

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 86/2
189 SCOMM 9: HOUSE SPEC. COMM. ON PERMANENT FUND 1977-78

FIGURE 3-64

COOK INLET OIL AND GAS PLATFORMS

FIELD	PLATFORM	OPERATOR	FIELD DISCOVERY DATE	WELLS DRILLED OR DRILLING 5/31/68	WELL CAPACITY PER PLATFORM
Middle Ground Shoal	"A"	Shell	6/62	16	32 ^b
Middle Ground Shoal	"B"	Pan Am		11	32 ^b
Middle Ground Shoal	"C"	Shell		7	32
Middle Ground Shoal	"Dillon"	Pan Am		11	32 ^b
Granite Point	1	Mobil	6/65	11	32 ^b
Granite Point	"Anna"	Pan Am		11	32 ^b
Granite Point	"Bruce"	Pan Am		13	32 ^b
Trading Bay	Monopod	Union	6/65	13	32 ^b
Trading Bay	"A"	Texaco		0	18 ^d
Trading Bay (Ivan Bering)	"Spark"	ARCO		0	12 ^c
McArthur River	Dolly Varden	Marathon	10/65	7	48
McArthur River	Grayling	Union		9	48
McArthur River	King	ARCO		8	32
North Cook Inlet		Phillips	8/62	0	32 ^{a, d}

^aGas field. All other fields shown are oil.

^bProduction drilling substantially completed by early 1969 (estimate).

^cLaid spring, 1968.

^dScheduled for placement in 1968.

consequences of the state's attempting to take a higher proportion of the value of oil discovered or produced on bonus bids, royalties or taxes, it is necessary to counterpose to these statements an understanding of the fact that effective costs of oil exploration in Alaska are remarkably low.

There is an element of truth behind these professions. Costs *are* higher in Alaska, and the environment *is* hostile. It is important to note, however, that drilling and exploration costs, which range up to many times "stateside" averages, are declining as the industry benefits from economies of scale inherent in the ongoing development of Alaska's transportation and communication facilities, as well as the directly related infrastructure being established in the growing number of small, specialized service firms in the Cook Inlet area. Also of importance in the future of Alaskan costs is the fact that while the unusual conditions experienced in Alaska have caused oil firms to make costly mistakes, particularly in offshore operations, the accumulating experience will tend to eliminate these in the future.

Relatively high wage rates in Alaska are often pointed out as having a negative effect on the development of new industrial enterprises in the state. However, high labor costs are of only minor importance in the case of Alaska's oil industry. Though wage rates for oilfield workers exceed the California scale by 45 percent, wages and salaries paid in Alaska represented only 9.6 percent of the industry's total expenditures on Alaskan operations in 1966. Reduction of Alaskan labor rates to national levels would thus reduce total costs by only 3 percent.

The relative unimportance of wage rate differentials on the oil companies' costs of operation emphasizes a significant point in the regional economic pattern: Only a small proportion of the industry's expenditures *on* Alaska are actually spent *in* Alaska. The definitive statistics which would indicate the percentage of goods and services actually obtained in the state, and thus directly contributing to its economy, are yet to be gathered. It is nevertheless clear that, despite its very favorable impact on state revenues, the oil industry contributes less to Alaska's economy, dollar for dollar, than any other basic industry except perhaps defense. In other words, an investment in almost any Alaskan industry--fisheries, forestry, tourism, etc.--will produce more jobs and business activity than an equal investment directed to developing Alaska's oil resources.

Despite the low percentage of oil industry investment "staying in Alaska" the absolute sums are large. In fact, the conditions of exploring for oil in Alaska dictate that expenditures be very large if they be made at all. Though the average profitability of Alaskan exploration may be very high, a tremendous investment is necessary to provide reasonable certainty that any particular company will in fact approach that average. It is for this reason that so many companies find it advantageous to pool their efforts, undertaking exploration, land acquisition, and development in partnerships

and combinations. While the chances of striking it extremely rich are reduced by this tactic (a bonanza, if found, must be shared), the corollary fact--reduced risk of ending up with nothing to show for one's investment--outweighs the strategy's disadvantages in minds of most oil company executives.

The huge scale of operations necessary to reduce uncertainties to reasonable levels reinforces the generally held impression of Alaska's disadvantageous position as an expensive place to search for oil. Yet it could be just as easily said that the relatively high costs result as much from the industry's objectives as from the difficulties raised by the state's climate and terrain. In Alaska, the oil companies are looking for giant fields because nothing but a giant field is considered worth developing at such a great distance from the main oil markets, and the search for giant fields demands a giant exploration program. In other parts of the country where a much smaller field can be economically developed, the minimum size exploration program is naturally much smaller.

Since 1958 the oil industry has invested about \$800 million on finding, developing, and producing Alaska oil resources.⁹ By the end of 1968 the cumulative total will almost certainly pass the billion dollar mark. Through 1966 the industry had produced natural gas and crude petroleum products worth just over \$200 million at the wellhead. These figures occasionally are cited to show that Alaskan operations have thus far shown a "loss." Such calculations fail to take into account the present value of oil discovered but still to be produced. These "proved, recoverable reserves," as estimated by the American Petroleum Institute, stood at 321 million barrels in 1967. Assuming that development and lifting costs will average 50 cents per barrel, and that the wellhead price will be \$3 per barrel, it can be calculated that the net future value of these underground assets is in the neighborhood of \$800 million. Additional reserves which will soon become "proved" as a result of presently scheduled development drilling will almost certainly boost this sum to beyond the \$1,500 million mark by the end of 1968. Ultimate reserves are still very much a matter of conjecture, but according to officials of one major oil company, "...exploration and development work to date provide the basis for a conservative estimate of an ultimate reserve in the Cook Inlet Basin of 1.5 billion barrels of oil and 5 trillion cubic feet of gas." At \$3 per barrel and 10 cents per Mcf, this quantity of hydrocarbons has a gross future value of \$5 billion.

From the foregoing picture it can be concluded that oil exploration and development in Alaska are moving ahead at a very satisfactory pace and that no special inducements are necessary at this time to coax either American or Japanese capital to enter the industry in the state.

(5) Current Petrochemical Activity

Two affiliated fertilizer plants presently under construction north of Kenai are expected to be completed in the fall of 1968. One plant will produce 1,500 tons per day of ammonia; the other, using a part of the first plant's ammonia production, will produce 1,000 tons of prilled urea per day. The combined operation will consume approximately 60 million cubic feet per day (20 billion cubic feet per year) of natural gas which will come from the Kenai gas field.¹⁰

Approximately 125 employees will be needed to operate the complex. The U. S. operator estimates the annual payroll of the 125 employees to be \$1.3 million and projects the total payroll at \$2.0 million per year when contract maintenance and turn-around personnel are added to operating personnel. These dollar totals indicate a steady employment of about 200 workers. It is not known how many more workers may be directly employed in tug-boat and docking activities as a result of the 20 to 25 ship dockings and the 17 to 34 barge dockings per year. Nor is the demand known for intermittent maintenance service and construction employment other than that already tabulated. It would seem generous to estimate that the equivalent of 50 full-time workers would be required for these transportation and intermittent maintenance operations. The total employment directly associated with the fertilizer plants can be no more than an optimistic 250. Since the estimated cost of the fertilizer complex is \$50 million, the ratio of investment per job is at a minimum \$200,000. The optimistic total of 250 production jobs is a substantial reduction from the more than 400 currently provided by the plant's construction.

A plant to liquefy natural gas for shipment to Japan is also under construction near Kenai. The builder estimates that the normal operation of the production facilities, gas pipelines, storage, and ship-loading facilities will employ 35 with an annual payroll of \$460,000. About 135 million cubic feet of natural gas will be liquefied per day. Two special tankers will be constructed to transport the liquefied gas to Japan where it will be utilized by two utility firms.

If the ratio of one direct employee to one contract maintenance or other directly affiliated worker established above for the fertilizer complex is applied to the liquefaction plant, no more than 70 new jobs will be created. (This appears to be an even more optimistic prediction than for the case of the fertilizer complex, for technical information available regarding other liquefying operations indicates a very high degree of automation.) The construction crew on the liquefaction plant will peak at more than 350. The reduction in total employment from 350 to 70 once operation begins is much more abrupt than for the fertilizer complex.

At present there is no indication that the existing oil refinery will be expanded. The manpower requirements of this plant have been reduced

from initial levels as operations and equipment have been improved. There have been repeated calls for a small, independent cracking plant to be constructed to provide gasoline for the local markets.

(6) Taxation

The oil and gas industry in Alaska is both the object of taxation and the recipient of tax benefits. As the object of taxation, the oil industry now pays a 3 percent extraction tax, the rate having been raised from 1 percent by the action of the last state legislature in the spring of 1968. In addition, a temporary 1 percent "disaster relief tax" was levied last fall, following the Fairbanks flood episode. In addition to these production-related taxes, nonvolume oil and gas revenues are gathered from bonus payments, leases and rental payments. For 1968 the direct and indirect remittances attributable to production in the oil and gas industry are estimated at some \$22.5 million. The nonvolume revenues received by the State of Alaska averaged \$14.2 million annually over the period 1959 to 1966.¹¹

At present there is no "hard" evidence that the oil and gas industry will change its corporate behavior in Alaska as a result of the recent tax hikes. While a tripling of the tax levy is a significant jump, it seems fair to say that this alone will not be a real deterrent to industry activity. It can be presumed, however, that in dealing with an industry which places a high value on certainty and "friendliness" it behooves the State of Alaska to demonstrate that tax changes are arrived at by full and considered analyses and not by legislative whim. The state's commissioning of a comprehensive study of its tax structure is a good step in this direction.

The petrochemical industry is a recipient of "favorable tax treatment" in certain specific cases. The state's so-called Industrial Incentive Act has been applied to several major enterprises in the industry, forgiving all or parts of their tax obligations--principally local property taxes, sales, and income taxes.¹² These tax receipts foregone have amounted to substantial totals and typically are in effect for a ten-year period. Though the matters are inextricably related, it is quite probable that the *expenditure* side of public finance; that is, what the communities and state do in the way of facility investments (schools, roads, and the like), is of more fundamental importance to the industry than the present levels and applicability of taxation.

(7) Forecast

As pointed out earlier, exploratory drilling in southcentral Alaska during the next several years will be on a reduced scale from that

carried on in 1966 and 1967 because the available favorable acreage, particularly offshore, is limited and the number of offshore rigs in the state has been reduced. Exploratory drilling will be initially concentrated in the Cook Inlet basin, the Middleton Island area, and that area of Bristol Bay covered by the recent state competitive sale. Exceptionally large discoveries or a high percentage of successes could encourage an acceleration of the drilling, but the industry's capability to react quickly, if it chose to do so, is limited by difficult time and distance problems of mobilization.

Development drilling, as already noted, will level off in 1969 and decline in 1970 as the known Cook Inlet fields are brought into full production. Initial development of new discoveries in the Inlet on available state tidelands or uplands would take a minimum of three years. Initial development of new fields, if discovered in the Gulf or Bristol Bay, would take longer.

The net reduction in jobs over the next several years as development drilling drops off could be in the magnitude of 800. The drop in production drilling employment will be partially offset by workers' installing repressurization systems, more collection pipelines, and additional treatment and storage facilities. Also, a substantial proportion of the affected employees are "outside" workers whose unemployment will not show up in Alaskan statistics.

Bringing the new petrochemical plants to production over the next two years will reduce total employment in the Kenai area from the peak 800 in construction workers to no more than 320 direct operating and support jobs.

For the longer term, it is assumed for purposes of this forecast that several more major oil discoveries will be made in Cook Inlet below the forelands. It is presumed that political and economic pressure will be generated, particularly as the development of known fields tapers off, for some solution to the title dispute over the lower Inlet offshore corridor and that exploratory drilling will be initiated three to six years from now. Full development of the Inlet petroleum potential should follow within the next decade. It is also forecast that commercial oil fields will be discovered in both the Gulf of Alaska and Bristol Bay. These discoveries may not come within the next several years, but some development of commercial fields should be underway within six years.

Finally, it is assumed that at least one additional major petrochemical plant will be attracted to the Cook Inlet area by the availability and price of raw stocks. The decision to construct may come within the next three years, and the plant could be in production within six years. It would be a capital-intensive operation whose employment would

not exceed that of the fertilizer complex for direct and support jobs (an optimistic 250) and probably would be closer to the comparable 70 jobs for the liquefaction plant.

If the above assumptions are accepted, what overall conclusions can be reached about the oil industry's future in southcentral Alaska?

It seems evident that the Anchorage-Kenai oil industry employment will level off in the next several years and actually decline somewhat beginning with 1970. This decline will be partially offset as exploratory drilling in other areas accelerates and if production drilling in other areas eventually occurs. The Anchorage-Kenai oil company headquarters installations and the service and supply-company complexes are large enough and so centrally located that progress in developing outlying oil provinces will benefit the Cook Inlet area through utilization of the area's facilities and personnel. There are no major communities close to the most favorable outlying prospects in the Gulf of Alaska or Bristol Bay. Until such communities are developed, the exploration, production, and service crews will be on an itinerant, turn-around basis with headquarters in the Anchorage-Kenai area if they are domiciled in Alaska at all.

The Anchorage-Kenai oil industry employment should resume its growth as the lower Cook Inlet area fields are brought into production three to six years from now and as additional petrochemical capacity is added. There will be a "lumpiness" in this growth, with "boomlets" generated by a particular series of projects riding along on top of a more stable growth pattern.

Discovery and development of a commercial oil field or fields in the Gulf of Alaska within three to six years from now would benefit the smaller communities along the Gulf. A development near Middleton Island, for instance, could benefit either Seward or Cordova. A Katalla major discovery would benefit Cordova. The economic impact would be evident in these communities as they became bases for supply redistribution and for support transportation and communication. Industry personnel of a professional and technical nature already based in the Anchorage-Kenai area would retain residence there and would work in the Gulf on a turn-around basis. Heavy equipment and supplies would be mobilized for movement from other states directly to the exploration or production sites.

Discovery and development of a commercial oil field in Bristol Bay would have even less economic impact on existing communities than would be the case for Gulf of Alaska communities. There are no deep-water port facilities in Bristol Bay, and direct deliveries of most equipment and supplies to the point of operation seems more feasible than redistribution through an existing community. Exploratory, development, and service crews will be, at least in the initial years, on a turn-around basis. The initial

benefits to Bristol Bay's existing small communities appear to be those that might spin off from use of the communities as personnel transportation points and communication centers. The ultimate economic impact would, of course, depend upon the particular location of developed fields relative to existing communities. Since the present communities of the area offer so little in services and facility infrastructure, the likelihood of creating entirely new communities more favorably located is not as remote as it otherwise would be.

B. Fisheries Sector

(1) Industry Activity and Potential--Summary View

The banks of the southcentral region extend from Icy Bay in the east to Attu Island some 2,000 miles to the west. The region includes such well-known fishing areas as Prince William Sound, Kodiak Island, and Bristol Bay. It has an enormous expanse of coastal shelf and slope area, especially in the Kodiak Island and Bering Sea areas.

The total catch (Figure 3-6b) for the southcentral region delivered to Alaska-based processors was 389,970,730 pounds in 1966. This represents a continued increase in the quantity of production from the 1962 level of 268,255,602 pounds. Salmon, king crab, and shrimp continued as the major species with Dungeness crab and halibut making substantial contributions to the total catch.

Salmon is the mainstay of the fishing industry in the southcentral region. Despite extreme fluctuations in various salmon species and within individual fisheries areas of the region, salmon has remained fairly stable since 1962. With the exception of a decline in 1962 to 113.5 million pounds and 1967 estimates of 131 million pounds, the catch has ranged between 187.7 and 191.2 million pounds.

In 1966, the Southcentral salmon catch in excess of 188 million pounds represented in excess of 48 percent of the total catch by weight, but over 59 percent of the total value to fishermen.

To counter the extreme fluctuations within individual fisheries areas, individual processors have acquired plants in widely dispersed locations within the state so that poor catches in any particular area can be partially offset by production in other areas. Another trend has been towards a fuller utilization of the salmon resources, particularly the taking of salmon eggs for the Japanese market. In addition, there has been a movement toward diversification by some salmon packers. Existing plants have been altered or expanded to process species such as king crab and shrimp where location permits. Elsewhere, new facilities have been acquired or constructed.

FIGURE 3-65

CATCH AND VALUE TO FISHERMEN, SOUTHCENTRAL ALASKA, 1962-1966

YEAR	SALMON		HALIBUT		Other Fish			
	Catch	Value	Catch	Value	Catch	Value		
1967								
1966	188,223,855	29,390,873	9,982,000	3,020,000	5,668,956	97,628		
1965	187,721,100		9,497,000	1,351,840	1,487,919	31,480		
1964	191,209,630		6,975,000	1,290,000	1,233,710	23,700		
1963	113,523,824		11,115,000	1,942,450	14,090	1,920		
1962	188,537,092		9,403,000	2,501,200	6,820	390		
	Dungeness Crab		King Crab		Tanner Crab		Shrimp	
	Catch	Value	Catch	Value	Catch	Value	Catch	Value
1967								
1966	2,557,319	306,878	159,095,796	15,658,836	217	11	24,407,624	1,098,343
1965	5,592,666	669,640	131,091,412	12,671,430	-	-	13,874,162	624,340
1964	8,075,290	909,450	85,800,140	8,104,140	-	-	4,933,650	197,360
1963	7,404,350	795,980	129,526,810	7,496,410	-	-	12,016,610	480,670
1962	5,066,510	530,690	51,492,480	5,149,260	3,400	340	13,059,070	587,660
	Clams		Total					
	Pounds	Value	Pounds	Value				
1967								
1966	43,963	8,793	389,979,730	49,581,362				
1965	87,679	21,920	349,350,938					
1964	97,450	19,490	298,424,870					
1963	410,280	51,950	274,010,964					
1962	687,230	78,930	268,255,602					

Source: Derived from Alaska Department of Fish and Game, *Alaska Catch and Production, Commercial Fisheries Statistics*, Statistical Leaflets Nos. 5, 7, 9, 11, 13, 1962-1966.

Despite an overall decline in salmon catches over the past thirty years, increases in the price of salmon have served to offset declines in fishermen's income. As a result, the numbers of fishermen have not declined in relation to declines in the salmon pack. Instead, increased costs are passed on to the processors and consumers. In an attempt to ensure a reasonable income for fishermen over the long run and, at the same time, promote an increase in efficient gear and vessels, a uniform system of gear limitation was included in the 1968 Alaska Commercial Fishing Regulations. The intent of the regulation is to limit salmon gear through restricting the licensing of existing net fishermen and new entrants.¹³

The U. S. Bureau of Commercial Fisheries estimates that the maximum sustained yield of Alaska salmon production can be increased to the vicinity of 390 million pounds in the southcentral region. This estimate is based on the success of conservation of the salmon resource to a point where catches will undergo lesser year to year fluctuations and on increased knowledge of the migration and spawning habits of this species so that more effective management policies can be instituted.¹⁴

Halibut landings in southcentral Alaska were 9,982,000 pounds in 1966. After reaching a high of 11 million pounds in 1963, halibut landings declined in 1964 below 7 million pounds. However, from 1964 through 1966 landings in Southcentral ports were again approaching the high level of 1963.

The halibut fishery differs from other Alaskan fisheries in that the maximum catch is predetermined. The International Pacific Halibut Commission oversees the industry and has determined that current catch levels, averaging around 60 million pounds annually, are at maximum sustained yield. Therefore, no further increases in the total halibut catch are expected.¹⁵

Although the total halibut catch remains at an almost constant level, the proportion of the catch that is landed in Alaska ports has increased, particularly within the central region. The principal reason for this is the faster turnaround which is possible when the three-or-four-day trip to Seattle is eliminated. Thus a greater proportion of vessels now head for the nearest freezing facility and make a quick turnaround to head back to the fishing grounds. Seattle auction prices tend to establish Alaskan prices and, with high Alaskan prices, vessels prefer to unload their catch here, making a short supply of halibut in Seattle and further driving up the prices.¹⁶

Halibut landings within the southcentral region more than doubled between 1948 and 1966, despite the reasonably constant nature of this fishery. It is anticipated that this trend will continue so that while the fishery as a whole will remain relatively unchanged, some growth may occur within the southcentral region--primarily at Kodiak and SandPoint, the two major halibut ports within the region.

Although king crab inhabit Alaska's coastal waters from southeast Alaska to the Bering Sea, they occur in their greatest commercial abundance from the Kenai Peninsula and Kodiak Island westward along both sides of the Alaska Peninsula and the Aleutian Islands.

The growth of the king crab industry between 1960 and 1966 was very rapid. From the 1962 catch of 51,492,480 pounds, the catch tripled by 1966 to 159,095,796 pounds. A decline was experienced in 1964 as a direct result of the Alaska earthquake, which destroyed the plant and equipment necessary to sustain the previous level. Estimates of the total Alaska catch in 1967 are 135 million pounds, or a 15 percent decline from the 1966 total.

The Bureau of Commercial Fisheries anticipates that the king crab industry will reach a stable level with catches of about 170 million pounds annually in southcentral Alaska.¹⁷ Additions to the annual king crab yield in southcentral Alaska are expected to result from the entry of Alaska's crab fisherery into the Bering Sea, from increased effort along the Aleutian Chain, and from harvesting of latent deep-water stocks.¹⁸

Unlike king crab, which is found almost entirely in the waters off the Alaska coast, Dungeness crab ranges from the Kodiak area down the Pacific Coast as far south as California. This fishery originated in the West Coast states and British Columbia and was geared to the West Coast market. Consequently, Alaska Dungeness production fluctuates widely according to the size of the catch along the Washington-Oregon-California coast and as Alaska producers who are further from the market and who face higher labor and transportation costs continue to find it difficult to compete with West Coast producers during years of good catches.

