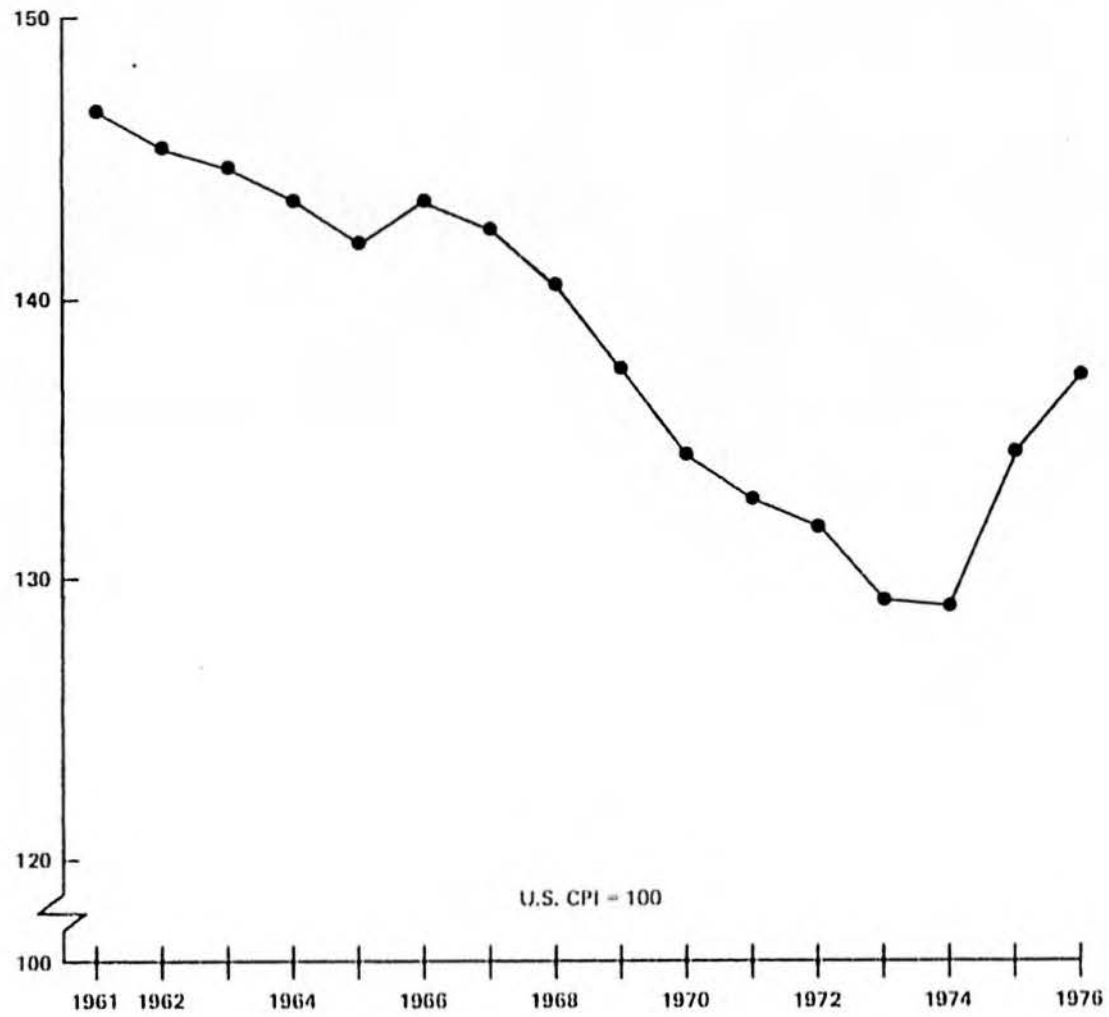
The above discussion of cost of living suggests that the higher wage rates in Alaska do not necessarily provide a higher standard of living for the state's workers.

Figure II-10 presents the data on average annual earnings per employee from the previous section adjusted to reflect the difference in CPI between Alaska and the United States as a whole. As can be seen, through 1973



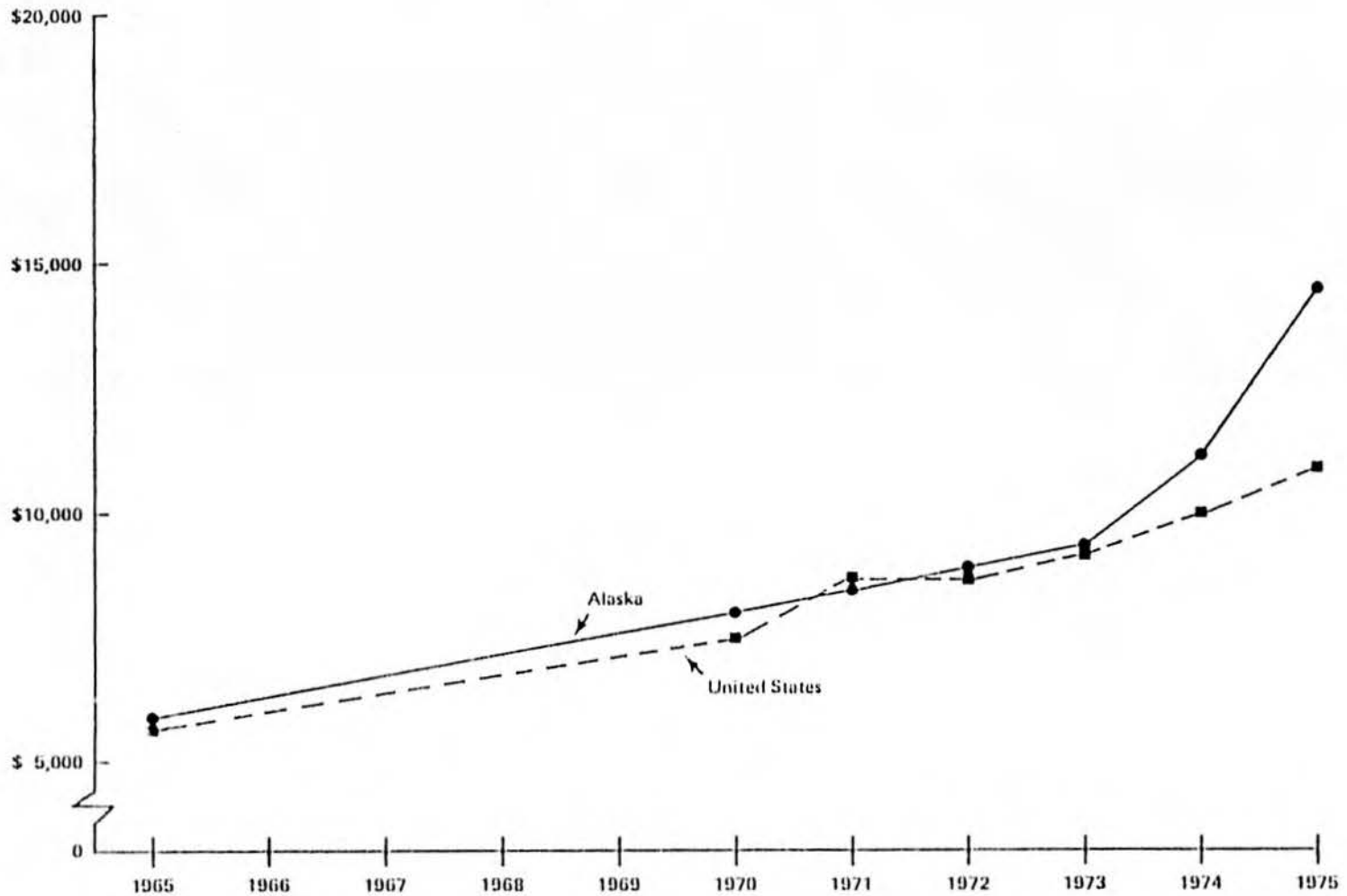
Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, various issues.

FIGURE II-8 AVERAGE WEEKLY EARNINGS OF PRODUCTION EMPLOYEES ON MANUFACTURING PAYROLLS - JUNE



Sources: U.S. Department of Labor, Bureau of Labor Statistics; Alaska Department of Commerce and Economic Development.

FIGURE II-9 ANCHORAGE CPI RELATIVE TO U.S. CPI - 1961-76



Sources: Figures II-6 and II-9.

FIGURE II-10 AVERAGE ANNUAL EARNINGS PER EMPLOYEE ADJUSTED FOR DIFFERENCE IN CPI

there was no significant difference in average earnings between Alaska and the rest of the country when considered in terms of consumer buying power. However, even adjusted for cost of living, average earnings per worker in Alaska were one-third higher than the national average in 1975.

Partial data for 1977 indicate that the rate of inflation in Alaska has decreased substantially since the peak pipeline construction period. The increase in the Anchorage CPI from January 1976 to January 1977 was only 6.7% compared to an 11.1% increase for the previous year. However, this was still above the national CPI increase of 5.2% for the same period. As temporary pipeline workers leave the state, it is likely that inflationary pressures will continue to decrease, particularly in the area of housing prices. Moreover, average wages adjusted for cost of living are likely to return to a level closer to the national average as high construction earnings, particularly overtime earnings, decrease as a percentage of wage and salary payments.

#### E. MAJOR ECONOMIC SECTORS

This section presents a brief description of Alaska's principal economic sectors:

- Mining
- Contract construction
- Manufacturing
- Transportation, communications, and utilities (TCU)
- Wholesale/retail trade
- Finance, insurance, and real estate (FIRE)
- Services
- Government

Each sector is described in terms of its contribution to employment and gross state product (GSP), and in terms of its links to other sectors.

Table II-1 shows the rank and percent contribution of each of the sectors to employment, wages and salaries, and gross state product for 1973 before the short-term effects of pipeline construction. (GSP for Alaska is measured from the earnings side in terms of employee compensation and other factor payments -- interest, rents, and profits.) Government contributed more than one-third of all non-agricultural wage and salary employment and a slightly smaller share of GSP. (The value of production originating in the government sector is measured in terms of employee compensation only.) Wholesale/retail trade was the second largest generator of employment and GSP, but its share of GSP was about five percentage points below its share of employment because of the relatively low wages paid in this sector, particularly the retail trade component.