During the five-year period from 1962 through 1966, Dungeness crab production in Alaska has had wide fluctuations, reaching a peak production of over 8 million pounds in 1964. However, a decline to approximately 2.6 million pounds was experienced in 1966 primarily due to increased catches along the Washington-Oregon-California coast. The estimated Alaska catch in 1967 increased 130 percent to 11.4 million pounds compared with 5 million in 1966.

At this time, it appears the national market for Dungeness crab is strengthening, due partly to the short supply of king crab experienced in 1967 and, also, to expanding markets brought about to some extent by live shipments of West Coast Dungeness crab by air to Hawaii and the East Coast. (Live shipment of crabs is prohibited by Alaska law.) However, most Alaska Dungeness crab processors are able to find ready markets for their freshly cooked whole crabs, cold packed, and canned crab.

Over the next few years the Bureau of Commercial Fisheries anticipates that production in the southcentral area will result in an additional \$1.5 to \$2.0 million to Dungeness crab fishermen based on a level of

production between 9 and 12 million pounds in southcentral Alaska and reaching a sustained yield of 21 million pounds.¹⁹

In 1966, tanner crab production was only 217 pounds and amounted to a sampling of the resource. The first commercial fishing for tanner crab was in 1951 and, in 1953 landings, reached a peak of 72,000 pounds. However, the resource was all but forgotten during the rapid development of the king crab fishery until 1967. During 1967, the landings amounted to an estimated 118 thousand pounds in southcentral Alaska.

The speed of development of southcentral Alaska's tanner crab resource is to a large extent dependent on future king crab catches. Should king crab yields continue on a downward trend, production of tanner crab will probably accelerate. If, however king crab catches show an upward trend, a rapid growth in the production of tanner crab will probably be delayed.

Tanner crab are abundant throughout southcentral Alaska waters in all depths to the edge of the continental shelf and appear especially abundant in the shallow shelf waters. The Bureau of Commercial Fisheries estimates that a Southcentral tanner crab industry could produce a maximum sustained yield of about 170 million pounds, an amount similar to that of king crab. Because the future of tanner crabs appears to be closely tied to that of the king crab industry, large-scale production is expected to occur initially in southcentral Alaska. The Bureau has tentatively estimated the tanner crab catch will reach 45 million pounds for southcentral Alaska within the next few years.

The southcentral region's shrimp resource ranges from the western Prince William Sound area down the Alaska Peninsula and Aleutian Islands. Shrimp production reached a high of 24,407,624 pounds in 1966, an increase of 76 percent over the 1965 high of 13,874,162 pounds. The low production of less than 5 million pounds in 1964 is in part attributable to the earthquake of that year which rendered major plants unusable. The estimated landings in Alaska for 1967 show a 61 percent increase to 46 million pounds from the 1966 high of 28 million pounds.

Results of exploratory fishing for shrimp by the M/V *Paragon*, under contract to the U. S. Bureau of Commercial Fisheries during the summer of 1964, indicated that the two southcentral Alaska areas with the greatest shrimp concentrations are the waters off the northern end of Kodiak Island and Marmot Bay and the area lying between Sutwik Island off the Alaska Peninsula west to Unimak Island, including the Shumagin Islands. Of all the areas tested, the yield from the Shumagin Islands far exceeded any other in commercial quantities. On an overall basis, the dominant species found was pink shrimp, which accounted for almost 70 percent of the shrimp taken. However, in the Shumagins area, catches included a significant amount of the larger, more valuable side-stripe shrimp, a species which was also well represented in Marmot Bay.²⁰

The Alaska shrimp fishery is expected to continue to expand as a result of improved processing techniques and better peeling machines together with further expansion of fishing efforts in the Kodiak area and exploitation of the Shumagin Islands area. Within the next three years, the Bureau of Commercial Fisheries anticipates that shrimp landings in southcentral Alaska will probably reach 145 million pounds.²¹

To date, U. S. production of scallop meats has been almost solely from the New England states. Although the presence of scallops off the Alaska coast has long been known, little interest in harvesting them commercially was expressed prior to 1967.

Detailed knowledge of the location, quantity, and sustained yield of Alaskan scallop resources is limited. Some experimental scallop fishing has been carried out in the Kodiak area by vessels of the king crab fleet converted for scalloping. However, the main research effort is being undertaken by the *Viking Queen*, an Eastern scalloper, under state-federal charter. Preliminary results of exploratory fishing indicate that the most extensive scallop beds are located in the area between Cape Yakataga and southeast Alaska's Lituya Bay, with the Yakutat area the most productive.²² The *Viking Queen* is to be joined by three other New England scallopers and two from the West Coast. The six trawlers will make up the fleet for scallop processing operations out of Seward.

Catches have been very encouraging for the formation of an Alaskan scallop industry, and five crab vessels in Kodiak are being modified in anticipation of this development. However, it should be remembered that Alaskan scallop catches are from "virgin" fishing grounds, and the sustained yield of these grounds has yet to be proven. In addition, it has yet to be demonstrated that Alaska scallops can be caught, processed, and marketed at a satisfactory profit. The Bureau of Commercial Fisheries has tentatively estimated that Alaska's scallop resource might eventually sustain landings of 12 million pounds per year; and within the next three years, landings in the Gulf of Alaska could reach up to 5 million pounds, with a catch value of between \$4 million and \$5 million.²³

Outside of halibut and limited amounts of herring and sablefish, "bottomfish" resources have been all but ignored by the fishing industry in southcentral Alaska. The continental shelf and slope areas off the coast of southcentral Alaska provide a fishing ground capable of supporting a large bottom-fishing industry.

(2) Activity and Potential--by Fisheries Area

With the past history of fisheries growth, especially shellfish, and the expansion of the latter industry into species such as tanner crab and scallop, increased activity is taking place in varying degrees in all the

fishing areas within the southcentral region. For purposes of ready reference in the discussion that follows, Figure 3-66 presents graphically the major fishing areas treated.

Salmon has been the major fishery in *Prince William Sound* since the late 1800's, with the dominant species being pink salmon. In 1966, the total salmon catch there was 23.6 million pounds, with the only other important fishery production being 986,949 pounds of Dungeness crab. Figure 3-67 reveals the precipitous drop in salmon catch in 1967. Also of importance in this fisheries area are herring and clams, not in terms of current harvest but rather their potential yield. In 1916, the salmon packers were joined by a cannery packing razor clams, and a sustained production of 1 million pounds was adhered to until 1957 with the exception of a low period in the 1920's. However, the cannery closed in 1962, and production has stayed below 100,000 pounds with the major portion of the output being used for crab bait.²⁴

Cordova's location and facilities are attractive to producers in harvesting the resources of Prince William Sound. A major fish processing firm and supplier of scallops for the U. S. market recently purchased an existing plant with proven salmon and Dungeness production in Cordova. Cordova's location relative to the known scallop beds will provide further diversification to the area's fishery.²⁵

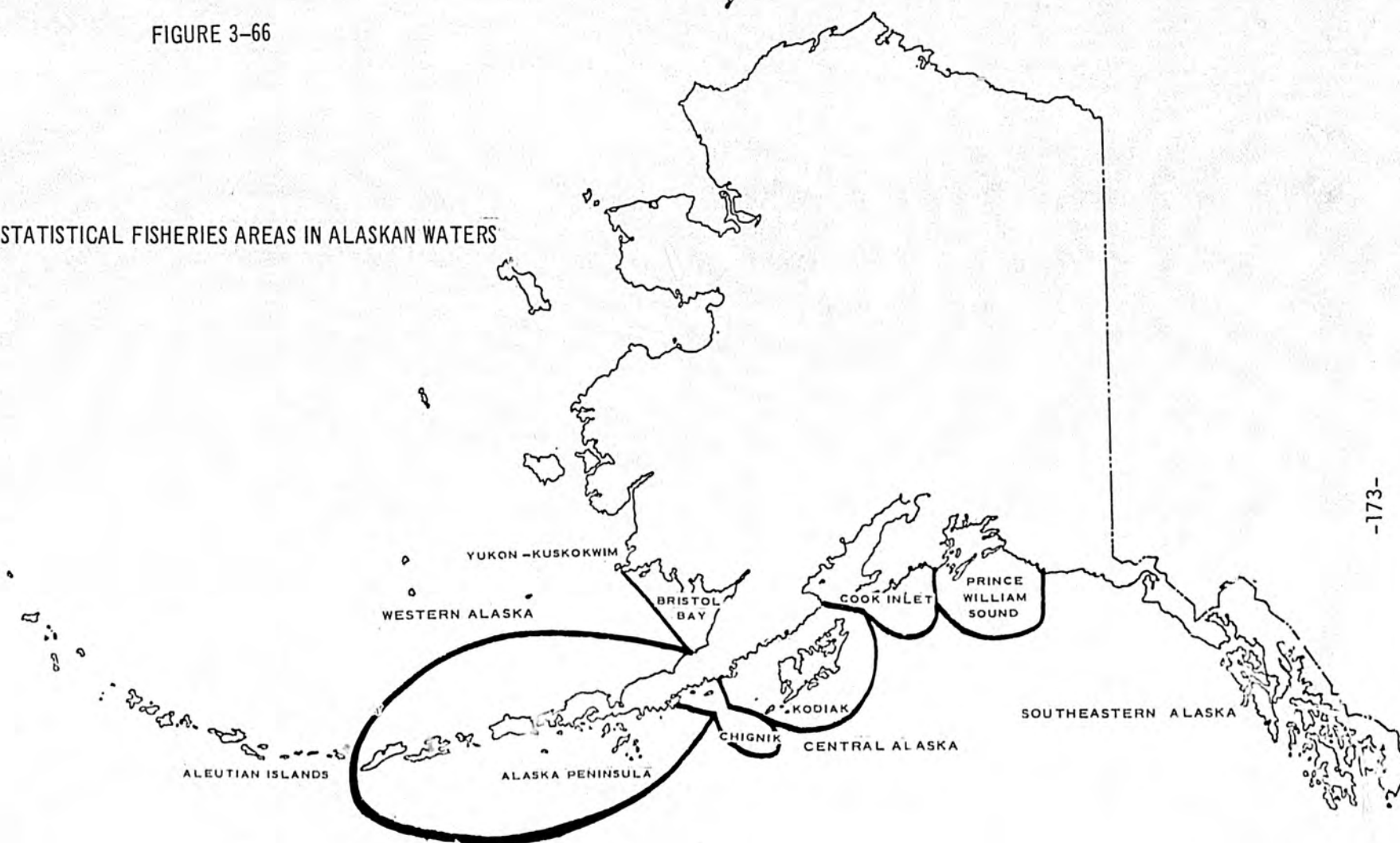
The *Cook Inlet area* can be divided into three separate areas-- Upper Cook Inlet, Lower Cook Inlet, and Seward. The Upper Cook Inlet area is centered about Kenai and produces a salmon pack throughout the season, extending from the 9th of July to mid-August. Two major packers operate on the Kenai River at Kenai, with smaller packers strung down the coast and in Anchorage. All five varieties of salmon are taken, with a good consistent run of reds and extremely large runs of pinks on the even years and extremely poor runs on the odd years. There are also reasonably good runs of chums, with considerably less fluctuation and, as is the case in most other abundant salmon areas, the salmon eggs are packed for export. Figure 3-68 summarizes the catch for the area as a whole.

The Lower Cook Inlet area, centered about Homer-Seldovia, has a king crab processing industry. Recent experimental fishing and processing indicates an immediate potential in the processing of tanner crab and possible entry into shrimp and Dungeness crab.

Prior to the 1964 earthquake, Seward was a major seafood producer with two large seafood operations located there. During 1967, there existed only one small plant engaging almost exclusively in the freezing of halibut and salmon, plus a family processor of a variety of gourmet fish packs. Although not as well located as many Southcentral fisheries ports, Seward does have the advantage of excellent facilities to support a large fisheries industry. As mentioned elsewhere, a scallop operation has now begun in Seward.

FIGURE 3-66

STATISTICAL FISHERIES AREAS IN ALASKAN WATERS



Source: Derived from Alaska Department of Fish and Game information .

FIGURE 3-67
COPPER-BERING RIVERS, PRINCE WILLIAM SOUND
SEAFOOD CATCHES, 1962-1967
(In Pounds)

YEAR	SALMON	KING CRAB	DUNGENESS	SHRIMP	CLAMS*
1967	3,644,836	35,269	2,530,226	374	114,837
1966	23,580,370	11,001	986,949	807	27,063
1965	16,802,000	31,190	2,190,090	2,280	86,447
1964	30,235,890	13,640	3,397,630	2,120	89,275
1963	38,947,475				86,340
1962	34,020,959				208,698

**Annual Statistical Report*, Commercial Fisheries Division, Cordova Area, Alaska Department of Fish and Game, Cordova, 1967

Source: Alaska Department of Fish and Game, 1968.

FIGURE 3-68
 COOK INLET
 SEAFOOD CATCHES, 1962-1966
 (In Pounds)

YEAR	SALMON	KING CRAB	DUNGENESS	SHRIMP
1966	27,393,286	3,897,589	129,560	300,676
1965	14,119,865	2,788,040	74,210	61,710
1964	35,143,270	6,905,100	423,040	201,410
1963	11,526,664	--	--	--
1962	34,131,594	--	--	--

Source: Alaska Department of Fish and Game, 1967.

In *Kodiak*, king crab is by far the major fisheries resource harvested. The king crab industry which began in Kodiak in the 1950's experienced rapid growth culminating in the harvest of over 90 million pounds of king crab in 1966. However, the 1967 catch fell to 60 million pounds (Figure 3-69).²⁶

One result of the decline in the 1967 king crab catch has been a greater interest in product diversification by both fishermen and processors. Several of the more modern king crab vessels have been or are being converted so they can take not only king crab but also Dungeness crab, tanner crab, shrimp, and scallops. Some of the recently constructed king crab boats were constructed as multipurpose fishing boats in anticipation of the leveling off of the king crab catch. Processors throughout the southcentral region are preparing to process new fisheries products at their respective plants. This development is a healthy sign, as it lessens the risk of financial disaster during years of poor market conditions or poor catches for any one species.

The Kodiak area is predominantly a pink salmon fishing area. This was the primary fisheries product of the area from the turn of the century until the development of the king crab and shrimp industry. However, the salmon catch is subject to extreme fluctuations from year to year, an example being the runs of 1966 and 1967. The total salmon catch in 1966 was almost 52 million, whereas the figure for 1967 was less than 2.5 million. Even greater fluctuation is evidenced in the pink salmon catches of over 45 million and just over 700,000 pounds for these two years.

Shrimp production which began in scale in 1959 has increased rapidly to its present position, although the product does not have a prime shrimp classification. In terms of Kodiak's fisheries resources, it was second only to king crab in 1967 in terms of quantity, recording a total in excess of 38 million pounds.

Dungeness crab is also a major fishery in the Kodiak area, with a 1967 catch of almost 6 million pounds, and the only remaining production of significance is halibut, which has reached an annual sustained yield. Although specific halibut areas may increase or decrease in yield, the landings at Kodiak have continued to increase over the years to an average of approximately 4 million pounds per year.

Kodiak's location relative to the expanse of continental shelf alone will tend to perpetuate its dominant position in the fish-processing industry. The City of Kodiak has a good harbor and marine-related facilities. It also has a wide range of community facilities and a more than adequate trade and service center. However, Kodiak is faced with problems in obtaining an adequate water supply and arresting pollution caused by discharge of butchering waste from king crab into Kodiak Harbor. It has become a serious problem that could hamper further expansion of the fishing industry and the City of Kodiak.²⁷

FIGURE 3-69

KODIAK
SEAFOOD CATCHES, 1962-1967
(In Pounds)

YEAR	SALMON	KING CRAB	DUNGENESS	SHRIMP	HALIBUT
1967	2,469,500	60,211,744	5,912,208	38,014,697	4,200,000
1966	51,934,591	90,616,615	1,416,174	24,097,141	3,455,117
1965	6,562,000	69,341,750	3,311,570	13,810,170	4,382,114
1964	52,063,755	29,645,330	4,254,620	4,330,120	
1963	22,891,486				
1962	53,070,163				

Source: Alaska Department of Fish and Game, 1968.

Operations in the *Chignik* area center about a large salmon plant in Chignik, which cans salmon and also takes the eggs. The salmon production is predominantly pink, with a good supply of reds.

In addition to the salmon, king crab has been taken in recent years (Figure 3-70). Between 500,000 and 1,000,000 pounds have been taken since this fishery developed. Delivery of the catch from this area is made to Kodiak Island or Sand Point.

It is necessary that the salmon plants operate in the Chignik area because of the required proximities to salmon streams. However, the king crab and halibut in the area can be harvested by longer-ranging boats from Kodiak and the Shumagin Islands area.

The principal fisheries product of the *Alaska Peninsula-Aleutian Chain* area is king crab (Figure 3-71). The king crab catch for this area totaled over 68 million pounds in 1967. This was a slight increase from the 1966 catch.

After the 1964 earthquake and with the reestablishment and growth of the Alaska king crab industry in Kodiak, the trend has been for processors to move west to the Alaska Peninsula-Aleutian Chain area. With the prospect in 1967 of the Kodiak area's having reached a point of sustained yield, it may be anticipated that further movement of processors to this area will take place. The shores of the Alaska Peninsula-Aleutian Islands appear to offer unexplored areas of king crab production.

As indicated in the figure, the salmon catch for the area declined from 10.6 million pounds in 1966 to 7.1 million pounds in 1967. The largest runs in this area are generally pink salmon, although the pinks are often exceeded in low cycles by both red and chum salmon which comprise a substantial portion of this fishery. Recent developments in salmon include the taking of salmon roe for Japanese and Russian-style salmon caviar. The salmon plants in many cases have also provided the physical structure for diversification into king crab. This diversification has also extended to shrimp, which is being processed at Squaw Harbor in the Shumagin Islands.

The Alaska Peninsula-Aleutian Chain area presents a major logistic problem. The area extends over 1,200 miles into the Pacific Ocean. To operate effectively in this remote area, basic transportation and communication services must be available along with an adequate water supply and an effective method of waste disposal.

The major processing activity in this area is presently located at Sand Point and King Cove in the Shumagin Islands area and at Unalaska and Adak. Other large processing plants are located at Squaw Harbor, False Pass, and Akutan. It is anticipated that Unalaska will be the center of major shore-based fisheries activity in the future.

FIGURE 3-70

CHIGNIK
SEAFOOD CATCHES, 1962-1966
(In Pounds)

YEAR	SALMON	KING CRAB
1966	5,770,518	561,312
1965	8,512,000	769,750
1964	12,193,547	720,460
1963	9,410,528	--
1962	9,435,001	--

Source: Alaska Department of Fish and Game, 1967.

FIGURE 3-71

ALASKA PENINSULA-ALEUTIAN CHAIN
SEAFOOD CATCHES, 1962-1967
(In Pounds)

YEAR	SALMON	KING CRAB	DUNGENESS CRAB
1967	7,127,580	68,474,700	--
1966	10,661,018	64,009,279	24,636
1965	19,011,000	58,106,630	--
1964	19,629,819	48,600,000	--
1963	14,448,918	--	--
1962	22,337,404	--	--

Source: Alaska Department of Fish and Game, 1968.

Adak, further to the west, is a center more suited for floating processors than shore-based facilities because of the unavailability of shore-based sites, stormy winter weather which prevents year-round fishing, and the limited quantity of continental shelf in this area. However, Finger Bay at Adak is an excellent base of operations for floaters and will continue to be used as long as the Navy is willing to lease dock space and access to other needed facilities.²⁸

In the *Bristol Bay area* the only developed fishery is the highly fluctuating salmon fishery; more specifically, the red salmon fishery. In 1966, the salmon catch amounted to 68.9 million pounds, in contrast to the 1965 figure of over 112.7 million (Figure 3-72) during one of the area's best years. It should be noted, however, that the 1966 catch was an excellent catch when compared to the 1964 production of 41.5 million pounds.

Since the commercial salmon season has traditionally been in June and July with the major activity concentrated in a period of four to six weeks (and the salmon industry is the predominant industry in the area), wide seasonality in employment and income takes place. The problem is further worsened by extreme fluctuations in salmon catch from year to year.

The concurrent trends of increasing numbers of fishermen and decreasing catch sizes have had adverse effects on income. Over the last fifteen years only the increasing price paid the fisherman for the fish has prevented a drastic decline in his income, which has remained relatively unchanged.²⁹

Attempts are being made to lengthen the fishing season in Bristol Bay. In addition to the freshwater fishing and the processing of herring roe, small processors are salting and further processing salmon in mild cured form for retail markets. They encourage local fishermen to fish the extremes of the season, which may last as long as five months.

The logical step would appear to be the establishing of a cold-storage facility to maintain a sustained high production of salmon as well as venture into the king and tanner crab resources in order to lengthen the Bristol Bay season; such a facility is planned for construction in Dillingham. The products of this extended high value fishery would have access from Naknek or Dillingham to scheduled air transport directly to Anchorage.

(3) Forecasts³⁰

What, then, is the economic outlook in the fisheries sector in the short-run, intermediate-run, and long-run time periods chosen? The general forecast follows.