TABLE II-1

PERCENT DISTRIBUTION AND RANKING OF  
EMPLOYMENT, SALARIES, AND GSP BY SECTOR - 1973

	<u>Employment</u>		<u>Wages and Salaries</u>		<u>GSP</u>	
	<u>Percent</u>	<u>Rank</u>	<u>Percent</u>	<u>Rank</u>	<u>Percent</u>	<u>Rank</u>
Mining	1.8%	8	2.9%	8	11.5%	3
Contract Construction	7.2	6	11.8	3	10.1	5
Manufacturing	8.6	5	8.3	6	7.2	8
Transportation, Communication, and Utilities	9.6	4	10.9	4	11.1	4
Trade	16.8	2	13.1	2	12.0	2
Finance, Insurance, and Real Estate	3.9	7	3.5	7	8.5	6
Services	14.0	3	10.5	5	8.2	7
Government	38.1	1	39.0	1	31.4	1

Sources: Alaska Department of Commerce and Economic Development, The Alaska Economy, Mid-year Performance Report 1977; University of Alaska, Institute of Social, Economic, and Government Research, Alaska Review of Business and Economic Conditions, "Estimates of Alaska Gross Product by Region, 1965-1973."

Even in 1973, before North Slope oil and gas production began, the mining sector was the third largest contributor to GSP, only slightly behind trade. However, mining was by far the smallest employer, providing less than 2% of all jobs. Mining, particularly the oil and gas industry, is highly capital-intensive and employee compensation is only a very small share of GSP generated in this sector.

Among the remaining sectors, construction, TCU, and FIRE contributed a greater share of GSP than employment. Construction and TCU both have relatively high average wage levels and thus make a significant part of their contribution to GSP through employee compensation. The FIRE sector generates its principal contribution through factor payments other than salaries. Manufacturing and services both generate greater shares of employment than GSP. For the services sector in particular, the relatively low wages paid make this sector the third largest employer but next to last in terms of GSP.

Table II-2 shows the distribution of non-agricultural wage and salary employment for Alaska and the United States and the growth in employment for each sector. During the 1960-73 period (i.e., before pipeline construction began), employment in three of the "support" sectors -- trade, FIRE, and services -- grew more rapidly than total employment. For the United States as a whole, these three sectors also grew more rapidly than total employment, but government was the second fastest growing sector, exceeded only by services. In Alaska, government employment grew somewhat more slowly than total employment.

The most obvious difference in employment distribution patterns between Alaska and the United States is the relative shares of government and manufacturing employment. For the nation, manufacturing contributed 31% of total employment in 1960 and gradually declined to about 24% by 1976. In Alaska, manufacturing employment has been 10% or less of the total. On the other hand, before pipeline construction, government contributed close to 40% of Alaska's total employment, compared to a national average of less than 20%. In addition, the trend appears to be a decreasing government share of employment in Alaska and an increasing government share nationwide. The Alaskan share of employment in the other major industry sectors is not significantly different from the U.S. average, although mining, construction, and TCU contribute a somewhat larger share of the state's jobs.

#### 1. Mining

Mining is Alaska's smallest sector in terms of employment, but the largest in terms of value of production. Furthermore, the mining sector has created, and will continue to create, significant employment and other economic impacts in the state, not only through directly related activities such as construction, but also through the revenues it provides to the state government.

TABLE 11-2

## DISTRIBUTION AND GROWTH OF EMPLOYMENT BY MAJOR INDUSTRY SECTOR

	1960		1970		1973		1976		Average Annual Growth Rate			
									1960-73		1960-76	
	Alaska	United States	Alaska	United States	Alaska	United States	Alaska	United States	Alaska	United States	Alaska	United States
Mining	1.9%	1.3%	3.2%	0.9%	1.8%	0.8%	2.3%	1.0%	4.7%	-0.8%	8.6%	0.6%
Contract Construction	10.4	5.3	7.5	5.0	7.2	4.8	17.8	4.5	2.2	2.6	10.7	1.4
Manufacturing	10.2	31.0	8.4	27.2	8.6	26.2	6.1	23.9	3.8	1.4	3.7	0.8
Transportation, Communications, and Utilities	11.9	7.4	9.9	6.4	9.6	6.1	9.3	5.7	3.3	1.1	5.4	0.7
Trade	13.5	21.0	16.7	21.2	16.8	21.6	16.2	22.3	6.9	3.0	8.3	2.8
Finance, Insurance, and Real Estate	2.5	4.9	3.4	5.2	3.9	5.4	4.2	5.4	8.8	3.3	10.7	3.0
Services	9.8	13.7	12.3	16.4	14.0	17.0	16.4	18.4	8.0	4.4	10.5	4.3
Government	19.8	15.4	38.6	17.7	38.1	18.1	27.7	18.8	4.8	3.9	4.7	3.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	5.2	2.7	7.1	2.4

Sources: Alaska Department of Commerce and Economic Development, Alaska Statistical Review, 1972, and The Alaska Economy, Mid-year Performance Report 1977; U.S. Department of Commerce, Statistical Abstract of the United States, and Survey of Current Business.

Since the late 1960s, the principal products of the mining sector have been oil and gas, which currently account for about 85% of the value of mining production and the same share of mining employment. Sand and gravel and gold are the other principal products mined, although barite, coal, silver, mercury, and other minerals are produced in small quantities. Much of the mining activity in recent years has been directed toward exploration for minerals in an attempt to determine the quantity and quality of Alaska's resources and the feasibility of development.

Many mineral deposits have been identified in Alaska, but there has been little development to date. The economics of mining operations in Alaska -- lack of infrastructure, labor costs, transportation costs -- make resource development feasible only under conditions of high world demand and price or national policy priorities, as was the case for North Slope oil and gas resources. Therefore, it is likely that activity in the mining sector will be concentrated in the oil and gas industry, at least for the next five to ten years, although coal development could occur over the short term with some transportation facility construction.

While the mining sector is highly capital-intensive and provides very few jobs in relation to its value of production, it can have significant spinoff effects throughout the economy. The obvious example is the trans-Alaska pipeline project. While oil and gas production at Prudhoe Bay will require relatively few workers, the pipeline built to transport the oil resulted in significant numbers of new jobs not only in the construction sector, but also in the support sectors of the economy -- TCU, trade, and services. Thus, the infrastructure construction and other support requirements associated with any large-scale mining project will provide jobs in other sectors of the state's economy. It is also possible that mining could generate activity in the manufacturing sector through the development of primary processing facilities in the state.

The mining sector also has a significant impact on the state's economy because of the taxes it pays. It is estimated that one-half to three-quarters of the state's general fund revenues are derived from the petroleum industry in the form of income taxes, production taxes, reserves taxes, etc. To the extent that the state uses these funds for capital improvement projects, additional jobs will be created and additional infrastructure will be available to support other economic and industrial growth. Thus, while the direct contribution of the mining sector to the state's economy is small in terms of jobs and wages, its indirect and related impacts are potentially immense.

## 2. Contract Construction

The construction sector in Alaska is subject to extreme cyclical fluctuations. During the early 1970s construction employed 7000-8000 workers on an annual basis and was the sixth largest employing sector in the state. However, as a result of the trans-Alaska pipeline project, construction employment reached 30,000 in 1976 and was second only to government in share of total employment. The contribution of the construction sector to GSP varies with its employment requirements.

The construction sector is made up of three major components -- private, public, and special projects construction. The private construction component includes the building of houses, office buildings, hotels, and other commercial or industrial facilities financed by the private sector. Growth in this part of the construction industry depends on population growth, which generates requirements for new housing and commercial facilities, and on the overall growth of the state's economy. The public construction segment of the sector is made up of those capital improvement projects financed by federal, state, and local government agencies -- highways, office buildings, sewage treatment systems, airport improvements, etc. The level of public construction activity is influenced by population growth, the availability of public funds (current revenues, grants-in-aid, or debt financing), and regulatory or policy issues which may dictate priorities or requirements for other than economic reasons.

Special projects construction activity, such as the oil pipeline, may be funded by either the private or public sector, but is set apart from other construction by its magnitude. Because of the cost of these projects, their cyclical nature, and the level of employment generated, special projects construction has the greatest impact in Alaska's economy. As discussed previously, trans-Alaska pipeline construction created increases in employment, population, wages, and prices throughout the state. Future special projects (the gas pipeline, OCS development, the proposed capital move) are likely to have similar consequences.

Overall, as was evident over the last few years, the construction sector has links to almost all other sectors of the state's economy. Construction of facilities and/or infrastructure is a necessary input to all of the other economic sectors. At the same time, the other sectors provide inputs to the construction industry: mining provides sand and gravel, manufacturing provides sawmill products, and TCU, trade, FIRE, and services provide many support functions. Thus, as demand for construction activity is created, the overall economy will grow.

### 3. Manufacturing

Alaska's manufacturing sector is quite small, providing 8000-10,000 jobs and 6-8% of total employment. In 1973, the share of GSP originating in manufacturing was the smallest of any of the eight major sectors. Manufacturing activity is currently highly seasonal and is concentrated in very few industries, making the entire sector vulnerable to industry-specific problems.

Almost half of the state's manufacturing employment is in the food processing industry, with most of this in fish processing. Employment in this industry is extremely seasonal, with peak summer employment two to three times January levels. The other principal manufacturing industry is lumber and wood products. Included in this industry are logging operations, sawmills, and Alaska's two pulp mills. Employment in the lumber and wood products industry is seasonal, but much less so than the food

processing industry. Other manufacturing employment (approximately 2000 jobs) is spread among a variety of industries. The Kenai Peninsula ammonia and urea plant is the only large-scale export-oriented manufacturer in this group. Other operations are generally small and supply the local market.

Local market-oriented manufacturing activities -- bakeries, printers, furniture makers -- will grow along with overall state population growth. Development of larger-scale export based industries will be tied to resource extraction and development of suitable infrastructure -- transportation, utilities, etc. In addition, the resolution of several regulatory/institutional problems will be necessary before significant new manufacturing activity will occur, for example, the U.S. Forest Service's 10-year limit on timber leases.

Even over the long term, manufacturing in Alaska is not likely to account for the 20-30% share of employment experienced at the national level. The economics of most manufacturing industries require that final product fabrication operations be located near major consumer markets. Furthermore, Alaska's wage structure, limited industrial base, and lack of significant infrastructure development all work against establishment of new industry. Development of the manufacturing sector in Alaska will likely follow the historical pattern of reliance on primary processing of natural resources (e.g., fish processing, petroleum refining). Over time, it may be possible to attract some intermediate product manufacturing industries (e.g., chemicals or primary metals), but final product manufacturing and high technology industries are not likely.

#### 4. Transportation, Communications, and Utilities (TCU)

The TCU sector has historically ranked fourth in terms of employment and contribution to GSP. While TCU is a support sector which depends on economic and population growth for its expansion, development in this sector may also act as a catalyst for further economic growth.

Transportation is the largest component of this sector, accounting for about two-thirds of its total employment. Within transportation, air transportation is the largest employer, followed by trucking and warehousing. Communications and public utilities together employ 4000-5000 people, roughly the same as air transportation.

The transportation and utilities components of this sector are not only affected by increased demand generated in other sectors, but can also be determinants of future growth. Lack of transportation infrastructure and high transportation costs are among the principal factors inhibiting industrial growth in Alaska. The road and rail systems are limited, and many interior areas can only be reached by air. Similarly, while water transportation is used for freight and passenger transport, there is not yet a large industrial port which would support coal or ore shipments. As a result, the expansion of the state's transportation network in response to population and business growth will in turn provide infrastructure to support additional growth.

Public utilities are in somewhat the same position as transportation. Utility services -- electric, gas, water, sanitary -- are expanded because of demand generated by increased population and business activity. However, utility infrastructure, particularly electric power generation, can also attract new industry.

The communications portion of this sector includes telephone, telegraph, radio, and television services. In recent years, activity in this sector has been directed toward improving communications facilities in the outlying areas of the state. Growth in communications reflects population and business demand. However, unlike the other components of this sector, additional communications development will not attract new industry.

Over the long term, the TCU sector will follow the growth of the state's population and economy. The transportation portion, in particular, is likely to be the greatest beneficiary of industrial development, as well as a catalyst for further growth.

#### 5. Wholesale/Retail Trade

This sector has historically been the second largest employer in the state, except in 1976 when construction and service sector employment rose dramatically because of the pipeline project. Retail trade has typically accounted for 80% of employment in this sector and 70% of wage and salary payments.

Alaska's wholesale trade activity is concentrated in Anchorage and Fairbanks; retail establishments exist in all areas of the state. One of the fastest growing components of retail trade in recent years has been eating and drinking establishments, to a large extent the result of increased business activity and travel in the state. This is also the most seasonal retail trade category. As might be expected, general merchandise, apparel, and food stores have experienced growth related to overall population increases. The "other retail establishments" component, which includes automobile service stations in addition to other retail categories, has also grown rapidly, in large measure reflecting new and expanded operations resulting from pipeline activity.

Three sets of events will affect the growth of the trade sector in Alaska. Obviously, trade can be expected to grow along with population and to generally follow the geographic distribution of population. Second, increased vacation and business travel to and within the state will increase trade activity in eating and drinking places and other travel/tourist-related businesses. Finally, the trade sector will grow to accommodate new industry in the state, either as a supplier of materials and equipment or as a distributor of products.

#### 6. Finance, Insurance, and Real Estate (FIRE)

The FIRE sector is the seventh largest employer in the state, exceeding only mining. However, this has been the fastest growing sector in the state, with total employment more than doubling since 1970. Almost two-thirds of FIRE employment is located in Anchorage, the state's population and commercial center.

The finance industries -- banking, securities, and holding companies -- make up the largest component of this sector, accounting for almost two-thirds of its employment. The largest share of this group is employed in Alaska's 14 commercial banks and four savings and loan associations. Another 20% of the employment in this sector is in insurance. While there is no major insurance company based in Alaska, there are more than 700 life, fire, casualty, and other carriers which operate there. The real estate component of this sector has grown with the expanding housing market of the last several years.

Growth in the FIRE sector is directly related to increased business activity and personal income.

#### 7. Services

Since 1960, service sector employment has grown faster than employment in any other sector except FIRE, to which it is related. In 1976, services was third behind government and construction in terms of total employment. However, until the last few years this sector's contribution to GSP has been small relative to employment because of low wage rates in most of its component industries. Increases in business and professional services have altered average wage rates in this sector dramatically since 1974.

Within the services sector, business services has been the fastest growing group since 1960. Included in this group are building services, advertising, employment agencies, data processing, consultants, etc. Moreover, business service employment increased more than fourfold between 1973 and 1976, reflecting the impact of trans-Alaska pipeline construction and related activity. Hotel and lodging services has also been a relatively rapidly growing industry because of increasing business and vacation travel in the state. The only part of the services sector which has not experienced substantial growth is personal services, where employment has remained virtually constant throughout the 1970s.

The services sector is affected by both population and business growth in the state. The industries likely to experience the greatest future growth are those tied to Alaska's other growth sectors -- hotels, business services, and other professional services (engineers, architects, accountants). Industries more closely related to population -- personal and medical services -- are likely to grow at a slower rate than other portions of the services sector.

#### 8. Government

Government is overwhelmingly the largest employer in Alaska, typically providing about 40% of the state's jobs. (It should be noted that this is only civilian government employment and does not include more than 20,000 military personnel stationed in Alaska.) However, government's share of total employment has been declining slowly because of more rapid rates of employment growth in other sectors.

Until the late 1960s, the Federal Government accounted for the majority of employment in this sector. However, total federal employment in Alaska has not changed substantially since that time. On the other hand, state and local government employment increased by nearly 75% between 1969 and 1976, with somewhat more rapid growth in local government employment.

The government sector has been a stable foundation for the state's economy, providing a large employment base which is fairly well insulated from seasonal and cyclical fluctuations. Moreover, government is indirectly responsible for activity in other sectors through purchases of goods and services and financing of capital improvement projects.

Growth in government employment is likely to continue, but at a somewhat slower rate. Federal employment will not grow significantly, and may decrease as the Federal Government transfers more Alaskan lands to the state and to native corporations and as a declining military force requires fewer support personnel. State and local government should continue to provide the growth in this sector, supported by increasing state tax revenues from the petroleum industry. However, the government share of total employment will continue to decrease because of more rapid growth in other sectors of the economy.

#### F. INTERACTIONS WITH THE U.S. AND FOREIGN ECONOMY

Because of its limited population and economic base, Alaska must rely on the rest of the United States and the rest of the world for production of the goods it needs and for markets for its own products. While the U.S. economy is the principal supplier of goods to Alaska, the rest of the world (and Japan in particular) is the major market for Alaskan export.

Tables II-3 and II-4 present data collected for the University of Alaska's Census of Alaska Transportation. The authors selected 1973 as the base year in order to display transport patterns without the effects of the trans-Alaska pipeline project. It was also noted that these data do not indicate transshipment through U.S. ports -- that is, some of the commodities shipped between Alaska and the rest of the U.S. may in fact have originated in or be destined for other countries.

In almost all commodity groups, the majority of imports came from other parts of the United States, principally through Washington and California. Other countries were significant suppliers of farm products, fresh fish, crude petroleum and petroleum products, and stone, clay, and glass products. After 1973, major foreign import commodities were jet fuel, steel pipe, and other construction materials necessary for pipeline construction. Japan and Canada have been the leading foreign suppliers of commodities to Alaska, and imports from other Asia countries have increased significantly in recent years.

TABLE II-3

MAJOR COMMODITY IMPORTS INTO ALASKA - 1973  
(tons)

	<u>Domestic Imports</u>	<u>Foreign Imports</u>	<u>Percent Domestic Imports</u>
Farm Products	6,349.9	6,670.0	49%
Fresh Fish and Other Marine Products	481.0	181,781.0	-
Coal	6,058.3	167.0	97
Crude Petroleum	-	82,674.0	-
Nonmetallic Minerals, Except Fuels	32,764.5	15,482.0	68
Food and Kindred Products	246,479.2	43,512.5	85
Basic Textiles	1,055.3	18.0	98
Lumber and Wood Products, Except Fuel	89,871.7	11,143.3	89
Furniture and Fixtures	14,073.5	386.3	97
Pulp, Paper, and Allied Products	14,025.4	1,033.6	93
Chemicals and Allied Products	85,348.7	16,686.9	84
Petroleum and Coal Products	853,917.2	335,378.8	51
Rubber and Miscellaneous Plastic Products	3,748.3	241.8	94
Stone, Clay, and Glass Products	76,619.0	59,347.7	56
Primary Metal Products	51,781.9	8,083.1	86
Fabricated Metal Products, Except Machinery	46,035.6	903.0	98
Machinery, Except Electrical	25,311.7	1,675.0	94
Electrical Machinery, Equipment, and Supplies	5,152.0	14.7	99
Transportation Equipment	43,540.7	2,275.1	95
Miscellaneous Manufactured Products	39,616.0	82.1	99
Miscellaneous Products	347,973.3	126,134.7	73

Source: Lloyd M. Perrella and Staff, Census of Alaska Transportation, prepared for the U.S. Department of Transportation, University of Alaska Institute of Social and Economic Research, September 1976.

TABLE II-4

MAJOR COMMODITY EXPORTS FROM ALASKA - 1973  
(tons)

	<u>Domestic Exports</u>	<u>Foreign Exports</u>	<u>Percent Domestic Exports</u>
Fresh Fish and Other Marine Products	26,337.0	4,098.0	87%
Metallic Ores	112.5	887,721.0	-
Coal	1,783.0	-	100
Crude Petroleum	7,571,806.0	7.9	100
Nonmetallic Minerals, Except Fuels	48,930.5	4,225.5	92
Food and Kindred Products	69,325.1	3,650.2	95
Lumber and Wood Products, Except Fuel	6,307.0	1,121,339.4	1
Pulp, Paper, and Allied Products	224,536.9	1,152,330.0	16
Chemicals and Allied Products	580,538.9	224,904.1	72
Petroleum and Coal Products	1,103,508.7	969,509.6	57

Source: Lloyd M. Perrella and Staff, Census of Alaska Transportation, prepared for the U.S. Department of Transportation, University of Alaska Institute of Social and Economic Research, September, 1976.

Of far greater importance to the future of Alaska's economy are the distribution and growth of export markets. Table II-4 shows the domestic and foreign shares of Alaska's principal commodity exports. In 1973 fresh and processed fish, coal, nonmetallic minerals, and crude petroleum were shipped primarily to the lower 48 (although a portion of the seafood was then transshipped to foreign destinations). Other countries were the principal purchasers of metallic ores, lumber, and pulp. Chemicals and petroleum products (ammonia, urea, and LNG) were shipped to both the lower 48 and other countries.

Alaska's principal foreign market is Japan, which regularly accounts for about 80% of all Alaskan foreign exports. (In 1976, the second largest export market was Mexico, with less than 5% of the total.) This export link is strengthened by Japanese direct investment in Alaska, estimated at more than \$300 million. It thus becomes evident that trends in the Japanese economy are as important as those in the U.S. economy to future industrial development in Alaska. The outlook for both countries is discussed in detail in Chapter IV.

#### G. INSTITUTIONAL ISSUES

Economic development in Alaska is subject to a variety of legal, regulatory, and other institutional considerations. While some of these issues are national in scope (such as environmental protection legislation), many are unique to Alaska. Furthermore, even when institutional actions do not specifically prohibit economic growth, the uncertainties about regulatory actions and perceptions of problems in obtaining development permits have contributed to an unfavorable business climate.