FIGURE 3-72
BRISTOL BAY
SEAFOOD CATCH, 1962-1966
(In Pounds)

YEAR	SALMON
1966	68,884,072
1965	112,715,000
1964	41,533,203
1963	18,369,937
1962	35,519,812

Source: Alaska Department of Fish and Game, 1967.

-Kodiak will continue to be the center of Alaska's fishing industry with further expansion and diversification of plants. Tanner and Dungeness crab will be fished more intensively as continued pressure is placed on the king crab resource. Shrimp processing will be accelerated in existing plants and added to production in some crab plants. Scallops will become part of this multi-product plant processing.
-The capacity of Homer's shoreside cold-storage and processing capabilities will be expanded to handle king crab, shrimp, tanner crab, Dungeness crab, and scallops. The provisions of a permanent water supply and expanded facility will attract greater numbers of boats to Homer.
- ...Seldovia will add products to its present king crab processing plant. Experimentation with tanner crab and shrimp will result in these products' being processed in quantity--scallops will be a further addition.
-Seward, which has just begun processing scallops, will support a fleet of at least six scallop boats by the end of this year. Additions to the fleet will be slow from that point onward, perhaps reaching twelve boats. Diversification to tanner and Dungeness crab, shrimp, and king crab will be a part of this fishing and fish-processing industry.
- ...Cordova will expand its processing capabilities and diversify its production. Increased Dungeness crab catches will be a major factor in expansion and diversification, as will scallops. It is anticipated that much more intensive king crab fishing will take place in Prince William Sound. The clams, which are in great abundance in this area, are forecast to experience a modest increase in production in these multi-product plants.
-Several of the Alaska Peninsula-Aleutian Islands centers will experience substantial growth during this short-run period (one to three years). Unalaska will add to its shore-based facilities and retain its status as the leading port of this fishery area. The shoreside facilities will diversify from king crab with the additions of tanner crab and shrimp. Sand Point will diversify into tanner crab and shrimp production. Being central to the Shumagin Islands shrimp beds, large-scale shrimp processing is forecast for this area. Squaw Harbor, which began shrimp processing this year, will increase in output during the short run, and King Cove will add tanner crab and shrimp to its king crab and salmon production.

-A modern cold-storage plant will be located in the Bristol Bay area to handle salmon, king crab, and, possibly, tanner crab.
-In the short run, king crab is expected to proceed toward a stable level with Southcentral catches approaching 170 million pounds annually. To compensate for a lessening rate of growth in king crab production, tanner crab production will increase rapidly to an estimated 45 million pounds by the end of the short-run period.
-Dungeness catches will increase to a level between 9 and 12 million pounds annually while shrimp landings will be in the neighborhood of 145 million pounds. The Bureau of Commercial Fisheries estimates that 4 million pounds of scallop meats will be taken in southcentral Alaska during this three-year period. Other fisheries products forecast to increase at modest rates during the short-run period are clams and sablefish.
-The short-run period will be highlighted by the diversification to multi-product plants and fishing operations. This type of fishery will contribute toward reducing the seasonality of employment.
-Large-scale operations will cluster in centers such as Kodiak; and pressure will be placed upon the infrastructure of some communities to accommodate these plants, especially in regard to water requirements and waste disposal. Other industry sectors such as trade and services will accelerate with this growth.
-Factors such as marketing moves toward fresh and frozen products, the merger and consolidation of firms, investment by large American and Japanese corporations, and the continued upgrading of the fishing fleets will be important contributors to growth.
-It is estimated in the short-run period that the annual average employment will increase by approximately 500 in the fish-processing industry. The increases will be of a long-season or year-round nature increasing the demand for a resident labor force. Opportunities for resident Native employment will increase, especially in processing activities.
-Continued expansion and diversification of the products in all of the locations described in the short-run forecast will continue in the intermediate run (four to six years). The latent or underutilized species such as clams and sablefish will be fished more extensively and will add to the diversification of the industry.

-A larger number of fish-processing plants and the centers of the fish-processing industry will be on a year-round operation. The result of this will be a substantial increase in the number of employees and their families residing in the fishing communities. Pressure for expansion and upgrading will be placed upon the existing infrastructure of many communities.
-Economic activity in this *intermediate period* is forecast to grow less rapidly than the short-run period based upon increased efficiencies created by upgrading the fishing fleets and increased plant automation and product diversification. It is estimated that 300 employees will be added.
-Entry into bottom fishing and industrial fisheries is forecast to take place in the *long-run period* (over seven years). This technically advanced and highly mechanized industry will be designed to serve the dual function of fish filleting and packaging of individual quick-frozen portions and reduction of industrial fish and by-products. The plants will likely be located in all three strategic areas: Prince William Sound, Kodiak Island, and the Alaska Peninsula-Aleutian Islands. The most probable individual community locations based on present and forecasted activity are Cordova or Seward, Kodiak, and Unalaska. It is estimated that with entry into the bottom-fishing industry employment could be increased by an additional 200 employees during this long-run period.

C. Forest Products Sector

(1) Considerations

The forest resources of this region are relatively small compared with those of southeast Alaska. It is estimated that the annual allowable cut from the Chugach National Forest is 67 million board feet. This is a small percentage of the 891 million board feet gross annual allowable cut estimated for the three national forests in Alaska. In terms of commercial timber acreage, the entire state has 28 million acres, and just over 6 million acres lie within Region II.

The relative smallness of the resource is one of the major reasons so little commercial activity has occurred. In the past, most attempts at harvest were small scale and uneconomical as indicated in a survey done by the U. S. Forest Service.³¹ Of the 29 sawmills in the area, none was capable of producing more than 50 thousand board feet (MBF) per day, and only 10 of these facilities were known to have operated in 1967. It has been contended that in the Susitna Valley at least, the disparity between size of sale and actual cut is due in part to lack of knowledge on the part of buyers, both as to quality and as to markets.³² Of the 3,670 MBF sold, only 756 MBF had been cut by 1966.

Prospects for the future are a good deal brighter, however. There has been considerable interest and activity in this sector in recent months, and more is to come. The State of Alaska recently sold 96 million board feet of timber at Rocky-Windy Bay on the Gulf of Alaska side of the Kenai Peninsula. A firm owned by combined Japanese and Alaskan interests made the purchase and will move logs by road across to a sawmill being built near Seldovia.³³ The same company has made a firm offer to buy spruce logs from private owners on the Kenai Peninsula. The volume hoped for is about 500,000 board feet per month.³⁴ More is to be purchased in the Seward area from Kenai Lumber Company. A Japanese ship is expected to make six to ten visits per year picking up logs (from private sales) and cants at Seldovia, Homer, and Seward if sufficient volume is available.

Recently the U. S. Forest Service sold 525 million board feet of spruce on Afognak Island. The purchaser had the option of buying an additional 100 million board feet of state-owned spruce on nearby Shuyak Island but chose not to. The state did have a successful sale of 100 million board feet of hardwoods at Goose Bay and the delta islands of the Susitna River.

Sales such as those outlined above will require larger scale operations than in the past. Since state and federal policy requires that before export primary manufacturing must be accomplished, the Afognak-Shuyak sale will necessitate erection of a sawmill and attendant facilities. To make the southcentral region more productive in terms of timber harvest, larger modern facilities must be built. The pattern in the past has been one of small sawmills that were generally inefficient and often financially weak. They had difficulty in the Anchorage and Kenai Peninsula area because most timber stands there are relatively small (see figure 3-36 showing estimated timber acreage by location). Even though the area is traversed by highways and a railroad, there is a shortage of access roads. High construction costs combined with smallness of timber stands dictate that such roads be of a multiple-use type at least partly financed by public money. Some isolated large timber stands are to be found in the region, such as at Afognak Island and on the mainland at Yakataga.³⁵

Of the several factors which hinder timber development, ranking high is the lack of knowledge about the resource. The Economic Development Administration of the U. S. Department of Commerce has funded a photographic inventory and ground survey of timber in the Tanana Valley area. The project is also intended to stimulate inventorying in other parts of Alaska. In the southcentral region, inventory projects are being carried out in the following areas:

Susitna--Includes Susitna and Matanuska Valleys, the west side of Knik Arm and Cook Inlet. Commercial timber on 1.3 million acres consisting mostly of paper birch and cottonwood with some white

spruce. Sawtimber volume is estimated at 3.6 billion board feet with an annual allowable cut of close to 73 million board feet. (The report on this area is due soon.)

Copper River--The Copper River drainage including Lake Louise and the Chitna drainage. White spruce predominates with birch, aspen, and cottonwood. Estimated commercial forest land is just over 1 million acres. (Final report due in 1970.)

West Kenai--About 750,000 acres of commercial forest land on the west side of the Kenai Peninsula, outside the National Forest but including the National Moose Range. The total sawtimber volume is about 2 billion board feet with an estimated annual allowable cut of 24 million board feet. The timber composition is a mixture of spruce, birch, and cottonwood. Limited photography exists, and some ground work has been done. (Final report due in 1971.)

Yakataga--This is a narrow strip of coastal forest north of Yakutat. It is estimated to contain 174,000 acres of spruce and hemlock. Total sawtimber is estimated to be 3 billion board feet with an annual allowable cut of 29 million board feet. No suitable photography exists, nor has any appreciable ground work been done. The state-selected lands in this area are scheduled for photography this year. (Final report due in 1970.)

Of the eight areas in the state to be inventoried (including Tanana) four are in the southcentral region. Benefits from these inventories would not be limited to the timber sector alone. Planning and development would be aided in such areas as minerals, agriculture, livestock range, industrial water supply, hydroelectric power sources, wildlife management, recreation, and land management.

The small size of the local market has had an adverse effect on development of southcentral Alaska's timber, especially in the case of hardwoods. In 1962 the national per capita consumption of lumber was 200 board feet.³⁶ Consumption of plywood and veneer was 64 square feet, or two 4 x 8 foot sheets of 3/8 inch plywood per person. If Alaskans consume wood at about the same rate, one modern efficient sawmill and one plywood plant could supply all their needs. Nor does the future of the local market look unusually bright with even the highest estimates placing Alaska's population at about 1 million people in the year 2000. In 1961, 7 percent of the state's forest products were marketed in Alaska; by 1966 the total was 3 percent (Figure 3-73). The composition of Alaska wood products has shifted slightly, and this shift is away from the local Alaska market.

FIGURE 3-73

ALASKA WOOD-PRODUCTS DISTRIBUTION

	1961	1966
Alaska	7%	3%
Other U. S. Markets	36	39
Foreign	<u>57</u>	<u>58</u>
TOTAL	100%	100%

Source: U. S. Forest Service, *Alaska's Forest Resource*.

External demand for wood products is increasing. This is particularly true in Japan, where domestic supply is presently limited.³⁷ Consumption in Japan has been rising and is expected to reach a peak in 1995, although projections show a slowdown after 1975.³⁸ The difference is to be made up by domestic production. Per capita consumption of wood in Japan has risen 62 percent in the last ten years to 155 board feet.³⁹ (At the moment the Japanese are emphasizing import of wood chips for use in pulp mills.) Figure 3-74 contains estimated Japanese timber supply and demand. Imports will roughly double by 1975. Alaska would seem to be a prime candidate for participating fully in supplying this heavy demand.

By 1975 it is expected that, with minor exceptions, the full annual allowable cut will be reached in the national forests of Alaska. The full annual allowable cut in the Chugach National Forest will not be reached as quickly as in the other national forests. At present, only about half of the 1.1 billion board feet annual allowable cut for the national forests is being utilized.⁴⁰

As indicated earlier, access roads and availability of transportation at reasonable rates are of prime importance in developing timber resources. Much of the so-called coastal forest is close to tidewater, but the terrain is usually rough and the cost of road construction high. In the interior forests the problem is more acute because the value and volume of timber per acre is low. Estimates by operators in the Susitna-Talkeetna area indicate hauling costs of \$11 per MBF for a 1-to-5-mile haul, \$15 per MBF for a 5-to-10-mile haul, and as high as \$25 to \$35 per MBF for distances of 25 miles or more. By comparison, costs in the Lake States for similar hauls are \$8.25 per MBF for 1-to-10-mile hauls, \$12.26 for 21-to-30 miles, and \$16 for over 30 miles. Put another way, the timber haulage charge that

FIGURE 3 - 74

ESTIMATED JAPANESE TIMBER SUPPLY, DEMAND
AND FOREST PRODUCTION, 1965-2015

	Year					
	1965	1975	1985	1995	2005	2015
<u>Demand</u>	(millions of board feet)					
Construction	10,558	16,112	-	-	-	-
Pulp	7,293	14,077	-	-	-	-
Other	10,345	12,211	-	-	-	-
Total	28,196	42,400	50,880	57,664	61,904	61,904
<u>Supply</u>						
Domestic	21,624	29,934	38,160	47,488	53,848	55,968
Imports	6,572	12,466	12,720	10,176	8,056	5,936
Total	28,196	42,400	50,880	57,664	61,904	61,904
Self-sufficiency Ratio	77%	71%	76%	82%	87%	90%

<u>Forest Production</u>	<u>Unit</u>	1965	1985	2015		
Forests (Plantation)	1,000 hectares	7,660	12,640	13,420		
(Natural)	1,000 hectares	16,520	11,540	10,760		
Forest Inventory	millions bd. ft.	802,208	983,256	1,230,872		
Annual Cut	millions bd. ft.	31,376	40,280	56,392		

Source: Tussing, *Alaska Japan Economic Relations: A Study of the Potential Contribution of Trade with Japan to Alaska's Economic Development*, Institute of Social, Economic and Government Research, University of Alaska, Fairbanks, Alaska, 1968.

allows for a 10-mile haul in Alaska would buy a 30-mile haul in the Lake States. This can be partially explained by the greater costs in hauling over consistently poor roads than short hauls on poor roads with the greater balance on high-grade roads. A further explanation is that where hauls are long and slow with equipment operators having alternative employment opportunities at higher wage rates (e.g., construction), the total wage cost becomes a barrier to economical operations.

Shipping rates in Alaska are historically oriented toward shipping into the region rather than out. Wood products are under particular disadvantage because of their weight and, with only primary manufacture accomplished, relatively low value. If adequate kiln facilities were available for hardwoods, a considerable reduction in rates might be realized. To establish a favorable rate, profitable utilization of empty backhaul capacity must be realized. One writer⁴² is of the opinion that a rate of less than \$20 per MBF for green lumber shipped to Seattle is necessary. For Los Angeles, on a dried basis, cost would have to fall below \$40 per MBF.

In terms of income and employment, development of the timber resource is of prime importance. In 1967 the average monthly wage in Alaska for employees in timber products was \$800. Total employment was 2,600 people with an annual payroll of \$25 million (Figure 3-75).

Employment in the industry is especially important because the industry is labor intensive and relatively stable (compared to construction or fishing), not generating large seasonal unemployment or a transient labor force. Of significance, too, is the fact that over 800 additional employees with an additional payroll of nearly \$7 million are employed in directly related service industries or with state or federal agencies engaged in forest management activities.

(2) Prospects

Future trends of employment and income associated with the forest products industry in Region II will be upward, due in part to the recent sale of 525 million board feet of Sitka spruce at Afognak Island, constituting a major effort toward establishing a sizable wood-products industry in this region. Ideally, this sale will serve as a catalyst for further development, stimulating cutting in other areas and creating a market for neighboring timber stands.

The operation at Afognak will begin soon.⁴³ The mill itself will probably be located at either Discoverer Bay on Afognak or near the City of Kodiak. Annual production of the mill will reach 50 million board of cants (eight inches and under in thickness) for the Japanese market. Included in this figure is 3 to 5 million board feet from state-owned timber on Shuyak

FIGURE 3 - 75

EMPLOYMENT IN ALASKA FOREST PRODUCTS INDUSTRY
1950-1967

Year	Average Monthly Employ- ment	Average Monthly Income (Dollars)	Estimated Yearly Payroll (Million \$)
1950	619	372	2.8
1952	782	417	3.9
1954	1,060	555	7.0
1956	1,434	572	9.8
1958	1,110	573	7.6
1960	2,316	659	18.3
1962	1,833	677	12.9
1964	2,100	773	19.0
1966	2,467	797	23.6
1967	2,600	800	25.0

Source. State of Alaska, Department of Labor, Employment Security Division, Juneau, Alaska.

Island which will probably be purchased within three years. Employment from this sale will be about 100 people initially. After the construction phase, the number will drop to about 70 or 80.⁴⁴

Also within the three-year period, smaller sawmills at Seward and Whittier will probably be producing cants for Japan and the Pacific Northwest. Annual production is expected to be about 15 million and 10 million board feet, respectively. It is expected that both these mills will supplement their supply of coastal logs with white spruce logs from the railbelt of the interior whenever they are available. Favorable transportation rates would increase that likelihood.

In the four-to-six-year period, it is likely that these mills will increase their annual cut. It is not likely that smaller local mills will attempt to capture the local market except at the present level of rough, green dimension material. The cost of quality manufacture and kiln drying now required by the American market will continue to favor the Puget Sound mills for lumber items. The Japanese and possibly the Australian cant markets are expected to be more lucrative to local mills.

It is probable that by the end of the four-to-six-year period all mills will have installed chippers and debarkers. The Afognak mill will have installed these during the first three years, Whittier and Seward during the second time frame.

By the seventh year it is likely that a pulp mill will be being seriously considered for location somewhere in Region II. This would mean a chip market for part of the timber volume in the Chugach National Forest as well as state and private lands and the Kenai National Moose Range. The present housing shortage in Japan has made the Japanese market for cants very strong. However, it is likely that Japanese preference for white woods (Sitka spruce in this case) will continue after the housing shortage has been alleviated.

In the Cordova area, a very small mill will continue to operate to meet local demands. The timber in the area south of the Copper River is presently inoperable because transportation is lacking. The timber resource alone cannot bear the costs of a complete road system. Development of timber in the area of the Bering River will not occur until primary roads have been developed by coal or oil or other interests. Expectations are that within seven years all the Chugach National Forest timber, except that south of the Copper River, will become economically available.

State-owned timber at Yakataga will probably be offered for sale during the next three years. Estimated annual allowable cut is 29 million board feet. Employment there would probably be on the order of magnitude of 40 people. The Rocky-Windy Bay sale will employ about 25 to 30 people.

There are little data available from which to estimate employment which would occur from harvesting the hardwoods of the interior type. Logging manpower requirements might be as much as 50 percent greater; and production of veneer would also require more labor input, perhaps 30 to 50 percent more. Small logs would influence the pre-chipper employment in a pulpmill. As timber of the interior type is marketed, and buyers become familiar with its quality and price, increased interest in white spruce may be expected. Although smaller and usually slower to mature, white spruce is quite comparable to Sitka spruce. White spruce predominates in the Copper River Valley area, where the estimated annual harvest is 20 million board feet.⁴⁵ Allowing time for the market acceptance of white spruce, it seems that Copper River area would not produce substantial amounts of timber until at *least* the second time frame (four to six years).

There is evidence that newer processing facilities in Alaska are more efficient and less labor intensive than in the past. For example, one of the newer cant mills in southeast Alaska is employing about one man (including loggers) per million board feet produced. In past analyses, the U. S. Forest Service used a ratio of about three men per million board feet for a combined logging and canting operation.⁴⁶ Another mill producing cants from the same area has a slightly higher ratio than one to one, but it is significantly lower than three to one. This indicates that mills built in Region II, being new, would also be more efficient and use less labor when producing cants from the coastal forest.

In sum,⁴⁷ orderly development of coastal timber in Region II seems assured. It is the hardwoods which seem least likely to develop now. The problem is not with the timber itself, but lies rather in institutional constraints such as transportation, the inflated Alaska price structure, small "domestic" market, and a national market which is difficult to enter, that keep it from becoming commercially exploitable.

D. Agriculture Sector

Though Alaska is by far the largest state, it suffers many problems of smallness. Roughly 12 million of Alaska's 375 million acres are presently classified as farm land. Excluding grazing land leased from the U. S. Government, about 72,000 acres are farm land with about one-fourth that total in actual crops for harvesting.

There are five crop-reporting districts in the state, three of which are in Region II. District 2, which is the Matanuska Valley (Palmer-Anchorage) and the Susitna Valley, is by far the most important farming area in the state. The other two districts are District 3, which is the Kenai Peninsula, and District 5, which is the Southwest and West. These three districts have for the past five years made up approximately 80 percent of the state's agricultural production.

Detailed soil surveys have been made by the Soil Conservation Service of the U. S. Department of Agriculture. Figure 3-76 indicates those areas in Region II which have been surveyed. It is significant that none of the land in Alaska falls in Class I, which is soil that has few limitations to restrict its use. At most, probably 1 percent of Alaska's total land area is suitable for farming. Possibly another 2 percent is suitable for grazing. Virtually all the primary grazing areas are in Region II--northeastern Kodiak Island, Umnak Island, Unalaska Island, and the southern parts of the Kenai Peninsula. While agriculture is not an important factor in the state's economy, it is relatively important in Region II.

In recent years (since 1962), total average annual employment in the agricultural sector of Region II has been falling. The high year was 1963 when over 1,000 people were employed. By 1967 employment had dropped to about 740 people. As a portion of the total work force in Region II, farm labor constitutes a small, declining percentage. In 1962, 2.3 percent of the work force was classified as farm labor. In 1966 farm workers made up only 1.4 percent of the work force. This was due partially to a reduction in the number of farms from a peak state total of 623 in 1939 to 340 in 1966.⁴⁸ More importantly, employment in other sectors of the economy has been growing while agricultural employment has not.