To a large extent these institutional considerations are a result of the long-time federal presence and influence in Alaska. In 1959, the Federal Government owned more than 99% of the land in Alaska. The Statehood Act granted 103.3 million acres, or 28% of the land area, to the new state, transferred natural resource management functions to state agencies, and provided for payment to the state of 90% of the revenues from federal oil and mineral lease sales, rentals, and royalties (excluding OCS area). Even so, the Federal Government remains a strong presence in Alaska, with about 4,000 military and 18,000 civilian employees (some 10% of total state population and close to 40% of civilian employment). The Bureau of Indian Affairs remains active in providing services for the native population, the Department of Transportation operates the Alaska Railroad, and the U.S. Forest Service controls the vast majority of timber harvested in the state.

The most significant issue affecting Alaska's economy is the Alaska Native Claims Settlement Act of 1971, which provided about 44 million acres of land and almost \$1 billion in cash grants to 12 native regional corporations. The economic development concern is centered on Section 17(d)(2) which provides for the withdrawal of up to 30 million acres of "national interest" land for federal protection as national parks, wildlife refuges, and national forests. Congress is required to act on the final selection and classification of these d-2 lands by the end of 1978.

The eventual status and extent of d-2 lands will have a significant impact on the development of Alaskan resources. One proposal -- HR 39 (the Udall bill) -- would set aside 115 million acres of land under d-2 status and would classify most of this land as wilderness, precluding virtually all industrial use and exploration. Other proposals call for smaller total land allocations (close to the 80 million acres mentioned in the 1971 Act) and a classification system allowing exploration and some development. Opponents of HR 39 fear that areas of potentially huge resources will be cut off not only from development, but also from exploration. Proponents argue that it would be possible to open wilderness lands to exploration and development at some time in the future should conditions warrant it.

While the selection and classification of d-2 lands will be determined by the end of the year, the corollary issue of transportation corridors will remain. If it is not possible to build highways, pipelines, or railroads across federal d-2 lands to reach state or native corporation lands, the most efficient transportation access to resources may be blocked. Particularly in Alaska, where transportation infrastructure is limited and construction costs for such infrastructure are high, the need to route transportation around d-2 lands could make an otherwise economically attractive development infeasible.

The d-2 question is part of the larger issue of environmental protection which has had and will continue to have impacts on almost all development proposed in Alaska. While the environmental laws (NEPA, clean air and water regulations, etc.) are national in scope, Alaska has received considerable attention from environmentalists. Court actions brought by these groups delayed construction of the trans-Alaska pipeline for three years and caused Champion International to abandon plans for a wood processing complex after 10 years of litigation. Water pollution abatement requirements nearly forced the closing of the Ketchikan Pulp plant before agreement was reached with EPA extending the compliance deadline.

Any future industrial development in Alaska will, of course, have to meet applicable environmental standards. However, the state appears to have become a battleground for environmental groups who see Alaska as the last remaining wilderness in America. The numerous lawsuits brought by such groups to halt industrial projects have convinced many potential developers that location or expansion in Alaska is not worth the "hassle."

Other related institutional actions are the U.S. Forest Service's regulations governing timber cut in national forests, about 90% of the Alaskan timber harvest. Forest Service stumpage fees, which are based on finished product prices, have become so high that logs are being imported from Canada for processing in Alaskan pulp mills. Furthermore, Forest Service lease sales have been cut back from 55 to 10 years, discouraging the establishment of large-scale processing plants.

Another federal law which affects Alaska's economy is the Jones Act which required that ocean shipments between U.S. ports be carried on U.S.-built and manned vessels. The higher shipping costs of the U.S. merchant fleet make Alaskan products less competitive in the lower 48 market and make goods shipped into Alaska more expensive. Lower foreign fleet shipping costs have certainly contributed to the extensive trade connections between Japan and Alaska. The Jones Act has also served to limit the cruise ship tourism market in Alaska, since non-U.S. ships (most of the cruise fleet) must spend at least half of the cruise in Canadian ports.

Not all federal laws and regulations are detrimental to Alaska's economy. In 1976 Congress enacted a 200-mile "fishery conservation zone." Foreign fleets have been allocated portions of the resources within these fisheries only when the stocks are determined to be surplus to U.S. needs. It is now reported that the National Oceanographic and Atmospheric Administration plans to give U.S. processors the same proprietary rights to fish caught within the 200-mile limit. The impact of the 1976 law and the proposed additional regulations will be to strengthen Alaska's fishing industry and provide it with a market in Japan and other countries whose fleets had previously fished in Alaskan waters.

Many other legal/regulatory actions proposed or discussed at the federal level could also have significant impacts on economic development in Alaska. The timing of OCS leasing and development will determine the nature of petroleum industry spinoffs in the state. Possible incentives to increase coal use and higher prices for gas and oil could make export of Alaskan coal to the lower 48 more economically attractive. In general, because of the federal presence in the state and the extent of federal land ownership, many of the legal and regulatory actions which will affect Alaska's economic growth will be determined by the Federal Government.

#### H. REGIONAL CHARACTERISTICS

The preceding sections have described demographic and economic characteristics for the state as a whole. However, Alaska is by no means homogenous. Labor force participation, employment, unemployment, and principal industries vary from region to region, and recent trends have tended to enforce regional differences. Therefore, this section presents a comparison of some of the demographic and economic characteristics of the five principal regions shown in Figure II-11.

While several studies have used the regional division shown in Figure II-11 (sometimes separating Anchorage and Fairbanks from the Southcentral and Interior regions), it should be noted that each region is composed of many different subareas. Even the Census Divisions in each region are not homogenous economic units. The purpose of this regional description is therefore to indicate broad regional differences and the variations from state average economic conditions which exist in each region.

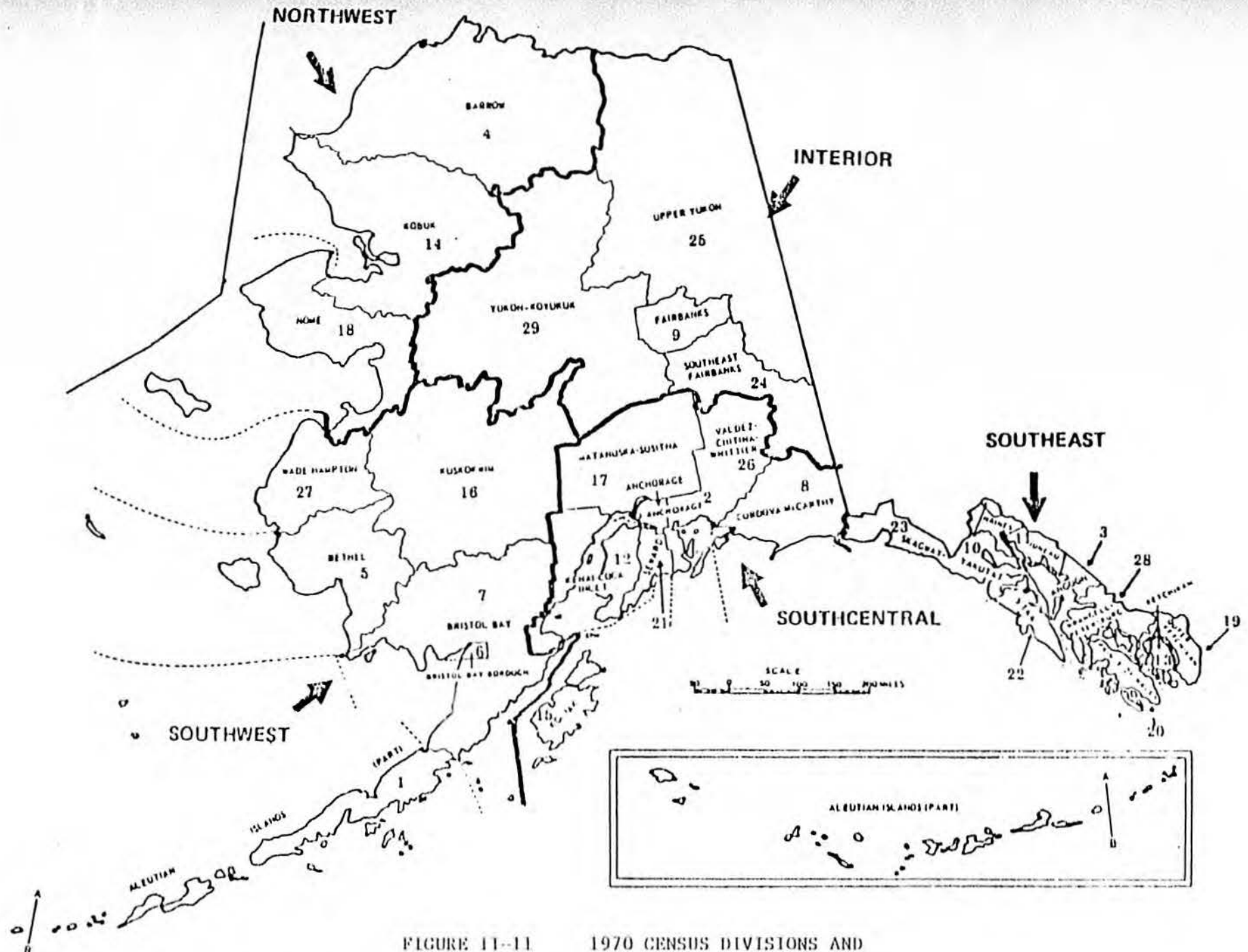


FIGURE 11-11 1970 CENSUS DIVISIONS AND MAJOR ALASKA REGIONS

Source: Babb, "Age and Sex Characteristics of Alaska's Population," *Alaska Review of Business and Economic Conditions*, March 1972.

Table II-5 shows the population distribution among the five regions. The Southcentral region, which includes Anchorage, currently contains almost 60% of the state's population, with another 17% in the Interior (Fairbanks). As noted above, nearly two-thirds of the state's population lives in its three largest cities (Anchorage, Fairbanks, and Juneau). Moreover, the trend has clearly been toward a greater concentration of population in the Southcentral region, particularly Anchorage. The share of population in each of the other regions has declined since 1960, although the Northwest has seen an increase since 1970 because of North Slope activity.

TABLE II-5  
REGIONAL POPULATION DISTRIBUTION

<u>Year</u>	<u>Southeast</u>	<u>Southcentral</u>	<u>Southwest</u>	<u>Northwest</u>	<u>Interior</u>
1960	15.7%	48.1%	9.3%	5.2%	21.7%
1970	14.1	54.2	8.8	4.2	18.7
1971	13.9	55.8	8.5	4.3	17.5
1972	13.8	56.4	8.3	4.0	17.5
1973	14.1	57.1	7.9	3.8	17.1
1974	14.3	55.4	8.0	4.3	18.0
1975	12.5	56.7	7.0	4.4	19.4
1976	12.4	59.1	6.9	5.1	16.6

Source: Alaska Department of Commerce and Economic Development, The Alaska Economy, Mid-year Performance Report 1977.

While data on detailed population characteristics for the last few years are not available, a 1975 report\* contained figures on the military and native population by region. In 1973, there was a significant military presence (more than 10% of the population) in the Southwest and Interior regions, although the largest number of military personnel was stationed in the Southcentral area. In the early 1970s, the Southwest and Northwest regions both had primarily native residents (more than 80% in the Northwest and two-thirds in the Southwest), although the native share of population in the Northwest has decreased in the last few years because of North Slope workers. The Southeast area has a significant native population (about 20%). The native population share is not significant in the Southcentral region.

\*University of Alaska, Institute of Social, Economic, and Government Research, Issues in Alaska Development, July 1975.

Table II-6 presents highlights of regional labor force, employment, and income characteristics. In general, lower labor force participation and income characterize the Southwest and Northwest regions, which is consistent with their large native populations, many of whom continue to participate in the traditional subsistence economy. These two regions also exhibit the greatest reliance on government employment, indicating relatively little development of the private sector economy.

The Southeast region includes Juneau, but also many smaller communities with fishing and timber as the principal industries. There was substantially less employment growth from 1970-76 here than in the other regions because of the geographic isolation of the Southeast. In other words, the pipeline project did little to stimulate economic growth in the Southeast. This is also evident from the government share of employment, which remained essentially constant here while declining significantly in all other regions as private sector employment grew substantially. The Southeast region has also experienced a significant increase in its relative unemployment rate; it had the lowest regional rate in 1970, but had a rate 2.5 points above the state average in 1976. The higher unemployment rate reflects not only the lack of pipeline-related job creation, but also problems affecting the fishing and timber industries in this area (e.g., poor fishing seasons and slack Japanese demand for wood products). Nonetheless, per capita income in the Southeast remains above the state average because of the large number of government employees with relatively high wages and salaries.

The Southcentral region, which includes Anchorage, is not only the state's population center, but also its economic center. This is particularly evident from the fact that government accounts for a smaller share of employment here than in any other region, even though about half of all government employees work here. With about 60% of Alaska's labor force and employment in the Southcentral region, economic conditions here generally determine the statewide average. Historically, the unemployment rate has been somewhat lower and per capita income somewhat above the state averages because of less favorable economic conditions in other areas.

The Southwest region has had a very small share of population in the civilian labor force -- in part because of the relatively high military presence and in part because of the number of persons engaged in the traditional subsistence economy. While the number of jobs has increased much more rapidly than population in recent years, the unemployment rate remains high. This is because military cutbacks have been offset by increasing civilian population and an expanding civilian labor force. Even with the related loss of some civilian Department of Defense jobs, however, the Southwest continues to derive about half of its employment from the government sector, with manufacturing (primarily seasonal fish processing activity) the other major employer. The subsistence economy and high seasonality in this region keep per capita income low even with substantial government employment.

TABLE II-6

## REGIONAL LABOR FORCE AND EMPLOYMENT CHARACTERISTICS

	<u>State Average</u>	<u>Southeast</u>	<u>Southcentral</u>	<u>Southwest</u>	<u>Northwest</u>	<u>Interior</u>
Percent of Population in the Civilian Labor Force						
1970	32.5%	41.4%	34.8%	15.5%	21.8%	29.3%
1974	42.4	50.4	45.2	25.8	26.6	38.4
1975	44.4	52.3	45.3	27.0	27.8	46.9
1976	48.3	53.2	49.2	29.9	44.2	50.6
Average Annual Employment Growth Rate - 1970-76						
	12.3	6.6	13.0	15.8	23.0	12.7
Unemployment Rate						
1970	9.2	8.5	9.0	14.8	13.6	8.5
1974	10.0	16.6	9.7	13.3	13.8	8.6
1975	8.3	11.3	8.1	10.8	11.5	5.7
1976	10.5	13.0	9.9	14.3	10.1	10.1
Government Share of Civilian Employment						
1970	38.6	38.2	33.2	55.3	53.8	38.7
1974	32.7	39.4	28.9	47.7	53.0	34.8
1975	28.6	39.0	25.5	46.8	46.8	24.2
1976	26.4	39.9	21.9	45.1	26.2	26.2
Per Capita Income						
1970	\$4,645	\$4,780	\$4,860	\$3,345	\$2,570	\$4,730
1974	6,890	7,295	7,020	5,375	4,595	7,405

Sources: 1970 - U.S. Department of Commerce, Bureau of the Census, City and County Data Book 1972;  
1974-76 - Alaska Department of Labor, Employment Security Division, Alaska Labor Force  
Estimates by Areas.

The Northwest has the smallest population of the five regions although it has experienced substantial population and employment growth since 1970 because of the North Slope oil field development. In fact, employment has grown about three times as fast as population because almost all of the in-migrants to the area are employed in the petroleum industry and related activities (pipeline construction and maintenance). Before these dramatic changes occurred, the Northwest was very similar to the Southwest in its demographic and economic characteristics, with a primarily native population engaged in traditional subsistence activities and the government sector supplying more than half of all civilian employment. The Northwest had, and still had in 1974, the lowest per capita income in the state. However, the wages paid to petroleum industry workers will continue to increase average incomes. The Northwest was the only one of the five regions which experienced a decreasing unemployment rate in 1976.

About 85% of the population and employment of the Interior region is in the Fairbanks area. The remainder of the region is similar to the neighboring Northwest in terms of a relatively large native population participating in the subsistence economy, and a high government share of available jobs. The pipeline project had a significant impact on the region because Fairbanks was the staging area for construction. The number of jobs (measured on an average annual basis) did not grow as rapidly as in other areas, but this is because of the seasonal nature of the construction industry. Nonetheless, the unemployment rate dropped nearly three percentage points below state and national levels in 1975; by 1976 pipeline layoffs had begun and the unemployment rate increased, although it remained below the state average. In addition, the region's population declined by about 10,000 in 1976 as temporary residents left the area or the state.

### III. ALASKA'S RESOURCES - DEVELOPMENT AND PROSPECTS

This chapter describes Alaska's principal natural resources in terms of their present and potential economic development. The state's timber, fishery, and oil and gas resources have been the focus of development to date. There has been relatively little development of coal, hardrock minerals, and tourism, and the state's agricultural potential is virtually untouched. The potential for expansion of Alaska's transportation and utility (primarily electric power) systems is also described, because future infrastructure development is directly tied to economic growth.

The factors and problems likely to inhibit or constrain development of resource-based industries are also described. Some of these problems are common to all economic development activity in Alaska -- the d-2 lands issue, limited transportation infrastructure, environmental concerns, etc. Others, such as U.S. Forest Service policies, will affect only one industry. While some of these inhibiting factors may be removed by appropriate public or private action, others are likely to remain constraints to development for the foreseeable future.

Even though there are factors likely to inhibit economic development in Alaska, there are opportunities to develop all of the state's resources. Whether such development will occur will depend on policy as well as economic considerations, many of which are outside the state's control.

The initial development of any natural resources (i.e., the extraction process) leads to both direct and indirect spinoff potentials. For example, a mineral ore can be mined in Alaska and shipped to the lower 48 or other destinations for processing, creating limited economic activity in the state. However, the first level of downstream development (the primary processing) could also occur in the state, increasing the value added and employment generated by resource development. In general, the value of resource development to the state and its residents will increase as steps are added in the processing chain. However, the economics of Alaskan operation make it extremely unlikely that in-state development will reach the final product state, except for small-scale operations to serve the local market.

Because of the small size and fragmented nature of the state's economy, the more indirect spinoffs of resource development may be as important, or even more important, than the direct downstream activities in terms of employment and income generated. A case in point is the construction of the trans-Alaska pipeline to support North Slope oil and gas development. Other resource development will generate support activities (e.g., boat repairing operations serving the fishing industry) and new infrastructure. New infrastructure will facilitate additional industry (e.g., roads built into the interior of the state to reach mineral resources, may also provide access to areas attractive for tourism).

This chapter identifies the outlook and opportunities for the entire resource development process. The prospects for resource-based manufacturing industries are described in greater detail in Chapter V.

## A. AGRICULTURE

### 1. Summary and Overview

Agriculture, other than subsistence farming, is insignificant in Alaska. Of the 20 million acres of land that appear to be suitable for agricultural development, only about 20,000 are being cultivated. In 1974, about 750 people were employed in nonsubsistence agriculture. There were an estimated 300 farms in Alaska in 1970. Milk production comprises the largest share of total agricultural production -- about 33%, followed by hay and potatoes. Although commercial production is confined to local and military markets, Alaskan farmers produce only a small part of the state's food needs.

The most obvious limitation on Alaskan agricultural development is the short growing season that limits the range of crops that can be produced. A more fundamental problem is the high cost of agricultural production in Alaska which limits the competitiveness of Alaskan products in the export and the Alaskan market. High production costs result from the size of Alaskan farms which are too small to realize economies of scale. Additional contributors to high costs of farm operations include the time and resources required to prepare land for agricultural operations (i.e., clearing, drainage, leveling, etc.). The most serious infrastructure problem is the lack of a marketing system, which forces farmers to deal directly with retailers and consumers, and the lack of a transportation system to bring in supplies and ship out products. Future agricultural development will, in part, depend on the resolution of political and regulatory issues that will determine the availability of large tracts of land for development.

The potential for expanded agricultural production in Alaska is theoretically huge because Alaska is one of the few remaining places in the world with large areas of undeveloped agricultural land. If Alaska is to realize its potential for agricultural production, operating costs will have to be reduced. Cost reduction will depend to some extent on establishment of state policies that make large tracts of land available for agricultural development and that improve transportation facilities to permit better access to supplies and markets. The most apparent opportunity for large-scale agriculture lies in the production of feed grain, especially barley, for the export market, especially Japan. Expanded grain production could also be the basis for expansion of beef, poultry, and pork production for the in-state market, and development of processing facilities.

### 2. Present Status

Agriculture, other than subsistence farming, is insignificant in Alaska. Of the 20 million acres of land that appear to be suitable for agricultural development, only about 20,000 are being cultivated. In 1974, about 750 people were employed (full or part-time) in non-subsistence agriculture. Alaskan agriculture is characterized by small farms reflecting the historical homestead basis of Alaskan agricultural development. There were an estimated 300 farms in Alaska in 1970.

The low level of agricultural development is evident from the data on agricultural production. In 1976 the value of Alaskan agricultural production was an estimated \$8.7 million (see Table III-1). Between 1960 and 1970, there was no change in the value of agricultural production in current dollars. Between 1970 and 1976, it rose from \$5.5 million to \$8.7 million, with most of the increase in crop value. Milk production comprises the largest portion of total agricultural production (almost \$2.9 million -- or about 33%) followed by hay and potatoes. Barley has been the principal grain grown in Alaska. Alaskan grains have been grown almost exclusively for livestock feed. Wheat is low yielding in Alaska and is grown only to a limited extent.