Wages paid to farm workers in Alaska have risen from \$2 per hour (without room and board) in 1962 to \$2.20 per hour in 1967. This is more than 40 percent above the annual average in the United States. The monthly wage in 1967 for workers who were provided housing was double the national average. As might be expected, the number of family workers (farmers and members of the household who work more than 15 hours per week) remains fairly steady throughout any year. Most seasonal fluctuation occurs with hired workers. A seasonality index for farm workers in the state shows the month of highest or lowest employment as a percent of average annual employment. Hired workers had low employment in March and December of 1966 with an index of 29 percent. September was the high month with 229 percent. For family workers the low was 89 percent and the high 122 percent, with the low recorded in March and December and the high in June. Averaged out, the seasonality factor for all farm workers was indicated by an employment low of 65 percent in March and December and a high of 151 percent in September.

The problem of Alaska's farmers is not insufficient demand for farm products but rather one of competition from other sources of supply; i.e., other states and Canada. A recent Federal Field Committee study points up the effect that reduced transportation costs has on farming in Alaska:

The relation of transportation to agriculture in Alaska is the curious one which sees most improvements in transportation service (and rate levels) to the state as making the task of the "domestic" producer a little more difficult. That is to say that, as transportation

FIGURE 3 - 76

ACREAGE OF SOILS, BY LAND CAPABILITY CLASSES,
IN SURVEYED PORTIONS OF MAJOR FARMING
AND RANCHING AREAS, REGION II--1967

Land Class*	Surveyed Portion			Total Region II
	Matanuska- Susitna	Kenai	Northeast Kodiak	
II	146,280	119,328	--	265,608
III	213,660	92,825	8,189	314,674
IV	181,560	91,143	12,130	284,833
VI	165,050	30,133	72,281	267,464
VII	375,960	130,785	92,414	599,159
VIII	<u>81,480</u>	<u>34,375</u>	<u>122,193</u>	<u>238,048</u>
	1,103,990	498,489	307,193	1,969,786

*Land classes are defined as follows: Classes II and III: Soils in these classes have limitations that reduce the choice of crops or require special conservation practices, but are suitable for most crops grown in Alaska; Class IV: Soils in this class have severe limitations (steepness, shallowness, or wetness) that make them marginal for cropping; Class V is not used in Alaska; Classes VI and VII: Soils in these classes are suitable primarily for pasture, range, or woodland; Class VIII: Soils in this class cannot be used for commercial plant production (i.e., field crops) and should remain in woodland or whatever natural cover that exists.

Source: Derived from data provided by Soil Conservation Service,
U. S. Department of Agriculture.

FIGURE 3 - 77

ESTIMATED CONSUMPTION OF SELECTED FOOD PRODUCTS,
REGION II--1970

Item	Unit	Matanuska Valley	Kerai	Southwest	Total Region II
Milk	mil. lbs.	39.4	4.1	5.0	48.5
Potatoes	tons	11,314.5	1,283.9	2,399.8	15,501.7
Eggs	mil. dz.	4.3	0.5	0.8	5.6
Carrots	cons	460.4	52.7	101.0	614.1
Cabbage	tons	526.2	52.7	101.0	679.9
Lettuce	tons	986.7	112.9	125.3	1,225.9
Tomatoes	tons	394.7	45.2	75.7	515.6
Beef	mil. lbs.	11.1	1.3	2.5	14.9
Pork	mil. lbs.	4.6	0.5	1.2	6.3
Reindeer	mil. lbs.	0.026	0.003	0.505	0.543
Other Meat	mil. lbs.	0.658	0.075	1.068	1.801
Wild Game	mil. lbs.	4.6	0.5	1.7	6.8

Source: Based on population projections the Alaska Conservation Needs Committee made for Rampart Project, Case I, and consumption estimates made by Alaska Agricultural Experiment Station, Palmer, Alaska.

FIGURE 3 - 78

ESTIMATED CONSUMPTION OF SELECTED FOOD PRODUCTS,
REGION II--1975

Item	Unit	Matanuska Valley	Xenai	Southwest	Total Region II
Milk	mil. lbs.	47.5	5.0	6.1	58.6
Potatoes	tons	13,363.8	1,547.6	2,892.8	18,775.2
Eggs	mil. dz.	5.2	0.6	1.0	6.8
Carrots	tons	555.0	63.6	121.7	740.3
Cabbage	tons	634.3	63.6	121.7	819.6
Lettuce	tons	1,189.5	136.1	152.2	1,477.8
Tomatoes	tons	475.7	54.4	91.3	621.4
Beef	mil. lbs.	13.5	1.5	3.0	18.0
Pork	mil. lbs.	5.5	0.6	1.5	7.6
Reindeer	mil. lbs.	0.032	0.003	0.608	0.643
Other Meat	mil. lbs.	0.793	0.110	1.287	2.190
Wild Game	mil. lbs.	5.5	0.6	2.0	8.1

Source: Based on population projections the Alaska Conservation Needs Committee made for Rampart Project, Case I, and consumption estimates made by Alaska Agricultural Experiment Station, Palmer, Alaska.

charges have gone down and frequencies (and the character) of services have gone up in Alaska, "outside" producers have increasingly been able to capture the largest portion of the state's food markets.⁴⁹

Another problem facing local producers is Alaska's climate. There are only about 100 frost-free days per year in farming regions of the state. So, in the case of vegetables, all the harvest is sent to market at once, forcing buyers to seek other sources of supply during the balance of the year. The result is that Alaska is not a major source of sustained supply to the local market.

In 1967 farms in Region II produced about 85 percent of the state's total output of eggs. Consumption requirements for eggs in the region are estimated to be 5.1 million dozen. Only 649,000 dozen (down 14 percent from the previous year) were produced within the region. In milk production, Region II again accounted for about 90 percent of the state total. Forty percent of the local needs could be potentially met by local producers.

Figures 3-77 and 3-78 show estimated food requirements for various items within Region II. A few qualifications about these tables: (1) the population projection cited is high. (2) The consumption requirements say nothing about *where* the food is to come from. Finally, whatever the projections, the portion which Alaska farmers provide may in fact decline in future years.

There may be some opportunity for export of beef and mutton from Kodiak Island and the Aleutians to Japan. Most of Japan's beef and mutton is imported from Australia and New Zealand, countries having a slaughter season which is opposite that of Alaska's. This means that the Japanese could "smooth out" their annual supply cycle by importing from Alaska. However, a detailed study of the potential for a relatively large-scale livestock operation in the Kenai Peninsula-Kodiak Island-Aleutian Chain area concluded that at present such an enterprise would probably not be profitable.⁵⁰ It was further found that the Kenai Peninsula-Kodiak Island area was capable of providing only about one-third the beef requirements of the Railbelt area.

Consumption of beef and mutton in Japan has been rising steadily since World War II. It has been estimated that, "Imports of beef [in Japan] were about 13 thousand tons and those of mutton about 93 thousand tons in 1966.... Import needs are expected approximately to double between 1965 and 1970, to double again by 1975, and by 1980 to stand at about six times the 1966 figure."⁵¹ At present most sheep in Alaska are used for wool production rather than meat. There are about 27,000 sheep in Alaska, 98 percent of these are on Unalakleet and Unalaska Islands.⁵² Few animals are sold for meat due to transportation and marketing problems, although a small slaughter house and

and freezer have been built on Unalaska Island. Sheep numbers and wool production have been increasing steadily. In 1967, 21,000 sheep were shorn in Alaska, and wool production totaled 246,000 pounds, for increases of 90 percent and 96 percent respectively over the 1960 figures. The value of Alaska's wool production totaled \$90,000--a 96 percent increase since 1960.⁵³ All of Alaska's wool production is from Region II, and virtually all is sold outside the state.

It is difficult to predict future growth where there has been little or none in the past. The possibility of a large Japanese-financed venture in livestock should not be overlooked, however, since the Japanese have both the interest and necessary experience for such an enterprise.

The milk industry has only two significant processing facilities, both in Anchorage; and even here there is too much capacity. The cooperative plant now produces 70,000 pounds of milk per day, operating one shift. The capacity is 100,000 per shift.⁵⁴ Bulk shipments from out of state make up a significant portion of processing. Were this not the case, unused capacity would be even greater. Even assuming that milk consumption requirements double by 1985 and that Region II maintains its share of the market, one fairly large processing facility could meet those needs. In the dairy industry, future transportation developments will probably further lessen the comparative advantage of local producers, thus making their situation still more difficult.

The pattern is much the same for other sectors within the industry. Economies of scale (reduction in average unit cost associated with increase in size of plant) is an important factor in agriculture as elsewhere. Thus, a large market is necessary; and even if Region II were to meet all the demand projected for 1985, one relatively large processing facility would again suffice. The story is more adverse for vegetables because of the short growing season and the small number of acres devoted to their production. In Region II only 559 acres were given to commercial vegetables in 1967.⁵⁵ To support a processing facility perhaps four times that many acres would have to be harvested annually to make either a canning or freezing operation feasible.⁵⁶

There is almost no likelihood that there will be major changes in the agriculture sector in the one-to-three-year period. In the intermediate run some changes could occur as earlier mentioned; e.g., shifting Japanese demand for meat, cost breakthroughs in "domestic" Alaska production, and Alaska's expected population growth (as much as 18 percent).⁵⁸

In the long run (over seven years) there may be technological advances such as environmental controls which would aid Alaska's agriculture. But, within the scope of this overall analysis, changes in income and employment will likely not be of great importance. In sum, it will be a struggle for agriculture to maintain present levels of output; and future growth is, at best, questionable.

E. Tourism Sector

(1) Significance

One of the most rapidly growing industries in Alaska is the tourist industry. Alaska is well known for its scenic beauty, its abundant supply of wildlife, and its diversity of cultural and ethnic groups that attract a large number of visitors every year. In short, Alaska has a comparative advantage in the "production" of tourist services, and it is not surprising at all to find that tourism is a rapidly growing Alaska export.

By one estimate (Figure 3-79), the number of tourists coming to Alaska increased by approximately 14 percent per year between 1964 and 1967. The total number of tourists (excluding nonresident business and government visitors) amounted to an estimated 86,700 in 1967; if the high rates of growth in the past prevail in the near future, 128,500 tourists can be expected in 1970.

A majority of the tourists that come to Alaska visit the Region II area. Region II attracts many visitors because, in addition to the opportunities it provides for summer and winter sports activity and travel, Region II also provides a relatively well developed transportation system and numerous lodging and merchandizing facilities. Because the Anchorage area is a focal point of the Alaska transportation system, a great many tourists coming to Alaska visit the Anchorage area.

In 1964, for instance, 54 percent of Alaska's tourists came to the Anchorage area, including 62 percent of those that came to Alaska by ferry and 81 percent of those that came by airline. Once in the Anchorage area, tourists use the highway to visit Valdez and the Kenai Peninsula, the railroad and highway to visit Mt. McKinley National Park, and the many chartered airplanes to visit rural Alaska.

Figure 3-79 also estimates the number of tourists visiting the Anchorage area. These estimates are considerably below those of the Anchorage Chamber of Commerce (due in part to a difference in the definition of "tourist"), but only slightly lower than estimates prepared by the Alaska Department of Economic Development. For the future, what is important is not so much the absolute level but the trend, and this is decidedly upward by any measurement.

Since the actual dollars that tourists spend have no special markings and since tourists demand many of the same goods and services that resident Alaskans do, it is difficult to get accurate measurements of the amount of tourist expenditures and the resulting employment from these expenditures. Furthermore, different kinds of tourists spend different amounts of money, e.g., fishermen spend less than hunters, tourists who come

FIGURE 3-79

TOURIST ARRIVAL IN ALASKA AND THE ANCHORAGE AREA
BY MODE OF TRAVEL, 1964-1967

	1964		1965		1966		1967	
	Anchorage Area	All Alaska	Anchorage Area	All Alaska	Anchorage Area	All Alaska	Anchorage Area	All Alaska
By Highway	11,600	23,300	14,500	28,350	13,800	27,100	17,000	33,950
By Ferry	7,200	11,650	9,000	14,400	10,700	17,300	11,700	18,950
By Cruise Ship	3,200	11,000	3,400	11,700	3,600	12,400	3,800	13,200
By Air	<u>10,700</u>	<u>13,250</u>	<u>12,000</u>	<u>15,100</u>	<u>13,200</u>	<u>16,250</u>	<u>16,700</u>	<u>20,600</u>
TOTAL	32,800	59,200	38,900	69,500	41,300	73,050	49,200	86,700

Source: Estimated from figures contained in *Traveler Profiles*, by Alaska Department of Economic Development and Planning, 1964, and a report by Cresap, McCormick and Paget, *A Program for Increasing the Contribution of Tourism to the Alaskan Economy*, 1968.

primarily to sightsee spend more than those who come primarily to visit friends and relatives, so that over time growth in tourist-related expenditures and employment depends upon what sub-group of tourist grows the fastest.

Despite the difficulties in measurement, estimates of tourist expenditures have been made by Cresap, McCormick and Paget that provide some indication of the magnitude of tourist expenditures in Alaska. As reported in Figure 3-80, tourist expenditures have risen from approximately \$18.2 million in 1964 to \$29.0 million in 1967, so that the volume of tourist expenditures has risen slightly faster than the volume of tourist arrivals. Based on these figures, Cresap, McCormick and Page estimate that tourist demand for goods and services created approximately 1,100 primary or government jobs in 1964 and 1,650 jobs in 1967.

How much of the tourist dollar finds its way into Region II can be estimated in the following manner. Hotel owners in the Anchorage area say that about one-third of their revenues are from tourist expenditures. If a tourist dollar is like any other dollar, then about one-third of the total employment in the hotel, rooming-house, and camping-services sector is attributable to tourist expenditures. This puts tourist-related employment in the hotel and related services at 118 in the Anchorage area in 1964. If as a rough estimate it takes \$20,000 in revenue to support one full-time employee, then tourist expenditures in the Anchorage area amounted to \$2,360,000 in 1964. The Cresap, McCormick and Paget study estimated that tourists spend close to \$3.8 million in Alaska on lodging; or, from the above calculation, 62 percent of the total tourist expenditure on lodging was spent in the Anchorage area.

The figure of 62 percent of the total lodging expenditure going to the Anchorage area seems compatible with the fact that approximately 52 percent of the tourists coming to Alaska in 1964 visited the Anchorage area and the fact that Anchorage, among all the cities in Alaska, has the most fully developed lodging services--a consideration which induces tourists to stay in Anchorage while visiting the rest of Region II.

What is true in lodging is generally true for other services as well. Because of its size, Anchorage can offer the tourist an adequate supply of most of the services and commodities that the tourist wants. It seems reasonable to assume, then, that at least 50 cents of each tourist dollar spent in Alaska is spent in Region II. This means that approximately \$9.1 million was spent in Region II in 1964 and \$14.5 million in 1967. If, on the average, it takes \$1 million in revenue to support 50 full-time workers in tourist-related services, then tourism activity in Region II created approximately 450 jobs in 1964 and 725 jobs in 1967. This estimate is on the low side; alternative assumptions with respect to revenue and employment place the 1967 employment as high as 950.

FIGURE 3-80

TOTAL TOURIST EXPENDITURE IN ALASKA, 1964 AND 1967
(In Millions of Dollars)

	1964		1967	
	TOTAL EXPENDITURE	PERCENT OF TOTAL	TOTAL EXPENDITURE	PERCENT OF TOTAL
Visitor and Vacationer	\$13.9	76%	\$21.4	74%
Tour Tourist	3.8	21%	7.3	25%
Cruise Tourist	<u>0.5</u>	<u>3%</u>	<u>0.3</u>	<u>1%</u>
TOTAL	\$18.2	100%	\$29.0	100%

Source: Tourism study by Cresap, McCormick and Paget, *A Program for Increasing the Contribution of Tourism to the Alaskan Economy*, 1968.

The significance of tourism for Alaska lies mostly in its potential. This is an industry that, if properly managed, can be expected to continue to grow at rapid rates in the future. The impact of tourism for the present, however, should not be down played, for tourism contributes almost as much towards primary employment as the oil and gas industry does.

(2) Prospects

The tourist sector is frequently looked upon as a growth industry for Alaska. Judging from the industry's record in the 1960's, this view is certainly justified, though the future importance of this industry can be exaggerated. As a proper caution to this kind of excess, it is useful to discuss some of the factors that affect the demand for and supply of tourist services.

Factors comprising the supply side of the tourist market can be divided into natural and man-made ingredients. In a time span of one to seven years, it seems reasonable to assume that Alaska's rich endowment of wildlife and natural beauty will continue to attract many visitors. Though the process of economic development tends to encroach upon the scenic beauty and the wildlife of an area,⁵⁹ Alaska can continue to grow and develop economically without damaging its tourist potential as long as it remains sufficiently different from other areas of the United States. For example, the difference between Anchorage and Los Angeles in the availability of scenic attractions may actually increase in the near future even though both areas are growing economically. It is important that Alaska emphasize its distinctiveness--that it point out in its advertising its special attractions and unique features, but it is not necessary to bring economic advance to a halt in order to preserve this uniqueness.

The supply of man-made tourist services poses several problems for Alaska's economy that must be solved if expansion is to occur. For one thing, the returns from investments in tourist facilities do not flow entirely to the initial investor but instead "spill over" into other areas; e.g., improvements in air transportation tend to increase the tourist demand for lodging facilities. These spill-over effects make the private rate of return of tourist investments lower than the social rate of return so that if these investments are left entirely to the private sector Alaska would tend to underinvest in tourist facilities. Because of the external effects of this type of investment, it is imperative that the public sector take an active role in promoting the tourist trade, in providing some of the services and fixed assets for the trade, and in participating in cooperative efforts with the business community.

Lodging facilities (campsites, trailer courts, motels and hotels) is one area in which underinvestment may be critical to the future growth of the tourist market. Investments in lodging require large capital outlays for

a service that is very seasonal in a geographical area that is often far removed from the main centers of economic activity (hence precluding alternative use of the facility). Frequently such an investment is not profitable for a single individual to make, though it would be economically beneficial for the whole community if such an investment were made. In order that bottlenecks do not occur in lodging facilities, it is essential that there be close cooperation with all groups concerned.⁶⁰ The supply of lodging facilities is critical to the tourist market because in this area supply tends to create its own demand. This is to say that, if Anchorage and Juneau are the only cities where private investors can profitably build hotels because in these cities winter occupation rates are relatively high, then in the future Anchorage and Juneau will tend to draw away the tourists from other areas.

The problem of underinvestment is compounded by the problem of seasonality. In all cases the tourist industry reinforces the seasonal pattern of employment that exists in other industries so that the peak demand for tourist facilities comes during those months where there are peak demands in other industries. As a result, the supply of inputs into the tourist trade cannot rapidly expand to meet the growing demand. The resulting bottlenecks choke off part of the flow of money into the state and tend to diminish the future rates of growth of the whole industry. Discussions of the future of tourism in Alaska usually assume that the supply of services will adjust to meet the rising demand; but in view of the existing bottlenecks in ferry services and lodging facilities, this assumption cannot be made with complete assurance. The seasonality of this industry puts constraints on the rates of growth and the time span during which this growth can be realized.

The demand for tourist services, like the demand for any other goods, depends primarily on people's tastes, their incomes, and the relative prices. The indications are that small percentage changes in prices, income, and advertising effort lead to large percentage changes in the demand for tourist goods.

In terms of future growth, the sensitivity of demand to changes in income provides the clearest optimistic sign for the Alaska tourist industry. The steady rise in real incomes in the U. S. means a growing market for tourist services--a market which Alaska can successfully tap. The same is true, to a lesser extent, for the growing incomes and tourist demand in Japan.

No quantitative study has yet been made to determine how responsive tourists are to price changes. It is clear that Alaska's high prices are one of the major complaints that tourists have.⁶¹ In particular, the high transportation costs to and within Alaska put the state in an unfavorable relative competitive position.⁶² Air rates to Alaska on a per mile basis are considerably above the rates in the rest of the nation (Figure 3-81), and intra-Alaska fares may be as much as 25 percent higher than intrastate fares outside

FIGURE 3-81

COMPARISON OF INTERSTATE AIR FARES TO ALASKA
WITH FARES FOR OTHER REPRESENTATIVE INTERSTATE FARES

	APPROXIMATE STATUTE AIR MILES	ONE-WAY FARE ^a	COST (Cents/Mile)
<u>To and From Alaska</u>			
Seattle - Anchorage	1,438	\$ 99 ^b	6.9
Seattle - Fairbanks	1,519	116 ^c	7.6
Seattle - Juneau	897	60	6.7
Chicago - Anchorage	2,846	180	6.3
Average cost per miled			6.8
<u>Routes Outside Alaska</u>			
San Francisco - Seattle	680	\$ 42	6.2
Denver - Los Angeles	849	50	5.9
Los Angeles - New York	2,474	145	5.9
Miami - Seattle	2,934	149	5.1
Boston - San Francisco	2,704	152	5.6
Los Angeles - Honolulu	2,558	110	4.3
Average cost per miled			5.3

^aCoach or comparable fares.

^bAlso a special rate of \$75, not comparable to coach.

^cAlso a special rate of \$80, not comparable to coach.

^dWeighted average based on miles (unweighted averages are 6.6 and 5.5 respectively).

Sources: Federal Aviation Administration of the U. S. Department of Transportation and the Official Airline Guide, February, 1968.