Commercial production is confined primarily to local and military markets. However, Alaskan farmers produce only a small portion of the state's food needs. For example, fresh milk sales from Alaskan producers accounted for only one-third of total fluid milk consumed in the state. Similarly, Alaska produces less than 2% of the beef marketed within the state.

Alaskan agriculture is concentrated in about five areas. Vegetables are grown on the Kenai Peninsula, the Tanana Valley, and the Matanuska/Susitna Valley. The latter two areas also produce small grains and dairy products. Beef cattle are raised on Kodiak Island and in the Matanuska/Susitna Valley. The Matanuska Valley accounts for most of the state's agricultural activity (see Figure III-1).

### 3. Problems

There are several reasons for the slow pace of development of Alaskan agriculture. The most obvious is the limitations posed by the Alaskan climate. Alaska's short growing season limits the range of crops that can be produced.

A more fundamental problem is the economics of agricultural production in Alaska. The high costs of agricultural production in Alaska limit the competitiveness of Alaskan products in the export market and in the Alaskan market. High production costs in Alaska result from small farms and from the lack of an agricultural infrastructure. Farmland in Alaska originated in homesteading or other government programs. Consequently, individual farming operations are generally too small to realize the economies of scale enjoyed by farmers in other states. The average farm in Alaska is less than 160 acres, which is considerably smaller than most estimates of economic farm size. Furthermore, large-scale agricultural development in other states has been accompanied by the local availability of supplies such as herbicides, pesticides, and livestock, hog, and poultry feed. In Alaska such supplies must be imported at high cost. In fact, one reason given for the failure of beef and pork production to increase is the lack of adequate feed supplies.

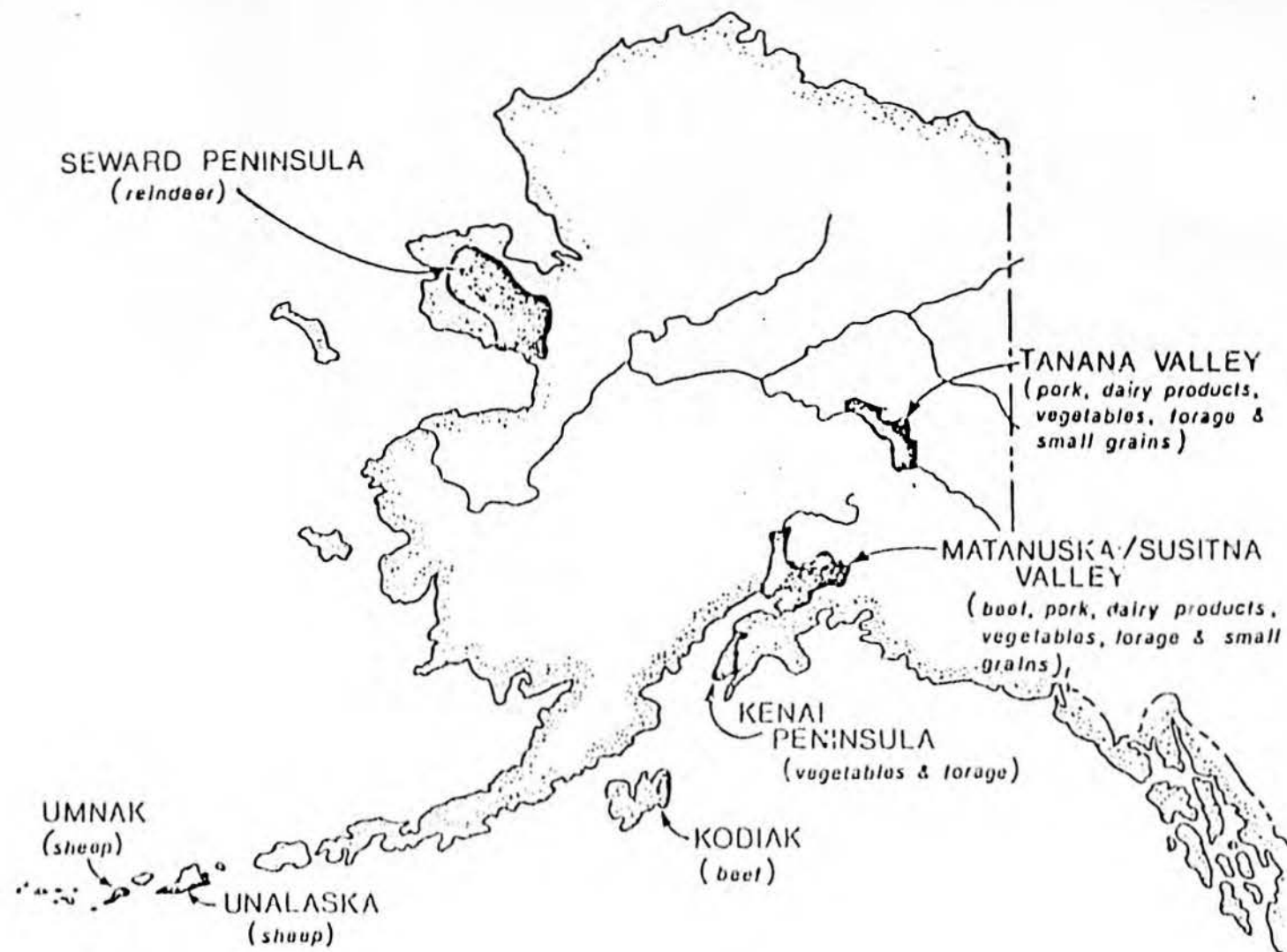
Probably the most serious infrastructure problem is the lack of a marketing system for agricultural products and a corollary system for supplying farm inputs. The small size of Alaskan farms and the Alaskan market resulting in low production levels have precluded the profitable

TABLE III-1

VOLUME AND VALUE OF AGRICULTURAL  
PRODUCT IN ALASKA BY MAJOR PRODUCT - 1976

<u>Product</u>	<u>Volume of Production</u>	<u>Value of Production</u>
Field Crops	3,800 cwt	
Oats	3,800 cwt	\$ 30,000
Barley	32,200 cwt	261,000
Hay	18,600 tons	2,325,000
Silage	11,200 tons	<u>391,000</u>
Total		\$3,007,000
Vegetable Crops		
Potatoes	91,000 cwt	\$1,001,000
Lettuce	9,500 cwt	261,000
Cabbage	4,000 cwt	59,000
Carrots	1,900 cwt	36,000
Other	2,200 cwt	<u>63,000</u>
Total		\$1,420,000
Total Crop Production		\$4,427,000
Livestock Products		
Milk	16,000,000 lbs	\$2,888,000
Eggs	500,000 doz	570,000
Beef and Veal	716,000 dr wt	608,000
Pork	105,000 dr wt	84,000
Poultry Meat	140,000 dr wt	43,000
Lamb and Mutton	18,000 dr wt	10,000
Wool	51,000 lbs	<u>45,000</u>
Total Livestock Production		\$4,248,000
Total Agricultural Production		\$8,675,000

Sources: U.S. Department of Agriculture, Statistical Reporting Service;  
State of Alaska, Department of Commerce and Economic Development,  
Division of Economic Enterprise.



Source: University of Alaska, Institute of Social, Economic and Government Research, "Agriculture In Alaska: 1976-2000 AD."

FIGURE 111-1 MAIN AGRICULTURAL PRODUCTION AREAS IN ALASKA

development of wholesale marketing and distribution enterprises. Consequently the burden of marketing has fallen on the individual farmers who lack the capacity to develop larger-scale markets. Thus farmers market directly to retailers, and in some cases to consumers. The lack of processing facilities further limits the market potential for farm products. The Alaskan local market is limited and the export market undeveloped so that there is only a small market for processed food products.

Transportation is another factor which has limited Alaska's agricultural development. The lack of transportation facilities in some areas has limited farmland development because of the inability to obtain supplies or to ship products to market. Where transportation facilities are available they are expensive. For example, transportation rates for milk are so high that in the southeastern part of the state, producers have difficulty competing with products brought in from outside the state.

Other problems will have to be resolved if agricultural production in Alaska is to increase substantially. To increase the economic viability of Alaskan agriculture, farms will have to be larger in order to realize economies of scale, and this will require a land policy that makes significant amounts of land available for large-scale agriculture. However, the following potential obstacles make the future availability of large tracts of agricultural land uncertain:

- The d-2 land issue,
- Availability of native corporation lands,
- The lack of privately owned land, and
- Competition with other land uses such as recreation and urban/suburban development.

In the Matanuska Valley agricultural land use has begun to conflict with other development uses. The valley is a prime agricultural area because of its good soil, warm temperature, and moderate rainfall. However, with increases in population in the Anchorage area, valuable agricultural land may be turned over for residential, commercial, and industrial uses.

The U.S. Interior Department's d-2 proposal would incorporate about one-half of the state's tillable land and significantly reduce the state's agricultural potential. Once the federal lands have been identified and selected for withdrawal, it would be impossible for the land to be used for agriculture.

Even if sufficient land becomes available for large-scale farming, the small size of the Alaskan market may limit the viability of large-scale development. Production for the export market could justify large-scale agriculture but this would depend on the prevailing commodity prices in world markets. Lands selected by the native corporations for ownership under the Alaska Native Claims Settlement Act would still have a potential for agricultural production. This could be through individual operation, corporate farming, or some kind of lease arrangement.

#### 4. Outlook and Opportunities

The potential for agricultural development in Alaska is theoretically huge, as indicated in Figure III-2. Alaskan agriculture has the potential to serve a world market and to reduce Alaskan imports of farm products. Alaska is one of the few remaining places in the world with large areas of undeveloped agricultural land (See Figure III-3).

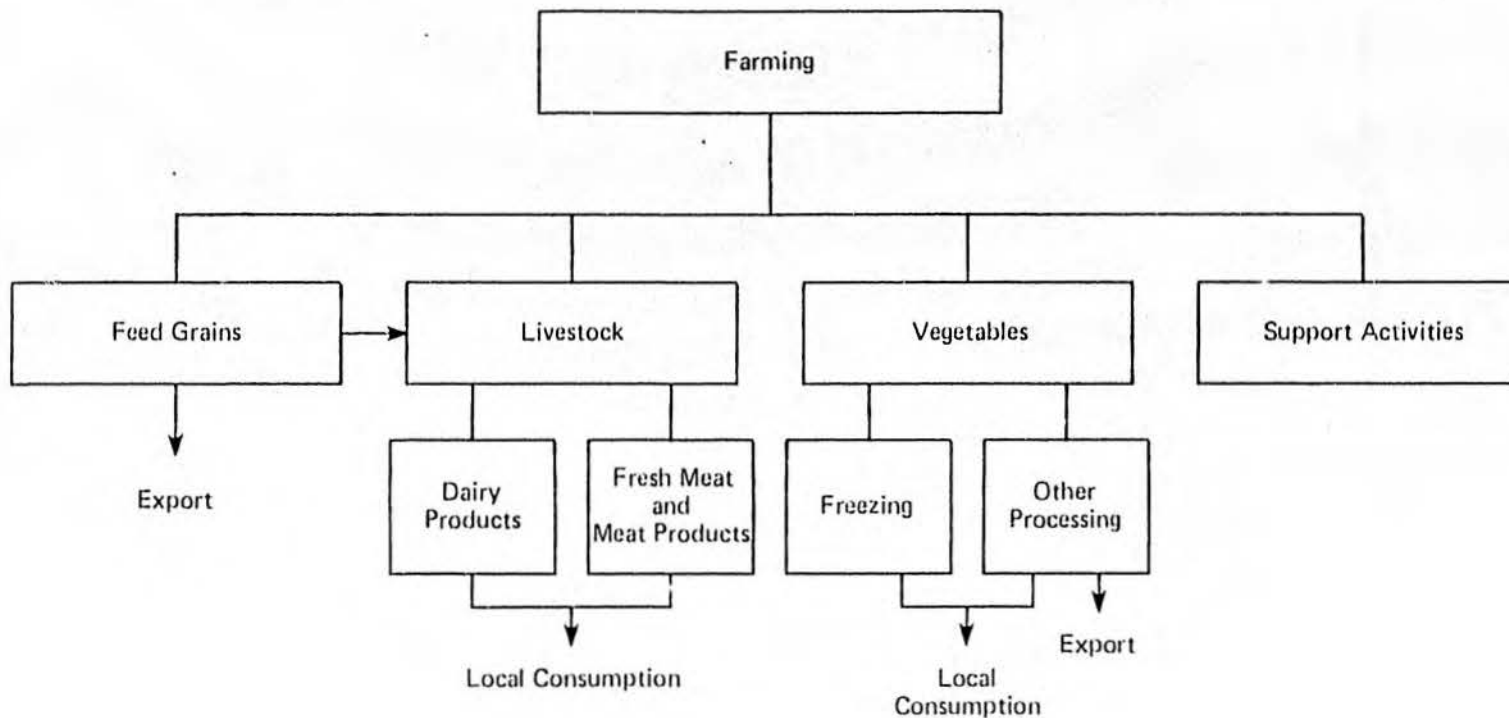
There are four major concentrations of suitable land: the Anchorage/Kenai/Matanuska-Susitna Valley area; the Dillingham/Tikchik Lake area; the Tanana/Kantishna/Salcha Basin area in the interior; and the Yukon flats area of the Upper Yukon. In addition, there are three minor areas: the Yukon Valley from below Holy Cross to Ruby (including the Koyukuk Basin), the Kuskokwim Valley from just below Aniak to Lake Minchumina, and the Copper Valley-Chitina Basin. The Tanana Valley has the greatest potential for agricultural development because of a large land base, available water, a developed transportation (rail and land) system, and land use planning; it has an even greater potential than the Matanuska Valley. The Tanana Valley currently produces about 20% of the crops produced in the state.

If Alaska is to realize its potential for increased agriculture production, operating costs will have to be reduced so that Alaskan products become competitive in the lower 48 and in worldwide markets. Reduction of production costs will depend in part on establishment of governmental policy that makes sufficient land available for large-scale agricultural production and that encourages improved transportation systems that permit better access to supplies and markets. However, development of commercial agriculture in Alaska has not been a major state policy goal. Only recently has there been discussion of the need for a comprehensive assessment of agriculture as a major land resource development alternative.

Recent developments show that statewide interest in agriculture in Alaska is gaining momentum. A Department of Commerce and Economic Development project is investigating the costs associated with producing Alaska's agricultural products and livestock. And the state legislature is beginning to look more closely to agriculture. This increased attention given to agriculture probably reflects concern for developing industries based on renewable resources.

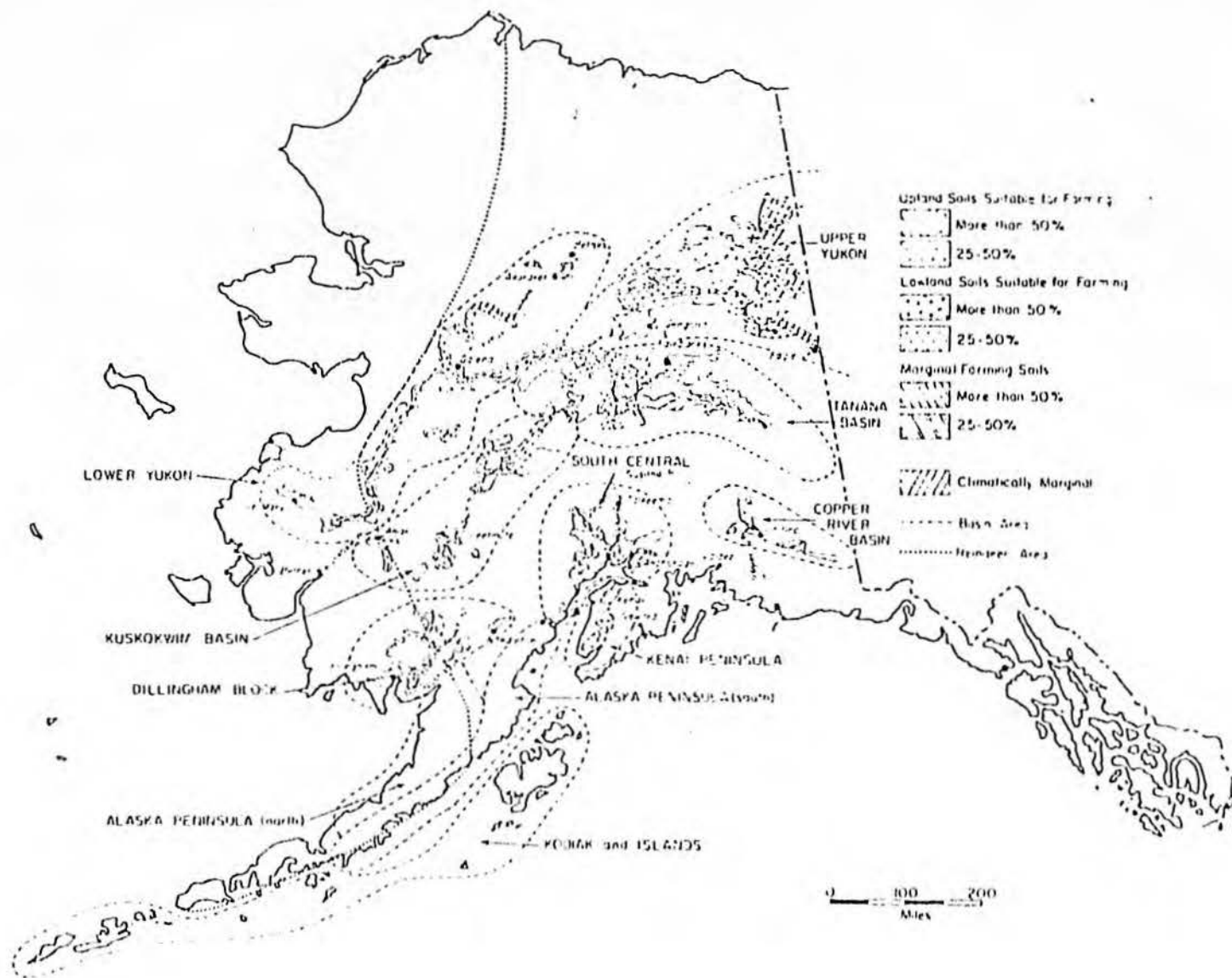
The proposed Delta project may be evidence of new state interest in promoting agricultural development. The project would promote barley production in the Delta-Clearwater area. The Delta plan would utilize 64,000 acres of land south of Delta for barley production with the state financing the clearing and breaking of the land. State costs under the plan would be recouped by leasing the land to farmers for a five-year lease period and then offering a purchase option. The North Pole refinery will be producing diesel fuel in its first stage of operation and probably gasoline in 1979. This new facility will assure lower prices and a steady supply of fuel and will exhaust steam at a rate of 200,000-350,000 pounds an hour at an average temperature of 600 degrees F. The waste heat from the North Pole refinery and from the pump stations on the trans-Alaska pipeline will provide a source of heat to dry grain and serve as an energy source

RESOURCE: AGRICULTURAL LANDS



III-8

FIGURE III-2 DOWNSTREAM DEVELOPMENT POTENTIAL -- AGRICULTURE



Source: Wayne Burton, Defining Parameters of Agricultural Potential in Alaska, Institute of Agricultural Sciences Bulletin No. 44, (Fairbanks: University of Alaska, 1975).

FIGURE III-3 REGIONS OF ALASKA AND SOILS SUITABLE FOR FARMING

in slaughter plants, feed lots, dairy operations, poultry operations, greenhouses, and soil warming. The project, if completed, would more than quadruple the presently tilled acreage in Alaska.

State policies and programs to encourage agricultural development would probably show results only in the long term. A study conducted in 1976 by the Institute of Social, Economic, and Government Research of the University of Alaska concluded that:

"Even if development of large-scale agriculture in Alaska were to begin now, it would take 10 years to obtain significant increases in production. Because knowledge of large-scale farming in northern latitudes is incomplete and because the private sector and the government lack adequate knowledge to deal with the problems, an estimate of 25 years seems more appropriate for obtaining significant increases in agricultural production."

The most apparent opportunities for increased agricultural development lie in the production of feed grains for the export market. Barley, which grows well in Alaska, could be produced and exported to Japan. Other potential export destinations for Alaskan feed grains include the Soviet Union and the U.S. West Coast. Furthermore, increased barley and oat production could form the basis for expansion of beef, poultry, and pork production which have been limited in part by the need to import feed. The development of an export-based feed grain industry would require, above all, the commitment of a substantial amount of land. Oceangoing grain vessels typically have a capacity of 2-4 million bushels. To put this into perspective, at typical U.S. yields of 40 bushels per acre of barley, 100,000 acres of production would be needed to load a single vessel. Furthermore, the world grain trade is carried out by an extremely sophisticated group of traders and the likelihood of attracting a major firm into Alaska before crop acreages exceed 2 million acres would be small.

Expansion of grain production would also require the construction of substantial infrastructure facilities. These would include:

- Construction of rail lines to move the product to coastal shipping points,
- Access roads for farmers to move product to the rail lines,
- Storage and grain elevator facilities at railroad collection areas, and
- Storage and grain elevator facilities at water shipment points.