Alaska. Furthermore, recent experience with air fares in Alaska suggests that small reductions in the cost of travel lead to large increases in the demand for travel.⁶³ Therefore, introduction of jumbo jets and the recent airline mergers will increase the demand for tourism if these changes lead to lower fares.

Much of the increase in tourist traffic in the future will find its way into the Anchorage area because Anchorage is the major supply center for food, lodging, merchandise, and transportation services. The future increase in this tourist activity means an increase in the surrounding areas as well.

The planned facility improvements in Seward are indicative both of the future tourist travel and inducement for it. If the roadway across the Turnagain Arm is completed in the not-too-distant future, the whole Kenai Peninsula, including the Seward and Portage areas, should be able to attract even more tourists (as well as the many Anchorage residents who use Seward and Portage for recreation areas).

The scenic areas of Valdez and Cordova should be able to share in the growing tourist market, especially as improvements in ferry service make these places more accessible. With the eventual completion of the Copper River highway, a great many tourists will be channeled to the primitive areas around Cordova. Similarly, if the proposed additional campground in the Keystone Canyon Park is built, Valdez will experience additional camping traffic.

Kodiak will continue to attract people who come to hunt (both with guns and with cameras). Improvements in the direct air service to Seattle, if realized, would have a favorable impact on tourist activity on the island.

Bristol Bay and the Katmai National Monument presently attract approximately 1,000 tourists a year. This level will increase at a moderate rate in future years, but any substantial increase in tourism in this area depends upon improvements in transportation and additions to the supply of lodging facilities. Direct coordination between lodging and transportation facilities is needed here for it does little good to increase one without the other. In order to open up a market for Bristol Bay fish in the Midwest, direct flights to Minneapolis have been proposed. If this occurs, the potential the Bristol Bay area has for attracting tourists from the Midwest (especially fishermen) may be realized, for the introduction of direct service between distant points in the U. S. has generally led to significant increases in demand for travel between the two points.

Tourist activity in Palmer is nowhere near its potential level. Palmer could attract a great many more of the people who travel the Alaska Highway into Anchorage if it offered special facilities to appeal to these

tourists. Furthermore, the Independence Mine area could develop into a major ski resort area. Such winter recreation activity in Palmer would be a significant economic asset to this area that is today plagued with a large amount of seasonal unemployment.

The market for tourism in each separate location within Region II depends a great deal upon the "supply" of transportation to these areas. This does not mean that the introduction of improved transportation service to one area necessarily "steals" tourists from another. Increasing the number of locations a tourist can visit by providing easier access to these areas would tend to increase the total number of tourists coming to Alaska and the amount of time each tourist spends in Alaska. The completion of the highway between Anchorage and Fairbanks or the construction of a causeway across the Turnagain Arm, for instance, probably would increase the number of tourists coming to Alaska and the amount of time each tourist spends in Alaska. The point is that an increase in the diversity and availability of transport routes has the effect of enhancing and extending travel generally rather than substituting one traffic flow for another.

The actions of different localities, then, tend to affect the tourist demand for the whole state so that projections of future tourist demand depend very heavily on the assumptions one makes as to how various regions react to the opportunities open to them. For this reason, projections of future tourist demand in a given region in a time span greater than three or four years become very difficult to make. The estimates in Figure 3-82 have been made on the assumption that the future will look like the past in the sense that the rates of growth in the near future will follow past rates. Because the validity of this assumption may hold for only a short period of time, projections have not been made past 1971.

The high projection of 96,335 tourists in the Anchorage area by 1971 is likely to be attained only if there should be some reduction in air fares, and/or the travel tax on foreign travel is imposed for the whole period 1968-1971. Alternatively, with existing transportation facilities and with a moderate expansion of lodging facilities, the low estimate of 72,600 visitors in the Anchorage area by 1971 should be realized with ease. This increase of 23,400 tourists over the 1967 level would create an additional 425 jobs in the area.

Carefully managed and fully encouraged, the tourist industry could become one of Alaska's biggest job creators.

F. Services Sector

(1) Tertiary

In terms of size and rates of growth, the tertiary sector (trade, finance, insurance, real estate, and services) is of great importance to the

FIGURE 3-82

REGION II TOURIST ARRIVALS AND EXPENDITURES AND JOB CREATION
1968 TO 1971

	1968		1969		1970		1971	
	LOW EST.	HIGH EST.	LOW EST.	HIGH EST.	LOW EST.	HIGH EST.	LOW EST.	HIGH EST.
Tourist Arrival in Alaska	95,400	98,800	104,900	112,700	115,400	128,500	126,900	166,900
Tourist Arrival in Anchorage Area	54,100	64,200	59,800	73,500	66,000	84,200	72,600	96,300
Tourist Expenditure in Anchorage Area (in millions)	\$16	\$19	\$18	\$22	\$20	\$26	\$23	\$31
Direct Employment Resulting from Tourist Expenditure in Anchorage Area	800	950	900	1,120	1,000	1,300	1,150	1,550

Sources: Estimated from figures presented in Cresap, McCormick and Paget study, *A Program for Increasing the Contribution of Tourism to the Alaskan Economy*, 1968, and the Alaska Department of Economic Development and Planning, *Traveler Profiles*, 1964.

Region II economy. Within Region II the City of Anchorage stands out as the largest supplier of these tertiary services. The modern hotels, the many retail establishments, the growing number of doctors, attorneys, CPA's, and educators, and the growing importance of banking to the city demonstrate that Anchorage is indeed the service and financial capital of the whole state.

The following figure describes (in terms of employment) how important the tertiary sector is to Region II and Anchorage. Roughly the same pattern emerges in terms of value added or income originating in these sectors though at somewhat different levels due to the below-average wage level in the wholesale and retail trades. Figure 3-10 shows that growth since 1961 in the service and finance sectors in Region II has been faster than the growth of the whole economy, with growth in the finance sector being quite rapid. Employment in the wholesale and retail trades, on the other hand, has been relatively stable, though the record shows great variation among districts within the region, with Kodiak, Kenai, and Anchorage experiencing fairly rapid rates of growth.

Growth in the tertiary sector is usually seen as a result of growth in the whole economy--in particular, a growth in personal and per capita incomes. As incomes rise and as the society begins to fulfill basic needs, households begin to demand more and more professional services (from beauticians and barbers to bankers and brokers). This factor, the so-called income-elasticity of demand for these services, has and will continue to play an important role in the Region II economy. But more than that, Anchorage's existing advantage over the rest of the state in terms of a ready supply of professional services and retail outlets means that future growth in any part of the state creates growth and generates income and employment in Anchorage. Oil development in Prudhoe Bay, for example, may create a demand for legal services in Anchorage just as the scallop industry in Seward may generate a demand for financial services at Anchorage banks.

The growth in the tertiary sector in Alaska's current stage of development is something more than just a response to growth in other sectors of the economy. It is in itself a catalyst for growth. One of the problems with which Alaska is faced--perhaps a major problem--is that purchasing power, i.e., money income, rapidly leaves the state. People and corporations come to Alaska from all parts of the nation with money borrowed from non-Alaska banks to develop resources and markets, the profits and wages from which frequently leave the state without contributing markedly to the demand for goods and services within the state. The result is that the impact (or multiplier) from any given development within the state is markedly reduced.

The growth in Region II's tertiary sector, especially the financial sector (and the growth in employment is also matched by a growth in demand deposits within the state), may be an indication that the "dollar outflow" is

FIGURE 3-83

PERCENTAGE OF THE NONAGRICULTURAL CIVILIAN LABOR FORCE
OF ALASKA, REGION II, AND ANCHORAGE EMPLOYED
IN THE TERTIARY SECTOR, 1966

	ALASKA	REGION II	ANCHORAGE
Trade	14.6%	16.2%	18.1%
Finance, Insurance, and Real Estate	3.1	3.6	4.3
Services	<u>10.7</u>	<u>11.9</u>	<u>12.9</u>
TOTAL--Tertiary Sector	28.4%	31.7%	35.3%

Source: Derived from Alaska Department of Labor *Workforce Estimates*, 1966.

beginning to dwindle. If residents of Alaska come to Anchorage for medical and dental treatment instead of journeying to Seattle, if the earnings of export enterprises are deposited in Alaska banks allowing them to be reinvested in Alaska, then the regenerative effects of any given development within the state will have a greater impact on the whole of the economy.

(2) Government

The government has traditionally been such an important part of Alaska's economy that it is well to focus briefly on its activities in relation to future growth.

The flood-control and navigational-improvement projects that the Army Corps of Engineers is currently studying are on the whole small-scale projects that would provide only a small number of construction jobs and would not seriously alter the pattern or location of economic growth. Several of the projects which are currently under review in Washington, D. C., include a flood-control project on the Klutina River and the dredging of a boat basin in King Cove and Sand Point. The King Cove and Sand Point projects, if initiated, would allow the fishing industry (particularly the shrimp industry) to expand in these areas. In addition, King Cove has obtained a grant of a quarter of a million dollars to improve the water system which is necessary in this area for fish processing. The cumulative effects of these two dovetailed projects would greatly stimulate fishing in this area.

An additional project that will be initiated in the next three years if the proper funding can be obtained is the improvement and enlargement of the Kodiak Harbor. Kodiak is now in a position to capitalize on the crab and shrimp trade. Failure to provide adequate harbor facilities for the larger crab boats would hamper Kodiak from full participation in an important source of growth.

Other studies being made by the Corps of Engineers include flood-control projects on the Matanuska, Susitna, and Anchor rivers; navigational improvements in Naknek Harbor, Raspberry Narrows, Cook Inlet (Anchorage and Kenai); and beach-erosion preventative measures in Dillingham and Kachemak Bay. These proposals, if adopted, would not be implemented within the short run (the next three years) and, like the other projects, would not alter the location of economic activity though they may moderately improve the rate.

(3) Military

Historically the military has had a major impact on the economy of Region II. Military payrolls contribute to the demand for goods and services much like the import of tourist dollars. Military construction projects oftentimes supplement the community's transportation and communication system

in addition to providing direct employment in the erection of such facilities. But a frequently overlooked aspect of military activities is the inputs it contributes to the labor force. The military, by drawing prime-age males from areas outside of Alaska and educating and training these personnel, provides to the community a trained and educated labor force "cost free" when these personnel leave the military and enter the local civilian labor force. No quantitative study has been made in trying to assess the importance of this source of growth, but in a region where the military personnel make up 14 percent of the total population it should not be ignored.

The military is playing less of a role in the economy today than it did in the past, and it will play relatively an even smaller role in the future. As previously mentioned, the growth in military personnel has not been as fast as the growth in population--in 1960 15 percent of the population in Region II and 14 percent of the population of Alaska were military personnel, by 1966 the percentage of the population in Region II in the military had fallen to 14 percent and in the state 11 percent. Whatever productivity growth the military has injected into the economy via the labor force will, in the future, have to come increasingly from Alaska's own efforts in training and educating its labor force.

Military construction projects in the 1968 to 1970 period can be assumed to remain stable. The effect of these projects on employment and per capita income in the various regions depends a great deal on what type installations are built and from where the labor force is drawn. In the Amchitka Atomic Energy Commission project, for instance, the importation of civilian workers from outside the region resulted in an employment multiplier close to zero, giving virtually no benefit to the economy.

The planned 21 million dollars in facility investments in the Alaska Peninsula and the Aleutian Chain for 1968 and 1970, then, could result in direct employment of anywhere between zero and 400 persons, depending upon the organization of the projects.

Predictions as to how an exogenously determined variable like military spending will behave in the future are at best difficult to make. The record of the past plus the scattered and incomplete indicators that are available for the future suggest that the military will be a source of stability not a source of growth in the next three years in Region II and that for the period after 1971 one of relative decline.

G. Transportation Sector⁶⁴

(1) Transportation and Traffic Flows

To achieve a self-sustaining, viable economy over the longer pull, a broadening of Alaska's narrowly based economy is required; and transportation advances have helped and can continue to bring this about. Services

and government oriented, with occasional sectors of selective industrial activity (chiefly oil, pulp, and salmon fisheries), the overall economy is still at the resource-development stage. Growth in the region and as among sectors has tended to be uneven. Government aside, and with a small "domestic" market, the importance of expansion of the export base is great indeed; and it is here that advances in the transport system can make perhaps their greatest mark. The *volume* of exports plays a large role in determining the income levels of a region and, hence, its internal growth--the amount and character of secondary and tertiary activities, population distribution, and labor-force skills. This assumes, of course, the existence of generous natural endowments for the regions, as is the case with Alaska.⁶⁵

The notable economies of scale that attend large market size are generally absent in Alaska. In this respect the region is penalized by smallness. The "geography of concentration," where agglomerations of economic activity become the important geographic fact, generally remains an illusive factor for Alaska. The possible exception is Region II.

The Alaskan economy, still in the early stages of development and based only partly on a few extensive resource industries of some primary and almost no secondary manufacture, has an unbalanced traffic flow. North-bound dry cargo from West Coast ports consists mainly of staples for domestic consumption, industrial and military construction goods, and commercial supplies. Fish products comprise the bulk of southbound cargo, except for the major flow of crude oil from the Cook Inlet area which moves southbound in tankers. Refined petroleum shipments are northbound to all Alaskan regions and move in tankers and, in some cases, via pipeline for part of the journey. Sixty percent of the traffic is associated with the southcentral region, the core of commercial activity. Similarly, examination of the major passenger and freight origination points for air traffic reveals that southcentral Alaska (Anchorage, Kenai, and Fairbanks) has about 45 percent of all originating passenger traffic and a vastly higher percent of originating tonnages.

An outline description of overall Alaska traffic flows would contain the following key summary features:

....Each of the regions of Alaska has a unique traffic flow, and the proportions of traffic associated with each are widely distributed with the southcentral region clearly dominating the patterns.

....The growth in crude-oil movements as a result of vigorous oil exploration and production activity in the Cook Inlet area is striking, and every indication is that it will continue to climb over the next few years. Larger northbound shipments of dry cargo to support this activity will be generated.

....Alaska's foreign trade will continue to grow and diversify as forest-product export activity increases in the southeastern part of the state, and perhaps in the southcentral as forests previously neglected now come into commercial use, liquefied gas moves in export from the Kenai Peninsula to Japan, and a derivative petrochemical industry (e.g., ammonia/urea plants) comes into fuller production.

....Increased volumes of traffic associated with earthquake reconstruction have "petered out," but growth in population, industry, commerce, income, and the pace of development presages a rising trend in most sections of transportation.

....Shifts within the transport sectors are taking place to include a relatively stable amount of traffic for the Alaska Railroad, a "normalizing" of military cargoes flowing over the "regular" transport system, a relative shift from large, self-propelled vessels to railcar barge services, other barge and smaller ship operations, and truck and jet air transportation.

The forces that are now operative in and around the Alaskan economy rather consistently spell one thing--increased traffic and, hence, increased demands on the transportation system. As domestic and world demand increase for the state's resources--minerals, oil and gas, forest products; as population grows and concentrates in economic-core areas and per capita incomes rise; as secondary and tertiary manufacturing enterprises locate and expand to meet growing markets; and as Alaska's price/cost differentials are narrowed, the volume of traffic moving to, from, and within the state will grow markedly. The transport system should not only be in a position to service this growth but should act as well to bring it about and reinforce it.

(2) Water, Air, and Overland Transportation

The main thrust of current mechanization and modernization in Alaska's transportation has been in that area where the cargo traffic is highest--southcentral Alaska. New modes of transportation have been introduced. With these new modes or combinations of modes have come not only improved services but also lower rates. The City of Kodiak has also benefited by tapping into the Sea Land Service, which provides containership service to the Port of Anchorage from Seattle on a weekly basis. Kodiak has been able to concentrate a number of processors in its immediate area, reduce the seasonality of production through multi-product processing, improve its port facilities, and attract with its growing tonnages additional service from water carriers at a reduced rate. But the fact remains that a major portion of the fishing industry is not physically positioned to take advantage of the major transportation improvements that have occurred in Alaska during the past five years. Indeed, if anything, the

improved competitive position of the few points (such as Kodiak) enjoying the better service and lower rates has made the "remote areas" even more "remote" to the mainstream of economic activity.

The rates for the movement of seafood products from those ports not in the mainstream of Alaska commerce have not followed this downward trend. Given the existing pattern of isolated processing plants and inefficient port facilities, and presuming a continuation of the current system of high-seas cargo carriages, it seems certain the freight rates for ports other than Southcentral's will move upward with each major increase of the carriers' wage structure and other operating costs.

Roughly 63 percent of the king crab catch and 59 percent of the Dungeness crab take was concentrated in the central Alaska fishing area (Cape St. Elias to the southern tip of Unimak Island on the Aleutian Chain). The major processing, as mentioned, has been centered in Kodiak Island. Increased production facilities are also being developed to the westward out of Unalaska, and this may be speeded up by the recent auctioning of lands formally held by the Navy (Dutch Harbor). It is this growth of a new fishing effort which has reduced Kodiak's dependence upon the highly seasonal processing of salmon and halibut. This "more year-round" operation plus the increased tonnages have attracted additional service from water carriers and resulted in reduced freight rates.⁶⁶

So far discussion has emphasized water carriage, and it is anticipated that the bulk of Alaska's fishery output will continue to move by water at least in the initial portion of the trip to market. However, other means of carriage should continue to be useful either in the direct movement of fish to market or in complementing the water carriage whether by closing gaps or by providing alternate service during certain seasons of the year.

Air freight will continue to be used where a fresh product of relatively high unit value is being shipped great distances; e.g., Alaska to Hawaii when direct routes are established. Freshwater fish could fall within this category if production and marketing problems can be resolved. Fresh shellfish and salmon should continue to move by air and in increasing volumes. But the demand for speedy movement of fresh products is tempered by the problems of quality control, of assured and timely delivery, and of relatively high freight rates. The real potential for the so-called "fresh" fish industry appears to lie in quick-frozen processes that employ new techniques using lower temperatures. Given adequate holding space and refrigerated surface carriage, the "fresh-frozen" product can be moved at a more leisurely pace than by air if the lower surface rates justify using slower transportation.⁶⁷

Publicity has also been given to the pending new family of aircraft--the "stretched" versions of the existing long-range jets, the "jumbo" jets, and the "supersonics." In Alaska there are three civil airports that, due to their strategic location on the international air routes, will likely be involved in the operation of this new type of aircraft--Anchorage International, Fairbanks International, and Cold Bay. All have been listed as needed in the international system of ICAO airports--a national commitment--but they are also transportation facilities that are vital to the economy of Alaska insofar as domestic and international air trade are concerned. All three are presently being used by the existing long-range jets, but all three will require additional development to permit operation of the larger aircraft--terminal-building expansion, additional apron and a new runway at Anchorage; terminal-building and apron expansion at Fairbanks; and additional apron for the refueling of the all-cargo jet aircraft at Cold Bay. The first stage of development of the new Anchorage International Airport is started and may be ready for service by the fall of 1969.

Two airports need upgrading on the Anchorage-Kenai-Homer-Kodiak-Seattle route of Western Airlines to allow B-720 service at all points. A runway extension to 7,500 feet has been programmed at Kenai, and the work began late in 1967. The first stage of runway extension and apron construction was scheduled to get underway at Homer during 1968.⁶⁸

Extensive work is required at many of the state-owned airports in southwestern Alaska before they will be suitable for jet operations. At several locations (notably Bethel and Dillingham), the nature of the work requires staging over two or three years. With such a long time span before they will be suitable for jet operations, early initiation of construction is needed. Reeve Aleutian Airways, the carrier serving the Alaska Peninsula, has no firm requirements for airport improvement at the present time. The airports at Cold Bay, Adak, Amchitka, Shemya, and Attu are now suitable for jet operations.

The jet aircraft presents the greatest problems in upgrading the Alaska airport system because the airport physical requirements and associated facilities are most critical and costly. Development needs to be carried out on a route and equipment system basis. Economical operation cannot be achieved if a carrier has to use different types of equipment over a route segment where the airports are not compatible with the most efficient aircraft. The airline mergers recently concluded hopefully will be followed by a CAB review of present service patterns and a possible resultant realignment of routes toward elimination of the lower-activity communities from the jet service picture. The propjets will continue to replace the DC-3 and C-46 aircraft on many of the lower-activity routes and can be expected to retain an important place in the air transportation service system for the foreseeable future.

The general "roadlessness" of the state is widely known. Except for a slender net in the Railbelt area, the Alaska Highway connections, and a few stubs on the Seward Peninsula, there are not even the beginnings of what might be called a road system. Between the Railbelt and the Seward Peninsula there is a land area the size of California and Indiana combined with virtually no roads at all. Given the concentration of population (hence, political strength) and economic activity (hence, economic strength), it is likely that what road building as goes on will be generally confined to the heartland area over at least the one-to-three-year period and probably well beyond. Until the philosophy of and funds for access road development--so-called "road to resources"--become a reality, not much more than the retreading of the existing network can be expected.⁶⁹

(3) Transportation Industry

The importance of the transportation industry to the various sectors of an economy that it serves needs little further emphasis. The volume of passenger traffic and freight movements, the reduction of costs to suppliers and producers, the increase in productivity allowed, the patterns of commercial and industrial location that are shaped, the national-defense implications that result, and the communication and contacts for the public that are encouraged--all testify to its great significance. One further acknowledgement is required, however, and that is the relation of transportation to growth in an economy *as an income-generating industry by itself*. What is involved here are direct employment, payrolls, taxes, other operating expenses, and the creation of directly and indirectly associated facilities and services.

Given the state's stage of development and a great dependence on transportation, it is not surprising that the industry is a relatively major one in Alaska. The industry statewide directly employs about 10 percent of the nonagricultural work force, providing a like percent of the total yearly payroll. Indirect employment of over 1,000 workers with a yearly payroll of \$17 million swells the totals considerably. In addition, about \$4 million in motor-vehicle taxes was collected by Alaska from truckers in 1965, about \$1 million from aviation fuel in 1967, and another million from marine fuel taxes. Region II participates in this economic activity in a leading way. While other numbers could be cited here to demonstrate the point, a brief sketch of current developments in Alaska's several transport sectors is indicative of the dynamics of the industry.

The application of containerization techniques and frequency of water and hydrotrain service continues to benefit the transportation corridor that is the Railbelt area of southcentral Alaska, and interest in sea-air joint routings and rates to improve service outside this economic core area is beginning to emerge. Extension of the Alaska Railroad north

and west of its Fairbanks terminus is increasingly the object of analysis and is treated later in this study. The possibility of extending the shipping season by use of the polar icebreakers is now under study. In addition to the old petroleum pipeline running from Haines to Fairbanks, the Department of Defense recently constructed a second pipeline from Whitter to the military base in Anchorage. In the former case, a study is underway to look toward its possible commercial usage. A gas pipeline transmits natural gas from the producing areas on the Kenai Peninsula to the Anchorage area for use in heat and power generation, while the oil companies have existing and under construction several oil lines across the Cook Inlet and along its west side. Truck registrations continue to rise (20,000 in 1960 and 33,000 in 1965), and interstate motor freight carriers are increasingly on the Alaskan scene. The extent to which Region II comprises and supports the "corridor concept" of the movement of goods and passengers to and from Alaska is indicated graphically in the Figure 3-86.

H. Power and Communications Sector

(1) Power

Historically, Alaska's electric power industry grew up around mining, fish processing, forest products, government (especially the military), and a few distributive centers. As such, it is very much a fragmented industry and can barely be described as "a system." Nevertheless, dramatic increases in electric power loads have been experienced in the past twenty years in Alaska, while the national load growth doubled every 5.5 years over that period.⁷⁰ As elsewhere, its future growth will depend importantly on population, income, and price changes, consumption habits, engineering and technological advances, and the growth of Alaska's economic base. Much of the outcome will be determined by and associated with what happens in Region II. Further, the electric power problems found here are multiplied manifold in other regions--the prospects, however, are not.

The present makeup of Alaska's electric-power industry is atypical in a number of regards. The ratio of nonutility (industrial and government) to utility generating capacity in Alaska is extremely high. Nonutility plants (statewide) comprise about 57 percent of total generating capacity and about 40 percent for the Anchorage-Kenai Peninsula region.⁷¹ While private industrial generating loads have increased little in recent years, government agency capacity (particularly military) has expanded more substantially. The expansion of utility loads has been by far the most dramatic, but a policy question of the first magnitude surrounds the matter of permitting a large percentage of the load now being served by industrial and military generating sources to be supplied by "normal" utility systems more economically and efficiently. Presumably this should come about as existing nonutility plants become obsolete, utility power costs are reduced, and substitute

capacities are available.⁷² For this "normalizing" to eventuate, however, will require a combination of conscious public policy and good public-utility regulation. If agencies replace their existing plant, power rates remain high, or system efficiencies are low or lacking, the circularity problem will not be really broken--nonutility capacity will be preferred, withholding the load volumes that enhance lower power charges.

Unlike the general pattern of ownership elsewhere, private ownership of electric power utilities constitutes a very small portion of the state's total generating capacity--only 9 percent.⁷³ Municipal electric plants, cooperatives, and a federal hydroelectric plant make up the dominant public power sector. Hydroelectric power comprises a small portion of total power produced compared with thermal-electric installations (steam-electric, diesel, and gas turbines). Of these latter, only 30 percent of the generating capacity is in the utilities sector. Most of the unit sizes are small in size and high-cost in operation.

Generating capacity installations have historically been sized to fit the individual load of a utility system. It is generally felt that the need is great for inter-system coordination and intertie permitting construction of larger-scale and more efficient generating units with lower average costs and reduced rates to consumers. A major goal of the Federal Power Commission's Alaska power survey now in progress is "...to encourage the utilities of Alaska to accelerate coordination efforts."⁷⁴ In southcentral Alaska there presently exists an interconnect extending from the Matanuska Valley through Anchorage to Seward and Homer on the Kenai Peninsula.⁷⁵ The power output of the single federal hydroelectric plant (Eklutna) is purchased by this group.

Assembling a composite of costs from several of Alaska's larger electric utilities reveals that of the distinct functions of generation, transmission, and distribution, the percent that each comprises of total delivered cost is 68, 4, and 28 respectively; the same breakdown for electric utilities in the U. S. as a whole is 51 percent, 10 percent, and 39 percent.⁷⁶ Within these composites, operating expenses in Alaska (as opposed to fixed charges) are 68 percent of the total cost of power compared to 41 percent for the U. S. at large. These differences in part are explained by the nature, size, and operating characteristics of the sets of systems, but do indicate where cost incisions might be made in the Alaska case.

Power consumption --and, indeed, consumer attitudes--depend in good measure not on the internal allocation of costs but the total delivered cost of electric power. While the trend in power rates in Alaska as elsewhere has been downward, charges continue to be substantially higher than national averages and comparable communities. The price for residential service typically runs 50 percent higher, and the disparities between commercial bills are in the same proportion. Bulk power purchases by large (industrial) customers is practically nonexistent.

Any estimating of the prospects for electric power load growth of necessity involves a host of judgments and considerations. This large task is, as indicated earlier (*supra.*, footnotes 70 and 74), formally being pursued. Accordingly, no attempt at original research on the matter is made here; rather, the tentative load projections found in the studies are presented with qualification (or dissent) as indicated.

For the fifteen-year period 1950-1965, utility energy requirements in Alaska increased sixfold. Such dramatic growth seems difficult to maintain for the subsequent fifteen years, though some current forecasts approximate that.⁷⁷ Taking the population and personal income estimates used throughout this subregional study, changes of 506 percent, 456 percent, and 300 percent result from the "high," "average," and "low" assumptions. In southcentral Alaska the energy load has been forecast to increase by 2-1/2 times 1975 over 1965 and by another 125 percent 1985 over 1975.⁷⁸ Implicit in such estimates are favorable judgments about such factors as growth in population and a rise in per capita incomes and consumption of electricity, successful competition with other energy forms in terms of price and service, and significant economic expansion in the industrial and commercial sectors. On this basis one analysis forecasts the percent change in total use of electric power for the southcentral region 1975 over 1965 (by type of customer) to be as presented in the following table.

FIGURE 3-84

ESTIMATED PERCENTAGE INCREASE IN ELECTRIC POWER REQUIREMENTS
SOUTHCENTRAL ALASKA, 1975 OVER 1965, BY TYPE OF CUSTOMER

RESIDENTIAL	COMMERCIAL	SMALL INDUSTRY*	LARGE INDUSTRY**
70%	140%	63%	--

*For example, sand and gravel and construction activity.

**For example, petrochemical and forest products assumed to become significant by 1975.

Source: Federal Power Commission unpublished draft, *Alaska Power Survey*.

In 1965 approximately 61 percent of electric utility output in the state was generated in the southcentral region (not including southwestern Alaska). The share can be expected to increase in the coming decade. With the Fairbanks area accounting for about 15 percent of total generating capacity, it is clear why a "Railbelt transmission system" interconnecting the utilities of Regions II and IV must be investigated. Given the recent advances in plant engineering and transmission technology, the demographic pattern of economic activity in Alaska, and the location of gas and oil energy fuels at tidewater near the populated center,⁷⁹ the factors making

for the development of a rational power network providing reliable, low-cost, bulk electricity seem present. If the will and wisdom are also there, a positive step in this direction could be made by the four-to-six-year period. No significant change is foreseen in the crucial matter of power cost reduction in the one-to-three-year time frame.

Two related elements that bear importantly on Alaska's cost structure generally and the state's power costs in particular are the availability and accessibility (transportation) of energy fuels. With the exception of fuel oil, the fuels used for thermal power generation in Alaska are available from local sources, and demand increases on these industrial sectors can be expected. By one forecast the percentage of fossil fuel generation to total power generation in Alaska (already 52 percent) is expected to increase further.⁸⁰ Natural gas will increase from 2 billion cubic feet in 1965 to 23 billion cubic feet in 1985. The use of coal for the generation of electricity by utilities is expected to increase from 125,000 tons of coal in 1965 to 206,000 tons in 1985, and the use of oil is expected to increase from 308,000 barrels to 640,000 barrels during this same period.

But the cost adversities are presently substantial. The average cost of fuel for the utilities in Alaska for the year 1965 amounted to 66 cents per million Btu. This is more than 2-1/2 times the average cost of fuel for the contiguous 48 states. The average cost of coal, FOB the mines, paid by electric utilities during 1965, amounted to 34 cents per million Btu. This is more than double the price paid by utilities in the contiguous 48 states and makes natural gas a competitive fuel where available. It appears that the price of natural gas at the source may be 15 to 18 cents per million Btu, but the Anchorage delivered price is about twice that figure.

As might be expected, transportation charges make up an important part of the cost of fuels burned in Alaska generating stations. About one-third of the price of coal burned in the generating stations in Fairbanks is attributed to transportation charges. At Anchorage, transportation charges are a little less than one-fifth the delivered price. Transportation charges likewise constitute a substantial part of the cost of diesel oil burned in Alaska, a fact of particular significance to rural Alaska.⁸¹

Natural gas burned in gas turbines in Anchorage costs about 0.8 cents per kilowatt-hour, while the price in the fields is about half as much. The transportation cost of natural gas to Anchorage thus costs the power user about 0.4 cents per kilowatt-hour, or about one-seventh of the price he pays. The transportation cost for coal to Anchorage is somewhat less than for natural gas but still amounts to nearly 0.2 cents per kilowatt-hour. Fuel transportation charges are between 7 and 14 percent of the price paid for electricity and, depending on the proportion of the fuels burned, might average about 10 percent for 500 kilowatt-hours per month usage.

With fuel cost the major portion of total operating expenses and operating expenses in Alaska over twice that of the United States as a whole, the significance of the fuel-transport sector as another adverse element in Alaska's difficult cost structure is clear indeed. Thus, advances in the *transportation* sector that lead to cost reductions may be among the most important contributors to breakthroughs in the *power* sector.

(2) Communications

The demand for telecommunications is a constantly growing one. In an affluent society and an integrated economy it is not surprising that the history of the industry is dynamic. The demand for telephone service is not only "income elastic" in the economist's terms, but it is also "price elastic." Each time levels of charges have been reduced, whether willingly or at the urging of regulatory bodies, the "consumption" of service has increased and total revenues have gone up. There is no reason why the same pattern of growth will not obtain in Alaska. Here is a population that requires having at its disposal the latest in subscriber services--perhaps even more so because of its relative remoteness to other states; here is an economy whose emerging commercial character demands the best the industry has to offer in the way of voice and data transmission equipment at reasonable rates. In sum, Alaska presents a modern, mid-century society with an antiquated communications system.

Reduction of the prohibitive communication costs and improvement of communications services to Alaskan subscribers essentially removes one of the obstacles to economic growth in the state. It makes for a successful incision into Alaska's difficult and self-reinforcing cost-price problems. It strikes down a deterrent to development and is, therefore, a proper goal of public policy. Obviously, it would be incorrect to argue that communications costs alone determine business location decisions or the success or failure of enterprises. It is fair to say, however, that given Alaska's relative remoteness to commercial centers and its need for frequent, long-distance communications in the conduct of its marketing, ordering, and stocking practices, present levels of charges are demonstrably hurtful in the aggregate of overhead expenses. Enterprises requiring extensive use of electronic data-processing and data-collection telecommunications equipment would be encouraged; effective and vigorous promotion of communication services would likely follow and enhance the economic growth of the region. The case is clear that a highly interdependent society with a complex economy requires rapid, high performance, low-cost communications if it is not to experience bottlenecks and blockages which frustrate its total growth.

The present high-cost system is a true deterrent to economic growth in Alaska and is, therefore, contrary to the best interests of both the state and federal governments and the people of Alaska.

Alaskan subscribers are seriously disadvantaged in the cost sense. Figure 3-85 presents a comparison of telephone rates for three-minute, person-to-person and station-to-station calls from certain cities in Alaska and calls of similar distances elsewhere. Since typically the length of an ACS call is about eight minutes, total charges for such calls are also compared. Charges to Alaskan callers are three to four times that for other callers. Initial charges for a person-to-person Juneau-to-Seattle call show at \$6.50 for three minutes and \$14 for eight minutes against \$2.25 and \$4.25 for a comparable, contiguous, interstate distance. For station-to-station calls, the comparison is \$4.50 and \$12 against \$1.45 and \$3.45. Additional minute charges are \$1.50 per minute in one case and 40 cents in the other. And while it is true that traffic densities and differing operating characteristics can be cited as governing, they do not fully explain the differentials. In any event, the cost penalties that these unregulated rates impose on Alaska subscribers are clear indeed. Note, too, that the exhibit is for day rates; "after eight" rates for these points generally go down to one dollar, while, in the case of Alaska, there are no such rates, and the differentials are further accentuated.

A similarly burdensome cost picture is revealed in ACS monthly charges for private-line teletype leases to heavy-user Alaskan companies when compared with what the monthly charges would be for equal coverage under AT&T tariffs. Differences range up to 120 and 180 percent in the case of airline companies, over 90 percent with a news service, and 60 percent with a steamship company. Acknowledging the limitations of the comparison, the example is at least illustrative of the obstacles to an economical and competitive cost position for companies operating in Alaska.

Some rough indication of the potential for telephone growth in the state can be seen from noting that, while the average number of telephones per 100 population is 46 for the United States as a whole, Alaska has 29. Anchorage, Alaska's largest city, has 31 telephones per 100 population. Further, as one looks to the number of telephones in several Rocky Mountain communities of comparable sizes, one finds that Pueblo, Colorado, for example, has 20,000 more telephones than Anchorage; and Sidney, Montana, 30 more phones per 100 people than Ketchikan. Obviously the varying profiles of different cities dictate the particular numbers of telephones, but the orders of magnitude quoted are wide enough apart to be of suggestive significance.

Commercial telephone revenues for the total system--even with the cost and service disadvantages indicated above--have averaged 13 percent annual growth since 1963.⁸³ This included an 18 percent increase in 1964, a 13 percent increase in 1965, and a 15 percent increase in 1967. For the City of Anchorage the annual growth rates are more remarkable--9 percent in 1963, 12 percent in 1966, and a dramatic 17 percent in 1967.⁸⁴ Further, each time the long-distance telephone rates have been reduced (three times

FIGURE 3 - 85

COMPARISON OF TELEPHONE DAY RATES
FOR CALLS OF SIMILAR DISTANCES,
Alaska and Elsewhere

Route	Miles	Person-To-Person		Station-To-Station	
		3 Minutes	8 Minutes	3 Minutes	8 Minutes
Chicago-Philadelphia.	666	\$2.00	\$ 3.75	\$1.35	\$ 3.10
Ketchikan-Seattle	670	6.00	11.75	3.50	9.25
Boston-Omaha.	1282	2.65	4.65	1.60	3.45
Cordova-Seattle	1297	7.50	15.00	4.50	12.00
Cincinnati-Seattle.	1972	3.30	5.80	1.90	4.40
Nome-Seattle.	1979	9.00	18.00	5.50	14.50
Albuquerque-Edmonton.		3.40	6.65	2.30	5.55
Anchorage-Edmonton.		9.50	20.25	6.50	17.25

Source: 1929th Communications Group, Alaska Communication System, U.S.A.F.,
Seattle, Washington, and Mountain States Telephone Company, Denver,
Colorado.

since 1966), traffic volumes have increased, the length of calls has increased, commercial services (e.g., live network radio programs) have become more varied, and total revenues have strengthened.

It can be expected that the installation of modern service offerings at reasonable charges in this type of communication would serve to further strengthen receipts. With the economies that could be expected from a modernized system (there have been no significant capital improvements in the system during the past six years), aggressive marketing practices, improvements in service such as direct distance dialing, and lower rates (there are recognizable demand elasticities in the telephone market), total revenues should increase while average costs should decrease.

Looked at as a whole, ACS business has increased from a gross of \$14.8 million in Fiscal Year 1965 (which was \$1.2 million over the previous year), to \$16 million in FY 1966, to \$18 million in FY 1967.

For some time ACS has felt the demand for improved and modernized service offerings to commercial/industrial customers as well as residential users. The installation of direct distance dialing for Anchorage, Fairbanks, Juneau, and Ketchikan is recognized as clearly desirable, with an estimated resulting gain in net revenue of half a million dollars annually (measured against a relatively small, one-time procurement and installation cost of \$1.2 million). ACS sees the need for a submarine cable to Sitka, one of Alaska's fastest growing industrial centers, where revenues from telephone subscribers amount to \$200,000 annually. Installation of the Sitka cable is expected to result in an estimated increase of \$50,000 annually. TELEX service provides for direct teletype service from subscriber to subscriber, similar to use of the telephone. When ACS informally sounded out the demand for such service, it found some 70 potential subscribers at estimated annual revenues of about \$106,000. The constantly expanding activity of the oil industry in the Cook Inlet-Kenai area has been accompanied by increased demands on ACS. Similarly with Kodiak.

Finally, new communications services like electronic data processing and data transmission facilities (e.g., daily banking transactions), channel capacity for live and color TV, private lease lines, news facsimile transmission, and high quality live radio broadcasting are in demand. It is noted that "next door" the Canadians have TELEX and the capacity for live TV as far as Whitehorse. Alaskan requirements are still more intense and will further intensify with continued growth.

Having received Congressional authorization to dispose of the long-lines commercial telecommunication system in Alaska, the Air Force is this summer (1968) inviting industry to bid on the system. The evaluation of proposals, sale, and transfer of the system are expected to be concluded by July, 1970. Considerable interest in the disposal action has been

generated, and the legislation contains safeguards that point to a constructive public-interest result in economic and service terms. For these reasons the economic future of the commercial communications sector over the next few years can be forecast with some degree of confidence. The levels of rates and charges can be expected to be cut by at least one-third in the one-to-three-year period resulting in wider, more frequent, longer, and more extended use of communications services by the residential and commercial public. The pent-up demand for these services will be released through developmental rates and new service offerings, and total message (and network program) traffic will increase as will total revenues. This particular aspect of the cost of living and doing business in Alaska will be relieved.

The possibility of commercial satellite communications in Alaska in the near term is very real. COMSAT has applied for a land site in the Talkeetna area which would allow a ground station between the Anchorage-Fairbanks area. The company may become an active participant in the sale of ACS. The advent of COMSAT on the scene (or any other corporation with a satellite technology) would allow a great quantum jump in channel capacity and, given the proper rate and corporate philosophy, could bring communication costs sharply downward.

The subregions of the state will, of course, be affected unevenly in the new services and new charges. The expected benefits will not, however, be limited to the larger populated areas. Service to the bush areas will likely be expanded and upgraded.⁸⁵ To a considerable extent the benefits to the communities of the state will depend on the wisdom of the actions of the regulatory bodies, the state legislature, and the municipalities which own their local telephone utilities. With the sale of ACS, the interstate portion of the company's operation would naturally come under FCC jurisdiction. Among other things, this would mean that the Uniform System of Accounts prescribed by the FCC would be applicable to telephone and telegraph carriers. From this would follow the FCC's regulations of rates, levels of charges, rates of return, and service. Regulation of intrastate activities of the carriers would similarly fall to the public utilities commission under existing authority contained in Alaska's statutes. Assuming that the regulation of telecommunication rates and services is aggressively pursued, all subscribers can expect to share in the public-interest results on into the future. If state public utility regulation is extended to the municipalities (or, as is possible in the case of Anchorage, the municipal telephone systems are sold to the private sector), subscribers may further benefit.⁸⁶

Finally, one of the current fiscal problems of Alaska is its narrow revenue base. Broadening of the tax base with the advent of large manufacturing and service enterprises is much to be desired. Sale of ACS into private corporate hands fits such a program very well. Public utility

companies traditionally are substantial contributors to taxing bodies through corporate income taxes to the state (as well as federal) government and property taxes to local units. The public finance aspects are treated elsewhere in this study (*infra*, Chapter 7).