Expanded agricultural production could result in development of spinoff industries. On the supply side, Alaska's farmers could have a competitive advantage in obtaining fertilizers and pesticides if chemical industry development occurs in Alaska. Feed industries could develop to meet the needs of increased beef production. On the demand side, beef and pork slaughterhouse and processing could develop to meet the needs of the intrastate market.

Expansion of potato production and potato processing is another possibility. Processing facilities could be developed to make french fries, chips, and shoestrings, and processed potatoes for the domestic market. Another possibility is the production of industrial alcohol from potatoes (or grain). Of greater potential significance is the export of processed potatoes.

Most of Alaska's potato production is in the Matanuska Valley; somewhat less than a third of the state's crop is harvested in the Tanana Valley and only a token acreage is grown on the Kenai Peninsula. Even in these areas, however, Alaskans produce less than half of the table-stock that they consume. Alaskan potato production does not satisfy or meet the in-state market needs because very few persons have been able to economically finance the mechanization necessary for efficiently producing, storing, and marketing their crop. Without these necessities, especially adequate up-to-date storage facilities, potatoes have glutted the market at harvest and later reached the market in poor competitive position after long periods in storage.

In Alaska, as in other potato growing regions, consumption of processed and frozen potato products, mainly french fries, now exceeds consumption of fresh potatoes. Therefore, processing of potatoes in Alaska is a "must" if Alaskan growers are to supply the market in the state.

Expanded agricultural development in Alaska will require, or occur in conjunction with, expanded infrastructure facilities and marketing channels. Transportation facilities would be needed to bring in supplies to farmers and to ship out farm products. As noted above, to increase grain production, additional rail transportation facilities would be required as well as grain elevators, loading facilities, and storage facilities. Processing facilities and the resulting vertical integration of agricultural production would provide a market distribution channel for primary products. For example, the availability of slaughterhouses could provide a channel for the use of hogs or cattle. The development of farmer cooperatives could help provide the resources needed to develop marketing channels that would be beyond the capacity of individual producers.

The most immediate potential for Alaska agricultural development is to increase the local market. Assuming the availability of feed and availability of lower cost transportation facilities, hog production could constitute a major share of the Alaskan market for pork. Increased milk production for the local market would be another possibility because marketing channels already exist.

If food supplies are tight and agricultural product prices are high, the interest of investors in Alaskan agricultural development could be substantial. On the other hand, if the present surplus situation for most major commodities and the associated low farm prices continue, the investment incentive will be limited.

## B. FOREST PRODUCTS

### 1. Summary and Overview

Timber harvesting and processing ranks third after oil and gas and fisheries in terms of contribution to Alaska's economy. In 1976, employment in logging, lumber, and pulp activities was 3200 -- less than 2% of the state's total employment but close to one-third of the state's total manufacturing employment.

In 1976, about 522 million board feet of timber were harvested in Alaska -- 90% of which were taken from national forest lands managed by the U.S. Forest Service. Forest Service policies have a great impact on Alaska's forest resource utilization. Most of the state's timber operations have been in southeastern Alaska in the Tongass National Forest. On a statewide basis Alaska is utilizing only about one-third of the allowable cut. Nearly 90% of the output of Alaska's forest products industry is shipped to Japan -- primarily cants, chips, and dissolving pulp for the production of rayon.

For economic and regulatory reasons, Alaska has utilized only a small portion of its forest product resources. The economic reasons are the same as those that limit the development of other export industries -- i.e., the high cost of operating in Alaska which limits the competitiveness of Alaskan products in the export markets. Regulatory limitations on the forest products industry include the following:

- Restrictions on the export of unprocessed logs,
- Limitation of future timber contracts to 10 rather than 55 years, and
- State and federal policies affecting timberland availability for commercial use.

The economics of Alaskan forest product production will probably limit the industry to its existing markets. The high costs of Alaskan operations will likely preclude the production of processed products that cannot compete in the lower 48 where the market is controlled largely by major integrated producers in the Pacific Northwest and the South. Future industry expansion will be linked to the Japanese need for lumber for construction and pulp for rayon and paper production. Some expansion of sawmill and processing facilities may occur to meet the needs of the in-state market.

### 2. Present Status

Timber harvesting and processing ranks third after oil and gas and fisheries in terms of contribution to Alaska's economy (measured in terms of value of production). In 1976, employment in logging, lumber, and pulp activities was 3200 -- less than 2% of the state's total employment but almost one-third of the state's total manufacturing employment. Employment in the industry has increased by about 400 since 1970.

In 1976, approximately 522 million board feet (mbf) of timber were harvested in Alaska (see Table III-2). The volume of timber harvested peaked in 1973 when 679 mbf were harvested, an 86% increase over the 1960 amount. The end product value of timber harvested increased from \$47.3 million in 1960 to \$208.2 million in 1976. Nearly 90% of the timber harvested was taken from national forest lands controlled by U.S. Forest Service.

TABLE III-2

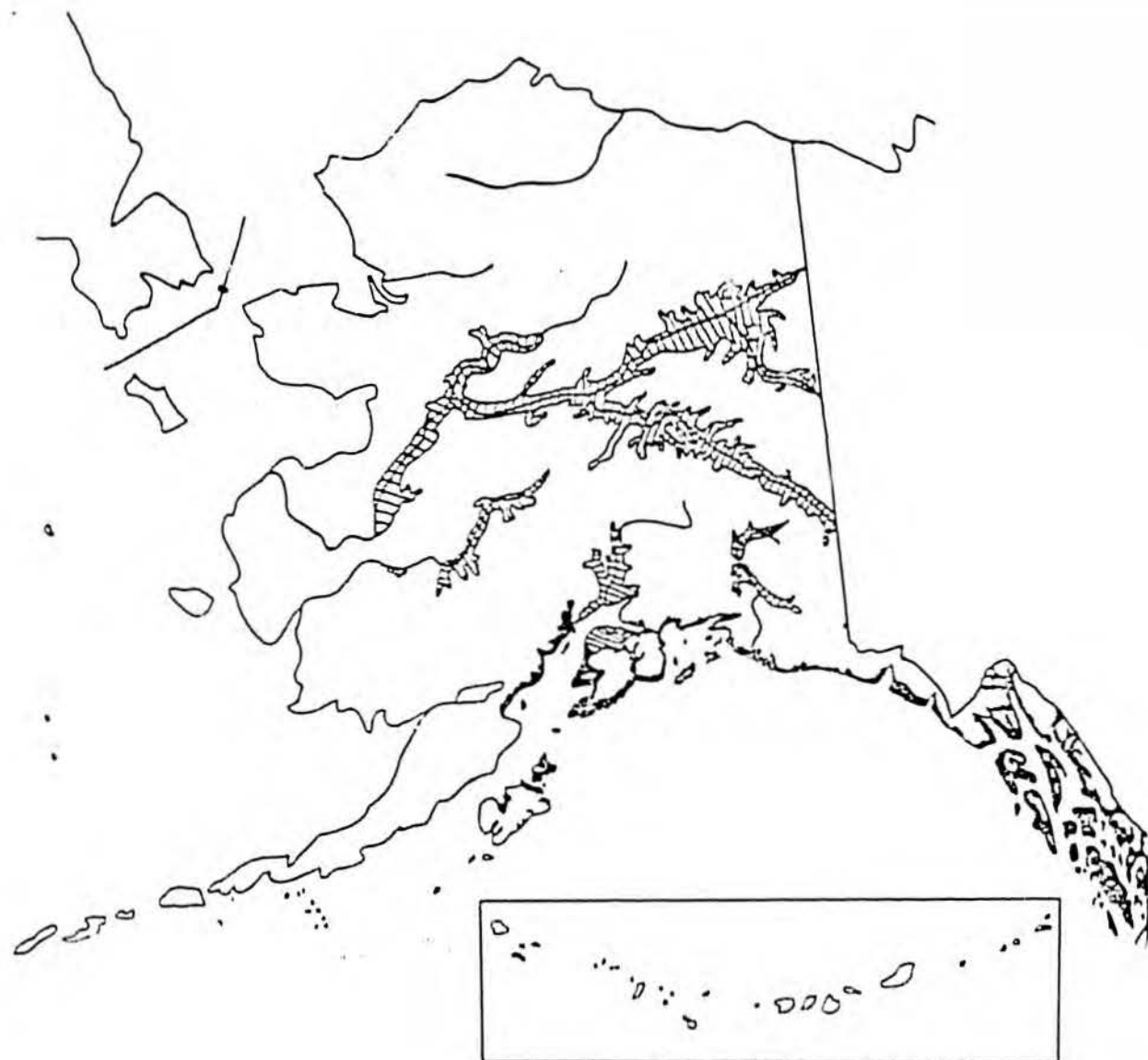
VOLUME OF TIMBER HARVESTED IN ALASKA  
BY LAND OWNERSHIP CATEGORY - 1960-76  
(in thousands of board feet)

<u>Year</u>	<u>National Forest Lands</u>	<u>State Lands</u>	<u>Other Lands</u>	<u>Total</u>
1960	351,109	210	14,181	365,500
1965	404,498	24,161	3,241	431,900
1970	560,975	53,568	41,648	656,191
1975	413,000	33,500	22,150	468,750
1976	472,800	41,700	7,200	521,700

Sources: U.S. Forest Service; Alaska Department of Natural Resources; U.S. Bureau of Land Management; U.S. Department of the Interior, Bureau of Indian Affairs.

For forest inventory purposes, the state is considered as two regions -- coastal and interior (see Figure III-4). Timber in the two regions differs in species, growth rate, and economic significance. Coastal Alaska contains about 13 million acres of forested land, or about 40% of the regions gross land area. Some 6 million forested acres, or 44% of the total forested area, are considered commercial by the U.S. Forest Service which manages most of the timberland. The major species in the coastal area include Sitka spruce, western hemlock, and some cedar and hardwoods. Interior Alaska contains an estimated 106 million acres of forested land or about one-third of the gross land area. Commercial timber accounts for about 23 million acres -- 22% of the forested area. The dominant commercial species in the interior is white spruce, with paper birch, aspen, and cottonwood as secondary species.

Most of the state's timber operations have been in southeastern Alaska in the Tongass National Forest. Of the 11 million acres of forest land in Southeast Alaska, about half are of commercial value -- and 92% of these commercial trees are in the Tongass. More than one-third of the national



Coastal Forests (Hemlock-Spruce)



Interior Forests (Spruce-Hardwoods)

Source: Compiled in 1971 by the Federal Field Committee for Development Planning in Alaska from authoritative sources.

FIGURE III-4 COMMERCIAL FORESTS OF ALASKA