I. Linkages with Other Regions

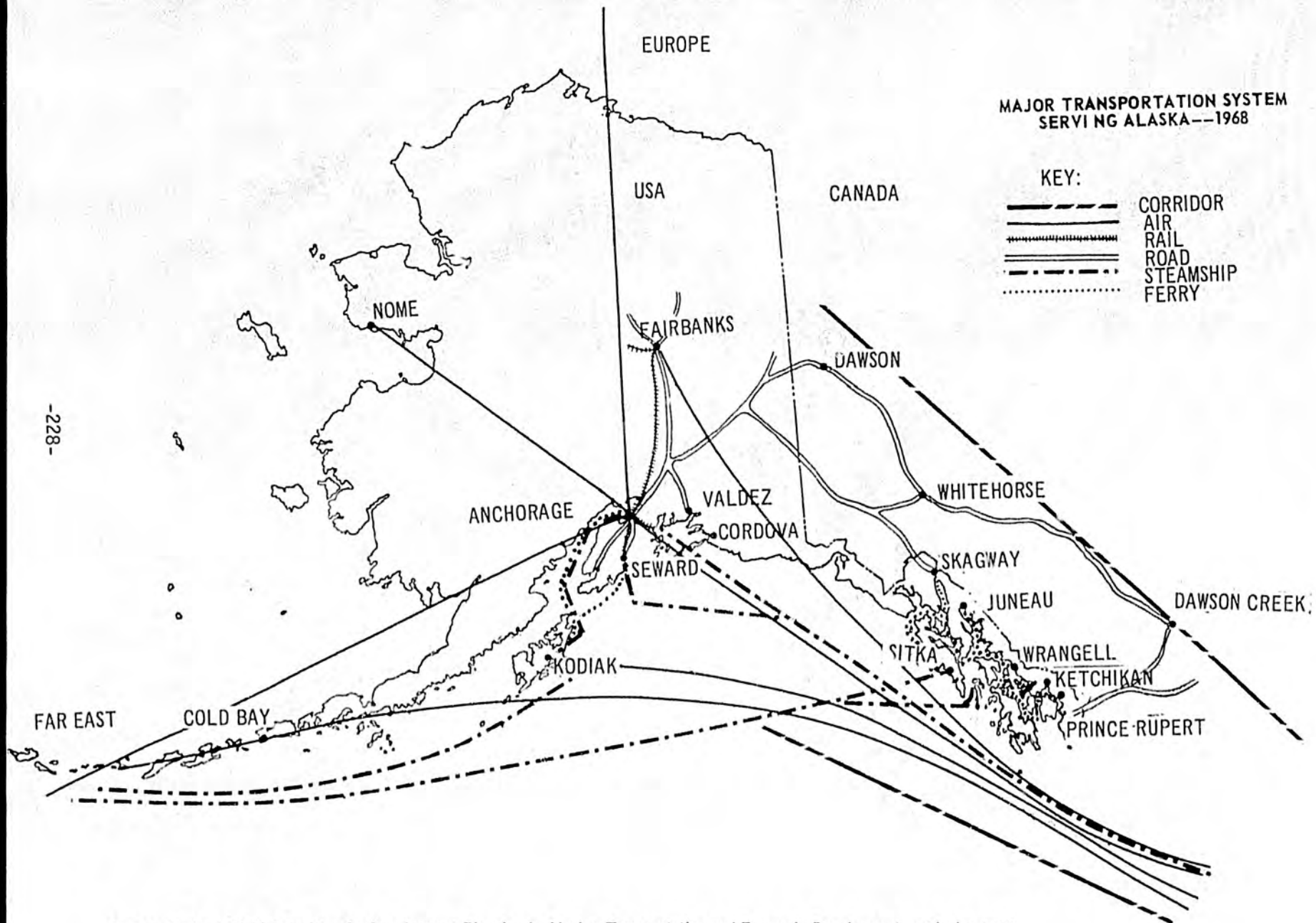
As has been seen, southcentral Alaska contains the present economic heartland of the state by almost any measure. The core of self-sustained economic activity--the only real growth area of any size--is located here. The present dynamic forces of development are embraced most specifically in the Cook Inlet Basin, comprising the Anchorage-Kenai area. With the gradual movement of the economic capital of Alaska from Seattle to Anchorage came a new and dominant relationship for the area. It is now only a slight overstatement to say that, "As this area goes, so goes Alaska."

One of the roles of a growth center is, of course, the provision of economic strength to surrounding areas. This leads to an examination of the interregional relationships--the linkages extant between Region II and the other regions. Both the metaphors of spokes radiating from a hub and of ripples generated by a splash are only partially descriptive of the role and relationship, for the economic "spokes" are not of even lengths and the "ripples" are not concentric. Yet in a functional if not a mechanical way Anchorage is the particular center which powers the economy generally.

Anchorage (and its environs) is to Alaska as, say, Boise is to Idaho. Accordingly, it is the marketing and distribution center; the transport, power, and communications hub; the commercial and financial core; and a seat of federal government (and considerable state) concentration. This being so, it is not surprising that the linkages running from the area to other regions (and, indeed, to other parts of Region II; i.e., southwestern Alaska) are several in number and direct in character.

Southcentral Alaska is the northern end of the transportation corridor which begins in Seattle and runs up the Pacific Rim (Figure 3-86). As such, the major northbound maritime traffic enters one or another of the parts of Region II for consumption or transshipment by rail or road (and sometimes air) to other regions. What few roads Alaska has are largely located in the region, and, as with the railroad, serve as the main arteries for freight traffic into the interior region. Having 55 percent of the population of the state and as an almost certain stop for the visiting tourist, the travel volumes from the region move out to all the other regions. The highly developed air system of routes and airports fans out from southcentral Alaska to the other four regions--and, indeed, to Seattle, Chicago, and the Far East and Europe. These provide ready and rapid links of very substantial political, sociological, and economic importance. Present and forthcoming Alaska-Japan marine movements and possible Alaska-Hawaii marine (gas) and air movements are further cases in point.

FIGURE 3-86



Source: Federal Field Committee for Development Planning in Alaska, Transportation and Economic Development in Alaska, 1968

The long-lines communication system has the largest of its four toll centers in the region with trunk-line connections to interior and south-east Alaska and military and commercial circuitry interconnecting all areas of Alaska with intrastate telecommunications as well as with the rest of the United States and Canada (Figure 3-87). When commercial satellite communication comes to the state the ground station will be located in this region for distribution of the signals to other regions. The statewide air traffic control center, with its elaborate communication network, is also being constructed here.

When Alaska's presently fragmented electric power facilities are rationalized into an efficient grid system, the interties from generation to transmission to distribution will be of greatest importance to the reduction of power charges throughout the Railbelt region (Regions II and IV).

Real estate, banking, and insurance enterprises emanate from Region II. The practice of branch banking (Figure 3-88) is a force for inter-regional ties and provides a flow of funds and financial information to many communities which, left to themselves, would otherwise do without. Anchorage Post Office is the central office for the postal service in the state--a service of singularly great significance in this state of remote communities and thin settlements.

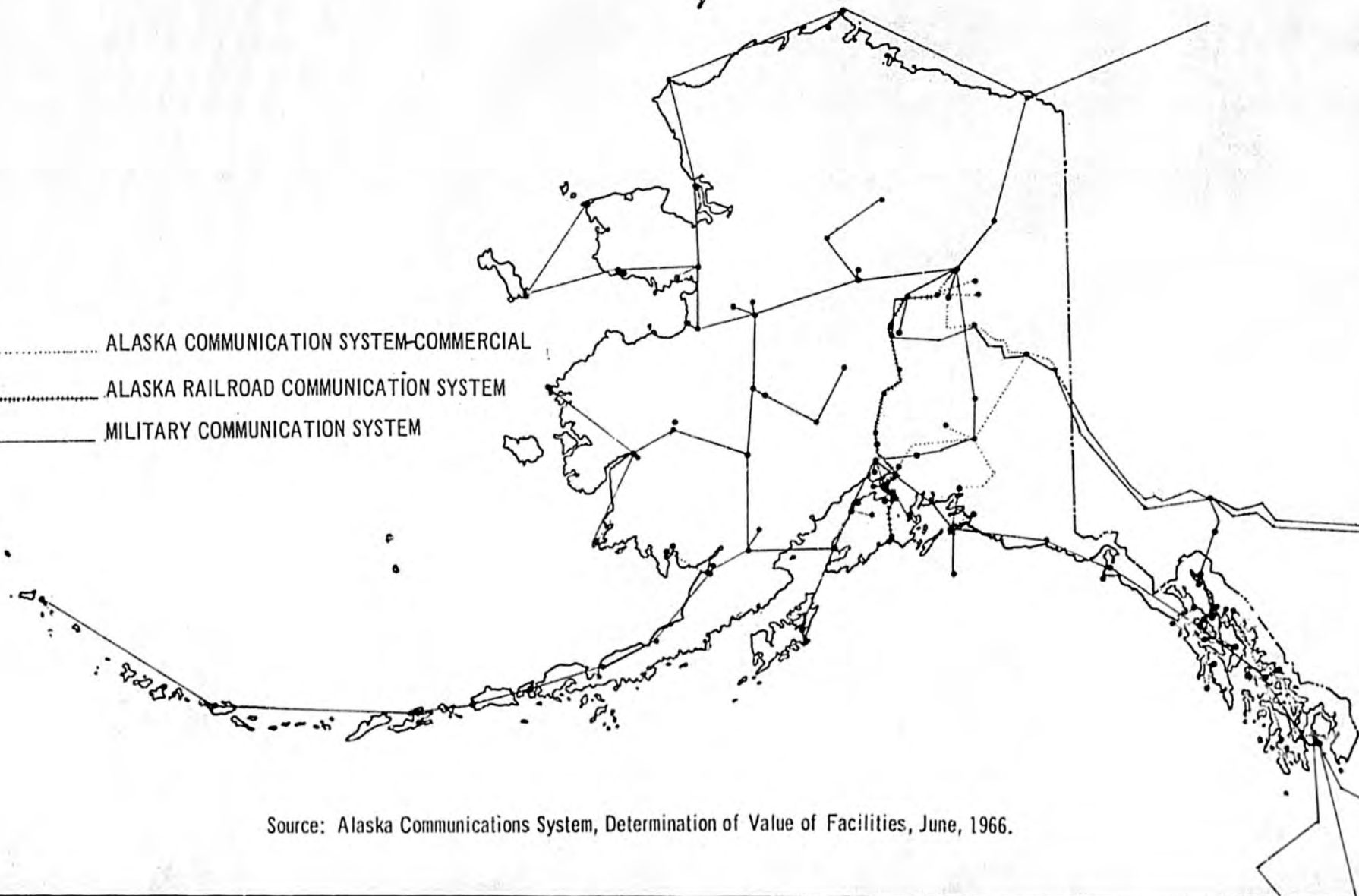
Government--federal (military and civilian), state, and local--as a major economic activity has many important links between Region II and the other regions in that many activities are either staged or headquartered in southcentral Alaska. Air Force, Navy, and Army units abound together with the Alaska Air and National Guards. The FAA, Alaska Railroad, and Public Health Service are among the major agencies that headquarter their statewide activities in Anchorage; and important divisions of BIA and BLM are to be found as well. On the state side, the Division of Lands operates out of Anchorage; on the local side, the linkup of successive Railbelt boroughs into a "development district" joining Regions II and IV may be possible at some future point.

Two further items require brief comment. One is the matter of the economic center as a cargo consolidation point for southbound movements (e.g., fish products) and a breakout point for transshipment of freight into surrounding regions. As pointed out, distribution patterns of this sort are already in existence in the case of several modes (air and rail) and some areas (the Railbelt). However, further advances in containerization and refrigeration will very likely enhance this redistribution role of the region as will the use of the area for resupply and logistic support activities of development elsewhere; for example, Bristol Bay, Seward Peninsula, or North Slope activities.

COMMUNICATION NETWORKS
1967

-230-

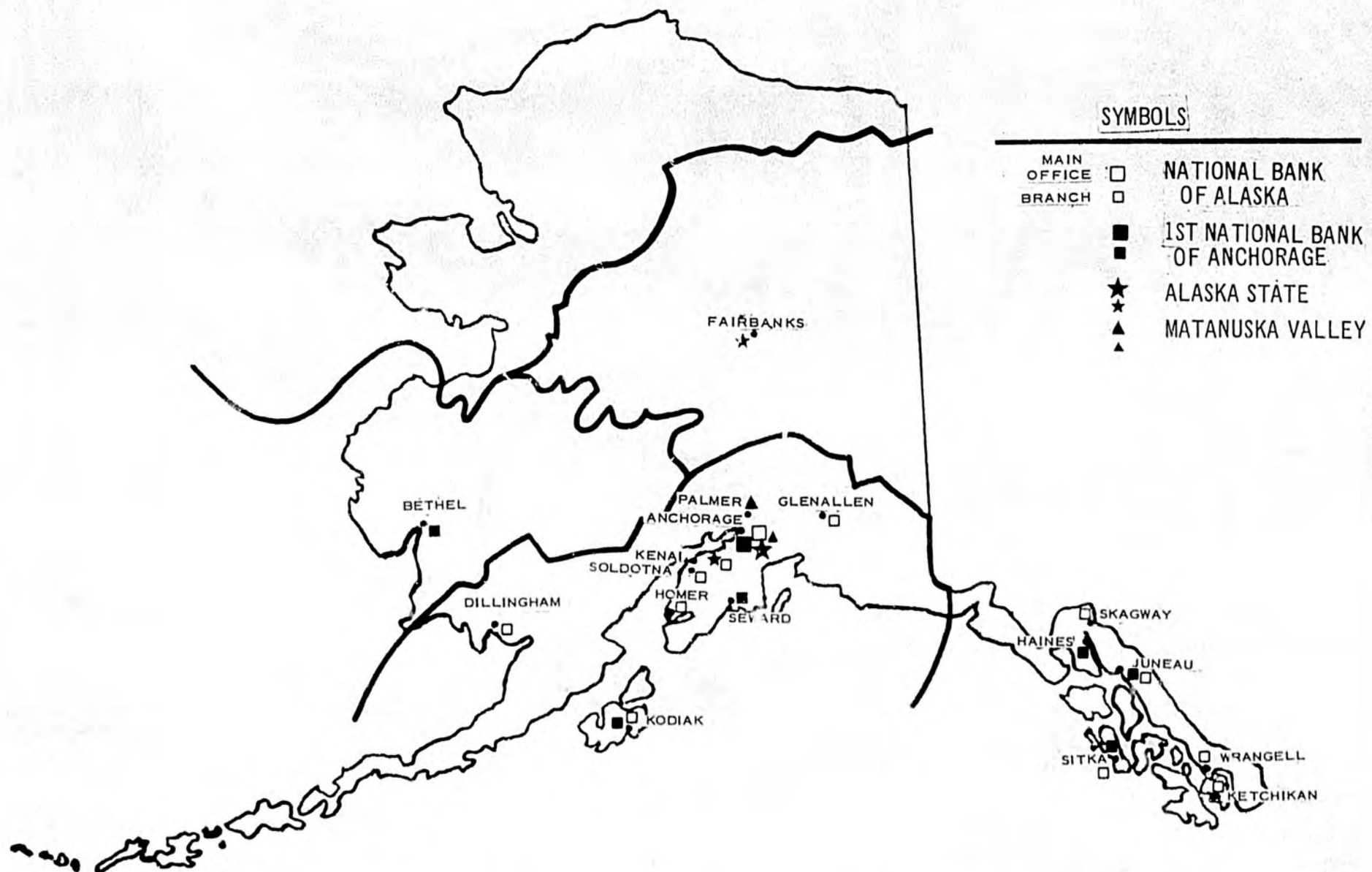
- ALASKA COMMUNICATION SYSTEM-COMMERCIAL
- ALASKA RAILROAD COMMUNICATION SYSTEM
- MILITARY COMMUNICATION SYSTEM



Source: Alaska Communications System, Determination of Value of Facilities, June, 1966.

FIGURE 3-88

ALASKA BRANCH BANKS WITH HEADQUARTERS IN REGION II, SOUTHCENTRAL ALASKA



The second issue turns on the relation of cost (and prices) to volume. This is the concept of "force feeding" the economic core in order to allow scales of operation and efficiencies that can mean the lowering of costs. In the transport sector, for example, this means that traffic volumes flowing through the "corridor" can have the effect of reducing transport charges across the board with attendant benefits to all regions. Finally, it should be explicitly acknowledged that the interdependency of the economic heartland with outlying regions means that not only do these latter regions benefit from the strength of the former, but also the core area draws heavily on the other regions for its sustaining momentum. This is the basis for the mutuality of economic interest.

J. Disaggregation and Reaggregation

This part of the analysis deals with an overall quantitative investigation of Region II.

(1) Economic Base Theory and Calculations

The basic approach is an empirical technique of investigation centering on the economic base of a region and the related employment and income multipliers. In its simplest form, economic-base theory asserts that certain economic activities in a region are "export" oriented, where export here refers to an outflow of produced goods or services from the region. The movement of oil from the Cook Inlet area to California or "exports" of service to the federal government are two examples of exports of this subregion. This export activity can be viewed as constituting the economic base of the region, with all other activities being (directly or indirectly) supportive to the economic-base activity. Hence, the export activity in a sense constitutes the reason for the *existence* of the region. In turn, it can be inferred that growth in the region is initiated in the export base, leading to a multiplicative expansion in the supporting sectors. It is the economic-base multipliers that are of particular interest in making forecasts. Simply stated, then, economic-base theory views total regional activity as a function of economic activity in the export sector.

There are some qualifications or criticisms of the economic-base approach that need to be mentioned, not only because they are necessary for proper perspective but also because they shed light on some of the empirical findings.⁸⁷ First, autonomous (internally generated) investment or increases in expenditures by domestic government units can be sources of regional growth even if the export base remains constant. Second, the emphasis on the export base as the basis for developing economic activity ignores the potential growth-stimulating effect of development of import substitute industries. Implicit in this second criticism is the assumption

that a more balanced or "self-sufficient" economic unit is preferable to one heavily dependent upon a narrow export base.⁸⁸ In the Alaska case it is highly doubtful that economic self-sufficiency is either a desirable or an attainable goal. Several reasons can be advanced in support of this position, but two are suggestive. The resource endowments of the regions, and the state as a whole, are not diversified to the extent necessary for meaningful self-sufficiency; also, neither the state nor any of the regions is large enough in terms of market size to support the broad spectrum of economic activity at the required scale.

The third criticism of economic-base theory of relevance to the present study is concerned with the conceptual neglect of the importance of an adequately developed supportive sector. Without this the potential growth of the export base may itself be limited. In other words, there is some minimum level of development in the supportive sector necessary for the sustenance and growth of the economic base. Also, since the export sector is competing with other regions, it is essential that costs in the supportive sector be such that export activity is economically feasible.⁸⁹

Though the economic-base approach is subject to these substantive criticisms, it is an empirical tool which can generate useful results. When these are carefully interpreted in the light of qualitative information regarding a region, valuable knowledge about the structure and development potential of a region can be gained.

Certain activities can be defined *a priori* as export oriented, and in the present analysis federal government activities (military and civilian) are so defined. In mining and manufacturing, coal and sand and gravel output in Region II is for domestic consumption, but petroleum and precious-metals mining is almost entirely export oriented. In the case of the manufacturing sector, a large portion of output in Region II represents processing of fish products, primarily for export. Further, activity in the distributive sector (transportation, communications, and public utilities; finance, insurance, and real estate; wholesale-retail; services) is generally classified as domestic market directed.⁹⁰ In summary then, the export base for Region II has been established as federal government, military and civilian activity and the export components of mining and manufacturing. Tourism, though of growing importance as an Alaska export, has not been incorporated because of a lack of consistent and adequate data. Simply stated by a conceptual equation, economic-base theory can be summarized as follows:

$$\text{Total regional activity} = f(\text{Economic-base activity}).$$

And though activity can be measured in any of several ways, such as output, income, or employment, in the present section wage and salary income has been the principal measure of activity.⁹¹

FIGURE 3-89

COMPONENTS OF THE ECONOMIC BASE STUDY SECTORS

SECTOR	COMPONENTS	SYMBOL
Economic Base and Economic Base, net of Military	Government, Military Government, Federal Civilian Mining Manufacturing	$\left. \begin{array}{l} X \text{ Base} \\ G_m \\ G_{fc} \\ M_i \\ M_a \end{array} \right\} = P$
Distributive	Transportation, Communications, and Public Utilities Finance, Insurance, and Real Estate Wholesale-Retail Services	DIST TCPU FIR W-R SER
Supportive	Distributive Sector Contract Construction Government, State and Local	SUPP DIST CC Gsl

As a first step in the quantitative formulation, the relationships of the aggregate distributive and supportive sectors were regressed against the export base, including the military component, using annual data from 1955 to 1965.⁹² The distributive equation says that for every unit increase in the export base there will be an increase in wage and salary income in the distributive sector of 0.89 units (where the units in this case are in millions of dollars). The total increase (the aggregate distributive multiplier) is the sum of the increase in the export base plus the distributive sector increase, or 1.89. The supportive equation is interpreted in a similar manner. Hence, given the projected income in the export base one can then predict distributive and supportive sector income.

It must be admitted that these multipliers are unrealistically large. The aggregate multiplier of 2.58 relating the distributive and supportive sectors of the economy to the economic base implies that all leakages (expenditures for goods and services produced outside the region, federal taxes, and savings) out of increased expenditures in the regional economy amount to only 38.8 percent, an unbelievable low figure. Without attempting a

deeper analysis of the relationship, the high coefficients can be attributed to three main influences: (1) a high rate of import substitution during the period analyzed adds to the increase in activity in the distributive and supportive sectors a component not directly a function of the increase in the economic base; (2) the increase in intergovernmental transfers, which account for about two-thirds of state and local government component of the support sector, are not represented in the base; and (3) investment in facilities for future production increases activity in the distributive and supportive sectors, particularly construction, without reflecting a corresponding increase in the economic base.⁹³

For the above reasons, projections using multiplier coefficients of this type may not be of the highest order of confidence. The economic base method, however, may be useful in comparing the relative contribution to growth of different parts of the export base. To determine this, the export base was disaggregated into its component parts. The theory underlying this disaggregation process is based on the assumption that components of the export sector are independent of one another, but that the secondary induced effects on the supportive sector are the same. In other words, it is assumed that within the export sector inter-industry transactions are negligible.⁹⁴

Next, regressions were run using both the distributive and supportive sectors as dependent variables, with the components of the export base as the independent variables. The most striking result was the complete lack of significance of the military variable. Not only was it insignificant for the distributive sector ($t = -0.22$) and the supportive sector ($t = 0.53$), similar results were obtained when components of the distributive sector were run separately against Gm. Others have previously come to the conclusion that the military's impact on the Region II economy was less than generally supposed, however it is somewhat surprising that no significant multiplier effects can be shown anywhere. This being the case, the Gm variable was dropped from the export base.

The next set of regressions were run using the Gfc and P variables as the independent variables.⁹⁵ Two items of interest should be noted. The multipliers in both equations are higher than in the first set of equations. A comparison of the coefficients in equations (3) and (4) indicates that the Gfc variable is a more important contributor to the supportive sector than is the P variable. This is not too surprising when one considers the importance of federal government construction activity in Alaska.

The final phase of the quantitative analysis was to disaggregate the distributive sector into its component parts. These dependent variables were then run against the independent variables Gfc and P.⁹⁶ The multipliers in this case turned out to be strong, ranging from 0.96 to 0.98.

(2) Interpretations

Some observations can be made from the results so far. One involves the dominance of federal government in the export base. In the 1960-1965 period, federal government accounts for roughly 87 percent of the economic base. The importance of the federal government in the economic base exists in spite of the large decline in both military employment and wage and salary payments over the 1955-1959 period. In terms of wage and salary payments this decline was sufficient to reduce the export base by almost \$11 million over the period. According to economic-base theory, a decline in the export base should have been accompanied by a multiplicatively larger decline in the distributive and supportive sectors. This did not occur. Instead, all components of the distributive and supportive sectors, except for contract construction, rose over the period. This increase in the face of decreased military payrolls is explained by the small increases in internally generated private investments and domestic government spending and by the fact that military payrolls have little impact on the distributive and supportive sectors. In fact, the regression analysis that was tried using the distributive and supportive sectors as a function of the export base (with military services as a component) showed that the military income multiplier was negligible.⁹⁷

The above results should not be interpreted to mean that the effects of, say, closing both Anchorage bases would not be felt in Region II. A substantial number of civilian jobs would be eliminated and undoubtedly some effects would be felt in such areas as retail trade. On the other hand, it is quite clear that only very major changes in defense expenditures will have any significant repercussions. This conclusion seems well substantiated for two reasons. First, the large decline in military wage and salary payments from 1955-1959 did not generate declines in the distributive and supportive sectors as would be expected. Second, no multiplier effects, either aggregate or by sector, can be shown to be statistically significant even though the regressions encompass very substantial changes in the magnitude of the military component of the export base.

Another observation involves the series on contract construction. It is a widely fluctuating series, both in terms of employment and wage and salary income, and in general bears little relation to the export base. Furthermore, the distributive sector does not seem to be materially influenced by, nor related to, changes in contract construction. It is apparent here, as in the case of other military expenditures, that contract construction activity suffers from a great many leakages.

Finally, in contrast to the high proportion of the export base accounted for by federal government activity is the somewhat distressingly small proportion attributable to the private sector. On the other hand, it is encouraging to note that the private sector share is increasing slowly.

In 1960 the private sector represented approximately 11.5 percent of the gross export base, or 22 percent of the export base exclusive of the military component. In 1965 the respective percentages had risen to 14 percent and 24 percent. It is likely that as petroleum activity continues to gain momentum the private sector share will increase more rapidly in this subregion.

In summary, (1) from the standpoint of growth and development, the future does not depend heavily on variations in federal military spending and (2) the private sector component of the export base has a substantially higher multiplier effect on the distributive sector, both in total and by subsector, than does the federal civilian government variable. Both conclusions have implications for development planning.

(3) Estimates

The purpose of this section is to quantify in terms of income the expected economic growth in Region II for the period 1967-1975.

The actual task of economic forecasting is at best a hazardous one. Usually forecasts are based on the continuation of the existence of historical relationships that have been observed in the past. Unfortunately (from a forecasting point of view), these relationships are prone to change. On the other hand, it is possible to anticipate some of these changes. And, since the wheels of change tend to grind slowly, one can at least predict over the relatively near future the direction of change and, with somewhat more luck, can often fairly closely approximate the magnitudes of the changes involved.

The projections in this section are made by viewing growth as a response to the demand generated from *outside* the region for goods and services produced *within* the region. Within the private sector, then, growth would be primarily due to an expansion in petroleum, mining, fishery, forestry, petrochemical, and tourist activity. The actual calculations for income generated are derived from the regression equations developed in the previous section.

The growth of crude oil production in Region II seems fairly well assured. Wage and salary predictions for Region II petroleum production are presented in Figure 3-90, Column 2.

The potential development in fisheries activity is somewhat more speculative than that of petroleum, but even under reasonably conservative assumptions it promises to continue to be of significance for Region II. The projections for this sector are found in Figure 3-90, Column 3.

FIGURE 3-90

REGION II PROJECTIONS OF ECONOMIC BASE GROWTH
THROUGH 1975
(Millions of Dollars of Wage and Salary Payments)

YEAR	(1) Gfc	(2) PETROLEUM	(3) FISHERIES PROD.	(4) FOREST PRODUCTS (INCREMENTS ONLY)	(5) PETRO- CHEMICAL (INCREMENTS ONLY)
1967	91.5	23.2	19.4	0.0	0.0
1968	93.1	26.3	21.7	0.5	0.8
1969	94.0	30.4	23.9	1.0	1.5
1970	101.4	30.7	26.2	1.5	1.5
1971	103.2	31.0	28.1	1.6	1.5
1972	104.9	31.3	30.5	1.7	1.6
1973	111.9	31.6	33.4	1.9	1.6
1974	113.7	31.9	35.5	2.0	1.6
1975	114.6	32.2	37.3	2.1	1.7

Source: Author's computations.

Notes:

- (1) Government, Federal Civilian. A trend line was fitted to federal civilian government employment over the 1960-1966 period and used to project the 1967-1975 figures. The average annual wage was figured for 1964-1966 (\$8.17 thousand) and used to convert employment to wage and salary payments. \$500 raises were added in 1970 and 1973.
- (2) Petroleum mining. Employment was initially plotted against production for the years 1961-1967. A line was extrapolated on the basis of these plots to a production level of 300,000 barrels, giving heavy consideration to the most recent observations and the fact that manpower requirements are less for production than exploration. Based on the extrapolation, employment figures were derived. Employment estimates were converted to wage and salary payments by use of an annual average wage estimate of \$13,500. The petroleum series includes other export mining activity which has over the recent past amounted to something under one million dollars per year. It is assumed that this will continue to be the case.
- (3) Fish processing. Fisheries production projections were based on information supplied by the Bureau of Commercial Fisheries, Juneau, Alaska. The Bureau estimated levels of catch of all major species at varying times in the next few years. Using current market prices and estimates of meat yields per pound of catch, total "value to producers" was estimated for each specie. These figures were converted to wage and salary payments by multiplication by a factor equal to the ratio of wage and salary payments to "value to producers" for 1964-1965.
- (4) Forest products. Estimates of employment and income resulting from the sale and probable sale of various timber tracts in Region II have been made in another section of the study. Linear interpolations were used to derive annual estimates.
- (5) Petrochemical activities. These projections are based on an assumed total employment of 100 and an average annual wage of \$15,000 with small annual increments. If the annual wage estimates seem excessive it only serves to point up the limited multiplier effects (income-investment) of capital intensive industry.

The forest products export sector appears to be of substantially less importance than either fisheries or petroleum. However, as outlined elsewhere, production of forest products will continually increase over time. Projections for this sector are presented in Column 4 of Figure 3-90.

A final activity that is relatively certain to occur is the further development of petrochemical production. Of note here is that \$100 million in investment generates about 100 jobs when production is under way in some plants. Hence, although dollar value of production and investment may be great, an industry as capital intensive as that of petrochemicals has smaller multiplier effects (in terms of dollar value of production) than many others, such as fisheries, forestry, or, in particular, tourism. Petrochemical projections are in Column 5 of Figure 3-90.

On the basis of historical trends and current knowledge, the federal civilian government component can be expected to continue its steady growth. Projections through 1975 are found in Figure 3-90, Column 1.

A final note of interest is the changing shares of government and the private sector in the economic base. In 1966, for example, the government share is about 73 percent. By 1975 it is predicted that this share will have declined to 61 percent. Although this still leaves the federal government in a dominant position, the trend is definitely downward. One implication is that growth of the relative share of the private sector will lead to roughly proportional expansion of the tax base. This is of real importance for state and local government units within the region.

Using the multiplier coefficients developed in the preceding section, growth in the distributive and supportive sectors can be estimated from the figures in Figure 3-90. Figure 3-91 presents the predicted growth in these sectors.

In the case of the export base itself, steady, substantial growth is indicated in the distributive and supportive sectors. Projected growth in the distributive sector appears to be somewhat more rapid than in the supportive sector. Since the difference between the two is construction and state and local government, it is implied that one or the other (or both) is going to gain less rapidly than the distributive sector. State and local government has in the recent past been at least maintaining its share in total production, so it appears that contract construction may decline in relative importance over the next several years.

To step from regional wage and salary payments to personal income requires the estimation of property income, proprietors' income, transfer payments, and an item referred to as "other labor income." Estimates of these components are shown in Figure 3-92.

FIGURE 3-91

REGION II ESTIMATES OF DISTRIBUTIVE AND SUPPORTIVE SECTORS
THROUGH 1975
(Millions of Dollars of Wage and Salary Payments)

YEAR	(6) TCPU	(7) FIR	(8) SER	(9) W-R	(10) DIST	(11) SUPP
1967	39.4	12.2	30.8	52.0	134.3	222.4
1968	43.4	13.5	33.6	56.9	147.3	238.9
1969	48.5	15.0	36.9	62.9	163.4	258.2
1970	52.3	16.9	41.1	68.7	178.9	283.4
1971	55.5	17.9	43.5	72.6	189.6	297.5
1972	59.1	19.1	46.1	77.0	201.4	312.7
1973	63.6	21.0	50.6	83.5	218.6	339.4
1974	67.1	22.3	53.5	87.9	230.5	354.8
1975	70.6	23.3	55.5	91.9	241.4	368.3

Source: Computed from data in Figure 3-90 and equations (3)-(8) (footnotes 95 and 96).

FIGURE 3-92

REGION II PROJECTED COMPONENTS OF PERSONAL INCOME
THROUGH 1975
(Millions of Dollars)

YEAR	(12) SUPP + X Base	(13) Wo	(14) Ypri	(15) Yprt	(16) Tr	(17) WGM	(18) TOTAL
1967	356.5	13.9	29.2	32.1	22.5	80.0	534.2
1968	381.3	14.9	29.7	35.5	24.0	80.0	565.4
1969	409.0	16.5	30.3	38.9	25.8	80.0	600.5
1970	444.7	17.3	31.1	43.1	28.0	80.0	644.2
1971	462.9	18.1	30.6	45.8	29.2	80.0	666.6
1972	482.7	18.8	29.9	48.8	30.4	80.0	690.6
1973	519.8	20.3	30.1	53.5	32.7	80.0	736.4
1974	539.5	21.0	29.1	56.6	34.0	80.0	760.2
1975	556.2	21.7	27.8	59.5	35.0	80.0	780.2

Source: Author's computations.

Notes:

- (12) This column is the sum of columns (11), Figure 3-91, and (1)-(5), Figure 3-90.
- (13) Other Labor Income. Statewide "other labor income" was computed as a percentage of civilian wage and salary payments. The percentage remained quite stable and the average was used (3.9 percent).
- (14) Proprietors' Income. Based on extrapolations of the 1960-1966 statewide data it was estimated that this component would decline linearly from 8.7 percent in 1967 to 5.0 percent in 1975.
- (15) Property Income. Trend values of the statewide property income as a percentage of civilian wage and salary payments were used to project the percentage values over the projection period. 1967 = 9.0 percent, and 1975 was 10.7 percent.
- (16) Transfer payments. Transfer payments as a percentage of statewide wage and salary payments were computed from 1960-1966. These have remained essentially constant at an average figure of 6.3 percent.
- (17) Military wage bill. Present indications are that manpower requirements will remain at about present levels through the projection period. These figures do not include election districts 14 and 15.
- (18) Region II personal income. Sum of columns (12)-(17).

Growth of personal income over the projection period is substantial, although not spectacular. Perhaps the most important observation to be made is the changing structure of activity; i.e., the shift from an entirely federal government dominated economy to one more dependent upon the private sector.

Note that a mild slowdown in the rate of growth in the later years of the period is projected. This is primarily a result of two factors. First, the full impact of petroleum production growth will be reached by 1970, assuming that production will level off at 300,000 barrels per day by the end of 1970. After that the *growth* influence of oil in Region II will be negligible. (Obviously, if production exceeds the predicted level or exploration activity increases in the post-1970 period, the effects will be greater than estimated.) A second factor contributing to this declining growth rate is the use of linear extrapolations in estimating fisheries activity. This necessarily leads to a percentage decline in the growth rate. Furthermore, estimated maximum sustainable yields will either have been reached or will be being rapidly approached for several species of shellfish. Since these species are the major source of growth in fisheries activity, it is inevitable that the rate of growth will decline.

Finally, in discussing development potential it is important to look not only at sources of growth but also at potential barriers to even more widespread progress. It must be kept in mind that growth is not a one-sided affair. Always in opposition to maximum growth is a broad array of barriers or deterrents to growth. Frequently the removal or surmounting of these is as important to long-run growth as the existence of external demands for regional product. In this connection, it is well to again acknowledge a general barrier that presently exists, both statewide and in Region II: The price-cost structure of the economy is substantially above that of the country as a whole and, for that matter, above that of any other region of the country.

FOOTNOTES

CHAPTER 3

1. Alaska Division, Western Oil & Gas Association, *Alaska Petroleum Industry Facts*, January 1, 1968.
2. The public finance aspects, particularly as they relate to the "multiplier effect" of state expenditures which will be more possible by oil and gas receipts, are treated elsewhere in this study and draw especially on the Federal Field Committee's *Alaska's Economy in Case of a National Economic Pause: Fiscal Strength through Oil and Gas Receipts*, by J. E. Shafer.
3. This chapter has drawn heavily for descriptive material from the report, *Geology and Natural Gas and Oil Resources of Alaska*, by Gates, Grantz, and Patton of the U. S. Geological Survey, which was published in 1964.
4. *The Oil and Gas Journal*, January 8, 1968, p. 160.
5. Because these expensive rigs are obtained under relatively long term contracts, and because mobilization for drilling in Alaska is both time consuming and costly, it does not seem probable that Alaska's current capability for offshore drilling can be readily expanded for several years.
6. So far, about half of the prospects acquired in the 20th sale have been tested. Unless more favorable results are soon forthcoming, exploratory drilling will show a continued decline until the federal-state dispute is resolved. This may be many years hence if the parties choose to exhaust all avenues of appeal. (The dispute is presently at the federal District Court level.) Although the state could break this impasse by ignoring the federal claim on these prospects and offering them for lease, there is a reluctance to do this for fear that the probable discovery of oil would induce the federal government to mount a much more vigorous fight through the courts.
7. It is important to recognize that the total well capability of each platform is not a true index of the final number of production wells. The reservoirs of Middle Ground Shoals and Granite Point evidently have proven to be elongated and relatively narrow. Drilling from the Trading Bay monopod has encountered particularly difficult structures. While the platforms are capable of drilling horizontally 11,000 feet away from their fixed location, the long lense-like shape of the Middle Ground Shoals and Granite Point fields makes useless their platform well capabilities. It is probable that the average number of

wells per platform for these two fields and for the monopod Trading Bay area will be less than 50 percent of total capacity. Current experience in the McArthur River field is far more favorable. This field's platforms may realize a much higher ratio of producing wells to total well capability.

8. The discussion and conclusions of this section are excerpted almost verbatim from Arlon R. Tussing's *Alaska-Japan Economic Relations*, Institute of Social, Economic and Government Research, University of Alaska, 1968, under sponsorship of the Federal Field Committee for Development Planning in Alaska, pp. 54-55.
9. Exclusive of operating expenses and other noninvestment charges.
10. The Japanese firm owning 50 percent of the urea plant is constructing a special ship for hauling bulk urea. The U. S. firm, which will own the ammonia plant and the other 50 percent of the urea plant, will move anhydrous ammonia and bulk urea by ocean-going barge.
11. Shafer, *op. cit.*
12. Alaska Statutes 43.25.010.
13. Alaska Department of Fish and Game, *Commercial Fishing Regulations*, 1968, Juneau, 1968 Edition, Sec. 102.09.
14. Written Communication to Douglas N. Jones, Federal Field Committee for Development Planning in Alaska, from Robert R. Simpson, Deputy Regional Director, U. S. Bureau of Commercial Fisheries, Juneau, dated May 31, 1968.
15. *Ibid.*
16. *Pacific Fisherman*, 64th Yearbook Number, 1967, Vol. 65, No. 2, p. 137.
17. Simpson to Jones, *op. cit.*
18. *Ibid.*
19. *Ibid.*
20. *Fishing Log*, M/V Paragon, Shrimp Explorations, Gulf of Alaska-Bering Sea, 1964, U. S. Bureau of Commercial Fisheries, Exploratory Fishing and Gear Research Base, Juneau, October, 1964.
21. Simpson to Jones, *op. cit.*

22. Alaska Department of Fish and Game and U. S. Bureau of Commercial Fisheries, *News Release: Exploratory Scallop Fishing*, June 17, 1968.
23. Simpson to Jones, *op. cit.*
24. For a discussion of the development of the fisheries industry in the Prince William Sound area see: Alaska Department of Fish and Game, Commercial Fisheries Division, *Annual Statistical Report: Commercial Fisheries Division, Cordova Area, 1967*, Cordova, p. 1-3.
25. It is also significant that the Nichiro Fisheries Company, the largest salmon-canning company in the world, and the Mitsubishi Shoji Kaisha entered a joint venture with the New England Fish Company at Orca Inlet near Cordova in 1966. Although salmon was the only product packed at this plant, the company is now actively studying other products.
26. It is the opinion of both the U. S. Bureau of Commercial Fisheries and the Alaska Department of Fish and Game that the decline was reached by "over fishing." An abundance of mature crabs over seven years of age were taken during the heavy fishing of the prior five years, leaving a majority of "recruits" for the 1967 take. It is estimated that the resource is on the edge of sustained yield, which is estimated between 50-80 million pounds per year.
27. U. S. Bureau of Commercial Fisheries, *Newsletter*, December 27, 1966. The water problem can be overcome and plans are already underway for the immediate construction to provide a short-run solution and a study is in progress dealing with long-range solutions, but the pollution problem is major and significant. Recent pressures on the Food and Drug Administration to impose more stringent controls on food processors has direct implication to Kodiak as the nation's third largest port in terms of value of landings.
28. In the long run, the possibility of the release of Finger Bay from the Navy for disposal to civilian interests to insure the upkeep of the dock facility should be explored since the Navy reportedly makes little use of the dock and does not desire to make the necessary capital expenditures to maintain the facility.
29. This increase in the number of fishermen throughout the mature salmon-fisheries industry resulted in the State of Alaska's instituting a uniform system of gear limitation for 1968 in the Alaska Commercial Fishing Regulations. The effect of the regulation is to limit the salmon gear through restricting licensing of existing net fishermen and new entrants into this industry.

30. The conclusions in this section have drawn heavily from the U. S. Bureau of Commercial Fisheries' estimates of future activity in the southcentral region, as provided by written communication to Douglas N. Jones and interviews of June 21 and June 28, 1968.
31. U. S. Department of Agriculture, Forest Service, *The Primary Wood Industry in Alaska*, Juneau, December, 1967.
32. Michael R. C. Massie, *Marketing Hardwood from Alaska's Susitna Valley*, Institute of Social, Economic and Government Research, University of Alaska, November, 1966.
33. Anchorage Daily Times, April 25, 1968.
34. Mildred Meiers Hansen, *Alaska Reporting Service*, Report No. 354, Juneau, Alaska, April 19, 1968.
35. 276,000 and 174,000 acres of commercial timber respectively.
36. O. Keith Hutchison, *Alaska's Forest Resource*, U. S. Department of Agriculture, Forest Service, 1967.
37. Arlon R. Tussing, *et al.*, *Alaska-Japan Economic Relations*, Institute of Social, Economic and Government Research, University of Alaska, 1968.
38. *Ibid.*
39. *Ibid.*
40. Hutchison, *op. cit.*
41. Massie, *op. cit.* For example, under effective and alternative rates in 1966, green white birch lumber could be shipped to Seattle for \$39.60 per hundred weight or \$32.86 per hundred weight. If the lumber were kiln dried, the rate would be \$27.28 and \$22.63 per hundred weight. Seattle, however, has only a limited market for birch; the biggest West Coast market is Los Angeles. Rates to Los Angeles were \$74.25 and \$67.50 for green lumber and \$51.15 and \$46.50 for dried.
42. *Ibid.*
43. Much of the information for the prediction of future growth in this region, especially concerning the expected location of activity, was provided by W. H. Johnson, Regional Forester for the U. S. Forest Service, Juneau, in a letter to Douglas N. Jones, dated June 13, 1968.
44. Thomas A. Morgan, President of Columbia Lumber Company, quoted in the Anchorage Daily New, June 12, 1968.